University of Newcastle

Cultural Maturity Modelling for Lean Organisations

By

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2010


Chesworth, B (80%), London, K & Thayaparan G (2010), ‘Diffusing cultural awareness and maturity in lean managed organisations’, Proceedings of the 26th Annual Conference of Researchers in Construction Management (ARCOM), Leeds, UK

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Abstract

There has always been in industry a need to address waste and productivity. Researchers and practitioners have approached these issues differently. Although approaching waste and productivity differently, the purpose of change has remained similar in the need for improved productivity and waste elimination. Typically waste is approached through the exploration and transferring of manufacturing based management strategies such as lean production. Despite this common goal of waste elimination and improved productivity researchers and practitioners have fallen into similar patterns of misunderstanding through the transferring of theory from manufacturing into construction, also referred to as the adoption of innovation. Misunderstanding of theory is occurs through three common factors the direction, process and practice or in other words how the process is interpreted, how the workforce responds to the innovation and why this may happen. The latter why is addressing the change that occurs culturally when innovation is diffused into the organisation. From a lean construction perspective these issues are often aligned to how the process is interpreted in research. This is representative of two approaches of lean construction either being interpreted as an engineering process of human relations approach and is about culture. Rarely are these two approaches ever viewed harmoniously. Such processed and cultural approaches of lean construction implementation tend to highlight the relationships within the organisation as aggressive, for example senior management are often described as neglecting the opinions of the workforce. Such aggressive representations of lean implementation leads the culture to be described as the workforce rejecting rather than accepting the principles of lean construction, and in some instances increasing waste. What is needed in research is a theoretical framework that identifies and explores those relationships in the organisation on a deeper level as the innovation is diffused. This introduces the conceptual framework of diffusion theory, particularly the use of theoretical constructs of communication and the social system to investigate, explore and understand lean diffusion within and across multiple organisations. In approaching cultural understanding the research considers cultural maturity over cultural change, this maturity perspective provides a framework that views the diffusion of an innovation evolutionary rather than statically. A cultural maturity model has been developed and proposed to explore the diffusion of lean and cultural maturity concurrently and aligned. Based on existing research and the conceptual framework and model the research is qualitative. A qualitative approach allows lean diffusion and cultural maturity to be explored simultaneously across multiple organisations from multiple perspectives. This constructivist approach allows a deeper and richer understanding of the process and maturing cultures and sub-cultures in the organisation. Nineteen interviews and three focus groups were conducted as part of the study, representing seven construction
organisations in Australia and the United States of America. The research proposes two research questions, with a thematic analysis used to assess and analyse the collected data. The research highlights a direct correlation between the diffusion of lean and cultural maturity, with lean to be diffused through three interconnected phases and maturity to be interrelated within four maturing phases. The research concludes by identifying a number of future research opportunities particularly relating to lean diffusion and cultural maturity.
Section 1: The Lean Problem

Chapters 1 & 2

Introduction
&
Literature Review

Chapters 1 and 2 provide an overview of the ‘lean problem’ by critically assessing and reviewing current interpretations of lean implementation and organisational construction culture, leading to an understanding of cultural maturity. These two chapters highlight an overall misunderstanding in how the process of lean implementation is approached and interpreted from a cultural perspective. The first research question is introduced at the conclusion of Chapter 2.
Chapter 1: Introduction

1.1 The Problem

Construction organisation leaders appear to be continually striving for higher efficiency from their employees. This can be viewed as a productivity problem. Improving productivity amongst the workforce often relies upon leaders implementing strategies to manage people better. The management of people is often influenced by organisational culture. Organisational culture including factors such as behaviours, values and attitudes can vary from organisation to organisation. In construction, the management of people is further challenged as organisations operate in a project environment as well as the traditional organisation environment. Project environments can differ quite markedly to the culture within an organisation as they are formed on a short term basis and relationships can be quite temporary in nature.

Currently, one of the pervading perceptions of the construction industry is that inefficient and ineffective management of people is viewed either from a physical or monetary issue rather than culturally. The efficient and effective people management is potentially one of the key causes of wasted resources in construction. There is often debate about waste in the construction industry and improved productivity.

In recent times, it appears new management strategies that deal specifically with waste have been sought. The intention of such management strategies is to cope with a fragmented and adversarial workplace with the aim of creating a collaborative workplace guided by more harmonious relations. The development of harmonious relations between organisational groups has been of keen interest in recent years, particularly when introducing new ideas into organisations, also referred to as innovation. To this end, various alternative strategies have been borrowed from other highly productive sectors, such as manufacturing. ‘Lean thinking’ is one such management strategy which has been borrowed from manufacturing and has been successful in promoting organisational efficiency.

Lean thinking is about creating value through the elimination of waste by improving productivity incorporating value and value streaming. In its simplest form, lean is about providing a way to do more with less; achieved by the delivery of a product to the needs of the customer enhanced by flow, value, value streaming, push and pull (Womack et al, 1990; Womack & Jones, 2000; 2003). Lean emerged in the manufacturing sector in the 1970s as an innovative way to revolutionise management strategies within the Japanese Toyota factory. The re-envisioning of Japanese manufacturing was brought to the world through the works
of Ohno (1974) and Shingo (1980) and later relabelled The Toyota Production System in the 1990 Womack, Jones and Roos’ book *The Machine that Changed the World*. Since the early 1990s, lean has been investigated in some form within construction (Pasquire & Connors, 2011). One of the defining moments of lean in construction has been the development of an engineering-focused planning tool Lean Last Planner (Ballard & Howell, 1995; Ballard & Howell, 1999). Lean Last Planner offers organisations with a series of tools developed specifically for the construction and engineering environments to better manage, plan and schedule construction works (Ballard & Howell, 2000). The development of the lean last planner has assisted in the claims of lean construction researchers that lean can be utilised effectively as a stabilising management tool for smaller ‘project’ organisations (Auada et al, 1998; Howell & Ballard, 2000; Ballard & Macomber, 2002; 2003; Macomber, 2004; Gehbauer, 2008). However, claims by researchers heavily highlight success of lean applications on temporary projects in isolation to the larger organisational environment (Howell & Ballard, 1999; Howell, 1999; Buch & Sander, 2005; Orr, 2005; Alves et al, 2010). This so called lean stabilisation at a project level helps to create an illusion that lean is easily transferable to and across organisational environments through relationships established within the team. Although this may occur there is no hard evidence that supports such claims.

Lean appears to create stability for management by managing employees through the development of a module that is production and process specific. The thinking behind such an approach is that the management of employees aligned to production goals and milestones will ultimately improve productivity. However, the diffusion of lean is often more complex, as organisations and the workforce are continually evolving. The approach taken by managers when introducing lean to the workforce is an important aspect to consider, as organisational instability can arise. The claim of culture researchers is that instability is impacted by the project culture of the industry, which is often described as adversarial and ad hoc (Brensen & Marshall, 2001, 2005; Cox, Ireland & Townsend, 2006). Such claims help to create an illusion that construction has an environment where the opinions, perceptions, attitudes and behaviours of the individual in the workforce are not influential in understanding organisational culture.

When researchers’ have interpreted lean implementation as a cultural construct they have tended to develop what could be termed a static model. Within this model culture is typically viewed aligned to four statistically organisational values power distance (PDI), individualism versus collectivism (IDV), masculinity versus femininity (MAS) and uncertainty avoidance (UAI). These organisational values form the basis of Hofstede’s (1983) National Culture approach. The model also encompasses long-term versus short term orientation (LTO) added
in 1991 through research by Bond (1991) and indulgence versus restraint (IVR) added by Minkov (2010). Although Hofstede’s (1983) model is still widely accepted as the way to approach organisational culture; the way organisational culture is approached has changed significantly since the 1980s due largely to the emerging of cultural dynamics (Hatch, 1993) an extension of Schein’s (1984) original defining of culture. Interpretations of culture and how culture is viewed considers the evolutionary nature of interpreting organisational culture as a transition that reflects structural, behavioural and time characteristics (Cassidy & Medsker, 2003), as reflected in Curtis et al’s (1995, 2002, 2010a, 2010b) People Capability Maturity Model (PCMM) developed at Carnegie Mellon University. The ‘maturing’ of culture is representative as the processes and sub-processes of implementation occurring as aligned to predetermined organisational milestones (Reefke, Sundaram & Ahmed, 2010). Researchers in the field of cultural maturity claim that the diffusion of new ideas is representative of a commitment by an organisation or individual to change and evolve as the organisation changes and evolves. A failure in maturity research claims exists in understanding the managerial approach and response of employees and vice versa in either accepting or rejecting the strategy of organisational evolution (i.e. the research problem).

Simplistically appropriating a cultural model for lean implementation is fraught with difficulties without understanding the structural and cultural characteristics of management and employees that give rise to new ideas (i.e. the industry problem). The use of existing manufacturing and production implementation approaches may be problematic to a model of lean culture, as the manufacturing process is often viewed in isolation, based on rates of success and failure. Further challenging the use of such approaches in construction is the project-influenced culture of the industry (Dainty et al, 2007). The project nature of the industry often creates an adversarial culture, which has not been specifically explored in current models of cultural maturity within production, manufacturing or construction. Research has tended to focus on defining the sub-cultures of the industry (Zuo & Zillante, 2006; Fox, 2007a, 2007b) as a starting point for further exploration. Although providing a basis, the defining of construction sub-cultures does not consider the differing contractual and social relationships that underpin construction organisations. These contractual and social relationships need to be understood before a model of cultural maturity can be developed for further investigation.

In the pursuit of lean implementation awareness over the last 20 years, two paths have been followed. Lean is approached as either a process guided by tool implementation or a process to control human resources. The two paths highlight a clear division in the thought process of researchers aligned to lean: the argument for and the argument against. The argument for claims that the implementation of lean leads an organisation through the implementation of
tools to become empowered and inspired to embrace and adopt the lean way of thinking (Koskela, 1992, 1994; Howell, 1999; Coffey, 2000; Ballard & Howell, 2003a, 2003b; Buch & Sander, 2005; Orr, 2005; Alves et al, 2011). The argument against claims that the implementation of lean leads the organisation through the adoption of lean principles to become dissatisfied and exploited, challenging and rejecting the lean way of thinking (Green, 1998, 1999, 2000, 2003; Dauber, 2000; Green & May, 2003; Winch, 2003a, 2003b). The division between lean construction researchers highlights the challenging nature of lean implementation in construction organisations.

It is known that lean implementation is occurring within construction organisation. Improvements in productivity and waste elimination have been widespread particularly across the Americas and Europe. Lean Last Planner and other strategic tools has been developed specifically for construction practices; however, implementation is problematic due to a lack of understanding of the tools, procedures and processes associated with lean and an organisation’s lean strategic direction. The challenges facing construction organisations and lean implementation go beyond simply implementing Lean Last Planner or strategic tools. Implementation is also about understanding, and understanding that implementation may mean a real cultural shift for the organisation and the cluster of organisations that the company works with. Lean implementation is also about changing culture and so tools are essential to the process, but one also needs to understand the culture that underpins the lean management philosophy (i.e. the research problem).

There are two approaches of lean implementation; a cultural and strategic tools approach. The two approaches have merit and answer many questions regarding lean. Yet each approach misses the relationship between lean implementation and culture. The degree, to which employees within the organisational environment culturally perceive and respond to innovation, has not been understood. Further to this is the way in which the implementation of new ideas differs and how the implementation of new ideas is approached differently across organisational environments. Different approaches may result in different organisational cultures, and this postmodern approach to understanding the ‘real world’ will ultimately be of value to the construction research community and the construction industry at large. Postmodernism refers to a

contemporary sensibility, developing since World War II, which privileges no single authority, method, or paradigm (Denzin & Lincoln, 2011: 16).

The cultural transition and evolution of organisations implementing new ideas is termed ‘cultural maturity’ (Curtis et al, 1995, 2002, 2010a, 2010b). Cultural maturity is an emerging field within the construction management discipline. Cultural maturity is the evolution,
transition and maturing of an entity when new ideas are introduced, viewed behaviourally or through targeted actions (Reefke, Sundaram & Ahmed, 2010). Less attention has been devoted to how new ideas are introduced and implemented within organisations and why employees culturally respond differently to new ideas. The holistic lens of diffusion and cultural maturity provides a theoretical and intellectual framework to this study.

Understanding how lean implementation culturally matures the construction organisation is on the agenda for many managers. Such an approach assumes that understanding the cultural dynamics of employees and employee relationships is essential in developing and rationalising implementation strategies. A cultural dynamic characteristic refers to how employees interact and change formally and informally within and outside the organisational environment, each with their own individual cultural behaviours, values and norm. It is important to understand the differences between employees and employee groups and how they respond to the implementation of new ideas by management.

The rationale for the modelling of cultural maturity for lean organisations lies in understanding how lean is implemented and the response by employees to implementation over time within the organisational environment. Understanding lean implementation aligned to cultural maturity is of relevance to construction industry organisations at both national and international levels especially as more organisations become global entities. Furthermore, modelling cultural maturity over the varying phases of implementation will assist in understanding how the diffusion of lean and cultural maturity of the organisational environment transitions.

1.2 Productivity, Waste and Culture

There has always been a relationship between productivity, waste and culture and its relevance to construction innovation. A recent Australian study into competition and productivity identified the construction industry to be in a lower percentile of innovation compared to industries such as manufacturing (ABS Productivity Commission, 2011). This is not a new issue for construction. Cole (2002) raised the issue of productivity in Australian construction in his report into corruptness and lawlessness. In highlighting this issue Cole (2002) also made a connection between productivity and culture, highlighting:

The culture of the building and construction industry has affected its efficiency, fairness and the capacity to innovate. Obviously, the breakdown in rights and lawlessness are problems in themselves. Other aspects of the culture have resulted in many inflexible practices and impediments to productivity, inappropriate behaviour, particularly by union officials, a lack of leadership among building and construction businesses and a range of national issues. Cole (2002: 214)
The reporting of productivity in the construction industry has similarly been reported internationally Latham (1994), Rethinking Construction (Egan, 1998 and 2002) in the United Kingdom and the McKinley Productivity Reports in the United States of America. These studies also highlight a connection between productivity, waste and culture that is not dissimilar to Australian reporting. Such reports highlight how low productivity impacts upon the industry through the presence of high waste levels. Table 1.1: Construction Waste outlines six causes of construction waste as identified in literature, including:

1. politics and regulations;
2. fragmented communication;
3. operational environment (productivity);
4. client-driven practice;
5. construction constraints; and
6. worker and project performance.

The identification of waste factors in Table 1.1 further highlights the challenges faced by construction organisations on a day-to-day level. Of the waste issues affecting construction, the most important is the operational environment, which is directly aligned to productivity; client-driven practice and fragmented communication are also considered important. In assessing these waste-creating factors in Table 1.1, productivity is aligned to the management of people.
## Table 1.1: Categories of Construction Waste

<table>
<thead>
<tr>
<th>Theme</th>
<th>Citation</th>
<th>Characteristics</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Politics and regulations</td>
<td>Woudhuysen &amp; Abley (2004)</td>
<td>▪ Seeks to standardise policy and practice underpinning whole of industry.</td>
<td>Is identified as problematic as the construction industry is recognised as economic entities. Waste is created through political arguments about construction, particularly as in most economies this contributes significant amounts to gross domestic product (GDP) while providing infrastructure for growth.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Seeks to regulate construction through quality controls.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Industry focused on construction quantity.</td>
<td></td>
</tr>
<tr>
<td>2. Fragmented communication</td>
<td>Cox, Townsend, Ireland (2006) Thomas &amp; Thomas (2005)</td>
<td>▪ Describes fragmentation as wasteful and detrimental to power and leverages relationships and professional markets, including materials and labour.</td>
<td>Problematic issues arise as communication structures are described as adversarial in nature. Waste is created by disintegrated project teams in supply chains. The impact of the waste is identified as project teams needing to undertake rework, trust issues and work duplication.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Seeks to provide a simple definition of the construction supply chain and sub-professions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Seeks to provide a standardised platform to understand construction supply chains.</td>
<td></td>
</tr>
<tr>
<td>3. Operational environment (productivity)</td>
<td>Egan (1998, 2002)</td>
<td>▪ Seeks to understand the external and internal factors that affect productivity.</td>
<td>Research centred on industry fragmentation and the structuring of supply chains. Waste is created through a dominance of high levels of short-term and highly differentiated demand, highly contested and smaller-scale supply markets with low entry barriers.</td>
</tr>
<tr>
<td></td>
<td>Gann &amp; Salter (1998)</td>
<td>▪ Seeks to provide standardised platform to understand productivity.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Olomolaiye et al (1998)</td>
<td>▪ Describes waste contribution through discontinuous learning, high production costs, time overruns and one-off project delivery systems.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Principe &amp; Tell (2001)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Acar et al (2005)</td>
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</tr>
<tr>
<td></td>
<td>Cox, Townsend, Ireland (2006)</td>
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<tr>
<td>4. Client-driven practice</td>
<td>Holt (1995)</td>
<td>▪ Seeks to provide a standard platform for client practice.</td>
<td>Problematic for construction as waste is created in the inability of contractors to achieve project- and business-related objectives. This is heightened by the client’s lack of knowledge of construction processes, procedures and practices.</td>
</tr>
<tr>
<td></td>
<td>Alarcon (1997)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Olomolaiye et al (1996)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cox, Townsend, Ireland (2006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Construction constraints</td>
<td>Dawood &amp; Striprasent (2004)</td>
<td>▪ Identifies major constraints impacting the industry.</td>
<td>Construction constraints are a problematic area of construction due to the creation of physical, contractual, resource and information waste.</td>
</tr>
<tr>
<td></td>
<td>Johansen &amp; Wilson (2006)</td>
<td>▪ Seeks to better understand the impact of constraints for the industry.</td>
<td></td>
</tr>
<tr>
<td>6. Worker and project performance</td>
<td>Garcia et al (2006)</td>
<td>▪ Seeks to provide a standard platform for worker and project practice.</td>
<td>Waste is managed by recognising the worker as an essential component of the process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Provide a framework in which to coordinate resources with worker performance.</td>
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</table>
As Table 1.1 highlights, current management strategies in construction are actually contributing to waste, further enhancing lower productivity levels and cultural negativity. Remaining on this path will encourage further waste and dissatisfaction across the construction industry, nationally and internationally. Construction is not the only production-centric industry that has been affected by high levels of waste; waste has also been seen as a significant barrier to management practices in other industries, including manufacturing.

Since the 1970s, manufacturing organisations addressing the presence of waste as part of the production process have turned to relational management strategies such as lean (Ohno, 1974; Shingo, 1980) as an alternative to traditional bureaucratic management. The implementation of relational management strategies are approached for their innovative capabilities of improving productivity and culture by targeting or eliminating waste (Brensen & Marshall, 2000, 2002).

1.2.1 Lean Construction

‘Lean’ is a manufacturing-influenced management philosophy. Its principles have been applied to construction through the triangulation of transformation, value and flow (Koskela, 1992, 1994; Howell, 1999) and expanded upon through the Lean Last Planner suite of tools (Howell & Ballard, 1999). Lean construction is aligned to the strategic management principles emerging within Toyota through Ohno’s (1972) Kaizen movement. In its purist form, lean can be broken down into five core management principles that incorporate value, value streaming, pull, push and perfection (Womack & Jones, 1996, 2000; Liker, 2004). Lean construction is not a new management strategy, having been investigated and implemented for the last 20 years across the United Kingdom, Europe, America and Asia. Despite wide acceptance and implementation of lean strategies there is still conjecture about how lean impacts productivity in the construction sector. The misconception of lean understanding is aligned to the implementation approach and employee response to the approach; i.e., culture.

Misconceptions of lean align to how the implementation is approached through the lean debate. Those supporting the adoption of lean view implementation statically; that is, the process is a series of steps involving systematic tool implementation across a project leading towards holistic adoption across the organisation (Alarcon, 1993; Ballard & Howell, 1995; Howell, 1998; Howell & Ballard, 1999; Coffey, 2000; Tommelein, 2003; Macomber, 2004; Buch & Sander, 2005; Orr, 2005; Alves et al, 2010). Those opposing the adoption of lean similarly view lean implementation statically; involving systematic tool implementation (Green, 1999, 2000, 2002, 2003; Winch, 2000, 2003; Green & May, 2005). The difference between how each approach is interpreted is aligned to culture: those who support lean to be
empowering for the workforce and those who don’t consider lean to be exploitative for the workforce.

Research studies on lean implementation have failed to understand the relationship between the process, productivity, waste and culture. Direct-implementation interpretations raise questions concerning the validity, value and significance of lean and the ongoing cultural implications of implementation for the organisation. Studies investigating the specific cultural implications of lean claim the organisational environment are positively impacted through more sustained and strategic partnerships, leadership opportunities and education incentives that emerge through the adoption of lean (Coffey, 2000; Buch & Sander, 2005; Orr, 2005; Alarcon et al, 2007, 2008; Alves et al, 2010). An understanding of cultural change within construction organisations when lean is adopted has also assisted in identifying the subcultures that emerge as lean is diffused (Zuo & Zillante, 2005; Arbulu & Zabelle, 2006). These cultural investigations provide a catalyst to investigate and better understand this idea of a lean organisational culture aligned to how adoption is approached and why the approach is either accepted or rejected; however, an understanding of construction organisational culture is unclear.

1.2.2 Construction Organisational Culture
The cultural environment of construction is often described as ‘complex’ (Brensen & Marshall, 2001; Brensen et al, 2005a, 2005b). Culture is said to be influenced and affected by fragmented communication, adversarial relationships and poor working conditions due to the ad hoc project-based environment and nature of the industry (Brensen & Marshal, 2001; Emmitt & Gorse, 1997, 1998, 2003, 2007, 2009; Loosemore et al, 2003; Cox et al, 2006; Dainty et al, 2007). Such descriptions suggest that the industry is culturally conflicted. Cultural confliction within the research community ultimately refers to context of construction subcultures for example, Zuo & Zillante (2005) suggests the presence of six subcultures whereas Fox (2007) describes four sub-cultures; a clear confliction. Conflicted understanding of culture also emerges when culture and cultural change is described by the research community. Typically, cultural research describes change within the project environment, not the organisational environment; those that do, describe the environment as unique and influenced by dynamic yet complex characteristics (Egbo et al, 2000; Emmitt & Gorse, 1997, 1998, 2003, 2007, 2009; Dainty et al, 2006). Characteristics are often linked to economic categorisation, with organisations described as small and medium enterprises or custom-build organisations that adapt to market fluctuations and variable rates of project opportunities (Raiden & Dainty 2004; Cox et al, 2006). Broad categorisation of the construction organisation within research suggests the culture to be continually changing and adapting to changes occurring internally and externally, i.e. undergoing a maturing (Duffy,
2010). Such constant change within the organisation could be cause for the high waste and low productivity as there is a lack standardisation in procedure and policy; this becomes problematic. To understand the culture of the construction organisation constants need to be identified and understood to provide an investigative cultural framework.

In developing an understanding of construction organisational culture, Fox (2007a) developed a framework that assists in the categorisation and description of construction culture and its sub-cultures. The framework is divided into four categories: industry, organisational, project and team. Industry culture incorporates the wider professional construction arc. Industry is culturally impacted by short-term, ad hoc, differentiated demand, and contested supply markets and low entry barriers. Corporate or organisational culture incorporates the collection of values, norms and behaviours learnt, shared and underpinned organisational management practices, controls and interaction. Project and team culture were similarly defined by Fox (2007b), incorporating loose groupings of specialist and experienced individuals; they are also impacted by pre-existing organisation or team relationships. Fox’s (2007b) defining of construction culture is significant as it aligns cultural understanding to communication, complexity and social relationships, something that had rarely been done beforehand.

Communication is often described as the thread that entwines the organisational environment (Dainty et al, 2006). Communication takes many forms within an organisation, including downward, upward, lateral, horizontal and diagonal. These may also be categorised as formal or informal (Wood et al, 2000; O’Dwyer, 2002; Dyer, 2002; Egbu et al, 2000; Emmitt & Gorse, 1997, 1998, 2003, 2007, 2009; Dainty et al, 2006). Further complicating communication within construction organisations is the intrapersonal, interpersonal, public or group, or mass process forms of communication (Taylor, et al, 1986; Kreps, 1989; Dwyer, 2002; Gorse, 2002). This is problematic as communication in construction is highly transactional, as communication is constantly occurring between the organisation and teams (Eisenberg & Goodhall, 1993; Bageuley, 1994). Poor communication between project and organisational teams is often described as contributing to the adversarial culture, fragmented communication, temporary partnerships, technical language and noise distractions of industry (Cherns & Bryant, 1984; Hill, 1995; Dainty et al, 2006). Approaching communication that is aligned to the organisational culture enables the organisation to be viewed holistically, considering the whole organisational environment, temporary partnerships and project team and group processes, with consideration to the informal (other routes) and formal nature (structured) of communication (Emmitt & Gorse, 2003). Viewing communication from a cultural perspective is particularly significant for organisational environments in achieving coordinated results, managing change, motivating employees and understanding the needs of
the workforce (Armstrong, 2001). It also allows an understanding of differing communication processes between project teams and the organisation, leading to a better understanding of the organisational culture.

The categorisation of construction culture into *industry, organisational, project* and *team* categories assists in providing an understanding of the nature of construction as well as gaining a greater understanding of the complexity of construction culture. Taking into consideration Fox’s (2007a) categorisation of culture, the thesis sits within the organisational cultural environment, with alignment to team and project cultures; although Fox’s (2007a) framework does not accommodate innovation and culture; rather, it simply provides a consideration of the cultural environment.

### 1.3 Research Problem

The research problem is guided by the alignment of innovation and culture in construction organisations. The research will involve the investigation of lean adoption aligned to organisational culture and the transitioning of the organisational culture as adoption occurs. This approach enables further questioning of how and why organisations culturally mature. It is within this intellectual environment that this thesis rests.

The research problem is concerned with two ideas: lean implementation and culture. The research problem is further guided by a number of themes that align and tie the two ideas of the research problem together. The two research ideas involve an understanding of the organisational environment, the implementation process and cultural maturity. The first research idea is lean implementation. Lean implementation concerns the investigation in and describing of supporting lean mechanisms. It is suspected that organisational management employs a variety of strategies that support the adoption of lean into the organisation; the sole purpose of strategising is to guide and persuade employees to accept lean decisions. The manner in which the implementation process is approached is considered to be organisational best practice. Three central themes tie this research idea to the problem and to second idea, that of culture, maturity and lean. The first research idea emerges as investigations of lean adoption specify the adoption from a project environment perspective, with conclusions that are site-specific and not transferrable into organisations. The reporting of the adoption is also systematic and does not consider variances in acceptance and rejection that influence rates of adoption. The way implementation is approached by management and is responded to by the workforce is an important relationship that is yet to be understood in research, particularly the strategies that assist and support this relationship. Identification of adoption strategies aligns to culture through understanding the response and reaction to strategies.
The second research idea is organisational cultural maturity or, more specifically, the aligning of lean implementation and the maturing of organisational culture. It is suspected that each organisation approaches the adoption of lean differently as the management and culture of organisations is not similar, with the approach considered to be best practice. This ideal also develops to an understanding of how organisational culture evolves and matures. The research idea has emerged as the manner in which culture (when change occurs) is described statically with a definitive change noted in the organisation culture. This approach assumes that once adoption takes place, and the culture changes, that culture remains consistent until the next change. These approaches towards organisational culture are cause for concern. Considering the organisational culture as a maturing entity enables variables that emerge as part of its adoption to be assessed. Maturity-specific literature similarly describes a static and staged process, with the completion of specific milestones representative of stage or phase completions. However, some cultural maturity approaches do consider internal and external environments as influencing factors towards the maturity process. Understanding the maturing of the organisation through the adoption of lean allows for the differing attitudes, behaviours, perceptions and values of employees to be considered. Most notably, the purpose of this is to acknowledge that lean implementation is and can be experienced as ‘culturally empowering’ (positive) and ‘culturally exploitative’ (negative), with the maturing to be perceived as culturally unique across organisations.

The research problem is about aligning lean implementation and cultural maturity in construction organisations. The alignment of lean and culture assumes that the research fits within the discipline of management, specifically construction management with some sociological notions particularly in understanding culture with consideration towards individual attitudes, behaviours and perceptions. Therefore, sociological considerations guide the theoretical development of the theory. The research is about a process and about how lean is approached and implemented in construction organisations; investigating lean innovation from a cultural perspective. Understanding is guided by the observations of employees in construction organisations implementing lean; as a snapshot in time. Meaning steps of the process will not be specifically identified, rather organisational personnel will reflect on the process, with these organisational reflections to be used to describe the phases of implementation. As such, the theoretical framework needs to reflect the relationship between the innovation and cultural responses of the workforce in the implementing environment. Rogers’ (1969) diffusion theory provides a theoretical framework that explores the diffusion of innovation through social system units, highlighting a relationship between the innovation, process and social system; further linking innovation to processes and social systems. The
Theoretical framework and diffusion theory

The theory provides the relevant theoretical framework to investigate the research problem and is now explored in further detail in relation to lean innovation.

This approach assumes that lean can be considered a form of innovation as it is seen as a new idea. Rogers (1969) developed diffusion theory for such a purpose, investigating how new ideas are adopted within social systems with consideration to a range of factors, such as time and communication. At its essence the theory is about social systems and the relationships that combine and assist in diffusing new idea. At its core the basic principles form an investigative framework that fits around the issues and align to the methodological framework of the research.

Theory is an essential component of this research investigation. Firstly, it assists in supporting the development of an understanding of lean implementation and cultural maturity in construction organisations. Secondly, it assists in supporting process mechanism identification and purpose. The purpose of theory for this research is to provide a platform through which to enable the exploration of the two research ideas. Of particular importance in the development of theory is an understanding the organisation-specific relationship/s present between lean implementation and cultural maturity. The use of theory as part of the research investigation emerged as most of the literature detailing in lean implementation and cultural maturity focused solely on non-theoretical and deductive approaches, which advocate static and end-result cultural interpretations. As a theoretical foundation the research investigation is guided by Rogers’ diffusion theory. Diffusion theory has been selected as it provides the essential theoretical concepts and principles to guide the investigative context and direction of the research.

1.4 Research Questions & Objectives

The research investigation is guided by one primary aim. The primary aim underpins the greater research problem. The research’s primary aim is:

To develop a rich understanding of cultural maturity in lean organisations diffused through time.

From this aim, two research questions are posed to explore the research objectives of the study.

Objective 1: Lean Implementation

To identify the drivers that supports the organisation in diffusing lean

Typically in the past researchers have identified specific strategies in isolation as drivers of lean implementation in project environments such as leadership (Orr,
partnerships (Buch & Sander, 2005), theory (Coffey, 2000), education (Alves et al, 2010) and subcultures (Zuo & Zillante, 2006), but those that apply to the organisational environment have yet to be explored. The identification of drivers and how organisational management utilised these is warranted for investigation as they assist in better understanding lean implementation and the evolution of cultural maturity.

**Objective 2: Lean Implementation and Cultural Maturity**

**To identify, explore and align lean implementation and the evolving cultural maturity within construction organisations**

Researchers have typically investigated lean implementation and culture change presenting results that are representative of empowerment or exploitation; with the representation dependent highly on existing attitudes of lean. The challenge of this is that an either/or interpretation of change is presented without reflection on the possibilities that both empowerment and exploitation could be occurring as part of the implementation within the organisation’s cultural environment. Ultimately ignoring the cause and effect of change; in this case lean. The relationship between the cause and effect of lean implementation on the cultural environment of the organisation is complex and requires a detailed analysis if lean implementation and cultural maturity is to be understood.

The research questions forming the investigation are:

**What are the drivers that support an organisation’s lean implementation journey?**

It is acknowledged that ‘what’ type research questioning typically is not reflective of the case study method as discussed by Yin (1999, 2003, 2005a, 2005b, 2011), Stake (2005) and Flyvbjerg (2009, 2011). Creswell (2009) proposes that the qualitative approach to research is

…about the establishment of a phenomenon from the viewpoint of the participants.

(Creswell, 2009:22).

As such the dominance of open-ended and diverse ways of structuring questions in the interview data collection technique enables the researcher to investigate a what type research question to identify key drivers of the strategy guiding lean implementation.

and:
How does the diffusion of lean in construction organisations influence cultural maturity?

As the world restructures from recent economic turmoil, organisations are now more keenly aware of waste and the need to improve productivity through the better management of people. The way people are managed and the cultural impact of changing management styles is important for organisations to consider. This thesis explores the implementation of lean aligned to cultural maturity in construction organisations. This field is of concern to all construction organisations who are considering implementing lean or who wish to be more competitive in the industry through the implementation of new ideas. The issue now is consideration of a strategy to investigate the research problem.

1.5 Research Strategy

The research strategy is framed according to three main parts including the ontology, epistemology and methodology. The strategy guiding the inquiry relies upon two main elements:

1. Identification of strategies that support the implementation of lean in construction organisations.

2. Description of cultural maturity of organisations undergoing lean implementation.

The challenge of this research problem is to identify real world practices and to explore the culture of organisations. Understanding culture is generally constructed from multiple perspectives and therefore in this study lean cultural maturity is described from a constructivist perspective. The constructivist perspective encompasses the interpretation of social phenomenon from varying perspectives as a means to understand the perceptions and knowledge of the social phenomenon (Lincoln & Guba, 2010). Interpreting lean cultural maturity from a constructivist perspective allows for a greater understanding of how the diffusion of an innovation, that is lean construction, is approached and embraced within construction organisations.

Since the research study lies largely in the constructivist inquiry paradigm; qualitative and interpretative research techniques are considered appropriate. The epistemology is empirical, as it is important to explore the concept of lean cultural maturity through real-world observations. The study is thus grounded in empirical observations with the approach validated and derived by real experiences of those involved in the process of lean diffusion. The study is positioned as an inductive inquiry. The descriptive nature of the research problem in the thesis – namely, understanding ‘how’ and ‘why’ organisational cultures mature when lean is diffused – implies the following:
• The investigator, can observe and interpret the process of diffusion while being detached from the actual implementation.

• To observe the real world, the investigator needs to observe the diffusion in real time.

The research is guided by an understanding of culture that allows multiple reactions and responses to the implementation occurring continuously and at any one time. As such a clear mapping of organisations in the study is not necessary according to Martin (2002). This is further supported by a number of existing studies – including Barrett & Sutrisina (2009), Gajendran et al (2011) and Green (2011), these studies have already mapped to some extent construction organisation culture through change management. The mapping of organisational culture is a common approach in sociology; it provides a better understanding of management styling and organisational culture assessing readiness of the organisation when change occurs (Umit et al, 2006). The research will map the processes used by organisational management that support lean implementation. This is similar to the approach undertaken by Umit et al (2006) in their research Dynamics of Performance Management and Organisation Culture who used mapping to assess the management styles that organisations use to evolve as maturity of the performance measurement system and organisational culture matures. The purpose of this study is to begin to build a pluralistic or composite view of lean implementation and cultural maturity across organisations.

The methodology is qualitative. Qualitative studies contextualise, explain, evaluate and generate knowledge of the phenomenon in a social context (Gray, 2004). Data collection involved 7 case studies which included 19 in-depth interviews and 3 focus groups. Case studies have been widely used in lean implementation research including Orr (2005), Buch & Sander (2005), Pavez & Alarcon (2009, 2010) and Alves et al, (2010). Sutrisina & Barrett (2007) suggest a case study method is considered reliable in capturing rich information, while allowing investigators to retain holistic and meaningful characteristics of real-life events. The people who could inform this study most were those involved in lean implementation. The criteria for selection was based on active involvement in lean groups such as the Lean Construction Institute and the criteria for of the interviewees was involvement in the lean decision, active in the project team and those identified as organisational champions. Therefore there were 6 senior managers, 7 middle managers, 8 champion and innovators and 8 project team members. The technique for data analysis included very traditional qualitative techniques of thematic analysis and coding.

1.6 Research Limitations

The findings reported in this study are limited to construction organisations that are currently
undergoing varying stages of lean implementation in Australia and the United States. The qualitative approach of the study prohibited further explorations of lean implementation in Europe. Data for the study was collected via open-ended interviews and group interviews of like-minded individuals (homophilic groupings). A large sample of American construction organisations were approached to participate with 5 participating; with participants per organisation ranging from one to nine. A smaller sample of Australian construction organisations were approached to participate with 2 participating; with participants per organisation ranging from four to six. Whilst the response rates of participating organisations was good the number of participants per organisation do not represent well the entire population of the organisation. The findings thus necessarily reflect varying and emerging generalisations of lean implementation and cultural maturity within each organisation with viewpoints highlighting those perceptions of individuals in middle management.

1.7 Thesis Outline

Figure 1.1 Thesis Outline (below) highlights the overall structure and organisation of the thesis. The thesis is divided into seven chapters, with descriptions as follows.

Section 1: The Lean Problem

Chapter 1 describes the research problem of lean implementation and cultural maturity in construction organisations. The critical discussion of the research indicates the placement of the investigation aligned with existing lean construction and construction culture research. Describing the research problem assists in placing the research aligned with and highlighting theoretical, ontological, epistemological and methodological concerns. This discussion of these concerns supports the introduction of the research questions, research aims and objectives, research strategy and structure of the thesis.

Chapter 2 presents the review of the literature to support the description of the research problem. The review is of literature from three areas: lean construction; construction organisations; and construction culture. The literature review also highlights current research investigations and perceptions correlating this into a defined topical area and research problem.

Section 2: Understanding the Lean Problem & Model Development

Chapter 3 contains a more in-depth literature review of the theoretical framework of diffusion theory. The chapter develops a conceptual framework for the research aligned with diffusion theory and a critique of cultural maturity models. The conceptual model is developed through the synthesis of the principles of lean innovation, cultural maturity and
diffusion theory. The principle components of the model include knowledge, communication, and processes of implementation, time continuum, acceptance and rejection.

Each construction organisation undergoes a lean innovation transformation, approaching implementation strategically but similarly with cultural expectations and experiences that are unique. The diffusion of the lean innovation occurs over a time continuum that is representative of the implementation holistically. The workforce forms a response to managerial decisions that have particular cultural implications for the organisation and the process. The impact of these responses further influences managerial decisions associated with the lean innovation and need to be constantly assessed to ensure a particular cultural acceptance of the innovation. The informing and reinforming of the process by the cultural responses of the workforce results in the maturing of organisational culture as the innovation is diffused.

**Chapter 4** outlines the research strategy to explore the cultural maturity model for lean innovation diffusion introduced in Chapter 3. The overall research strategy and design is structured to capture, collect and analyse data to describe the real-world problem of cultural maturity in lean organisations is described. The method of data collection and analysis relies on a constructivist ontological stance and an inductive epistemology. The research methodology utilises qualitative and thematic analysis techniques, within the construction organisation data type.

**Section 3: Results & Discussion**

**Chapter 5** describes the results of the interviews and focus groups forming the seven research case studies and, in doing so, highlights the diffusion of lean and identified supporting process drivers. A qualitative data display is used to describe the process through the reflections of the interviewees across the organisations. Also included in this chapter is a cross-case analysis which further draws and brings together the two research ideas forming the research problem.

**Chapter 6** expands on the conceptual model, drawing upon the results to answer the two posed research questions. This chapter highlights the main conclusions of the research and where the research fits within the context of the research strategy, problem and theory contribution in lean diffusion and cultural maturity in construction organisations.

**Section 4: Future Research**

**Chapter 7** describes and reiterates the main conclusions of the research, the limitations and the suggestions for future research within the research area.
Figure 1.1: Thesis Outline
Chapter 2 The Rationale for Lean Culture Modelling

2.1 Introduction

This chapter presents a review of literature related to lean construction, construction organisation environments and construction culture. The purpose of the chapter is to provide an overall view of the current theories and approaches within these focus areas.

The chapter begins by addressing the overarching research area of lean construction – including understanding, awareness, applications and implementation – before outlining the issues and problems that challenge this area. Of particular importance is a description of the varying perceptions, attitudes and beliefs associated with lean implementation in construction organisations presented in the lean construction community. This introduces the concept of culture.

Construction culture is then described. Theory, methods and models are reviewed and analysed that highlight perceptions of cultural understanding in construction research, specifically related to change management. This discussion introduces the concept cultural discourse that largely underpins construction research into change management, and the nature of change. Establishing these foundations is important to further understand how and why an organisations’ culture develops uniquely when lean is implemented. The review of culture research alludes to the notion of organic transitions of construction organisations when lean is implemented, an idea that is discussed in detail in Chapter 3: Cultural Maturity Model for Lean Innovation Diffusion. The discussion of culture further forms the basis of methodological enquiry in Chapter 4: Research Methodology.

The chapter concludes with a summary of the key problems identified through a critique of the literature, which guides the discussion in Chapter 3: Cultural Maturity Model for Lean Innovation Diffusion. This section highlights two research gaps: the limited understanding of cultural matters in construction organisational environments when lean is implemented; and the limited understanding of how the organisation is guided and encouraged to adopt the lean implementation. The two research gaps contribute to the preliminary notion of cultural maturity.

2.2 Literature Review Structure

The literature review is divided into three sections; representative of two bodies of theory. Lean construction and construction culture are to be reviewed and critiqued from the perspective of construction organisations; specifically from the perspective of change management. Figure 2.1 Research Literature Framework groups the main themes emerging
within the two bodies of theory and the positioning of the research to the organisation perspective. The review of the literature assists in the identification of a research gap for this study.

Eight themes are explored in the literature review (refer to Figure 2.1). The themes were identified in lean construction and construction culture research as dominate and therefore guide the analysis and critique of this literature review. The eight themes are:

- **Lean Construction**
  - Theory
  - Implementation
  - Organisation
  - Culture
- **Construction Culture**
  - Communication
  - Change
  - Empowerment
  - Exploitation.

The research is therefore theoretical positioned in construction management theory specifically lean construction; exploring the lean implementation process from a cultural perspective. Lean implementation and culture are viewed from a perspective of implementation and cultural identity within construction organisations. The review indicated that there was a need to view lean implementation from multiple perspectives to better comprehend culture when change occurs.
2.3 Lean Terminology

The following words are predominately featured throughout the literature review. For the purpose of the research and to enable a flow and contextualisation of ideas the terms are described as follows:

1. Lean Organisation: An organisation that identifies itself as implementing lean principles
2. Lean Culture: The culture of an organisation implementing lean
3. Lean Thinking: The principles and ideas of continuous improvement as developed by the managerial ideals of Ohno (1974) and Shingo (1984, 1988) and introduced by Womack et al, (1990)
5. Collaboration: Integration of organisational groups through the alignment of
communication, trust and loyalty (Dainty et al, 2006)

6. Action Learning: A prominent approach used by the lean community to understand lean implementation

2.4 Lean Construction

This section of the literature review draws upon lean research and literature. The purpose of the review is to develop an understanding of lean implementation in construction organisations in the research community; not to define lean. The review of literature will lead to the development of the first research question. The section seeks to further understand the components that form lean construction.

2.4.1 Lean Construction Origin

The term lean emerged in the 1990’s as a means to describe the re-envisioning of the Japanese manufacturing sector brought about through innovation at Toyota that occurred in the 1970’s (Hines et al, 2004). In its simplest form lean is referred to the adoption of waste-eliminating principles and management procedures as a means of improving an organisation’s productivity and output (Womack & Jones, 1996, 2000; Howell, 1998; Ballard & Howell, 1999; Green, 1999; Chesworth et al, 2010, 2011). The basis of lean thinking emerged in the 1970s through the evolutionary management ideas developed by Ohno (1974) as part of change management in Toyota. This change was first coined in the Toyota Production System and was guided by 14 principles of management (Liker, 1994); this went on to become Lean Thinking (Womack & Jones, 1996, 2000, 2003) with more specific references to industries such as production, manufacturing and construction as interest and research increased. The basis of thinking lean is concerned with five basic principles of management involving flow, value, the value stream, pull and perfection. As a result over the early years lean thinking and the Toyota Production System terminology was interchangeable in describing principles, processes and tools however as lean became more prominent scholarly research made distinct differences between terminologies. Although it is not uncommon to see researchers still interchange lean thinking and the Toyota Production System (Spear and Bowen, 2009; Rajenthirakumar & Shankar, 2011; Hasle et al, 2012).

Hines et al (2004) and more recently Stone (2012) have both reviewed lean literature over its history using contemporary thinking to understand core knowledge; highlighting voids in both scholarly and industry. In their review of contemporary lean thinking Hines et al (2004) state historically the need to re-envision manufacturing during the 1970’s within Toyota was due to a scarcity of resources, increased domestic competition, increased presence of new Just-In-Time (JIT) deliverable, customer satisfaction, kanban method of pull production and employee satisfaction (Ohno, 1974, 1988; Shingo, 1981, 1988; Monden, 1983; Shingo and
Dillon, 1989). The purpose of this re-envisioned management approach was the elimination of waste through tactical production flows represented as an alternative model to capital-intense mass production (Ohno, 1974, 1988). Stone (2012) refers to this early stage of lean development as the discovery phase; the period between 1970 and 1990. It was Womack and Jones’ publication *The Machine that Changed the World* that brought prominence to lean and the transition of lean to the dissemination phase; the period between 1991 – 1996 (Stone, 2012). During this period Womack and Jones (1990) presented lean as five basic concepts; flow, value, value streaming, pull and production were used to describe the manufacturing principles in use over the last 100 years by Toyota (Baines et al, 2006; Elimiliani, 2006; Holweg, 2007; Stone, 2012) having been re-articulated on numerous occasions (Liker, 2004; Lander and Liker, 2007). Following on Stone (2012) maps the quickcession between the dissemination phase and implementation phase (1997 – 2000) again being driven by empirical work by Womack and Jones (1996) this time in their book *Lean Thinking*, which has served the basis for lean change management studies throughout organisations and enterprises, both quantitatively and qualitatively (Kippenberger, 1997; Storch and Lim, 1999; Detty and Yingling, 2000; Lewis, 2000; Hines and Taylor, 2000; Yingling et al, 2000). According to Stone (2012) much of the research during this period of lean was more about building upon existing knowledge and connecting aspects of lean to organisational theory (Niepce and Mollerman, 1998; Hummels and De Leede, 2000). Between 2001 and 2009 lean is representative of the Enterprise Phase (2001 – 2005) and Performance Phase (2006 – 2009), according to Stone (2012) these phases in the development of lean are representative of a change in literature to consider other enterprise areas such as marketing, service, product development and culture (Holweg and Pil, 2001; Hyer and Weermerlov, 2002; Mann, 2002; Crute et al, 2003; Holton, 2003; Salaheldin, 2003; Comm and Mathaisel, 2005). As well as performance based through quality, cost, delivery and safety (Cumbo et al, 2006; Doolen et al, 2006; Meade et al, 2006; Wan and Chen, 2008).

Lean construction has followed a similar pattern of development as proposed by Stone (2012); although lean construction development has occurred more rapidly. The concept of ‘lean construction’ was first adopted from lean production knowledge in manufacturing (Alarcon, 1997); although investigations of lean within construction had been undertaken since the early 1990’s (Alarcon, 1992; Koskela, 1992). Lean construction at its core has been approached within the research community from three different perspectives:

- Lean as a theoretical foundation;
- Lean as a management philosophy;
- Lean as a strategic tool.
Philosophical principles and theoretical concepts of lean in construction are deeply rooted in Koskela’s (1992) seminal paper into a new production philosophy for construction. Although viewing lean philosophically has been present since the early writings of Ohno (1974) and his re-envisioning of the supply chain and its structure. A trend that was carried through into construction London (2005) in her PhD viewed management aligned to the supply chain of the organisation, particularly the long- and short-term relationships that are present in the industry. However, this idea is complicated as in early writings both lean production and the Toyota Production System were interchangeable. However as lean communities have grown so too has knowledge on the basic lean concepts and as such the interchange-ability of Toyota Production System and lean have become separate concepts.

As lean became more prominent Kokela’s (2000) explored lean theoretically through the concepts of transformation, value and flow. Central to Koskela’s (2000, 2001, 2004, 2011) theory is the development of a coherent thought process designed to view construction similarly to production, i.e. inputs are linked to production that are then linked to outputs. Others in the field who similarly view lean theoretically include Howell (2000) and Bertleson (2005) who further propose that central to transformation, value and flow is management-planning, execution and control.

The third representative of lean construction is that of a strategy; typically the implementation of tools (Howell, 1998; Howell & Ballard, 1999; Green, 1999, 2000; Tommelien, 2004). This third interpretation of lean understanding is representative of the problematic nature in academia discussing successful and unsuccessful implementation; a trend that is continuing. It is therefore essential for this idea to form the basis of this research. A recent study outlining the past 40 years of lean research; Stone (2012) identifies transferability as a continuing issue in lean adoption; due mainly to concepts being loosely defined the use of unnecessary jargon and the resulting confusion of specific contexts. Furthermore, Stone (2012) suggests it’s the ideology of lean in its origins that causes such confusion.

2.4.2 Lean Construction Definition

Lean implementation has occurred widely across the construction industry, particularly in the United States, Asia, the United Kingdom and Europe, with the sole purpose to improve inefficient and ineffective practices; from this, a number of lean construction definitions have emerged. Lean construction is difficult to define holistically as research aims and objectives typically dictate awareness of the concept; meaning lean is interpreted different ways by different people. A trend that also occurs in manufacturing and was researched by (Samuel, 2008) who likened this to interpretative viability (Ortman, 1995) who argued that interpretive viability was necessary for an innovation like lean to gain wide acceptance for two reasons:
To be applicable in varying situations (we now see lean in all sorts of environments beyond its origins in auto manufacture)

To gain acceptance from the different parties involved in the change process

Samuel (2008) further debates that although lean is difficult to define, it is teleological; in which it refers to something we aspire to i.e. an end state. Within the lean construction community there is still a desire to present a definitive definition of lean.

Pasquire and Connor (2011) in their paper *Where does the Theory Informing the International Group for Lean Construction Come From?* undertook a review of existing lean construction theory to date to test inadequacies in theory. Within the lean construction community there has been much debate over a global definition of lean construction; until 2006 there was no explicit global definition of lean construction. Jorgensen (2006), in his PhD, identified this to be the result of an absence of consensus of a common definition of ‘lean production’. In his research Jorgensen (2006) identified that the defining of lean production is not to blame for a lack of consensus of lean construction understanding; rather, it is how the principles of lean are integrated within the construction management discipline. He suggested that to understand the concepts of lean, there has to be discussion between lean production and lean construction. This is to be done knowing that this research is not about defining lean but rather about exploring differing perceptions of lean construction within the research community as what occurs in industry practice. Although Pasquire and Connor (2011) suggests the inward defining of lean within the construction community could be masking “lack of progressive development” however the study was dominant in theory development and did not consider other approaches of lean construction; as presented here.

Lean construction has been broadly defined across five themes over the last 20 years: theory, design, delivery, management and the cultural environment. Each theme is further defined into sub-themes representative of more specific topics such as supply chain management, people and change, production planning and control. Koskela (1992), in his earlier research, attempted to understand lean construction in its entirety, incorporating philosophical considerations. However, most research explores lean construction exploring specific construction issues and the application of lean principles to improve productivity aligned to waste (Melles, 1994; Seymour, 1996, 1999; Vrijhoef & Koskela, 1999, 2000, 2001; Koskela, 2001; Picchi, 2001; Koskela, 2004; Koskela & Kaagioglou, 2005). Such direct interpretation of lean implementation in construction has resulted in lean to be defined as either a theory, a strategy or management philosophy. Representations of these approaches are now considered.
The defining of lean construction first emerged in the early 1990’s through Koskela’s seminal work *Application of the New Production Philosophy to Construction*. The definition encompassed many of the ideals of early lean thinking, waste elimination, productivity improvement and opening up a new field within construction management theory.

Improve and maximise value while reducing or to an extent minimise waste and associated project and organisation costs within the value system. (Koskela, 1992)

In particular Koskela (1992) highlights the financial and cost benefits associated with the elimination of waste in construction; this directly links to performance phase of lean as presented by Stone (2012). Koskela (1992, 1999, 2001, 2003, 2004, 2005, 2006) through-out his academic career has approached lean as a theory, since 2000 this has predominately described through the concepts of transformation, value and flow. As Koskela’s (2000) defining of lean through TFV theory developed so too did the understanding of lean as an innovation and the presentation of innovative ideas for the American Construction Industry a trend supported by Davey (2003) and Vrijhoef (2003). One such approach was presented in *The TFV Theory of Production* (Koskela, 2000) and again by Bertelsn & Koskela (2002) regarding the benefits of fabrication and delivery of prefabricated structures just in time, and the flow-on for site safety and on-site man hours. Central to this approach was the viewing of construction as a production firm (Koskela et al, 2007) this shows a clear transition between theory and strategy. Although highlighting some benefit towards organisational costs, Koskela’s works (1992, 1999, 2000, 2001, 2003, 2004, 2005, 2006) do not highlight how the implementation impacts the organisation, particularly culturally. A trend that occurs for many researchers who reference Koskela’s (1992) seminal work, Pasquire and Connor (2011) identified 55 citations of this work in the lean construction community and 455 citations of the work on Google Scholar.

As lean construction became more prominent and transitioned through early discovery and dissemination phases so too did lean understanding; transitioning between lean theory and lean strategizing. The second lean perspective was raised by Bender (1999), who viewed lean implementation within the organisation as a strategy, in this example through design. Bender’s (1999) focus was more cultural and highlighted considerations towards knowledge, operations and relationships that are present in the organisation, describing lean implementation as:

A more or less coherent perspective vision of organisational design ... They can be seen as codified bodies of knowledge on how to organise, and as such they figure prominently in business curricula as prescriptive ideals to be followed. (Bender, 1999)
Bender’s (1999) understanding highlighted a need to consider the cultural impact of lean implementation, particularly within the organisation. Further to this, the defining of organisational design suggested that lean implementation can occur across multiple platforms within the one business entity; that is, a team, a project, an organisation. This approach is common in research that is inclined towards workforce adoption (Bender, 1999; Green, 2000; Buch & Sander, 2005; Green & May, 2005; Orr, 2005; Alves et al, 2011). One sector not addressed in Bender’s (1999) definition of lean is industry; this third perspective has been addressed in a number of significant industry reports including Latham (1994) and Egan (1998, 2002). These industry specific reports are representative of viewing lean construction as a management philosophy. Although, it is interesting to note that Koskela (1992) first presented lean under the term “new production philosophy” that referred to:

…an evolving set of methodologies, techniques and tools, the genesis of which was in the Japanese JIT and TQC efforts in car manufacturing. Several alternative names are presently used to refer to this philosophy: lean production, JIT/TQC, world class manufacturing, time based competition. (Koskela, 1992: iv)

Egan (1998), in his *Rethinking Construction* review of productivity in the British Construction Industry, was the first to identify lean thinking as an alternate management philosophy to improve construction productivity. In this report Egan said:

Lean thinking presents a powerful and coherent synthesis of the most effective techniques for eliminating waste and delivering significant sustained improvements in efficiency and quality. (Egan, 1998: 25)

Further highlighting that:

Lean describes the core principles underlying a system that can also be applied to every other business activity – from designing new products and working with suppliers to processing orders from customers. (Egan, 1998: 23)

The Egan report provided a catalyst for the industry to improve productivity through the implementation of lean.

In construction the approach to gaining a lean understanding is to approach lean typically as representative of the study or field. That is, production studies define lean aligned to costs through productivity and waste (as highlighted in Koskela’s [1992] original definition) or cultural studies to investigate a singular strategy or tool for example leadership (Orr, 2005) or subcontractor relationships (Buch and Sander, 2005). Jorgensen’s (2006) phd study contextualises the approach to lean research has largely and broadly defined lean construction across five specific themes:
1. The lean philosophy and its application to the built environment.

2. Production planning, control and management.

3. Production system design and construction project design.

4. Design management.

5. Implementation.

Jorgensen does note the defining of lean is problematic as the themes forming lean construction do overlap and further complicate awareness; he suggested in his research for further classification of the themes to be undertaken.

Table 2.1 Lean Construction Definitions addresses common lean implementation definitions in lean literature; each definition is described, with theoretical categorisation and productivity characteristics identified. The purpose of the table is to gain a deeper understanding of lean research and the failures of this research in understanding lean thinking in construction. The other purpose of the table is to understand the direct orientation and application of lean construction. Identifying theory overlaps and emerging complications in existing research is important as this guides the research conceptualisation.

Two trends identified in Table 2.1 that influence lean thinking in construction are either viewed as:

1. A fundamental rationality of lean implementation and its strategic importance.

2. The management of people, waste reduction and productivity improvement.

Both trends present a similar understanding of the lean purpose, that lean implementation will ultimately lead to the elimination of waste and non-value-adding activities through productivity improvement (Koskela, 1992; Egan, 1998; Howell, 1999; Ballard, 2000). The two trends are supported by early research that approached lean implementation through the use of tools that advocated improved control of the construction process, particularly costs and scheduling (Howell, 1999; Pavez et al, 2005). As lean became more prominent, research also began to highlight an awareness of culture through implementation influencing the workforce to become culturally empowered (Coffey, 2000; Buch & Sander, 2005; Orr, 2005, Zuo & Zillante, 2006; Alves et al, 2010) or culturally exploited (Green, 1999, 2000, 2002; Green & May, 2005).
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Lean Construction Theory</th>
<th>Key Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
<td><strong>Lean Construction Theory</strong></td>
<td><em>Koskela, Bertelsen, Howell, Ballard</em></td>
</tr>
<tr>
<td>Author</td>
<td>Description</td>
<td>Characteristics</td>
<td></td>
</tr>
<tr>
<td><strong>Ballard</strong></td>
<td>Lean</td>
<td>The approach of lean production and lean thinking adapted and applied to construction, with special emphasis on eliminating waste.</td>
<td>- Identified aspects of the lean last planner system.</td>
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<tr>
<td>2000</td>
<td></td>
<td></td>
<td>- Construction production focus.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Can fall into the delivery theme and sub-themes.</td>
</tr>
<tr>
<td><strong>CIB</strong></td>
<td>Lean principles</td>
<td>Lean construction is discussed as consisting of a number of lean construction principles that are considered the most important to lean.</td>
<td>- Reduce output variability.</td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td>- Improve flow reliability.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Symbiotic relationships.</td>
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<td></td>
<td></td>
<td></td>
<td>- Reduce cycle times.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Simplify work methods.</td>
</tr>
<tr>
<td><strong>Thomas et al</strong></td>
<td>Lean</td>
<td>'Lean construction refers to the application of lean principles to construction. Lean production is an encapsulation of recent production management developments in manufacturing' (p. 144).</td>
<td>- Productivity through production management and control.</td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td>- Can fall into the delivery theme and sub-themes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Highly criticised definition and understanding.</td>
</tr>
<tr>
<td><strong>Construction Industry Institute (CII)</strong></td>
<td>Lean</td>
<td>'Lean construction is the continuous process of eliminating waste, meeting or exceeding all customer requirements, focusing on the entire value stream and pursuing perfection in the execution of a constructed project’ (p. 5).</td>
<td>- Productivity paramount issues.</td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td>- Can fall into the delivery theme and sub-themes.</td>
</tr>
<tr>
<td><strong>Winch</strong></td>
<td>Lean</td>
<td>Lean construction is approached as being represented on the theoretical level by Koskela’s transformation/flow/value theory, and on an applied level through practical tools as the Last Planner System (Ballard &amp; Howell, 1996) and the Lean Project Delivery System (Ballard et al, 2002)</td>
<td>- Economic-based approach to construction project management.</td>
</tr>
</tbody>
</table>
### Table 2.1: Lean Construction Definitions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Implementation &amp; Performance Management</th>
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<tbody>
<tr>
<td>General</td>
<td>Implementation &amp; Performance Management</td>
<td>Key Authors</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Koskela, Bertelsen, Howell, Ballard</em></td>
</tr>
<tr>
<td>Author</td>
<td>Description</td>
<td>Characteristics</td>
</tr>
<tr>
<td>Howell</td>
<td>Identification of productivity based ideas and goals of lean construction and people management.</td>
<td>- Highlights importance of production ‘physics’ in the process.</td>
</tr>
<tr>
<td></td>
<td>Lean is a mechanism that better achieves and meets customer needs through the utilisation of finance, equipment, labour control and construction physics (overall analysis).</td>
<td>- Development of teamwork and willingness to shift burdens along the supply chain.</td>
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<td></td>
<td></td>
<td>- Bring flow of work and production under control.</td>
</tr>
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<td></td>
<td></td>
<td>- Can fall in the delivery theme and sub-themes of theory.</td>
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<tr>
<td>Seymour</td>
<td>Production system</td>
<td>- Proposes an ethnographic approach to lean understanding.</td>
</tr>
<tr>
<td></td>
<td>Lean construction is a production system for dynamic projects where a ‘key technique for lean construction is the lean last planner system’.</td>
<td>- Tries to understand culture.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Can fall in the delivery theme and sub-themes of theory.</td>
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</table>

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<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Production Planning &amp; Control</th>
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</thead>
<tbody>
<tr>
<td>Delivery</td>
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<td>Key Authors</td>
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<tr>
<td></td>
<td></td>
<td><em>Formoso, Marosszeky, Abdelhamid</em></td>
</tr>
<tr>
<td>Author</td>
<td>Approach &amp; Description</td>
<td>Characteristics</td>
</tr>
<tr>
<td>Koskela (A)</td>
<td>Production costs, time and value</td>
<td>- Early definition.</td>
</tr>
<tr>
<td>1992</td>
<td>Koskela suggests the targeting of construction production consists of conversions and flows, there are value-adding and non-value-adding activities.</td>
<td>- Can fall into the theory theme and sub-themes of theory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Elimination or suppression of value adding activities.</td>
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<tr>
<td></td>
<td></td>
<td>- Increase of efficiency of value adding activities.</td>
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<td></td>
<td></td>
<td>- Continuous improvement.</td>
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<tr>
<td></td>
<td></td>
<td>- Reduce cycle times .</td>
</tr>
<tr>
<td>Koskela (B)</td>
<td>Production costs, time and value</td>
<td>- Early definition.</td>
</tr>
<tr>
<td>1992</td>
<td>Lean construction is way to improve and maximise value while reducing or to an extent minimise waste and associated project and organisation costs within the value stream.</td>
<td>- Can fall into the theory theme and sub-themes of theory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reduce waste.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Maximise productivity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Value streaming.</td>
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</tbody>
</table>
### Table 2.1: Lean Construction Definitions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Product Development &amp; Design Management</th>
<th>Key Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delivery</strong></td>
<td></td>
<td><strong>Production</strong></td>
<td>Kagioglou, Tzortzopoulos, Formoso, Emmitt</td>
</tr>
<tr>
<td>Author</td>
<td>Approach &amp; Description</td>
<td>Characteristics</td>
<td></td>
</tr>
<tr>
<td>Ballard 2000</td>
<td>Production</td>
<td>▪ Production.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The application of lean construction is concerned with production, which is understood as an integrated process of designing and making artefacts. The focus of this approach is on design related waste in construction.</td>
<td>▪ Designing versus making.</td>
<td></td>
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<td></td>
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<td>▪ Design waste.</td>
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<tr>
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<td>▪ Can fall in the design theme and sub-themes of theory.</td>
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</tr>
<tr>
<td>Ballard et al 2001</td>
<td>Production costs, time, value and planning</td>
<td>▪ Production.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This approach towards lean understanding involves the designing of production systems to maximise value and minimise waste and a temporary production system should be designed, controlled, and improved for delivering the products to customers.</td>
<td>▪ Designing versus making.</td>
<td></td>
</tr>
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<td></td>
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<td>▪ Design waste.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Can fall in the design theme and sub-themes of theory.</td>
<td></td>
</tr>
<tr>
<td>Paez et al 2005</td>
<td>Production costs, time and value</td>
<td>▪ Production control.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The application of lean philosophy is specifically designed for on-site, one-of-a-kind, complex operations for long-term improvement. Lean conforms to a socio-technical design with the same goals, activities and workforce.</td>
<td>▪ Project design control.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Manufacturing based perspective.</td>
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<td></td>
<td></td>
<td>▪ Does not consider the presence of craft production elements in construction.</td>
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<tr>
<td><strong>Delivery</strong></td>
<td></td>
<td><strong>Prefabrication, Assembly &amp; Open Building</strong></td>
<td>Ballard, Cuperus, Mattheus, Milberg</td>
</tr>
<tr>
<td>Author</td>
<td>Approach &amp; Description</td>
<td>Characteristics</td>
<td></td>
</tr>
<tr>
<td>IGLC 2011</td>
<td>Formal</td>
<td>▪ Production.</td>
<td></td>
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<tr>
<td></td>
<td>Simplify site installation to final assembly and commissioning. Pursuit of this ideal involves every phase in project delivery and in the life of the products that are components of the facility being constructed.</td>
<td>▪ Flexible planning.</td>
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<td></td>
<td></td>
<td>▪ Control.</td>
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<td>▪ Manufacturing based influences</td>
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</tbody>
</table>
### Table 2.1: Lean Construction Definitions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Key Authors</th>
<th>Author</th>
<th>Approach &amp; Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery</td>
<td>Enabling Lean with IT</td>
<td>Sacks, Gehbauer</td>
<td>IGLC</td>
<td>2011 ▪ Investigates the synergies between lean construction and information technology.</td>
<td>• Optimisation of materials, information, and labour flows.</td>
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<td></td>
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<td>• Reduction of the incidence of non-value added activities.</td>
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<td>• Increasing product values by better understanding client needs.</td>
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<td>• Reducing process variability.</td>
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<td>• Reduction of process cycle time (transportation + wait + pre-process + inspection) reduction.</td>
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<td>• Enabling smaller production batches.</td>
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<td></td>
<td>• Increases product flexibility and process transparency</td>
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<tr>
<td>Management</td>
<td>Supply Chain Management</td>
<td>Tommelein, O'Brian</td>
<td>IGLC</td>
<td>2011 ▪ This sub-theme focuses on all elements and parties involved within the supply chain of construction projects and organisations.</td>
<td>• Optimisation of contractor and subcontractor project relationships</td>
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<td></td>
<td>• Improving project relationships</td>
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<td></td>
<td>• Building information modelling (BIM) alignment</td>
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<td>• Challenging of theory transferability</td>
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<td>• Alignment of structural and behavioural characteristics of project relationships in the supply chain</td>
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</tbody>
</table>
### Table 2.1: Lean Construction Definitions

#### Theme: Delivery

<table>
<thead>
<tr>
<th>Sub-Theme</th>
<th>Key Authors</th>
<th>Author</th>
<th>Approach &amp; Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract &amp; Cost Management</td>
<td>Pasquire, Ballard</td>
<td>IGLC</td>
<td>Formal</td>
<td>- Aligning lean implementation to cost savings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2011</td>
<td>The legal and financial infrastructure which underpins the design, construction and</td>
<td>- Establishment of integrated project delivery specific contracting options</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>operation of buildings and structures and can be aligned to the primary functions of the</td>
<td>- Alignment of lean to building information modelling (BIM)</td>
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<td></td>
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<td></td>
<td>production management model.</td>
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</table>

#### Theme: Environment

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<thead>
<tr>
<th>Sub-Theme</th>
<th>Key Authors</th>
<th>Author</th>
<th>Approach &amp; Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>People, Culture &amp; Change</td>
<td>Alarcon, Mitropoulos, Folkestad</td>
<td>Kinnie</td>
<td>People, human behaviours</td>
<td>- The lean organisation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>et al</td>
<td>Lean thinking is associated with five key principles as the authors explain:</td>
<td>- Downsizing as a form of leanness (problematic viewpoint).</td>
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<td></td>
<td></td>
<td>1998</td>
<td>(1) specify value as defined by the ultimate consumer;</td>
<td>- Quantitative measures and benchmarking as justification.</td>
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<td></td>
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<td></td>
<td>(2) identify the value stream;</td>
<td>- Financial and economic downturns.</td>
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<td>(3) make the value creating steps flow;</td>
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<td>(4) let customers pull value from the organisation;</td>
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<td>(5) seek perfection.</td>
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<td></td>
<td>Coffey</td>
<td>People management</td>
<td>- Relationship between commitment and involvement.</td>
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<td></td>
<td></td>
<td>2000</td>
<td>The fundamental lean activity of eliminating waste requires analysis of the production</td>
<td>- Employee characteristics that must be developed and maintained in order to</td>
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<td></td>
<td></td>
<td></td>
<td>process and the continuous identification and elimination of waste.</td>
<td>achieve the required level of employee involvement.</td>
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<td>- Continuous improvement.</td>
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<td>- UK perspective.</td>
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</tbody>
</table>
### Table 2.1: Lean Construction Definitions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>People, Culture &amp; Change</th>
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<tbody>
<tr>
<td><strong>Environment</strong></td>
<td><strong>Key Authors</strong></td>
<td>Alarcon, Mitropoulos, Folkestad</td>
</tr>
<tr>
<td><strong>Author</strong></td>
<td><strong>Approach &amp; Description</strong></td>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td><strong>Orr 2005</strong></td>
<td>People management and culture</td>
<td>- Leadership.</td>
</tr>
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<td></td>
<td>The relentless elimination of waste in every</td>
<td>- Human behaviours.</td>
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<td>area of operations with the aim of reducing</td>
<td>- Daily toolbox meetings.</td>
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<td>inventory, cycle times and costs so that</td>
<td>- Project based.</td>
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<td></td>
<td>higher-quality goods and services can</td>
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<td>be provided in the most efficient, effective</td>
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<td></td>
<td>and responsive manner possible</td>
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<td><strong>Buch &amp; Sander 2005</strong></td>
<td>People management and culture</td>
<td>- Danish perspective.</td>
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<td></td>
<td>Presents a perception that the use of lean</td>
<td>- Subcontractors and communication.</td>
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<td>construction requires a change in the style</td>
<td>- Project based.</td>
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<td></td>
<td>of management towards the management of</td>
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<td></td>
<td>people rather than the management of processes.</td>
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<tr>
<td><strong>Zuo &amp; Zillante 2006</strong></td>
<td>People management and culture</td>
<td>- Project and organisational focused.</td>
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<td>Lean thinking focuses on reducing unnecessary</td>
<td>- Relationships.</td>
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<td></td>
<td>efforts by removing non-value-adding activities</td>
<td>- Introduces the concept of the project/organisation to be divided</td>
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<td>in the production system. All activities that</td>
<td>into sub-cultures.</td>
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<td>cannot add value to the whole system are</td>
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<td></td>
<td>viewed as waste and should be eliminated</td>
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<thead>
<tr>
<th>Environment</th>
<th>Safety, Quality &amp; the Environment</th>
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<tr>
<td><strong>Key Authors</strong></td>
<td>Howell, Horman, Abdelhamid</td>
</tr>
<tr>
<td><strong>Author</strong></td>
<td><strong>Approach &amp; Description</strong></td>
</tr>
<tr>
<td><strong>IGLC 2011</strong></td>
<td>Purpose to improve practice and optimise</td>
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<td></td>
<td>higher-level project performance.</td>
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</table>
Table 2.1 highlights the diversified interpretations in lean construction research. It is commonly agreed opinion across research that lean is about waste and productivity. However, the debate can be summarised between practice and theory. The debate between practice and theory was first raised by Green (1998) in *The Dark Side of Lean*. Within this and subsequent research Green (1998, 1999, 2000, 2005, 2011) has aimed to highlight the cultural implications of lean implementation in organisations and for individuals. Or, as Green and May (2005) have said, as:

... a set of techniques, a discourse, a ‘socio-technical paradigm’, or even a cultural commodity (Green & May, 2005: 503)

Green & May (2005) defined the cultural discourse of lean implementation as a form of ‘leanness’. In their study, Green & May (2005) further discussed that the implementation of lean is typically approached and diffused by one of three abstract perspectives: waste elimination, partnering and structuring of the lean context. The three abstract perspectives proposed by Green & May (2005) do not well represent lean implementation and do not have the capacity to understand how the workforce of the implementing environment responds to implementation. Lean research is further complicated as studies are typically undertaken at either a project or industry level. As highlighted in Table 2.1, a limited scope in research sees lean implementation exploring one group’s interpretation in isolation. In studies undertaken by Cameron (1994) and Kinnie et al. (1998), this limitation of isolated investigation was assessed to identify awareness of lean thinking, complicated by existing industry perceptions and the implementing environment.

In approaching an understanding of lean, researchers and practitioners have sought to define lean either theoretically, as a strategy or management philosophy. It is interesting to see how different lean is presented across the lean community, with researchers more inclined to be theoretical, practitioners to be strategic and industry to be philosophical in understanding. However central to all lean construction research is the ideal principles of waste elimination and productivity improvement.

It is interesting to note that in the production industry lean is approached and implemented as both a philosophy and set of operational tools (Shah and Ward, 2007; Hasle et al, 2012). Within their empirical study a theoretical foundation of lean is provided as well as identifying lean practices that are applied within the manufacturing industry. However this study views lean from only a waste elimination perspective and does not consider productivity improvements (Hasle et al, 2012). There is a need when developing a lean framework to also consider the enhancement of efficiency and productivity improvements; this is of particular importance as waste is not easily characterised in many organisations (Hopp and Spearman,
Hines et al (2004) suggest to encompass both levels of lean understanding should be viewed on two levels; a strategic level of understanding and the operational tools used to eliminate waste. Hasle et al (2012) used this approach to review existing quantitative research to explore the effect of lean implementation within the working environment; targeting implementation on job specific roles and around characteristics of the role and effects. Within this study it was assumed and concluded that within practice that there is a clear statement for or against in both industry and practice with to lean take on different forms which has different effects on working environments. Central to the research was Hasle et al (2004) conclusion that the relationship between lean and the working environment is not simple. Mann (2009) summaries the relationship between tools and cultural effect as a 20/80, further concluding the need to view lean implementation across organisational groups. This need to view lean on multiple levels and the relationship between lean and the organisational environment is central to thesis in understanding lean implementation and cultural maturity. The approach is something that is not clearly defined or approached in current lean construction research. Understanding the relationship between individual perceptions and the diffusion of lean and the approach/response relationship forms an important part of the research gap. To understand the relationship in context and to the wider research problem of cultural maturity, critiquing of lean and cultural research must occur. Lean research will be critiqued first.

2.4.3 Lean Implementation

Stone (2012) summaries the lean implementation debate as scholars engaged in better trying to understand and predict outcomes of lean transformations while practitioners continue their quest to operationalize and apply lean concepts for process and business improvement. Confusion around lean implementation holistically has been concerned with the initiation of tool implementation without understanding the underlying philosophical ideals (Seddon & Caulkin, 2007). In a manufacturing context Hallam (2003: 32) notes lean implementation becomes problematic as the same term is used to describe four aspects of firm “namely the operating philosophy, the tools, the activities and the state of the manufacturer”. This is supported by Herron (2007) a lean consultant in manufacturing who states the misapplication of lean takes different forms; misapplication of lean tools, misuse of singular lean tools, use of similar tools across similar problems and misunderstanding of tools and techniques. This is occurring to some extent within the lean construction community in relation the transferability of lean.

As lean construction has become more prominent conceptual understanding has similarly changed; although limitations in implementation and application are prevalent. In construction this specifically has been a result of knowledge and practical transferability of
concepts between production and construction industries (Winch, 2000, 2003; London & Kenley, 2001; Dauber, 2003). This concern is prevalent in early research into lean implementation approaches where studies involved the transferring of lean production principles for the purpose of productivity improvement and waste elimination (Koskela, 1992; Ballard & Howell, 1998; Howell, 1999). The tendency to approach lean implementation fairly simplistically and in an isolated way has further fuelled the transferability debate and the need for a clear understanding of lean implementation (Winch, 2000, 2003; London & Kenley, 2001; Dauber, 2003; London, 2005). Stone (2012) identified transferability as a common issue across lean literature over the past 40 years, due mainly to the loose manner in which the term “lean” is used and its associated with “Japanese manufacturing” when addressing lean outside manufacturing. This could be a direct result of the interchange-ability of the terms “lean” and “Toyota Production System” during the early application and translation of lean outside Japanese manufacturing through the works of Ohno (1974, 1984) and Shingo (1981, 1988). Further research undertaken by Koskela et al. (2002) proposed that lean construction be inspired by lean production and not by a direct transferability of principles between the two industries. Jorgensen (2006) highlighted that as lean implementation has occurred, the adoptive practices by entities has also changed to reflect new project structures emerging in organisations based on the philosophy of design.

Despite the diversified understanding of lean implementation – incorporating safety, design, culture and production – the general strategic consensus is still to view implementation as either:

- a suite of tools to improve strategic operations (e.g. Koskela, 1992; Ballard & Howell, 1998; Howell, 1999; Howell & Ballard, 2000; Tommelein, 2002; Shah and Ward, 2007; Hasle et al, 2012); or

The first suite of tools is typically described as targeting or identifying waste-creating activities within the organisation or system as a way to improve productivity (Koskela, 1992; Howell, 1999; Howell & Ballard, 2000; Green, 2000; Womack & Jones, 2000, 2003). The approach is guided by the principles of transformation, value and flow as promoted by Koskela (1992), and utilise the basic philosophical principles of value, value stream, push, pull and flow (Womack & Jones, 200, 2003). The basis of the tool suite is the selection of tools based on the ability of the tool to improve process-related inefficiencies (Koskela, 1992; Howell, 1999). The suite-of-tools approach is supported by viewing construction as a production system, more specifically through an engineering lens of production value and
planning. Ballard & Howell’s (2000) *Lean Last Planner* system is considered a milestone in this approach, having restructured how planning processes are mapped, controlled and costed. Ballard et al. (2001) considers the lean last planner as a tool that redesigns the production system to:

> ... maximise value and minimise waste, and a temporary production system should be designed, controlled, and improved for delivering the products to customers.

(Ballard et al., 2001: 2)

The suite of tools to improve strategic operations is also concerned with production control (Koskela, 1992; Ballard & Howell, 1998; Howell, 1999; Howell & Ballard, 2000; Tommelein, 2002; Herron, 2007). The process of implementation is generally explained as the adoption of the tool or tools in accordance with the process-related milestones identified as wasteful. The milestone is representative of an element or elements within an organisation, project or team. The approach does have restrictions. The approach is limited in explaining the relationship between the implementation process, the selected tool/s and the impact on culture (Herron, 2007), although interpretations of culture are still represented in the detailing of the implementation outcome, for example expected or assumed implementation outcomes (Howell, 1999). The representation of culture in this approach introduces one half of the cultural dichotomous debate underpinning this thesis.

The suite of tools describes culture within the implementing environment aligned to success or failure. Lean implementation success is highlighted by an acceptance of the tool by the workforce, with improvements seen in productivity and either a reduction or elimination of waste (Howell, 1999; Ballard & Howell, 2000). On the other hand, unsuccessful lean implementation is highlighted by a rejection of the tool by the workforce, characterised by low levels or no productivity improvements, increases in waste, or worker dissatisfaction (Green, 1998, 1999, 2000, 2003, 2005; Green & May, 2005). Although this work is not empirical and contextualises Japanese studies Green’s research contributes to the theoretical foundation of the argument against lean and therefore balances the debate.

Although presenting differing opinions, each representation shows an understanding of workforce reaction and cultural response towards change. This introduces a management/workforce approach/response/reaction dynamic to the debate. This understanding aligns to Hatch’s (1993) interpretation of cultural dynamics (addressed in more detail in Section 3). The approach/response/reaction dynamic is not well explained or explored in lean research as lean implementation is typically described in the collective reaction/response of the implementation environment, usually in the past tense. Generally, a change in the culture is described through the use of generic statements such as:
Lean was implemented into this construction organisation, with this many employees and this (culturally) was the end result of the implementation.

or:

These particular lean principles were incorporated into this strategic management approach, using this technique/approach, with this result.

Such generic statements describing the cultural relationship between lean implementation and the workforce further contribute to cultural dichotomy in research. Generic statements describing culture highlight researchers’ inefficiency in understanding change and culture, particularly the relationship between the two. Inefficiency has been core to cultural debates across industries (Cox, 1997; Green, 1998; Gann, 2000; Brensen & Marshall, 2002; Cox et al., 2006). Herron (2007) suggests to be proactive in understanding lean implementation within the organisation, managers need to consider implementation holistically through ‘Genba Kanri’. Genba Kanri refers to:

‘workshop management’, the system by which standards for running the day-to-day business are established, maintained, controlled and improved. It involves the application of 3S, standard operations, skill control, kaizen, autonomous maintenance and work measurement to quantify waster ad improvements (Herron, 2007: 37)

From a construction perspective, Green (2011) discusses inefficiency to the way researchers approach implementation. Taking Green’s (2011) understanding and applying it to current cultural understanding in lean, culture extending from lean implementation can be viewed as either external to or internal to the implementing environment. Research undertaken external to the implementing environment is typically more proactive in describing cultural successes or victories, depending on the scope of implementation (Brensen & Marshall, 2000, 2005; Freire & Alarcon, 2000; Macomber & Howell, 2003). This research characteristically is about implementation from a construction management perspective. Research highlighting an internal representation of the implementation is generally aligned to social theory. Characteristically this research is about implementation from the perspective of the workforce. Research in this field has been extensively undertaken by Green (199, 1999, 2000, 2003) and Green & May (2003, 2005) who, through Japanese empirical studies, identified that lean implementation led to worker dissatisfaction. Empirical studies investigating lean implementation in production and manufacturing industries highlight lean tools as a form of Marxism that aims to control individuals and teams through the creation of high pressure working environments (Garraham and Stewart, 1992; Williams et al, 1992). The exploitative nature of the Marxism approach is that lean is regarded by some as more than a set of
mechanistic hard tools and techniques and the human dimensions of motivation, empowerment and respect are not important but rather lean is de-humanising (Hines et al, 2004). In earlier research Hines et al (1998) put forward the need for manufacturing organisations to clearly define the vision and what the organisation believes it will look like once the transformation is complete; this underlies poor quality and elementary management problems (Hines and Taylor, 2000). It is interesting to see that further research within manufacturing that suggests that lean enterprises will only succeed if lean is viewed as a philosophy rather another strategy (Bashin & Burcher, 2006). Within this conceptual paper Lean viewed as a Philosophy Bashin & Burcher (2006) propose that an organisation must implement the majority of the technical tools but also needs to consider the cultural transformation of the organisation; with the changes to be implemented through the organisation’s value chain.

Lean construction cultural change is simplistically viewed as two extremes also referred to as cultural dichotomy. Cultural dichotomy is the difference between cultures in either/or debates (Overton, 1997). In this research dissertation, cultural dichotomy is about differences in understanding, behaviours, attitudes and perceptions when lean implementation occurs taking into consideration Overton’s (1997) approach to Boesch’s (1991) oriented cultural action theory which explores relational-developmental methatheory. According to Overton’s research into cultural psychology which explored ‘inclusively the nature of developmental change, expressive-constitutive and instrumental-communicative functions of the action’; with the central ideal of the person-action-culture relationship (this is explored further in Chapter 3). This goes far beyond simplistic representations of culture as presented by Hofstede (1979, 1983, 1988) and Eisenberg and Goodall (1993). Cultural dichotomy has been addressed in the interpretation of lean implementation through cultural research within construction organisations and from production industries. Cultural research undertaken in lean construction research has been approached by a small number of researchers, particularly Green (1998, 1999, 2000, 2001, 2011) and Pavez & Alarcon (2006, 2007, 2008). Green’s (1998, 1999, 2000) empirical studies highlight the cultural indifference of workers towards lean, whereas Pavez & Alarcon’s (2006, 2007, 2008) studies highlight cultural acceptance of workers towards lean. The reporting of cultural indifference of workers towards lean has been a catalyst towards the need to further understand the relationship between culture and lean implementation. A number of empirical studies investigating lean implementation emerged in the mid 2000s that purposefully aligned lean implementation to leadership (Orr, 2005), subcontractor partnerships (Buch & Sander, 2005), organisational readiness (Abduh & Roza, 2006), lean ‘champions’ (Pavez & Alarcon, 2006) and professional lean construction profiling (Pavez & Alarcon, 2007, 2008). Of these studies, earlier researchers tended to
investigative cultural implications of lean implementation in isolation to the change occurring, rather than the cultural change, being:

... a change in the style of management towards the management of people rather than the management of processes. (Buch & Sander, 2005)

Later research exploring implementation, particularly Pavez & Alarcon’s (2006, 2007, 2008) *Professional Lean Construction Profiling* empirical studies, challenged earlier cultural studies by viewing lean implementation across multiple lenses. Pavez & Alarcon (2006, 2007, 2008) through their research identified a need to have multiple professionals strategically engaged in the process to ensure success. This basis led to further research by Alves et al. (2011), who explored lean implementation incentives. However, there is limited alignment between these studies and lean implementation. This could be due to the cultural dichotomy that underpins lean implementation understanding. This is further complicated by cultural studies into lean implementation such as those by Orr (2005), Buch & Sander (2005), Abduh & Roza (2006) and Alves et al. (2011) to simplify lean as a cultural phenomenon. The cultural phenomenon perception emerges as lean implementation is typically investigated within an implementing environment in isolation to the larger environment; for example, implementation in a team or project without recognition of the impact for the organisation. The problem with research with researchers viewing lean implementation in isolation is that the complex relationships, structures and social behaviours of construction organisation are not captured. Understanding organisational complexities is important in being able to explore how existing relationships in organisations assist in lean diffusion. This forms part of the research gap in this thesis dissertation.

The reporting of culture-specific implementation is described in a similar manner as the ‘suite of tools’ approach. Implementation is typically described to identify the major lean decision and the cultural environment. The culture is often described as workforce empowerment or worker exploitation. The generic describing of worker culture further contributes to the complexity of the cultural dichotomy debate. Zuo & Zillante’s (2005) study of project culture explored the differing relationships and groups of the implementing environment when lean is implemented. Zuo & Zillante (2005) reviewed cultural literature and studies to better understand the culture of projects prior to lean implementation. Using a modified organisation cultural model the authors went about identifying and assessing the merits of lean aligned to an optimal ‘Project Culture’, proposing that culture should be ‘developed and maintained’ with the catalyst of this to be buried within ‘lean thinking’. The study by Zuo & Zillante (2005), although providing an extensive review of literature, does not provide any clear ideas.
of the relationship between lean implementation and culture as those already known. That culture after lean implementation either becomes:

- empowered, undergoing a transformation with the workforce becoming more collaborative and communicate their ideas more freely (Coffey, 2000; Buch & Sander, 2005; Orr, 2005; Thomas et al, 2005; Zuo & Zillante, 2005); or

- exploitative, undergoing a transformation with the workforce responding negatively to lean change and rejecting the change, with the workforce experiencing dissatisfaction and not to communicate their ideas (Green, 1999; 2000; Green & May, 2005; Loosemore et al, 2003; Dainty et al, 2007).

The cultural dichotomy debate is complex, with common ground in opinions; the thesis dissertation is about the closing of this gap. Specifically, the dissertation is about understanding at the centre of the organisation how and why individuals and groups within the organisation approach/respond/react to lean decisions, processes and practices. The approach/response/reaction relationship will also be explored from a management perspective. Developing an awareness of the relationships assists in better understanding of how and why culture matures.

Such direct interpretations of the lean implementation process raise questions concerning the validity, value and significance of understanding that has been raised within the field. A study by Cameron (1994) highlighted the importance of understanding the lean process and the ongoing effect of lean implementation. This study suggested that lean-specific change, particularly within an organisational environment, is much broader than the five principles of lean and is more systemic, describing implementation as a:

… focus on changing the organisation’s culture and the attitudes and values of employees, not just changing the size of the workforce or the work’ (Cameron, 1994: 198)

A number of other studies have highlighted positive outcomes of lean implementation, including lean benchmarking (Kinnie et al., 1998), strategic partnerships, and theory transferability (Brensen & Marshall, 2000, 2002). Although highlighting different approaches, these studies deliver similar cultural understandings. The emergence of education as an alternative strategic approach towards lean implementation has been a result of differing lean implementation approaches.

In recent years education has been identified as another strategic approach of lean implementation. Education is approached in a way that reflects the organisational environment. Alves et al. (2010) describes this reflection of the organisational environment to
be representative of an organisations’ eagerness to embrace lean or learn about lean, although
the approach is influenced by time and effort constraints. An as implementation strategy,
education is guided by two learning agendas (Hirota et al., 1998): action learning and learning
platforms. Action learning provides a framework to support the workforce through the
implementation process, usually through knowledge development and transition between
individuals and groups (Revans, 1983; Mumford, 1985; Pedlar, 1996; Meehan & Jarvis, 1996;
Botham & Vick 1998; Davey et al, 2000). Learning platforms enable the organisation to
implement collective learning processes, competencies, meetings and discussions surrounding
lean. Such learning platforms are driven by issue and solution assessment (Hirota et al, 1998;
Alves et al, 2010).

Hirota et al. (1998) and Alves et al. (2010) discuss education as an alternative approach to
lean implementation, although being positioned in lean construction. There is no definite
implementation process described. Rather, the process is simplified to suggest that education
is used as a supporting framework that guides and teaches those groups of the implementing
environment about lean. Hirota et al. (1998) and Alves et al.’s (2010) research is important to
consider in the development of a conceptual framework, particularly if they were suggesting
that the implementation of lean should be guided by some form of educational platform.
Although not specifically discussed, the thesis considers education as a potential strategy in
which to support knowledge development and interaction of the workforce with the
organisational environment.

The distortion of lean construction and lean construction culture research positions this thesis
dissertation within two fields. The review of lean construction literature highlights two
divisions:

- Lean management theory versus practical applications of lean.
- Lean culture.

These divisions form the research gap. The dissertation is about aligning and closing the
identified divisions. Lean construction has been widely explored; however, the culture of lean
is limited. To address this gap, research that has investigated organisational culture will now
be critiqued. The critiquing of literature will address construction organisation culture, with
an emphasis on construction organisations that are actively involved in project delivery from
either a contracting or subcontracting perspective and of differing sizes.
2.5 Construction Culture
This section of the literature review draws upon construction management and management cultural research to framework an understanding of culture, specifically construction organisation culture. The section also seeks to further understand the elements, characteristics and components that form construction culture.

2.5.1 Culture Definition
Schein (1984) was the one of the first researchers to define the concepts of culture. Schein’s (1984) culture concepts have formed the core of the cultural debate. The concepts of culture are:

- The assumptions and beliefs that form reality and guide human nature decisions.
- The values and social philosophies, goals and standards that are considered to have intrinsic worth.
- The artefacts and the visible, tangible and audible results of activity grounded in value and assumptions.

From these concepts, culture is defined as the:

Ideas, perspectives and attitudes arising from interactions between individuals, members of a group or organisation resulting in shared behavioural patterns, morals, values, beliefs and meanings. (Schein, 1984; Hatch, 1993)

In developing an understanding of culture, construction researchers and practitioners have sought to define culture through describing the operational or strategic environments (Root, 2001; Dainty et al, 2007). The culture studies by construction management researchers that have sought to develop an understanding of culture and taken a ‘cultural’ perspective have attempted to define culture through topics as diverse as safety, tasks and professional ethics (Brensen & Marshall, 2001; 2005). These studies have tended to highlight how culture is unique in the construction industry.

‘Construction culture’ is broadly defined. This broad definition has led to construction culture being typically described through construction attributes, highlighting positive and negative interpretations. Researchers have been quick to identify problematic issues without consideration of Schein’s (1984) cultural concepts within their understanding, which contributes to construction culture being interpreted dichotomously. The cultural debate in construction culture similarly reflects the cultural dichotomy debate in lean construction, particularly the temporariness of projects and organisational partnerships, adversarial relations amongst project teams, and worker commitment to the project as significant issues affecting
construction culture (Hardy, 1985; Loosemore et al, 2003; Dainty et al, 2007). Alternatively it is described as a learning culture where change is embraced to positively mature and challenge the workforce (Cheng et al, 2004; Chueng et al, 2005). Dainty et al (2007), the cultural debate reflecting the nature of the industry, its sub-cultures and the workforce, highlighting the industry to be guided by conductive environment (Blauner, 1964; Blumberg, 1968; Patemen, 1970; Brennen, 1983; Coffey, 2000) and influenced by industrial relations (Dainty et al, 2007) interpretations.

Attempts have been made to define construction culture outside the boundaries of conductive or industrial relations understanding; this redefining of construction culture has been approached by both practitioners as well as researchers. Fox (2007a, 2007b), in his research to define construction cultures, critiques the overall perspective of construction culture by suggesting interpretations of culture include some reference to constructs as the ideas, perspectives and attitudes. In his research, Fox (2007b) further suggests that the constructs of construction culture represent the interactions between individuals or groups, which result in specific behavioural patterns to emerge. These behavioural patterns then lead to the identification of sub-culture attributes across industry, organisational, team and project teams.

A 2001 UK-financed council Construction Research Council (CRC) published a number of research papers that investigated the emergence and effect of relational management strategies in construction. The general consensus of the studies within the publication suggested culture to be influenced by the morals, values, attitudes, beliefs and meanings shared between members of a group or organisation (CRC, 2001). Despite this rigour, construction culture is still representative of cultural dichotomy.

Seven cultural themes underpin construction culture research including task culture, cultural dynamics, human management, cultural characteristics, learning cultures, safety culture and role culture. These cultural themes have been sourced from two bodies of knowledge: construction and business. The broadness of the themes highlights just how diverse the understanding of culture is, not only in construction but in other sectors as well. Although the cultural themes are diversified in the interpretation of culture they are similarly driven by a need to understand the values, behaviours, attitudes, morals and beliefs of the target cultural group.

Two central understandings of culture are present within construction research and are derived from the concepts of learning or procedural human relationships. The idea of learning guides Hatch’s (1993) cultural dynamic understanding of what culture is and its constructs. Cultural dynamics incorporates the issues relating to the origin and evolution of culture. Core to Hatch’s cultural dynamics interpretation is the move towards interpreting culture as
something more evolutionary through recognition of stability and change outcomes within the same process (Herskovits, 1948). Cultural dynamics is guided by learning attributes within the organisational environment; more specifically, how beliefs and values are taught within the group to new members.

The defining of culture that emerges from human relationships – such as task culture (Hardy, 1985), safety culture (Biggs et al, 2005) and role culture (Cheung et al, 2005) – sits within the concepts of Schein’s (1984) definition and the research undertaken by Fox (2007a) and through the CRC. With culture to be aligned to the physical process of shared values, beliefs and understanding rather than an individual or group learning and growing from within. The shared understanding in this latter cultural theme is about the visible attributes of that group that is reflected in each of the individuals. However, linking of these cultural constructs is not understood well outside the cultural group, particularly in understanding how individuals and groups respond to change. This is an important aspect that the research is considering, particularly in understanding how the culture of the organisation matures when lean implementation occurs.

Construction culture is diverse in the interpretation of cultural understanding. Although diverse, the consensus of culture is driven by similar cultural constructs; that is, value, attitudes, beliefs and behaviours. It is these cultural constructs and associated interactions that assist in understanding why and how culture evolves. The construction constructs identified in Table 3.3 are not representative of any practical application of cultural understanding; rather, the identification of cultural specific values, attitudes and beliefs. Although cultural constructs are identified they are not fully understood within the contextualised environment in which they exist, particularly those relational management constructs that underpin Cheung et al. (2005) and Choppin (1997).

2.5.2 Construction Culture & Change

Schein’s (1984) interpretation of cultural environments suggests that basic assumptions are core to understanding cultural change. Culture is further guided by a fourth concept incorporating issues relating to the evolution of culture, also known as ‘cultural dynamics’ (Schein, 1984; Hatch, 1993). Schein (1984) discusses cultural dynamics by associating learning attributes of the individual or collective environment; more specifically, how beliefs and values are taught within the group to new members. Hatch (1993) further builds upon Schein’s theory by introducing symbols, explaining that culture is evolutionary rather than static, introducing the term ‘cultural dynamics’.

Figure 2.2 Cultural Theory versus Cultural Dynamics illustrates the components of Schein’s and Hatch’s interpretations of cultural dynamics. The figure in particular illustrates the static
A representation of Schein’s interpretation and Hatch’s interpretation where the inclusion of the symbols component links the other components for the model to become more relational in its explanation. Hatch’s interpretation is guided by Herskovits’s (1948) understanding of culture, explaining that cultural understanding emerges through the recognition of stability and change outcomes within the process.

![Cultural Theory versus Cultural Dynamics](Hatch, 1993: 569–570)

From a construction management perspective, the cultural environment of construction organisations is typically described as productive or conflicted. Productive cultures are primarily influenced by employer motivation and commitment (Emmitt & Gorse, 2003). Organisations identified as maintaining a strong and productive culture (Deal & Kennedy (1981), cited by Emmitt & Gorse (2003)) are guided by attributes of shared ‘positive’ values, heroes, rites and rituals and cultural communication networks. Deal and Kennedy’s (1981) identification of productive cultural characteristics shares similar resemblance to those cultural attributes found in adaptive organisational environments. Organisations that are naturally structured as matrix organisations promote a more resilient and open organisation.

Conflicted cultures are primarily influenced by the nature of the construction industry and the temporary project relationships that form the industry (Loosemore et al, 2003; Dainty et al., 2007). Organisations identified as maintaining a weak and conflicted culture are affected by the structure of the construction organisation, particularly ad hoc conditions that include adversarial relationships, temporary multiple organisations and project partnerships as well as productivity and performance issues and further sub-cultures (Zuo & Zillante, 2006; Fox, 2007; Chueng et al, 2011). Organisations that are considered conflicted are naturally
structured as bureaucratic and promote an adversarial culture that suggests the organisation to be less open to change.

The debate surrounding cultural dichotomy in organisational environments is further widened in the direct interpretation of construction culture. Whereas cultural studies in lean attempted to understand how people respond to change (Buch & Sander, 2005; Orr, 2005; Zuo & Zillante, 2006; Alves et al, 2010), construction manager researchers are quick to pigeon hole culture as what it ought to be (Loosemore et al, 2003; Dainty et al, 2007; Emmitt & Gorse, 2007). Research into cultural psychology (Valsiner, 2007) have similarly reported how poorly defined notions of culture have led to culture to be presented through limited casual entities such as “nature” versus “nurture” or cultural factors developed through standardised testing (Hofstede, 1983; 1988; 2003). The cultural psychology field is concerned with the ‘phenomena of human conduct and meaning construction that vary immensely across the world’ representative of a basic universal process (Valsiner, 2007). This notion forms the basis of Boesch’s (1991) cultural action theory which views culture through symbolic actions with mean making persons who act within the social word, this tests current theories of knowledge to be “fragmented” or “localised”. Central to the theory is the united person is “heterogeneous” and “highly flexible”, with the person being able to act differently in different social situations and similar settings over time (Boesch,1991). Although providing a basis to challenge existing cultural understanding the theory however does not offer a framework in which to investigate maturing of organisational culture (this is detailed more in section 3.3). The cultural debate becomes an important aspect of the research thesis, particularly as the purpose of the thesis is gain a deeper understanding of the culture of construction organisations when an innovation is diffused within the organisational environment. The thesis is positioned to consider both sides of the cultural debate; more specifically, the research is about gaining a deeper understanding of how individuals within construction organisations respond to lean implementation. As a means to further understand the structure of construction organisations and culture, the environment needs to be explored aligned with applications that highlight change.

It has been highlighted thus far that culture is affected by change, with the change being described as either empowering or exploitative; this forms the cultural debate in construction. Two strategies that engage the workforce through social means have been used in construction research to explore this cultural debate: social capital and action learning. Approaching cultural understanding through social interaction allows the interpretation of behaviours when the change occurs (Meyerson & Martin, 1987; Brensen et al, 2005).
The two perspectives guiding culture interpretation in construction is linked to a reluctance of researchers and practitioners to accept or acknowledge cultural downfalls in already prominent construction management procedures, practices and processes. This lack of acknowledgement forms an important aspect in understanding the cultural response towards change by the workforce, particularly across the construction organisation. Before this can be conceptualised an understanding of construction culture and change needs to be explored and understood.

Change within construction, according to Dainty et al. (2007), is difficult to engender due to the presence of ongoing social interactions within particular contexts (Meek, 1988; Barhorpe et al, 2000), particularly in the representation of people issues within the structural landscape (Brensen & Marshal, 1998). A lack of acknowledgement of processes and strategies advocates change to be represented negatively. The conflicted nature of change within construction environments and its sub-industries has increased the existence of known industry issues (Woudhuysen & Abley, 2004). Such issues include structural fragmentation, poor management, low financial investments, low entry barriers and small market dominance (Woudhuysen & Abley, 2004; Cox et al, 2006; Dainty et al, 2007). The presence of such notable construction-related issues suggests that industry is reluctant to change. However, most government-backed productivity reports have identified and addressed mechanisms designed to overcome such problems. Governments advocate industry to undertake a cultural move towards relational management as the course of action most identified to overcome industry problems (see Latham, 1994; Egan, 1998, 2002; McKinley Reports).

Five barriers are commonly identified in research as affecting the ability of organisations to undergo change:

1. **Project-based structures:** A project-based structure is made up of multiple disparate organisations coming together in the pursuit of shared project objectives and individual organisational objectives. Objectives are not always compatible and don’t always align with personal objectives, which leads to competing demands (Loosemore et al., 2003). It is agreed that project structures as a form of cultural barrier to change are characteristic of short-term project objectives, challenges in the effective management of people, diversity of employee groups operating as an itinerant labour force, high pressures on cost and human resource management, increased turnover of employment and ad hoc and adversarial relations (Loosemore et al, 2003; Dainty et al., 2007; Emmitt & Gorse, 2007).

2. **Fragmented communication and industrial conflict:** The project-based industry of construction is dominated by fragmented interaction and communication between
individuals working in unfamiliar groups coming together for short periods of time before disbanding (Dainty et al., 2007). Communication is an essential component for successful project completion (Emmitt & Gorse, 2007). It is agreed that fragmented communication and industrial conflict barriers are characterised by complex communication networks and temporary relationships (Cherns & Bryant, 1984; Latham, 1994; Hill, 1995; Egan, 1998; Loosemore et al, 2003; Dainty et al., 2006, 2007).

3. **Employee dissatisfaction:** This is linked to the emerging mobility culture underpinning the industry, with the project-based structure of industry, individuals tend to migrate from job to job (Loosemore et al., 2003). Organisation that are identified as having employee dissatisfaction are characteristically affected by short-term project objectives, challenges in the effective management of people, diversity of employee groups operating as an itinerant labour force, high pressures on cost and human resource management, increased turnover of employment, and ad hoc and adversarial relations (Latham, 1994; Egan, 1998, 2002; Green, 1999, 2000, 2002; Loosemore et al, 2003; Dainty et al, 2007).

4. **Working conditions:** The nature of the industry, and subcontracting components linked to fragmented delivery, results in higher levels of self-employment and employees who bear responsibility for their own health and safety. Organisations that are affected by poor working conditions are characterised by lower safety standards and poor working conditions (Latham, 1994; Egan, 1998, 2002; Loosemore et al., 2003; Dainty et al, 2007).

5. **Recruitment:** The nature of construction work is one of the main factors affecting difficulties in recruitment. Further affecting the industry is shrinking labour markets, lower economic growth rates and the male-dominated industry culture (Loosemore et al., 2003). Recruitment is considered a barrier and is characteristically described to address site-based and itinerant work patterns, job insecurity, relocation of workforce and the male-ominated culture that is industry (Loosemore et al, 2003; Dainty et al, 2007).

These barriers are typically described aligned to productivity and knowledge. This further complicates the culture debate in construction. The project and fragmented culture of industry were identified in research by Dainty et al. (2007) as increasing worker dissatisfaction, which indirectly impacts productivity. Research investigating productivity through education and training (Brensen & Marshall, 2000; Rooke et al., 2003; Phua & Rawlinson, 2004) identified the need for organisations to establish standard procedures as a way to improve productivity.
This was established by exploring individual perceptions of change and the need for worker education and training, the research identified success through social capital. Bourdrieu (1986) defines social capital as:

… the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition … which provides each of its members with the backing of the collectively owned capital, a ‘credential’ which entitles them to credit, in the various senses of the world. (Bourdrieu, 1986: 248–9)

Social capital involves the application of such elements as knowledge, learning and management into small implementing environments, typically an organisation. The purpose of the social capital approach is to interpret the emerging culture within the context of the wider organisation, with consideration of social elements (Brensen et al., 2005). Social capital is a strategic tool of application used to understand how innovative implementation processes occur with an organisation with the process closely linked to knowledge, knowledge sharing, knowledge creation and learning and ultimate conduct of social interaction (Meyerson & Martin, 1987; Winch, 1988; Gann, 2000; Fairclough, 2002; Phua & Rawlinson, 2004).

Social capital within construction also incorporates information and network connections and links within the organisation (Burt, 1992; Nahapiet & Ghoshal, 1998). Social capital elements within construction are not representative of internal and external forces of organisation culture; rather, the elements are designed to target collaboration at the project level, thus creating critical project frameworks (Cicmil & Marshall, 2005). The development of critical project frameworks within the organisation at the project level assists in the development of knowledge capture and learning, which develop into the organisation undertaking more human-centred and empowering management approaches (Chopin, 1997). It is suggested that if, implemented correctly, social capital is a valuable asset to the organisational as the tool can be easily appropriated and exploited to harness intellectual capital, thereby increasing competitive advantage (Nahapiet & Ghoshal, 1998).

Knowledge is the second theme typically discussed as being aligned to cultural barriers through change. There has been much discussion in ways to overcome the negative public image of construction. Brensen et al. (2005), in research investigating best practice thinking, identified benchmarking, value, lean construction and risk management as examples of strategic management that highlights knowledge as an alternate approach. Typically the investigation of strategic management through knowledge encompasses action learning as a driver to educate and train the workforce aligned to change. Action learning is the application of tools designed to improve continuous professional development, lifelong learning,
construction culture, construction learning and practice (Davey et al., 2000). The purpose of action learning is to engage the workforce of the implementing environment through education and training (Hirotta et al., 1998). Action learning is an experimental management education and development tool directed towards senior, frontline and middle organisational management training through real-task learning (Revans, 1983; Mumford, 1985; Pedlar, 1996; Meehan & Jarvis, 1996; Botham & Vick 1998; Davey et al, 2000). The approach utilises innovation and change more freely without impacting too heavily on the culture of organisations and teams (Davey et al, 2000). Action learning has been identified as an alternate strategic lean implementation approach through the facilitation of education programs and training initiatives for the workforce (Alves et al, 2010).

Social capital and action learning, although different in the approach of understanding, both use knowledge as the core driver to understand change and culture. The purpose of these strategies is to engage the workforce of the implementing environment through social means (Meyerson & Martin, 1987; Brensen et al, 2005). These strategies offer similar cultural understanding as each approach is investigated within the context of the implementing environment considering such social elements as norms and value and using these element as a framework to interpret how behaviour is affected when change occurs (Meyerson & Martin, 1987; Brensen et al, 2005).

When culture evolves as a result of innovation the workforce responds in a way that is representative of a ‘type’ of impact which is ‘culturally experienced’ as result of ‘change’. Within construction, the evolution of culture is representative where ‘change’ is either accepted and embraced (described as a constructive environment) or rejected and conflicted (described as an industrial relation environment). The different perspectives of the cultural construction environment are influenced by the differing cultural reactions in which the characteristics dominate perceptions in each cultural environment. The thesis dissertation is concerned with construction organisations; therefore, the culture of organisations needs to be defined to understand the cultural change debate.

2.5.3 Construction Organisation Culture

There are numerous factors that impact upon the culture of a construction organisation when changes occur; these include practices (Choppin, 1997; Brensen & Marshall, 2000, 2002; Chueng et al, 2005), processes (Brensen & Marshall, 2000, 2002) and structure (Dainty et al 2007). Giddens (1990) views the relationship as structure versus agency. The research study is positioned in viewing the behaviours of agents that affect structure; Boesch (1991) identifies these agents as meaning-making individuals, whereas Rogers (1969; 1983) identifies these as change agents. The difference between the two is that innovation is driven
by key change agents who are actively involved throughout diffusion (Rogers, 1969; 1983) whereas meaning-making individuals is considered to be all individuals in the organisation (Boesch, 1991). Within construction the dominance of projects and temporary project relations has seen construction culture, prior to and following change, to be described as fragmented, adversarial and leading to high levels of worker dissatisfaction and conflict (Cherns & Byrant, 1984; Latham, 1994; Green, 1998, 1999; Hill, 1998; Green, 1999, 2000, 2002; Loosemore et al, 2002; Dainty et al, 2006, 2007). Descriptions of fragmentation, adversarial relations and forced project relations have seen construction organisation culture to be debated either from a conductive or open environment (Blauner, 1964; Blumberg, 1968; Patemen, 1970; Brennen, 1983; Coffey, 2000) or an industrial relation (Green, 1999, 2000, 2001, 2002; Dainty et al, 2007) perspective. This further complicates the cultural dichotomy debate underpinning construction culture and change, through waste and productivity.

The culture of construction organisations is not limited to simply an open environment or union intensive; rather, construction organisation culture can be summarised across five characteristics, including:

1. **Project relationships (industry):** Interpretations of project relationships generally describe the culture as either empowering or exploitative. Characteristically, project relationships are described within the boundaries of on-site activities, including but not limited to quarrying raw materials, building material manufacturing, and construction material and service sales (Coffey, 2000; Smithers & Walker, 2000; Thomas et al, 2002; Pearce, 2003; Sacks & Harel, 2006; Dainty et al, 2007).

2. **Temporary multiple organisations:** Often described as ‘project team’ cultures created during construction projects. The structure of these organisations are representative of complex and temporary inter-organisational relationships governed by project-defined interactions. Temporary multiple organisations are often described as contributing to adversarial relations and conflicted culture. Within the temporary environment is it described as difficult to sustain the repetitive and routine relationships (Breinesen & Marshall, 2001; Breinesen et al, 2004; Dainty et al, 2007).

3. **Project relationships (worker):** Characteristically, project relationships are viewed narrowly and described within the boundaries of the construction process and employee work, including assembly of on-site materials, infrastructure and building repair/maintenance and subcontractor work (Coffey, 2000; Smithers & Walker, 2000; Thomas et al, 2002; Pearce, 2003; Sacks & Harel, 2006; Dainty et al, 2007).
4. **Communication**: Is described to address those verbal and non-verbal behaviours and graphics perceived or transferred between individuals or groups. Communication is recognised as an ongoing process incorporating feelings, ideas, values and perceptions (Cherns & Bryant, 1984; Gameson, 1992; Hill, 1995; Coffey, 2000; Gorse, 2002; Thomas et al, 2005; Emmitt & Gorse, 2007).

5. **Diversity**: This refers to a means to develop the full potentials of employees with different sets of skills to the advantage of the business. Diversity can also produce negativity within working groups and performance by over commitment of management to a single cause or organisation group (Jehn, 1997; Davidson & Fielden, 2003; Gale & Davidson, 2006; Dainty et al, 2000; Chan & Tse, 2003; Sweet, 2005; Clarke & Gribling, 2008).

The identified characteristics of construction organisation culture further complicate the debate through the isolation of norms, values and behaviours. For example, the describing of culture as fragmented or adversarial typically refers to organisations where the values are impacted because of the competitive nature of bidding for projects or a need to undertake relational contracting for project bids (Brensen & Marshall, 2002). The culture for this organisation would be difficult to describe as the organisation partakes in multiple avenues of business; this suggests that organisations are made up of a number of sub-cultures that are integrated and complex. These issues contribute to construction organisations experiencing high levels of waste and lower productivity. Organisational culture is not just about a project or team but the organisation as a whole entity. Fox (2007) has broadly defined construction sub-cultures and Hofstede (1962, 1983) provides an understanding of organisational culture across borders.

Despite research highlighting potential reasoning behind the debate there has been no clear assessment of the issues that are core to the cultural dichotomy debate of waste and productivity. Although waste and productivity are at the core of the debate, research that introduces the concept of relational contracting (Brensen & Marshall, 2000) is limited. Lean has been identified in production-based industries (Ohno, 1974; Womack & Jones, 2000, 2003; Liker, 2004) and construction (Koskela, 1992; Ballard & Howell, 1998; Howell, 1999; Howell & Ballard, 2000; Tommelein, 2002) as a management philosophy that specifically approaches waste elimination through productivity improvement. Rates of success are varied, with many studies investigating implementation in isolation to culture. Other studies have identified communication as a core strategy within construction organisations that assists in understanding implementation and how and why implementation is either successful or unsuccessful (Orr, 2005; Buch & Sander, 2005). What has yet to be understood is how the
culture of construction organisations, when implementing change, evolves with new direction, practices or processes. If it is simply a question of how the change is communicated then an understanding of communication is required.

Communication is the behaviours, verbal and non-verbal interactions and graphics perceived and transferred between individuals (Axley, 1984; Dainty et al, 2006). Communication is typically described as a process incorporating feelings, ideas, values and perceptions (Kakabadase et al, 1988; Cheng et al, 2001; Dwyer, 2002); that is, it is composed of intrapersonal, interpersonal, public or group and mass approaches. Each approach is specifically defined, highlighting unique characteristics that include:

- **Intrapersonal**: individual-specific communication involving inward feelings and thinking to process information (Taylor, Rosegrant & Meyer, 1986; Kreps, 1989; Dwyer, 2002; Gorse, 2002).

- **Interpersonal**: interaction between two individuals on a one-on-one basis or in small groups to establish and maintain relationships (Taylor, Rosegrant & Meyer, 1986; Kreps, 1989; Dwyer, 2002; Gorse, 2002).

- **Public or group**: originating from a singular source taking place when an organisation communicates with multiple receivers as a means to co-ordinate activities (Taylor, Rosegrant & Meyer, 1986; Kreps, 1989; Dwyer, 2002; Gorse, 2002).

- **Mass**: messages sent through the media as a means of contacting an organisation’s public (Taylor, Rosegrant & Meyer, 1986; Dwyer, 2002; Gorse, 2002).

Within construction a fifth communication approach emerges, identified by Kreps (1989), that of ‘multi-group messaging’, or the coordination of multiple group efforts (Gorse, 2002). This is also referred as ‘transactional communication’ (Eisenberg & Goodall, 1993). Transactional communication occurs between organisations and teams (Baguley, 1994). Emmitt & Gorse (2003), in their research into forms of construction communication, identified that communication within construction is further influenced by three dimensions of communicative processes, including scientific categorisation (e.g. measurement, classification etc.), manifestation of messages (e.g. produced, processed and delivered) and the importance of signs and symbols as part of communication. According to Emmitt & Gorse (2003) the presence of these dimensions suggest that communication in construction environments is linear, due in course to the more bureaucratic and divisional nature of the organisational structure.
Communication networks in construction are typically described as a linear structure that incorporates the sender sending a message along a channel to the receiver (Emmitt & Gorse, 2003; Dainty et al, 2006). Communication is both formal or structured and informal or non-structured (Emmitt & Gorse, 2003). Formal and informal communication is made up of differing messaging characteristics. Wood et al (2000) and Dwyer (2002) have described the difference between formal and informal communication. Formal communication involves downward, upward, lateral/horizontal and diagonal forms of messaging to inform; informal communication conveys information via a single strand, cluster or gossip chain. The descriptions of communication describe interactions within a singular organisation. Wood et al (2000) and Dwyer (2002) do not consider in their representation of the temporary and ad hoc nature of communication in construction.

Emmitt & Gorse (2007) identified that construction communication is one aspect of project management that pervades all other aspects. The reasoning behind this is related to the process of communication influenced by the well documented adversarial culture, fragmented communication, temporary partnerships, technical language and noise distractions of industry (Cherns & Bryant, 1984; Hill, 1995; Dainty et al, 2006). It is suggested by Hargie et al (1999) that in order to improve communication then the communication process must first be understood, despite the difficulty of the task (Fiske, 1990). The need to understand communication within construction is supported by Dainty et al (2006) who propose the most efficient way to understand the communicative process is from a cultural perspective. A cultural perspective, according to Dainty et al (2006), incorporates the whole organisational environment, temporary partnerships and project team and group processes, with consideration to informal and formal communication characteristics – an approach also supported by (Emmitt & Gorse, 2002). Viewing communication from a cultural perspective is particularly significant for organisational environments in achieving coordinated results, managing change, motivating employees and understanding the needs of the workforce. An approach utilised in research by Armstrong (2001) involves communication between project teams and organisations. According to research by Cherns & Bryant (1984) and Hill (1995), communication between teams and organisations is complex as the culture of the relationship is transient and involves large numbers of subcontractors who are only present for the duration of the project. Hence the general acceptance in research is that once the project is completed the relationship or partnership stops (Emmitt & Gorse, 2007). Reasons given for the finishing of the contractual relationship include communications at project-specific resources (human, financial and material capital), unique work scope and cost or time constraints (Turner, 1998; Dainty et al, 2007).
Studies thus far have identified communicative concepts throughout construction (Gameson, 1992; Larson, 1996; Loosemore, 1996; Emmitt, 1996; Emmitt & Gorse, 2002; Dainty et al, 2007); however, these have yet to explore how communication is used to support change management. Furthermore, studies have tended to focus on one-dimensional relationships between like-minded individuals without consideration towards those relationships present within organisational environment between non-like-minded individuals. Such relationships can be viewed formally and informally. This lack of understanding positions this thesis as using communication as a mechanism in which to explore the diffusion and implementation of lean strategies within construction organisations. Communication is also key to understanding the cultural debate that underpins all construction research.

2.5.4 The Cultural Debate in Construction

The nature of the cultural environment when change occurs is still similarly reported. Three cultural environments of change are identified within organisational environments.

The first cultural environment of change leads to an environment that is positive and empowering. This environment occurs when shifts in traditional working or management practices, processes and procedures take place (Dainty et al, 2007). Characteristically, the nature of the environment is often described as being driven by teams, groups and individuals within the organisation resulting in incorporated trust and commitment amongst organisational members (Dainty et al, 2007).

It is generally agreed in research that for an organisational culture to be considered empowered the following themes should be present:

- **Motivation** within an empowering construction environment enables the workforce to establish and maintain high levels of performance and productivity (Smithers & Walker, 2000; Gann, 2001; Cox et al, 2006; Koch, 2007).

- A sense of open and shared communication aids in the establishment of responsibility lines, resolution process and integrated team roles; within the empowering construction environment, communication is linked closely with the management competencies of leadership and decision making (Thomas & Thomas, 2005; Emmitt & Gorse, 2007).

- **Commitment and participation** is best represented within integrated team frameworks, within which employee commitment and participation occurs through the opening of opportunities associated with continuity, reciprocity and continuous improvement (Barlow et al, 1997; Winch, 2000; CRC, 2001; Cheng et al, 2004).
Trust and leadership elements/components reflect individual employees within the construction environment. Development of trust and leadership characteristics is influenced by strategic team collaboration, innovative thinking, team functionality, communication, loyalty and authority (Walker et al, 2001; Gallagher, 2003; Orr, 2005, Ingirige & Sexton, 2006). In terms of team functionality, trust and leadership is facilitated by the contributions of all team members, which facilitates the development of continuous improvement and learning objectives.

Cooperation and collaboration is another component directly linked to individual employees. Cooperation refers to the development of attitudes, beliefs, behaviours and values as a means to better perform organisational outcomes, goals and productivity (Emmitt & Gorse, 1998, 2000, 2003; Dainty et al, 2006, 2007). Collaboration targets integrate team frameworks through the implementation of innovative thinking and strategic partnering approaches assists in the aligning of communication, trust and loyalty (CII, 1989, 1991; Adudayyeh, 1994; Walker, 1996; CIRA, 1999; Walker et al, 2001).

The themes are representative of research investigating construction culture. Identifying the themes in isolation highlights a trend that is typical of research in construction. This trend is the description of the culture as a phenomenon that is similarly shared across a collective of the implementing environment. The description of the phenomenon is positioned in the components. More specifically, if the implementing environment is identified to have all components then it is assumed that the implementing environment is positive and empowering. Such static descriptions of culture limit the understanding of how and why the workforce responds to change. This is important as the workforce in its response is influenced by internal and external factors. However, what the table does allow one to assume is that these components are used by management as key performance indicators of cultural understanding and as mechanisms to support knowledge within the workforce. This latter idea is explored in more detail in Chapter 3 Cultural Maturity Model for Lean Innovation Diffusion.

The second cultural environment of change leads to an environment that is negative and exploitative. A negative and exploitative cultural environment is advocated through a human resource management platform of interpretation. The approach is advocated in this way to provide a way to investigate how change and innovation implementation negatively impacts the workforce (Green, 1999). The nature of the approach further advocates cultural exploitation within construction; this has similar implementation processes to that of cultural empowerment. This emerges as both strategic approaches are underpinned and guided by
levelled decision-making power and responsibilities for team and individual environments; however, differences arise due to resistant attitudes and reluctance to change.

The environment of a negative and exploitative culture is typically described to be driven by teams, groups and individuals within the organisation, dominated by employee dissatisfaction (Green, 1999; Green & May, 2000, 2005), including:

- **Reduced commitment** of workers within a culturally exploitative environment is characteristically identifiable through the presence of lower rates of pay, higher work intensities, onerous working systems, increased overtime workloads and unfriendly/hostile working environments (Green, 1999, 2000, 2002; Loosemore et al, 2003; Green & May, 2005; Dainty et al, 2007).

- **Employee dissatisfaction** within the construction industry is recognised as culturally exploitative through the presence of lower rates of pay, higher work intensities, onerous working systems, increased overtime workloads and unfriendly/hostile working environments (Green, 1999, 2000, 2002; Loosemore et al, 2003; Green & May, 2005; Dainty et al, 2007).

- **Industry de-professionalism** is identifiable within a culturally exploitative environment through the presence of lower rates of pay, higher work intensities, onerous working systems, increased overtime workloads and unfriendly/hostile working environments (Green, 1999, 2000, 2002; Loosemore et al, 2003; Green & May, 2005; Dainty et al, 2007).

- **Industrial conflicts** are culturally exploitative for the industry due to the project-based nature of the industry, ad hoc and adversarial relations and issues of mistrust and management (Green, 1999, 2000, 2002).

- **Management and personnel practice** within a culturally exploitative environment is characteristically identifiable through the presence of lower rates of pay, higher work intensities, onerous working systems, increased overtime workloads and unfriendly/hostile working environments (Green, 1999, 2000, 2002).

These components of culture have been identified in construction environments that describe a negative and exploitative construction organisation. The purpose of the table is to gain a deeper understanding of construction culture. The components presented in the table are representative of research specifically investigating construction culture. Identifying the components of an exploitative construction culture is important as this guides the research conceptualisation and the positioning of the research within the cultural debate.
This trend is the description of the culture as a phenomenon that is similarly shared across a collective of the implementing environment. The description of the phenomenon is positioned in the components. More specifically, if the implementing environment is identified to have all components then it is assumed that the implementing environment is therefore negative and exploitative. Such static descriptions of culture limit the understanding of how and why the workforce responds to change. This is important as the workforce in its response is influenced by internal and external factors. What the table does allow one to assume is that these components are used by management as key performance indicators of cultural understanding and as mechanisms to support knowledge within the workforce. This latter idea is explored in more detail in Chapter 3 Cultural Maturity Model for Lean Innovation Diffusion.

Cultural change leads to an environment that is exposed to both positive/empowering and negative/exploitative responses. This third environment is identified as differential and acknowledges both sides of the cultural debate through the study of cross-relationships within the implementing environment (Martin, 2002). This third cultural approach concentrates on the existence of individual sub-cultural groups and how cultural behaviours are shared within these groups but not across other sub-cultural groups (Martin, 2002; Gajendran & Brewer, 2007).

A key feature of the differential perspective of culture is the analysis and measurement of non-physical cultural aspects. These non-physical cultural aspects are identified as expression, ideational and symbolic contexts within the process of the cultural considerations associated with each sub-group (Smircich, 1983; Alvesson, 2002; Martin, 2002; Gajendran & Brewer, 2007).

The third, differential perspective of culture within a theoretical context explores the reasoning behind particular cultural environment problems such as communication. If considered from an innovative perspective this approach to understanding the cultural environment provides a framework in which to view and interpret the process. The cultural perspective is also guided through the perception and interpretation of implementation through organisational objectives such as employees, clients and turnover (Alvesson, 2002).

Although a third cultural perspective is emergent within construction, descriptions of the cultural environment when lean is implemented are representative of the positive and empowering or negative and exploitative perspectives. Understanding the culture of the implementing environment is key to interpreting how and why change is perceived and responded to by the workforce, particularly differences in understanding and response.
Within the lean community there has been no recognition of a differential environment to be present when lean implementation occurs. This study is about better understanding how the workforce responds to lean change, as well as how organisational management handles the transition of change. Therefore the study will consider culture from a differential perspective that highlights both positive and negative attitudes and behaviours. Considering both a positive and negative culture will allow for a deeper understanding to emerge and contribute new knowledge in the lean communicate about culture and lean implementation.

2.5.5 Construction Culture Summary
Culture has been identified internationally as a link to improved productivity and reduced waste, minimising the number of conflicts and improving product performance. There is within industry a failure and inability to investigate and understand the cultural impacts of change within implementing environments (Ankrah & Langford, 2005). Three trends emerged within the review of cultural literature.

Firstly, the failure of reasoning associated with culture and change. This trend is influenced by the human factors present within the implementing environment. The failure of the trend is present in such attempts to successfully implement a cultural targeted change in the form of construction processes; management and performance has been dependent on the human factors associated with the intended change or innovation implementation (Loosemore et al, 2003; Dainty et al, 2007).

The second trend, concerns how change is approached and understood. This trend deals with perceptions, attitudes and the comprehension of the cultural change. The fundamental objective of this trend concerns the management, operation and workforce of the implementing environment interpreted alongside the change (Schein, 1985; Ankrah & Langford, 2005).

The third and final trend concerns the implementing environment as a mechanism to understand the impact of change. This trend considers the true cultural impact of change. There is a failure within academic literature to identify and explore the cultural constructs that underpin the ideals of cultural thought.

The research aims to overcome such limitations through the consideration of human behaviours, attitudes, beliefs and values of the workforce when the implementation of new ideas occurs. The context of the study will focus on the construction organisation.

2.6 The Lean Organisation
The review of literature has so far discussed elements that form the underlying culture of construction organisations, but what has not been considered is the idea of a lean organisation.
It has been suggested in lean production literature that for lean to be “successful” organisational management need to have a clear idea of the “end goal” (Add references); is this “end goal” a lean organisation. This will now be considered.

As the construction industry is identifiable as predominantly project-based, such classification has resulted in construction organisations adopting and showing characteristics that weaken productivity (Dainty et al, 2007). As a result there has been movement within the construction research to explore the organisational environment aligned with change management (Bennett & Jayes, 1995, 1998; Cox, 1997; Green, 1998; Brensen & Marshall, 2000, 2002; Gann, 2000). This research focused on the application, exploration and transferability of manufacturing and production-influenced strategic management approaches such as strategic partnering, lean, ‘six sigma’ or total quality management to be implemented. Such strategic management approaches specifically deal with ineffective and inefficient productivity (Koskela, 1992; Bennett & Jayes, 1995, 1998; Bennet et al, 1995; Brensen & Marshall, 2000, 2002).

The rate of implementation of production and manufacturing strategic approaches within construction has caused much debate concerning the theory of transferability between industry sectors (Green, 1999, 2000, 2002; Winch, 2000, 2003; London & Kenley, 2001; Green & May, 2005). Of particular concern is the application of standardised manufacturing practice into an industry that is considered characteristically unique, particularly the implementation consequences that can occur for organisational management (Brensen & Marshall, 2002). The consequences are cultural in nature and reflect the existing cultural behaviours and attitudes already ingrained in the environment (Brensen & Marshall, 2000).

There are currently three interpretations highlighting a distinct change when lean implementation occurs within construction organisations. The first interpretation is that of a transforming lean organisation. In their research Kinnie et al (1998) discussed the idea of lean implementation transforming the organisation into a lean organisation. The second and third interpretations are reflective of the cultural approach of lean implementation, highlighting empowering and exploitative ideas. For other lean researchers and practitioners the transforming of the organisation is a cultural ‘success’ typically described as the organisation becoming a positive and empowering environment (Coffey, 2000; Orr, 2005; Buch & Sander, 2005). The cultural ‘success’ interpretation is more prominent in lean literature, though researchers such as Green (1998, 1999), Dauber (2000), Fairclough (2004) and Winch (2005, 2006) disagree with the ‘successfulness’ of lean implementation by challenging the practicality and transferability of theory between industries. These interpretations of lean change in construction organisations are now explored.
The idea of ‘the lean organisation’ or a ‘lean culture’ has become more prominent with the increasing rates of lean implementation across the construction industry to reduce productivity ineffectiveness and inefficiencies (Kinnie et al, 1998). Issues such as ad hoc working environments and industry fragmentation have been identified as major issues impacting and limiting the cultural success of lean implementation (Green, 1999; 2002; Cox et al, 2006). The cultural phenomenon strategic approach of lean implementation advocates the facilitation of cultural limitations, as the culture of implementation is often described in the context of the collective. Typically the collective culture of the implementing environment is represented of a response that is either successful, positive or empowering (Coffey, 2000; Buch & Sander, 2005; Orr, 2005; Zuo & Zillante, 2006) or unsuccessful, conflicted or exploitative (Green, 1999; 2000; Green & May, 2005; Loosemore et al, 2003; Dainty et al, 2007). Although collective perspectives are dominated in cultural studies of lean implementation, such studies have identified a variety of cultural characteristics which are uniquely lean.

The emergence of cultural characteristics unique to lean environments can assist in further understanding the transitional environment of organisations when lean is implemented. Table 2.2 Cultural Characteristics of Lean Construction Organisations identifies prominent cultural characteristics and the organisational context in which they emerge within lean cultural studies. In particular the table illustrates a lack of understanding regarding negative cultures, neglected by a driving need for immediate positive change associated with lean construction. Understanding how individuals and the collective workforce respond culturally to innovation is an important aspect that the research considers. It is already known that culture is representative of a collective group guided by norms, values and morals; further influencing the collective group is the behaviours and attitudes of the individual. This latter influence of the individual in the collective has not been explicitly explored in construction management research, particularly with regard to lean implementation. Rather, culture is representative of a series of five themes: leadership, teams, communication, employees and sub-cultures.

The information presented in Table 2.2 also further guides the research approach and purpose. The purpose of the thesis is to explore how individuals in the collective respond to the implementation of lean in construction organisations, looking specifically at lean implementation through a cultural lens. The approach takes into consideration differing rates of understanding and also the potential for the use of mechanisms to support knowledge development and interaction within the workforce.
Table 2.2: Cultural Aspects of Lean Construction Organisations

<table>
<thead>
<tr>
<th>Theme</th>
<th>Author</th>
<th>Description &amp; Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>Blanchard 1966</td>
<td>Although written prior to the lean movement, the author highlighted a need to promote collaboration within the organisational environment. In this research the author suggested that, to improve productivity ineffectiveness and inefficiencies, management should encourage situational opportunities throughout the construction process. This characteristic has been identified as one of the core principles to the production centric approach of lean for construction embraced through elements of control, cost, planning and design.</td>
</tr>
<tr>
<td>Orr 2005</td>
<td></td>
<td>• Inspire workers/employees by leading by example.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Missing link between practical application and theorisation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Focuses on coaching as a means to teach the construction workforce.</td>
</tr>
<tr>
<td>Arbulu &amp; Zabelle 2006</td>
<td></td>
<td>• Focuses on coaching as a means to teach the construction workforce.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creates employee commitment and involvement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Guides the implementation process.</td>
</tr>
<tr>
<td>Alsdorf et al 2006</td>
<td></td>
<td>• Focuses on coaching as a means to teach the construction workforce.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creates employee commitment and involvement.</td>
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<tr>
<td></td>
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<td>• Guides the implementation process.</td>
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<tr>
<th>Theme</th>
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<th>Description &amp; Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teams</td>
<td>Buch &amp; Sander 2005</td>
<td>• Recognition of all team members’ participation in the construction process and performance achievement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creates employee commitment and involvement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Shifts management philosophies.</td>
</tr>
<tr>
<td>Arbulu &amp; Zabelle 2006</td>
<td></td>
<td>• Recognition of all team members’ participation in the construction process and performance achievement.</td>
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<td></td>
<td>• Creates employee commitment and involvement.</td>
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<tr>
<td></td>
<td></td>
<td>• Shifts management philosophies.</td>
</tr>
<tr>
<td>Theme</td>
<td>Author</td>
<td>Description &amp; Characteristics</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Teams</strong></td>
<td></td>
<td><strong>Negative Interpretations</strong></td>
</tr>
<tr>
<td></td>
<td>Thomas et al</td>
<td>• Fragmented cross-project relationships.</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>• Demand for social management skills.</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>• Fragmented cross-project relationships.</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>• Demand for social management skills.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• One-sided implementation.</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>Buch &amp; Sander</td>
<td>• Developed communication structures and streams with workers.</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>• Regarded as a resource.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creates employee commitment and involvement.</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td>Coffey</td>
<td><strong>Positive Interpretations</strong></td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>• Inclusion of the workforce in the decision making process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Viewing the workforce as a resource.</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td>Green</td>
<td><strong>Negative Interpretations</strong></td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>• Controls the workforce.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Empowerment only experienced when management imposes or sets production targets.</td>
</tr>
<tr>
<td><strong>Sub-cultures</strong></td>
<td>Zuo &amp; Zillante</td>
<td><strong>Description &amp; Characteristics</strong></td>
</tr>
<tr>
<td></td>
<td>2006</td>
<td>• Addresses the importance of industry and project cultures within the implementation process.</td>
</tr>
</tbody>
</table>
2.7 The Research Gap

The literature review draws upon two bodies of theory – lean construction and construction culture – and explores these theories that are aligned with construction cultures. Figure 2.2 Lean Literature Review summarises the main themes emerging from the literature review before introducing the first research question. The figure highlights how the review started with the development of lean theory in construction before identifying lean implementation as a major issue.

Within the review of implementation-specific research the ideas of lean implementation leading to the emergence of a lean culture or lean organisation was proposed. As research in these areas is limited, highlighting mainly positive cultures with little negative reported, construction culture research was drawn upon to fill in the cultural gaps.

In reviewing construction culture literature it was found that when organisations undergo a ‘change’ that the cultural environment of that organisation also changes. The nature of the debate of cultural change was dichotomous, highlighting a wide spilt between researchers. The cultural debate identified that in construction culture those instances of organisational change lead to the organisation either experiencing or becoming an empowered or exploitative cultural organisation. Although the cultural debate is thus divided, both sides identified communication as a power agent that assists in understanding how the culture changes. The presence of communication assumes that organisational change is supported by management, the extent of which is not known. Communication also introduces the potential to understand the process of change and interaction across organisational groups when change occurs.

The review of literature then drew the two bodies of theory together to further explore this idea of ‘the lean organisation’. This correlation identified the presence of some characteristics that are unique in the lean environments; however, there is a need to further explore this idea.
Figure 2.2: Lean Literature Review
The discussion here now leads to the presentation of Research Question 1 of the thesis:

What are the mechanisms supporting an organisation’s lean implementation journey?

Research Question 1 focuses on identifying and describing the mechanisms employed by organisational management to support the workforce when lean is implemented. Supporting mechanisms are described as being representative of a commitment by management to encourage knowledge development and interaction between groups and individuals in the workforce throughout the implementation process. Research Question 1 in this respect makes contributions to new knowledge by merging the current engineering and cultural implementation interpretations to identify and describe the mechanisms that support the lean implementation process.

2.8 Conclusion

The chapter commenced by highlighting lean construction and its origins in theory, practice and as a philosophy. The review of literature highlighted that lean is viewed multiple ways with interpretations influenced by the understanding of original lean concepts established in manufacturing and production as introduced by Ohno (1974) and Shingo (1984, 1988). How lean is understood has also influenced how implementation is approached. The review of literature identified two interpretations of lean implementation the staged approach which views lean typically as a strategy with implementation occurring statically enhanced by the acceptance or rejection of lean - this approach dominates the lean implementation debate. Or the cultural approach which views implementation alongside the culture of the implementing environment suggesting there is more to lean that an acceptance or rejection – suggesting implementation results in the emergence of a lean organisation.

The discourse between implementation awareness is linked to culture and how the culture of the implementing organisation is perceived. For example, static interpretations are typically linked to viewing lean as a strategic tool for productivity improvement whereas cultural interpretations are linked to viewing lean as a measure of control. The same descriptions are often presented across research and in many industry reports. The underlying understanding of why and how implementation occurs has not further progressed, yet claims are regularly made regarding successful integration of lean within the implementing organisation without describing holistically the implementation approach. Descriptions of change simply rely on grouping organisations into successful and unsuccessful implementations.

Construction culture was introduced as a means explore how change impacts construction organisations. The review of literature identified a number of similar trends between the lean and
construction communities, of particular importance is how change is approached and understood. The review of literature highlighted that change occurrences bring about two direct and one evolutionary change to organisational culture. The two direct changes suggest change is either positive or negative, with the reaction dependent on the existing environment. The third perspective highlights an awareness of cultural evolution of the organisational environment experiencing both positive and negative reactions throughout the change process.

These three representations of cultural change form the investigative and intellectual framework of the study. The nature of the representations assumes that culture does not change but evolves; this evolution of culture is also referred to as ‘cultural maturity’. The maturity perspective forms the research problem, with the problem in understanding how the culture of construction organisations matures through lean implementation. Also of interest is the identification of mechanisms used by organisational management as a means to support the organisation throughout the process. These elements will now be discussed in Chapter 3 Research Conceptualisation.

The chapter commenced by highlighting the areas of research interest as identified in Chapter 2 Literature Review. Three areas emerged regarding lean implementation and cultural maturity in construction organisations: viewing lean implementation in line with theoretical foundation; the exploration of lean applications within construction organisations; and the exploration of approaches that consider evolutionary cultural change rather than static cultural change approaches.
Section 2: Understanding the Lean Problem & Model Development

Chapters 3 and 4

Cultural Maturity Model for Lean Innovation Diffusion

and

Methodology

The chapters in this section assess the research gaps identified and highlighted in Section 1; the identified research gaps guide the conceptualisation and methodology discussion. Using existing research as a basis, Chapters 3 and 4 explore in detail diffusion theory and its application in the development of the culture maturity model. The model provides a framework that enables the second research question to be introduced. The two research questions are supported by the methodological framework, which addresses such concerns as research design and ontological and epistemological considerations, research method and analysis techniques.
Chapter 3 Cultural Maturity Model for Lean Innovation Diffusion

3.1 Introduction
This chapter describes the conceptualisation and design of the research investigation. The purpose of the chapter is to explore lean implementation as an innovation and to develop a conceptual model to investigate lean innovation cultural maturity. The chapter also discusses the research conceptualisation with consideration to other research projects. The structure of the chapter reflects the approach, with conceptualisation discussed across three areas.

The chapter begins by re-identifying the conceptualisation contexts that form the research gap. Re-addressing the research gap assists in providing a summary of the main issues forming the investigative and intellectual framework of the research. Following on from the research conceptualisation contexts is a deeper exploration of the research gap. This section synthesises the limitations of current research in lean innovation and diffusion. In exploring these contexts in detail, the implementation of lean can be viewed as an innovation, and as such diffusion theory is used as an investigative framework to interpret lean diffusion.

The chapter then explores diffusion theory and its constructs in greater detail. The purpose of this section is to explore the viability of diffusion theory as a valid theoretical framework to guide the research investigation. This addresses the validity of diffusion as a theoretical framework. The theoretical constructs are identified and analysed with consideration to lean and non-lean studies that have also used diffusion as a framework. This section of the research conceptualisation poses the potential use of diffusion as a framework in which to explore cultural responses to innovation.

Cultural maturity is the final component addressed in the chapter. The purpose of this section is to identify and explore cultural perceptions concerning culture; specifically, the idea of cultural maturity. The exploration highlights how the implementation of innovation is perceived to be a cultural change rather than a cultural evolution of the implementing environment. Borrowing research approaches from business management, cultural evolution is explored. The exploration of business management literature highlights that cultural evolution process is actually an environment undergoing maturation. This maturity is reflective of the implementing environment and the implementation.

The chapter concludes with a discussion about cultural maturity. The discussion serves as a basis to develop a research model in which to investigate the research problem. Guiding the development of the research model is the underlying consideration of why culture is perceived by
individuals and the workforce when lean is implemented. The research model is guided by the cultural perception that responses to the implementation of lean are varied, being influenced by the existing cultural environment and assistance by management through supporting mechanisms. The conceptual model suggests the maturity of culture is representative of how culture should be understood, not as it ‘ought’ to be described.

3.1.1 The Research Gap
Chapter 2 Literature Review explored two research areas of construction: lean implementation and construction culture. The review of literature highlighted two observations that assist in guiding the conceptualisation of the research problem. Lean implementation is the first issue observed as forming the research problem. The prominent observation of this problem is that the interpretation of lean implementation by the research community defines the process as what it ‘ought’ to be and not as it is. The ‘ought to be’ description of implementation is representative of either an engineering or cultural phenomenon, typically describing implementation a certain way within a project or activity based scenario. The research community neglects to acknowledge how the implementing environment responds to the implementation and associated process decisions that occur and influence.

It is therefore proposed that the research will position implementation aligned with a diffusion-influenced theoretical approach to interpret how the lean innovation is diffused in construction organisations. This will form two elements of the research conceptualisation model. Consideration of implementation within a construction organisation will enable the highlighting and incorporation of varied social, cultural and environmental attitudes, perceptions, behaviours, values and morals to emerge as part of the process. This approach will further allow for responses of organisational groups to identified and interpreted alignment with the implementation process and how the workforce is then supported. Guiding the development of the research conceptualisation model is a theoretical foundation of diffusion theory.

Lean culture is the final issue observed as forming the research problem. The prominent observation is that lean construction culture is dichotomously represented. The research community typically describes culture as representative of either a static, mono or cohesive state of altered change. This static representation of cultural change was also considered normal in construction culture research that also dealt with ‘change’. The ‘ought to be’ description of culture is representative of either one of two extreme interpretations of culture, typically supported by and described as being influenced by the project nature of the construction industry. The culture is often described as either empowering or exploitative, as shown in Figure 3.1 The
**Research Gap.** The research community neglects to acknowledge how the implementing environment responds to change and associated change decisions that influence culture.

It is therefore proposed that the research will position culture aligned within an evolutionary framework. The evolutionary framework approaches culture as a continuously maturing entity influenced by internal and external forces throughout the diffusion process. The approach proposes that the organisational environment does not so much change but rather, as a living organism, organically matures.

Figure 3.1 visually describes the research community’s typical approach to lean implementation. The simplistic approach to lean implementation highlights how higher management makes a decision to implement lean, applying lean to an implementing environment and then culturally interpreting it as either empowering or exploitative. Such a simplistic understanding of cultural change assumes change is usually described as what it ‘ought to be’, not as it ‘should be’. This idea of ‘should be’ is representative of cultural change not as an explicit description of the whole but rather as an entity that is formed by multiple interconnected cultures. The observations underpinning the conceptualisation of the research problem are interconnected and focus on understanding lean implementation. Clearly there is a need explore lean implementation culture with a more diverse and pluralistic approach.
As the research is about understanding lean implementation using a cultural lens, the conceptual model and theoretical foundation need to reflect this. In particular, the conceptual model needs to reflect considerations towards multiple perceptions of response, interaction and lean awareness within the implementing environment over a continuum of time. Lean implementation from this point forward will be referred to as ‘lean innovation’. Lean innovation is the first component of the conceptual model, and will now be discussed.

### 3.2 Lean Innovation

The section draws upon the observations forming the research gap to explore the relationship between three concepts of lean implementation, organisations and culture.
Innovation is widely defined across three perspectives. Firstly, innovation is defined as an overarching perspective (Schmookler, 1952; Marquis, 1988) and is often described as a:

Non-trivial improvement in a product, process of system that is actually used and which is novel to the company developing or using it. (Slaughter, 2000: 246)

Secondly, innovation is defined as a general perspective (Manley et al, 2005) and is often described as:

The implementation of a new or significantly improved product or process, a new marketing method, or new organisational method in business practices, workplace organisation or external relations. (OECD/Eurostat, 2005: 46)

And finally, innovation is defined as a construction perspective and is typically described as being guided by:

The generation, development and application of new ideas to improve organisational competitive advantage, productivity, performance and profitability. (Schumpeter, 1976; Winch, 1998; Manley et al, 2005; Manseau & Shields, 2005; Shields, 2005)

It is common practice within construction to simply apply theories and management systems developed within manufacturing and production sectors to construction as a means to improve productivity and eliminate waste (Cox, 1997; Green, 1998; Gann, 2000; Brensen & Marshall, 2002; Cox et al, 2006). Such manufacturing and production approaches including lean have either been borrowed or completely transferred (Koskela, 1993; Vrijhoef & Koskela, 1999; Koskela & Vrijhoef, 2000, 2001; Davey et al, 2003; Green & May, 2005); this transferring is a form of innovation. Koskela’s (2000) study highlighted a connection between lean and innovation, exploring lean innovation through a theoretical perspective of transformation, value and flow. Further studies by Koskela and Vrijhoef (1999, 2000, 2001), Davey et al (2003) and Green and May (2005) have similarly viewed lean as a form of innovation. Koskela and Vrijhoef (1999, 2000, 2001) have studied lean innovation theoretically through the application of lean as a mechanism of information technology to create deeper levels of innovative thought, again using the theory of production or transformation, value and flow. These studies highlighted the counterproductive nature of managerial decisions and how this counter-productivity leads to systematic added costs and reduced functionality suggested that the lean innovation is an adequate solution to improvement. Although providing a direct understanding of lean innovation, the studies undertaken by Koskela & Vrijheof (1999, 2000, 2001) neglect to consider the cultural implications of lean innovation within the implementing environment.
Cultural implications of lean have been discussed and analysed across a number of studies, such as Davey et al.'s (2010) study of lean diffusion through action learning objectives and Green and May's (2005) study of the leanness of lean construction theory; these studies further highlight the cultural dichotomy that underpins the lean debate. Davey et al (2010) suggest successful lean diffusion occurs through active learning objectives that create interaction between the innovation and the individual; results from this empirical study highlighted a positive altering in the culture occurring in small and medium enterprises. Green and May (2005) present culture negatively suggesting lean innovation alters the culture of the workforce towards a dictatorial management structure to emerge. Although the studies provide a cultural response within organisations aligned to lean innovation the two studies do not explicitly explain the diffusion (implementation) or cultural response through study participants; though contributions to innovation theory are made. Recent research by Green (2011) suggests construction organisations can be viewed both positively and negatively when construction improvement occurs. One such approach advocated by Green (2011) in this research is construction improvement viewed as a cultural metaphor focusing on the importance of an organisation possessing shared values and beliefs (Morgan, 2006). The approach here is guided by the assumption that organisational performance depends on an alignment between the values of the employee and management strategy (Peters & Waterman, 1982). This latter idea, presented in research by Peters and Waterman (1982), has been questioned by researchers exploring the extent to which culture can be manipulated and controlled by higher management (Willment, 1993; Antony, 1994; Legge, 1994); further impacting the organisation by promoting unforeseen counter-cultures that become dysfunctional (Green, 2011).

Although the lean philosophy has been identifiable as an innovation, the contextualisation of lean implementation is limited, particularly in understanding the link between diffusion and culture. The perceptions towards lean innovation in construction organisations from research have primarily addressed the nature of lean implementation followed by the intended ‘cultural’ outcome of the application (Koskela, 1992, 1993; Alarcon, 1992; Ballard, 1998; Howell, 1999; Green, 1998, 1999, 2000; Buch & Sander, 2005 and Orr, 2005), rather than aligning the process of lean implementation to changing culture. Current approaches in the lean construction community complicate cultural understanding as culture is represented as a collective ‘cultural’ response of the innovation. The focus on specific philosophical elements such as flow, productivity or waste neglects to recognise how those elements then influence and encourage responses in the workforce. Rarely has lean been discussed within the constructs of a well-
considered culturally innovative theoretical framework; therefore, a theoretical framework is considered to guide the study’s conceptual model.

The study is essentially investigating lean innovation from a cultural perspective. Understanding is guided by the observations of employees in construction organisations implementing lean; as a snapshot in time. Meaning steps of the process will not be specifically identified, rather organisational personnel will reflect on the process, with these organisational reflections to be used to describe the phases of implementation. As such, the theoretical framework needs to reflect the relationship between the innovation and cultural responses of the workforce in the implementing environment. Rogers’ (1969) diffusion theory provides a theoretical framework that explores the diffusion of innovation through social system units, highlighting a relationship between the innovation, process and social system; further linking innovation to processes and social systems. The theory provides the relevant theoretical framework to investigate the research problem and is now explored in further detail in relation to lean innovation.

3.3 Diffusion Theory

3.3.1 Diffusion Theory Definition

Diffusion theory has been used to investigate a wide arc of disciplinary research fields, including social sciences and sociology (Rogers, 1969, 1971, 1983, 2003), management (Bayer & Malone, 1988) and construction (Vrijhoef & Koskela, 1999; Koskela & Vrijhoef, 2000, 2001; Davey et al, 2000; Green & May, 2005; Manley et al, 2005; Kale & Arditi, 2006; London et al, 2006).

Diffusion refers to the:

Process by which an innovation is communicated through certain channels, over time, among members of a social system. (Rogers, 1969)

Diffusion theory comprises four primary constructs: the innovation; the communication; time and the social system (Rogers, 1971, 1983, 1995; Bayer & Melone, 1988; Kale & Arditi, 2006). Further to the primary constructs, Rogers’ (1983) suggested that diffusion theory is guided by two social aspects; further linking innovation to process and social system unites. The first, applies to the method in which messages are communicated along the social system when implementation occurs. Understanding the communication of messages assists in the identification and development of special or uncertain characters to emerge as part of the process. The second applies to the type of relationships found within the working environment, such as ‘semi-fragmented’ or ‘temporary’ (Rogers’, 1983). This second aspect is of particular importance to this research as industry is often described as being affected by fragmented and adversarial relations.
and temporary project relations (Cox et al, 2006; Latham, 19994; Egan, 1998, 2002; Thomas & Thomas, 2005; Dainty et al, 2006, 2007, 2011). Understanding how these relationships influence the response of the workforce allows for a deeper understanding to emerge and contribute new knowledge.

Peansupap and Walker (2006), while investigating the diffusion of information communication technologies in construction projects, highlighted a third social aspect of diffusion theory. The researchers suggest that the diffusion of innovation within construction organisations requires a direct managerial change to facilitate and encourage adoption. The type of managerial change is not clearly stated but could be reflective of a major catastrophic event such as the death of a company chief executive officer (CEO), or encouraged through an external contract or project relationship. Research undertaken by Senge et al (1999) and cited by Peansupap and Walker (2006) however note that the facilitation and encouragement of innovation diffusion can be achievable by simply supporting the workforce through motivation, training and technical support or providing supervisor support for an open-discussion environment. This latter social aspect of diffusion theory has considerations towards the first research question and the identification of supporting mechanisms of innovation. However, the constructs of diffusion theory need to be identified to determine the alignment of these social aspects within the larger theoretical framework.

### 3.3.2 Diffusion Theory Constructs

Roger’s (1962) diffusion theory is typically viewed in construction as a having both primary and secondary theoretical constructs. Table 3.1 *Diffusion Theory Constructs in Construction Research* summaries these constructs as defined in construction and lean research. The table describes construction approaches highlighting both lean and non-lean representations of diffusion awareness. The purpose of the table is to gain a deeper understanding of diffusion theory and its application within construction. Of particular interest in the table is the development of an understanding of lean and diffusion; the inclusion of non-lean research allows for limitations in theory to emerge without impacting the conceptual model. The purpose of this table is to identify pass research in construction management and lean construction disciplines that have used Rogers’ diffusion theory to investigate lean implementation; highlighting both construction management and lean construction disciplines enables the research to be contextualised within existing work.

It is apparent that there are common themes across research of innovation, communication, time and the social system: the primary constructs. It is also equally apparent that there is disagreement
on the secondary constructs, such as relative advantage and compatibility that extend beyond the parameters of the original theory. Construction researchers who have adopted an innovative diffusion theoretical framework have explored ‘innovations’ such as construction information technology (Sonnenwald et al, 2001; London et al, 2006), supply chain networks (Cox et al, 2006) and lean (Koskela & Vrijhoef, 2001; Green & May, 2005). However, there has been some debate between the simplistic nature of the theory aligned to the practical implementation of the innovation within the real world (Bayer & Malone, 1998; Sonnenwald, 2001; London et al, 2006); [refer to section 3.3.3 for more]. In diffusion theory the concept of time is fundamental and there is a dearth of literature that brings together the temporal dimension, champions and lean implementation. Clearly there is a need to further explore the diffusion of innovation in real time.
Table 3.1: Diffusion Theory Constructs in Construction Research

<table>
<thead>
<tr>
<th>Diffusion Construct</th>
<th>Rogers’ Approach</th>
<th>Construction Approach</th>
<th>Lean Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation</td>
<td>An idea, practice, object or other unit of adoption which has been or is perceived to be new by an individual. Reflection into the human behaviour of the individual to which the innovation impacts. The innovation is expressed in terms of the knowledge, persuasion or the decision to adopt. Rogers, 1969, 1972, 1983, 1995</td>
<td>To largely be measured through the degree of adoption within a social system; and the notion of a direct decision of the workforce to either ‘adopt’ or ‘not adopt’.</td>
<td>The adoption of lean principles into construction projects or organisations.</td>
</tr>
<tr>
<td>Communication</td>
<td>Diffusion is classified as a particular type of communication in which the ideas of the innovation exchanged along communication channels. Communication channels refer to the means in which innovative ideas and messages are passed between individuals within the social system. Rogers, 1969, 1972, 1983, 1995</td>
<td>The presence of stable and appropriate communication channels within the context of construction is complex due mainly to the presence of fragmented and temporary organisational relationships characterised in particular by the one-off project nature of the construction. Cox, Ireland, Townsend, 2006</td>
<td>Identified as simply the networks in which the workforce communicate and interact.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Davey et al, 2000; Green &amp; May 2005; Larsen &amp; Ballal, 2005</td>
</tr>
</tbody>
</table>
Table 3.1: Diffusion Theory Constructs in Construction Research

<table>
<thead>
<tr>
<th>Diffusion Construct</th>
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<th>Construction Approach</th>
<th>Lean Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time</strong></td>
<td>Time within the diffusion process is seen as a variable strength however the measurement of time dimensions is considered weak. Time can be defined as the process between the first knowledge of the innovation by the individual, through the decision to adopt or not to adapt, through to the implementation of the said innovation and the confirmation of the said decision. Rogers 1969 1983 1972 1995</td>
<td>Diffusion happens in time, whilst the other key elements of innovation, communication channels and social system exert variable influence upon the temporal diffusion process depending on their specific qualities. London et al (2006)</td>
<td>Observed as the timeframe of implementation. Green &amp; May 2005</td>
</tr>
<tr>
<td><strong>Social System</strong></td>
<td>‘Social system’ refers to the set of interrelated units engaged to solve common problems therefore accomplishing common goals. Social system includes individuals, informal groups, organisations or sub-systems. Adoption of innovation is driven by either opinion leaders/change agents or a combination of the two. Rogers 1969 1983 1972 1995</td>
<td>Construction social system refers to groups of professional working within a department, organisation or project team environment. Tornatsky &amp; Fleisher 1990</td>
<td>Implementation of the lean innovation into an environment, usually a project team or organisation group. Larsen &amp; Ballal, 2005</td>
</tr>
<tr>
<td>Diffusion Construct</td>
<td>Rogers’ Approach</td>
<td>Construction Approach</td>
<td>Lean Approach</td>
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</tbody>
</table>
| Relative Advantage  | Refers to the extent in which the innovation surpasses current practices and can be viewed within the context of operational or measured variable terms particularly in the usefulness in the accomplishment of working goals, quality of working outcomes, added convenience and social prestige. | The process may be affected by various factors relating to the key elements of including:  
- the specific attributes of the innovation in question;  
- how influential is the type of innovation decision being made. 
These factors parallel the recognition of organisational culture and managerial philosophy as a driver to lean construction adoption, particularly the event that influences the decision of adoption. | Not observed. |
| Compatibility        | This refers to the degree in which the innovation is perceived to be consistent with the adopters of existing values, past experiences and needs which include such elements as individuals, group and organisational needs, culture, structures and goals. | Rogers 1983 1995 |

Table 3.1: Diffusion Theory Constructs in Construction Research
<table>
<thead>
<tr>
<th>Diffusion Construct</th>
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<th>Construction Approach</th>
<th>Lean Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>Is the perceived difficulty in which learning to understand or used aligned with the innovation. Rogers 1983 1995</td>
<td>Construct may be classified as a limitation to the theory due to the complex nature of construction relationship systems, if this construction relationship system is not defined then complexity is harder to address and analyse related impacts Sonnenwald et al, 2001</td>
<td>Not observed.</td>
</tr>
<tr>
<td>Trailability</td>
<td>Refers to the experimentation associated with the implementation of the innovation. Rogers 1983 1995</td>
<td>Construction trialability and observability can be used within smaller projects as a means to test the possible advantages associated with the implementation of a particular innovation.</td>
<td>Not observed.</td>
</tr>
<tr>
<td>Observability</td>
<td>Is the degree in which the results of the innovation are seen and understood. Rogers 1983 1995</td>
<td></td>
<td>Not observed.</td>
</tr>
</tbody>
</table>
3.3.3 Diffusion and the Conceptual Model

Innovation has a long history; Schumpeter (1934) and Kondratieff (1935) first discussed innovation in business organisations in the early 1930s. They described the implications of innovation, considering it as a form of competitive advantage to sustain position within the context of the global economy. These early approaches advocated innovation to follow a historical path defined by phases of prosperity, recession, depression and recovery. In construction, innovation is similarly discussed as a form of competitive advantage typically described as achieving organisational competencies, behaviours, history and costs through change management (Bayer & Malone, 1998; Dosi, 1998; London et al, 2006; Peansupap & Walker, 2006). The purpose of change through innovation has altered since the 1930s, with innovation less about sustaining position in the market and more about complementing existing dynamic capabilities, idiosyncrasies and path-dependent management systems that are already present in the implementing environment (Teece et al, 1997; Eisenhardt & Martin, 2000).

In their critique of Rogers’ diffusion theory, London et al (2006) discuss Rogers’ diffusion framework to largely be measured through the degree of adoption within a social system, and fundamentally challenged the notion of a direct decision by the manager of an organisation to either ‘adopt’ or ‘not adopt’. They suggested that adoption is a much more complex and blurred process affected by various barriers and enablers. Because of this complexity their research produced results from an empirical study of more than 30 organisations that also suggested that there are decision pathways to adoption and that the organisations have different characteristics at different times as they evolve and adapt to the innovation. Lean implementation is similarly a complex process and yet this complexity has not really been explored and critiqued to any great extent. There has been a dearth of literature investigating the way in which the lean organisation evolves and if this transformation differs or is similar across organisations.

Adopters are simplistically categorised by Rogers’ (1962) as ‘innovators’, early adopters’, ‘early majority’ or ‘laggards’. These categorisations are differentiated primarily in relation to diffusion as a temporal process; that is, diffusion happens in time, whilst the other key elements of innovation – communication channels and social system – exert variable influence upon the temporal diffusion process depending on their specific qualities. According to Rogers (1962; 1983), for example, communication channels vary in importance according to the type of adopter; mass media and expert knowledge has more influence on innovators, whereas personal networks are more important for late adopters (Rogers, 1995). However, Rogers’ adopter group categorisation does not consider the fragmented relationship networks that are present in
construction and how this fragmentation develops informal communication networks. Larsen and Ballal (2005), researching within construction environments and citing anthropological and sociological-based arguments by Menzel & Katz, (1955), Katz, (1956), Becker, (1970) and Gray (1985), identify informal communication networks as providing a platform to understand diffusion and knowledge within and across organisational groups.

Rogers’ diffusion theory is therefore viewed as the adoption-decision process and the rate of adoption-comprising multiple phases influenced by various factors. The adoption-decision process is a key phase through which an individual (or group) passes from:

- first knowledge of the innovation; to
- forming an attitude to the innovation; to
- making the decision to adopt or reject the innovation; to
- implementing the innovation and confirming the decision taken.

This transition from first knowledge of the innovation to its implementation measure as a temporal process encompasses the innovations rate of adoption (London et al, 2006). The assumed presence of formal and informal communication networking within the implementing environment throughout diffusion will form a significant component of the conceptual model. The study of lean innovation adoption highlighting communication will allow the study to explore how individuals and groups within lean organisations utilise communication to assist knowledge development and interaction over the continuum of time; in this study time is representative of a implementation snapshot. Within the study the continuum of time assumes that the workforce is constantly interacting and evolving, developing new relationships and knowledge as lean innovation is diffused and altered by the decisions of management. This is something that has not been considered or approached in lean construction research.

London et al (2006) further suggest that the process may be affected by various factors relating to the key elements of Rogers’ theory including:

- the specific attributes of the innovation in question – its relative advantage, compatibility, complexity, trial ability and observability (Rogers, 1995); also
- how influential is the type of innovation decision being made whether its option/individual, collective/organisational and authoritarian/hierarchical.
These factors parallel the recognition of organisational culture and managerial philosophy as a driver to lean construction adoption, particularly the event that influences the decision of adoption. The basic significance of Rogers’ theories of innovation diffusion, according to London et al (2006), can be found in his acknowledgement of the complexity of the process. His unravelling of this complexity displayed considerable insight considering the inception of the original theory in the early 1960s. It is also worthwhile noting that London et al (2006) also critiqued Rogers’ diffusion model, stating that it was a useful starting point for analysing the processes involved in diffusion and was particularly relevant to their study on e-business adoption due to its recognition of the importance of social and cultural factors on the adoption and diffusion of innovations. However, Bayer and Malone (1989) suggest aspects of the theory must be extended and modified before it can be applied, and in London et al.’s work (with particular reference to IT adoption in construction organisations) there are limitations to Rogers’ diffusion model. Bayer and Malone (1989) argue that Rogers’ theory of diffusion is oversimplified in terms of binary dualism of ‘adopt’ or ‘not adopt’. Bayer and Malone (1989) further identify the lack of differentiation between adopting an innovation at a firm level and at an individual user level, and the failure to consider adoption and diffusion as a function of interactions between social systems, as other theory limitations. This idea of ‘adopt’ or ‘not adopt’ is the approach that is typically described when lean innovation is adopted, which results in the static and cohesive description of cultural responses in implementing environment (Koskela, 1993; Vrijhoef & Koskela, 1999; Koskela & Vrijhoef, 2000, 2001; Green & May, 2005). Davey et al (2000) first challenged this ‘adopt’ or ‘not adopt’ approach by aligning lean innovation adoption through an educational framework incorporating action learning and encouraging informal communication between groups. According to Davey et al (2000), action learning provided an interpretative framework in which to understand the attitudinal habits of the workforce as the lean innovation was diffused.

Rogers’ theoretical tendency towards frameworking a simplified binary conceptualisation of the adoption-decision process is considerably problematic, particularly in understanding construction (Bayer & Malone, 1989; London et al, 2006) in that it does not address the complex nature of the construction industry, nor does it take into account the flexibility and multi-functionality of, in this case, lean construction. Firms are typically selective on how they may implement an innovation such as lean construction as they have their own contextual environment to deal with. Therefore this makes it very difficult to make broad generalisations about level of adoption as it can be quite individualistic and idiosyncratic. It is proposed that it is difficult to place firms into one definite category because adoption is not simply an either/or situation – and if it is then this is a fairly simplistic reading of the situation. This approach was proposed by London et al (2006)
when investigating the adoption of e-business within construction organisations, and provides a provisional framework to explore the diffusion of lean innovation within construction organisations from a cultural perspective. This will be discussed aligned with the introduction of the first two components of the conceptual model.

The diversity of lean innovation approaches in construction is particularly influenced by such forces as fragmentation, the restricted resources of small and medium enterprises (SMEs), and competition. The approach to the diffusion of lean innovation is forcibly and simultaneously aligned in project relationships that are characteristic of close collaborations within limited project-influenced time frames. This introduces discontinuance for construction organisations in the form of temporary project organisations that further affects the adoption of the lean innovation. In terms of investigating an adoptive approach it is assumed that all organisations in the early phases of diffusion undertake a similarly standard streamlined process, with the process of adoption becoming less streamlined over the time continuum and as the organisation matures. This proposition is that once an organisation reaches a particular point in the diffusion of lean innovation could be representative of the organisation’s desires towards lean innovation or internal and external relationships or a catastrophic event occurring in the organisation. Of particular interest is the cultural affect the adoption of lean innovation has on the organisational workforce and the differences in understanding, acceptance and rejection across organisational groups. This is yet to be explored in research studies of lean innovation and forms an unknown in the research study.

As the diffusion of the lean innovation presents a limited understanding of the process within construction organisations, the constructs of Rogers’ theory and other research studies can be used to provisionally framework the conceptual model. In particular, the diffusion components of communication and the social system are proposed to assist in the interpretation of the diffusion process, with the other theory constructs to provide a way of analysing and grouping the workforce culturally.

Figure 3.2 Lean Innovation and Diffusion Components visually aligns lean innovation and diffusion conceptually; the figure has been changed from the usual representations in research to reflect diffusion and the propositioning of an evolution or maturity perspective towards the process. The figure shows three distinct components of the conceptual model for lean innovation diffusion in construction organisations, the arrows are representative of the forward motion of the process.
1. The first component of the model reflects the implementing environment.

2. The second component of the model highlights the decision to adopt the lean innovation into the implementing environment.

3. The third component of the model shows the breakdown in the process aligned with the constructs of Rogers’ theory, highlighting the social unit structure, social unit management, sub-process decisions, implementation of sub-process decisions, persuasion of process and sub-process decisions and implementation and finally knowledge and the development of knowledge.

The figure also proposes a fourth component to form the conceptual model; however, this is identified as a component that is yet to be conceptualised and will be discussed in further detail in Section 3.2.
Figure 3.2: Lean Innovation and Diffusion Components
3.3 Lean Innovation and Cultural Maturity

Central to the research is the re-evaluation of a more efficient way to understand cultural maturity within organisations when lean innovations are introduced and implemented. Re-evaluating the way culture is understood within the organisational environment will assist in investigating how emerging, current and past cultural interpretations have added to the conflicting nature of lean implementation within construction organisations. The forming of a unique organisational culture when lean is implemented has become the reasoning behind the need to re-evaluate the approach to cultural understanding within construction organisations (addressed in section 2.4 of the literature review). Therefore, the second research question of the thesis is:

How does the diffusion of lean in construction organisations influence cultural maturity?

Research Question 2 focuses on the description of lean implementation through a theoretical framework as an approach to understanding cultural maturity in construction organisations. In this respect the research makes contributions to the field of lean construction and in particular lean culture. The second research question merges two bodies of theory – lean construction and diffusion theory – with considerations from cultural action theory and cultural maturity concepts.

It is important to note that the research does not necessarily contribute to diffusion theory, except to explore theoretically a method of data collection and interpretation; rather, diffusion is used to understand ideographic representations of lean implementation processes and cultural maturity. The research also does not necessarily contribute to cultural action theory except to provide an empirical study on construction organisations, understanding how the cultural environment matures when social phenomena occur, such as lean implementation.

This section of the conceptualisation chapter will explore the propositions guiding the conceptual model, as identified and proposed in Section 3.2. The purpose of this section is to further explore the evolution of the culture when lean innovation is adopted into construction organisations, drawing upon existing cultural maturity models. These models will be synthesised, with this discussion forming the latter components of the conceptual model.

3.3.1 Cultural Interpretations of Lean Innovation

Guiding the development of a cultural maturity model for lean innovation diffusion are the existing interpretation of organisational culture by researchers; these existing interpretations of culture form the research gap. Researchers typify the cultural environment when lean innovation occurs as either:
• ‘positive and empowering’, described as advocating increased motivation, communication, commitment and participation, trust and leadership and increased cooperation and collaboration. The culture is often described to be resilient; or

• ‘negative and exploitative’: described as advocating reduced commitment, poor management and personal practices, employee dissatisfaction, industry de-professionalism and increased industrial conflicts. The culture is often described as conflicted and less resilient.

Such direct interpretations of culture are influenced by focusing on understanding the implementing environment as one collective group rather than a series of smaller groups and cultures that form a collective organisation. The cultural collective is described as the implementing environment sharing similar attitudes, behaviours, values and opinions across all groups. This is a simple representation of researchers describing what ‘ought to be’ rather than what culture ‘really is’.

In his critique of construction improvement Green (2011) discusses change, particularly lean orientated to be viewed metaphorically. Green’s approach focused on finding an alternative approach of cultural understanding for lean as:

Every improvement initiative directed at the construction sector tends to be accompanied routinely be exhortations in favour of an associated cultural change. (Green, 2011: 169)

However, Green (2011) advocates lean innovation to lead the implementing environment towards a negative and exploitative culture; Green’s approach leads to a direct contradiction of the approach and his views. Research undertaken by Gajendran and Brewer (2007) into the diffusion of information communication technologies in construction organisations promotes a more diverse perspective of cultural understanding. Their research highlighted a need to investigate diffusion by considering individual sub-cultural groups of the implementing environment and how the cultural behaviours are shared within the groups but not across sub-cultural groups (Martin, 2002). The approach is guided by the assessment of non-physical cultural aspects such as expression, ideational and symbolic contexts within the process of the cultural considerations associated with each sub-group (Smircich, 1983; Alvesson, 2002; Martin, 2002; Gajendran & Brewer, 2007). The study assumes that the culture of the organisation is influenced by how the workforce responds towards the lean innovation and that these responses occur at different times during implementation; influenced by management decisions as suggested by Overton’s (1997) research. Therefore, consideration of a more open approach to lean innovation and culture is
proposed to understand diffusion and maturity. This discussion of the conceptual model will first look at maturity in construction prior to developing the cultural maturity conceptual model for lean implementation.

### 3.3.2 Cultural Maturity for Lean Organisations

Cultural maturity in construction is investigated using a framework developed by the CIB Task Group 23 Culture in Construction, led by Steve Rawlins. The Task Group in 2001 defined the investigative framework for culture as:

- international transferring of cultural technology, skills and techniques; also
- perceived need for the transformation of attitudes and conventional ways of working.

Cultural maturity has been explored with research across disciplinary fields. A cultural maturity perspective has yet to be proposed conceptually for understanding the diffusion of lean innovation in construction organisations. Drawing upon cultural maturity across the disciplinary fields of business management and information technology allows an analysis of cross-sectional differences and similarities that guide interpretations of cultural understanding. The cultural analysis is of particular importance to the conceptual model as cultural interpretations within construction consider culture as a perspective of the environment (Triandia & Bhawuk, 1997; Brensen et al, 2005; Green & May, 2005, 2007; Dainty et al, 2006, 2007), whereas cultural interpretations within business or information technology are representative of a process model of culture (Humphreys, 1992; Fuller & Vassie, YEAR; Duffy, 2001; Crawford, 2002; Mullaly, 2006; Reefke et al, 2010). Table 3.2 *Platforms and Perspectives of Cultural Maturity* assesses the cultural perspective and cultural maturity models identified across construction, business and information technology research. The assessment within the table analyses culture addressing the approach, structure and disciplinary fields; the purpose of the table is to gain a deeper understanding of existing cultural models and perspectives that assist in the development for a cultural maturity model for lean innovation diffusion.

Table 3.2 identifies a similar underlying approach of the highlighted cultural perspectives and cultural maturity models; one that is one-dimensional. One-dimensional interpretations of culture are characterised by one or all of the following:

- an outcome of implementation; or
- a procedure of change; or
a tool to categorise and box organisational attitudes, behaviours, values and opinions.

Such one-dimensional interpretations of cultural change assume that culture, particularly in construction, is simply viewed as an entity of the implementing environment – the implementing environment in this study being the lean organisation (Kinnie et al., 1998; Green, 1999; Buch & Sander, 2005; Orr, 2005).

To understand one-dimensional interpretations of culture, the source of understanding needs to be critiqued. Hofstede’s (1983) ‘national culture’ has routinely guided construction culture research, advocating organisations to be distinctively of a ‘national culture’. The understanding presented by Hofstede assumes that management strategies utilised in one organisation or ‘national culture’ are not applicable to another organisation or ‘national culture’. Assessing this ‘national culture’ is guided by five broad ‘national culture dimensions’, including: power; distance; individualism versus collectivism; masculinity versus femininity; uncertainty avoidance; and long-term versus short-term orientation. According to Hofstede (1983), the approach is about interpreting culture as a management ideal, particularly how nationality influences political, sociological and psychological behaviours within the organisational environment. Important to Hofstede’s interpretation is this ideal of individualism versus collectivism:

Individualism stands for a preference for a loosely knit social framework in society wherein individuals are supposed to take care of themselves and their immediate families only. Its opposite, Collectivism, stands for a preference for a tightly knit social framework in which individuals can expect their relatives, clan, or other in-group to look after them in exchange for unquestioning loyalty. (Hofstede, 1983: 83)

From a cultural perspective Hofstede (1984) is simply suggesting that if an organisation’s national culture is identifiable as an individualistic culture, then the relationships within that culture are business orientated based on an assumption of mutual advantage between parties. In contrast, in an organisation with a national culture that is collectivist, relationships are considered to be naturally moral. This approach to organisational relationships suggests that individualist cultures break relationships easily if ineffective and collectivist cultures have a mentality of its ‘us’ versus ‘them’. Hofstede in his research fails to acknowledge whether an organisation’s ‘national culture’ can have characteristics of both individualist and collectivist cultures; this is of particular relevance in construction as the industry is known to have both short- and long-term relationships. In critiquing Hofstede’s ‘national culture’ approach, McSweeney (2002) assumes
this link to be representative of an organisation’s ‘cultural identity’; this idea will be discussed further following the table.
### Table 3.2: Multi-Disciplinary Interpretations of Culture & Cultural Maturity

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Non-Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business Management</strong></td>
<td><strong>Interpretation</strong></td>
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<td>National Culture</td>
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<td>Hofstede (1979)</td>
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<td></td>
<td>Team Personality, Culture &amp; Effectiveness</td>
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<td></td>
<td>Zoogah, Boghossian &amp; Sawyer (2002)</td>
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<td>Discipline</td>
<td>Non-Maturity</td>
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<tr>
<td>EFQM Model of Excellence</td>
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<td>Rooke et al (2001)</td>
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<tr>
<td>Cultural Change &amp; Supply Chain Management</td>
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<tr>
<td>Root (2001)</td>
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Table 3.2: Multi-Disciplinary Interpretations of Culture & Cultural Maturity

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<tr>
<th>Discipline</th>
<th>Maturity</th>
<th>Interpretation</th>
<th>Approach</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>Construction</td>
<td></td>
<td>Cultural Maturity for Health &amp; Safety</td>
<td>Fuller &amp; Vassie (2001)</td>
<td>Model of health and safety assessment developed for cultural awareness on partnership and alliance-based construction projects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Model assessment extends four zones of individual attitudes concerning specific health and safety elements. Assessment is conducted across project environments.</td>
<td></td>
<td>There is no presence of qualifying cultural attitudes, behaviours, value or opinions concerning the assessment of health and safety and maturing of culture that could be occurring.</td>
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<tr>
<td></td>
<td></td>
<td>Cultural Maturity for Business Evolution</td>
<td>Duffy (2003)</td>
<td>Model framework interpreting an organisation’s cultural maturity in terms of staged change management.</td>
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<td></td>
<td></td>
<td>Guided by three testing agents and is similar in the approach of Fuller &amp; Vassie.</td>
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<td>This assumes that which assumes no maturity occurs.</td>
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<td></td>
<td></td>
<td>Organisations &amp; Behavioural Sciences</td>
<td>Waard (2001)</td>
<td>Utilising work within the discipline of behavioural sciences as a means to understand organisational structures.</td>
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<td></td>
<td></td>
<td>Approach and perspective views the organisation as a series of concentric circles, with the organisation to be interpreted and explored based on a series of cultural assumptions.</td>
<td></td>
<td>The model does not recognise the specific formal and informal relationships and social norms that underpin the cultural environment of the organisation, which makes the nature of the approach and structure, assuming no maturating to be occurring.</td>
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<tr>
<td><strong>Interpretation</strong></td>
<td><strong>Approach</strong></td>
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<tr>
<td>Perceived Performance &amp; Organisational Project Management</td>
<td>Model explores whether project management maturity relates to perceived organisational performance and how organisational culture orientation is a contributing factor.</td>
<td>Approach and structure is about the quantifying of organisational performance aligned with an assessment criterion.</td>
<td>The model framework does not support the adding of organisational variables. Furthermore, the model does not address or explore cultural attitudes, behaviours, values or opinions.</td>
</tr>
<tr>
<td>Yazici (2003)</td>
<td>Introduces the Organisational Project Management Maturity Model (OPMM3) aiming to integrate, assess and improve project management practice. The model considers five levels of maturity developed and supported by research by Humphreys, 1992; Crawford, 2002 and Mullaly, 2006</td>
<td></td>
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<tr>
<td><strong>Maturity Progression Model for Sustainable Supply Chains</strong></td>
<td>Model involves the integration of social, environmental and economic considerations into managerial decision making for organisations and the wider supply chain.</td>
<td>Approach and structure is representative of an evolutionary understanding of maturity that can be occurring.</td>
<td>The model does not recognise the specific formal and informal relationships and social norms that underpin the cultural environment of the organisation, which makes the nature of the approach and structure, assuming no maturating to be occurring.</td>
</tr>
<tr>
<td>Reefke, Sundaram &amp; Ahmed (2010)</td>
<td>The model views supply chain maturity as a series of successive levels or stages that a supply chain moves through. The developed model incorporates six levels of maturity, beginning in the early forming stage/s and moving through to the forming of a collaborative supply chain environment with common goals, measures and resource sharing. The model is further supported by time, assessed by outlining potential states of the supply chain and the long-term vision of the supply chain.</td>
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<td><strong>Interpretation</strong></td>
<td><strong>Approach</strong></td>
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<tr>
<td>People Capability Maturity Model</td>
<td>The model focuses upon the performance of people within organisational environments.</td>
</tr>
<tr>
<td>Developed by Carnegie Mellon University (2001)</td>
<td>A systematic view of performance and its context, value, measured results and the implementation of repeatable practices underpin the model.</td>
</tr>
<tr>
<td>Model of Cultural Maturity</td>
<td>Directed towards the development of a collaborative framework underpinned by trust and risk/reward sharing. In particular, the model incorporates progressive activities towards effective supply chain management and process maturity, with predictability within the model a core ideal.</td>
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<tr>
<td>Lockamy III &amp; McCormack (2009)</td>
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<tr>
<td>Model of Cultural Maturity</td>
<td>Evaluates the progress of maturity through target action and performance objectives for each stage of the model. In particular, this maturity model target aim is agility within the inter-organisation leading to sustained innovation and growth within the supply chain.</td>
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</table>
McSweeney’s (2002) critique of Hofstede’s research, with consideration towards this idea of ‘cultural identity’, assumes that organisations with similar disciplinary fields can have similarities in cultural environments developed through external partnerships. This is particularly relevant in construction as the industry is project-based with a major focus on project delivery through external contractual relationships, emphasised in McSweeney’s study. Cultural identity has been similarly approach in other cultural studies exploring the evolution of e-business (Duffy, 2001), supply chain management (Root, 2001) and a cultural model of excellence (Rooke et al, 2001). Although these studies did not specifically critique Hofstede’s research they were some of the first to recognise this idea of a ‘cultural identity’ for an organisation and challenge pre-existing interpretations of organisational culture in construction. However, Root’s (2001) and Rooke et al’s (2001) models, in developing a model of cultural understanding, also assume that innovation is a cultural change that is influenced by the implementation of ‘tools’ and ‘techniques’, therefore modelling their interpretation with this consideration. Duffy’s (2001) is representative of an evolutionary understanding as the model highlights interconnected phases that approach cultural identity in e-business building upon knowledge and awareness of the workforce as e-business is diffused.

Two further cultural models that are more specific to cultural maturity in construction highlight this idea of an organisational cultural identity. Waard (2001) and Fuller & Vassie (2002) base their modelling of cultural maturity on an identification of culture as a representation of a culture within, suggesting that the organisation is a changing dynamic that is living and is more organic. Although representative of an ‘evolutionary’ cultural understanding the models in their representation of culture interpret the maturing process as what it ‘ought to be’ and not ‘as it is’, as suggested in their discussions prior to model presentation. This understanding of cultural maturity in construction research involving organisations is lacking in developing a relevant and appropriate model to framework culture studies in construction. This is why the disciplinary field of business management has been included as part of the analysis of cultural maturity for the conceptual development of a cultural maturity model for lean innovation diffusion. The research assumes that maturity is the most efficient way to investigate and understand the diffusion and interpret what is going on.

Table 3.2, in the assessment of interpretations of culture and cultural maturity, assessed five business orientated models of cultural maturity which consider the influence of organisational variables that underpin the maturing process. This latter element of the maturity models takes into consideration the organisation as a changing dynamic that is living and is organic, something that
is suggested but not conceptualised in construction research. The cultural maturity models reflect research into organisational performance and project management (Yazici, 2003), supply chains (Reeke et al, 2010), model of cultural maturity (Lockamy III & McCormack, 2004) and people capability (Curtis et al, 1995, 2002, 2010a, 2010b). Each of these models, although different, approach cultural maturity in the same way, particularly in their understanding of the process of maturing and the organic transitions of the workforce when innovation occurs within the organisation, with consideration towards the continuum of time. Two of models in particular describe the cultural maturity process for innovation and will be considered to form the conceptual framework of the cultural maturity model for lean innovation diffusion. Reeke’s et al (2010) supply chain maturity model and the Carnegie Mellon’s developed people-capability cultural maturity model (Curtis et al, 1995, 2002, 2010a, 2010b) will now be discussed and critiqued with consideration to lean implementation.

Reefke, Sundaram and Ahmed’s progression model for supply chain maturity is underpinned by the need to consider corporate sustainability and the integration of social and economic environments in the corporate and wider supply chain decision making process in the long term (Reefke, Sundaram & Ahmed, 2010; Hutchins & Sutherland, 2008; McIntyre, 2007 & Kleindorfer, Singhal & Van Wassenhove, 2005). This model incorporates a transformation roadmap to understand the maturing of the supply chain over time, time being representative of a strategy outlined by a:

... strategic progression between the potential current state of a SC [supply chain] and the long-term vision. (Reefke, Sundaram & Ahmed, 2010: 313).

This is represented in Figure 3.3 Supply Chain Maturity Model. Although the incorporation of a transformation roadmap and time element consideration suggests the maturity model to be evolutionary in nature, the presence of the staged and progression of the maturity levels presents a more static interpretation to be underpin the model. The static nature of the maturity model is further enhanced by the maturity models, which have guided the development of the model. However, there are elements which are applicable in providing a framework in which to re-evaluate interpretations regarding cultural maturity within construction organisations, in particular the:

- consideration and assessment of time as part of the model framework; and
- inclusion of a transformation roadmap as part of the model framework.
These elements, present with Reefke, Sundaram and Ahmed’s model, are also present within Carnegie Mellon’s People Capability Maturity Model (Curtis et al, 1995, 2002, 2010a, 2010b).

![Diagram of the Supply Chain Maturity Model](image)

**Figure 3.3: Supply Chain Maturity Model (Reefke, Sundaram & Ahmed, 2010: 313)**

The second maturity model providing consideration to explore cultural maturity and lean innovation diffusion is the People Capability Maturity Model (CMM) developed by Carnegie Mellon in 2005. This model is an extension of Carnegie Mellon’s CMM and is focused on the continuous improvement of management and human asset development within the organisational environment (Curtis, Hefley & Miller, 2002; Wademan, Spuches & Doughty, 2007; Cassidy & Medsker, 2003). Guiding the model is the process-based assumption that the practices of the workforce are standard and that these can be improved continuously through similar methods that have been used to improve other organisational and work practices (Curtis, Hefley & Miller, 2002). The development of the maturity model is derived from Humphrey’s original maturity framework, which integrates principles from three domains:

- processes;
- total quality management practices; and
- organisational change.
The structure of this maturity model is five-tiered which, according to Le Vasseur (2001), serves to transform the organisational environment from undisciplined to disciplined; that is, capable of producing predictable results (Wademan, Spuches & Doughty, 2007). The purpose of the five-tiered maturity assessment is concerned with bringing together human resources through the promotion of a structured, repeatable and predictable approach for improving the processes of the organisation’s workforce (Wademan, Spuches & Doughty, 2007) and leads to the organisation developing a culture of ‘best practice’ (Carnegie Mellon, 2002; Cassidy & Medsker, 2003). Figure 3.4 *Carnegie Mellon People Capability Maturity Model* addresses the main elements of the Carnegie Mellon PCMM.

![Figure 3.3: Carnegie Mellon People Capability Maturity Model (Curtis et al, 2010a: 99)](image)

Although both cultural maturity models suggest the maturing process is organic, the structure of the model suggests the process is static overall. This is evident in the structured approach of maturity in stages or at specified levels. The presentation of these elements in the models suggests that once an organisation reaches the optimal level of maturity then it is assumed that the organisation maintains this culture for the rest of the organisational life or until a new innovation
is diffused, despite the use of words such as ‘developing’, ‘building’ or ‘continuous improvement’. Therefore the models become representative of a one-dimensional understanding of cultural maturity.

The presence of these issues makes the use of current models of cultural maturity problematic for the conceptual model. The problematic nature of the models for the study becomes apparent in being able to:

- understand how the workforce responds differently to the diffusion of lean innovation within the organisation; also
- describe the rate of adoption of the lean innovation across different organisational environments; also
- understand how internal and external forces influence the diffusion of the lean innovation.

These elements are something that is not explicitly identifiable or described in either of the maturity models and form the framework in the development of cultural maturity model for lean innovation diffusion for this study. The conceptual model will now be discussed in full.

### 3.3.4 Cultural Maturity Model for Lean Innovation Diffusion

Guiding the development of an evolutionary cultural maturity model is the need to address and understand how and why maturity occurs when lean is implemented. The presence of a number of problematic issues in current cultural interpretative platforms and maturity models enables a provisional framework to be developed to support the development of the cultural maturity model for lean innovation diffusion for this study. The conceptual model will now be discussed in full.

**Figure 3.3: Cultural Maturity Model for Lean Innovation Diffusion**

visually describes the model guiding the investigative framework approaching the research problem. The conceptual model is guided by an intellectual framework of diffusion theory to explore the diffusion of the lean innovation and cultural maturity to explore the maturing process. The purpose of the conceptual cultural maturity model proposed within this research is to explore the cultural attitudes, behaviours, values and opinions of the workforce and the way these cultural attributes, throughout the diffusion of lean innovation, uniquely influence the acceptance and rejection of innovation within the organisation. The conceptual model can be broken down into seven components (below). Each of these components addresses a specific aspect of cultural maturity, the lean innovation or supportive mechanism.
**Component 1: The Existing Organisational Environment**

The purpose of this component within the conceptual model is to gain an understanding of the existing environment and the issues that are or were faced within the organisation that led to the decision to implement the lean innovation. Furthermore, this component in the conceptual model is reflective of the beginning of the cultural maturity for the organisation.

**Component 2: Strategic Direction**

This component is identifiable as the starting point of the lean innovation diffusion process for organisational management. The purpose here is to gain an understanding of the events that lead to the strategic direction that guides/guided the diffusion of the lean innovation.

This component will also allow for the identification of cultural attitudes and behaviours as they begin to emerge within the organisation.

**Component 3: Communication**

Communication is an important component as it helps in the exploration of the diffusion of the lean innovation. Communication as part of the conceptual model is representative of the forward and evolutionary motion of the process. This is addressed in the model with the arrows connecting each of the other components in the forward motion. As lean is diffused, communication becomes more of a supportive mechanism to assist the acceptance and rejection of the workforce. Communication is a component of the process that is a part of the process across the time continuum.

It is assumed that other mechanisms are identifiable in guiding the acceptance and rejection of the lean innovation for the workforce through the development of knowledge and interaction. This unknown is addressed in the first research question, which assists in linking the two research questions.

**Component 4: Diffusion Theory Framework**

Rogers’ theory provides a provisional framework that explores the diffusion of innovation within a social unit; in the case of this study, being construction organisations. The purpose of this component is to framework the diffusion of the lean innovation aligned with and across individuals or organisational groups within the implementing environment.
Reflections of the lean innovation diffusion process are broadly grouped, highlighting the organisational environment, managerial environment, sub-process decision, sub-process implementation, persuasion and knowledge. The broad grouping of the diffusion framework will enable each individual to reflect personally on the process while also allowing a collective understanding and triangulation of the process to emerge within the organisation.

This component will also allow for the identification of cultural attitudes and behaviours to be identified and assessed within the organisation.

**Component 5: Phases of Implementation**

It is assumed that the diffusion theory framework can assist in providing an understanding of the strategic implementation process within construction organisations. The conceptual model proposes that the diffusion of the lean innovation can be interpreted across three phases.

Each of the phases is representative of broad strategic elements that organisational management are setting out to achieve. The broad strategic elements are identifiable as being a simple representation of the process and are structured around smaller strategic outcome of the organisation.

The conceptual model highlights that the phases on implementation are interconnected, suggesting the phases of implementation inform and are re-informed by the other phases. Such a broad classification of implementation phases assists the study in understanding the diffusion of lean innovation and the maturing of culture occurring over time.

This component will also allow for the identification of cultural attitudes and behaviours to be identified and assessed within the organisation.

The structure and approach of the responses propose that the maturing of organisational culture and lean innovation diffusion is forever ongoing and is not determined by success or failure.

**Component 6: Response**

Rogers’ theory of diffusion advocated the idea of to ‘adopt’ or ‘not adopt’, highlighting a one-dimensional interpretation of the process. In overcoming this interpretation, the conceptual model suggests that the ‘acceptance’ or ‘rejection’ in the process is representative of a lack of innovation understanding or awareness.
Within the conceptual model ‘rejection’ is not representative of a failure but rather of a need by management within the organisation to revisit, rethink and revise earlier components. The revisiting of the lean innovation diffusion is representative of a revision of, for example, the subprocesses of Component 4, or supporting mechanisms in Component 2.

The response component in the conceptual model is about exploring, understanding and identifying the differing rates of acceptance that occur within organisational environments when an innovation is diffused.

Identification of responses within the conceptual framework will be assessed, focusing on the confirmation of activities or processes and challenges of activities or processes in the organisations.

The structure and approach of the responses propose that the maturing of organisational culture and lean innovation diffusion is forever ongoing and is not determined by success or failure.

**Component 7: Time Continuum**

The representation of the time continuum in the conceptual model is reflective of the maturing of organisational culture and lean innovation diffusion that is considered forever ongoing and is not determined by success or failure.
Figure 3.3: Cultural Maturity Model for Lean Innovation Diffusion
3.5 Conclusion

The chapter commenced by highlighting the areas of research interest as identified in Chapter 2 Literature Review. Three areas emerged regarding lean implementation and cultural maturity in construction organisations: viewing lean implementation in line with theoretical foundation; the exploration of lean applications within construction organisations; and the exploration of approaches that consider evolutionary cultural change rather than static cultural change approaches.

Diffusion theory was then introduced as a theoretical foundation in which to explore all three research areas of interest. Diffusion theory is the diffusion of innovation as a process by which an innovation is communicated through certain channels, over time, among members of a social system. The theoretical foundation provides a basis in which to explore ‘how’ innovation is implemented and the strategies influencing implementation and ‘why’ organisational movements occur. Diffusion theory also provides the framework in which to understand ‘how’ and ‘why’ organisational culture matures from an evolutionary perspective. The approach and framework proposed by Rogers’ challenges the more static representations of cultural maturity as developed by Carnegie Mellon amongst others.

Diffusion theory as a framework to understand lean implementation and cultural maturity was then addressed, which allows the study of the process in real time and in line with process as it is occurring. This was highlighted by the breaking down of each structural element of the theory including the social system, communication, time, reliability, complexity in line with strategies and principles of the innovation. The nature of the theory also allows for flexibility to occur in the approaches undertaken by each organisation, as implementation approaches may be considered unique and different across organisational environments, as are social systems, communication and timing elements.

The chapter concluded with a small discussion on cultural maturity modelling and current perceptions of this area within research. An understanding of ‘how’ cultural maturity should be approached was considered. This was represented in the figures addressing the elements forming an awareness of cultural maturity, not a model as such but a framework in which to understand and explore the topic further. The problem now is to contextualise the thoughts presented in this chapter and the application of these thoughts into a real-word context in understanding lean implementation and cultural maturity within construction organisations; this will be addressed in further detail in the following chapter.
Chapter 4 Methodology

4.1 Introduction
Chapter 4 of the research thesis draws together the conceptualisation discussion with the methodological design. The discussion will describe the real-world issue of a culture maturity model for lean organisations in terms of:

- research justification;
- research design; and
- data Analysis.

The justification of the research strategy is highlighted first.

4.2 Justification of the Research Strategy
This section highlights the rationale of the research strategy, addressing the research characteristics and research questions posed in previous chapters. The discussion outlines the ontological, epistemological and methodological issues and their relationship to the research method. The characteristics forming the research study will be described first.

4.2.1 Characteristics of the Research Study
The research study is investigating how construction organisations implement lean and the maturing of culture that occurs. The study proposes the use of diffusion theory as a framework in which to explore lean implementation and the maturing of organisational culture. Therefore, the research is about lean, in particular the process of lean implementation that organisations undergo, explored culturally. The element of culture is representative of providing a metaphorical understanding of lean, which suggests organisations possess more than a single homogenous culture (Green, 2011).

As the study is guided by a diversified understanding of culture, the mapping of the cultural domain (Martin, 2002) is acknowledged but is not critical to the understanding of the lean implementation process. This is particularly relevant in the role of informality within construction organisations and the influence on the workforce during the implementation process (Barrett & Sutrisina, 2009; Gajendran & Brewer, 2007; Gajendran et al, 2011). The study gains a deeper understanding of the process as implementation is approached as a snapshot in time guided by reflections of organisational personnel. Understanding informality within the construction organisation environment when lean is implemented can also assist in developing more meaningful understandings of the complex issues emerging within...
organisations, through methodological considerations (Berggren & Soderlaund, 2008; Moldoveanu, 2004).

The research study is concerned with one research problem and industry problem, investigating both with consideration towards two ideas.

The industry problem highlights:

A need to better understand applications, implementation and the cultural environment of lean within construction organisations going beyond descriptions of improved productivity and waste elimination.

The research problem highlights:

A need to identify, describe and understand the cultural implications associated with lean implementation within construction organisations and how the workforce is supported by mechanisms employed by senior management to assist in knowledge development.

The first research issue concerns the identification and description of mechanisms that support the workforce when lean is implemented in the organisational environment. To understand how management approaches lean implementation in the organisational environment a deeper awareness of the process and supporting mechanisms is required. The identification of supporting mechanisms of the process will enable a greater understanding of how individuals within the workforce respond to and approach lean. The investigation assumes that these supporting mechanisms are fundamental in the development of knowledge for the individual in the processing of lean. Such supporting mechanisms can be considered as examples of informality through the advocacy of communication, practices and knowledge (Brensen et al, 1986; Emmitt & Gorse, 2007; Gajendran et al, 2011). The identification and description of supporting lean implementation mechanisms has not been undertaken in the past.

The second research issue concerns the description of lean implementation and cultural maturity. Describing the lean implementation process through diffusion theory will enable phases and events of the process to be identified, enabling the maturation of the culture of the organisation to also be identified and described. The purpose of describing the process is to highlight cultural maturity within the organisation and of the individual at particular process phases and events through reflection. Diffusion theory has been selected to form the theoretical framework of the study. Rogers’ (1962, 1970, 1983) diffusion theory offers an opportunity to study the process and implementation of innovation within a construction organisation and how this and other knowledge is transferred from the organisation to the
project team. In using diffusion theory to map the flow of innovation implementation two key elements of the theory – ‘communication’ and ‘the social system’ – will be used as the analysis mechanism. The research approach taken in this thesis dissertation is underpinned by the describing of cultural maturity for organisations undergoing lean diffusion.

The two research questions are posed again to further guide the ontological, epistemological and methodological issues of the lean implementation and cultural maturity investigation.

Research Question 1:

What are the drivers supporting an organisation’s lean implementation journey?

Research Question 1 focuses on identifying and describing the mechanisms employed by organisational management to support the workforce when lean is implemented. Supporting mechanisms are described to be representative of a commitment by management to encourage knowledge development and interaction between groups and individuals in the workforce throughout the implementation process. Research Question 1 in this respect makes contributions by merging the current engineering and cultural implementation interpretations to identify and describe the mechanisms that support the lean implementation process.

Research Question 2:

How does the diffusion of lean in construction organisations influence cultural maturity?

Research Question 2 focuses on the description of lean implementation through a theoretical framework as an approach to understanding cultural maturity in construction organisations. In this respect the research makes contributions to the field of lean construction and, in particular, lean culture through a metaphorical cultural lens. The second research question merges two bodies of theory lean construction and diffusion theory, with considerations towards cultural theory through maturity. The research does not necessarily contribute to diffusion theory, except to explore theoretically a method of data collection and interpretation; rather, diffusion is used to understand ideographic representations of lean implementation processes and cultural maturity. The research also does not necessarily contribute to cultural theory except to provide an empirical study on construction organisations, understanding how the cultural environment matures when social phenomena, such as lean implementation, occur.

4.2.2 Ontological Issues

The rationale of the research strategy is also influenced by ontological considerations. Ontological considerations address the nature and reality of the research (Denzin & Lincoln,
The research strategy is guided by assumptions that have emerged in existing lean and cultural research. These assumptions have limited understanding of the lean implementation process and cultural maturity within construction organisations, including:

- lack of lean implementation description;
- isolated interpretations of the lean implementation process; and
- the objectification and subjectivity of organisational culture when lean is implemented.

The identification of existing limitations in research enables the ontological considerations of the research to be understood on a deeper level.

Three ontological considerations are assumed in the informing of the research nature and reality. The assumptions are directed towards, firstly, the viewing of constructions organisations as unique entities (if the organisation is unique then it can be assumed that organisations approach the social phenomena of lean guided by their existing cultural environment); and, secondly, organisational management employs mechanisms as a way of supporting knowledge development and interactions around the social phenomenon. The nature of the research problem suggests that construction organisations are a reality that is guided and influenced by sub-realities of the environment, with a need to provide illustrations of the reality from different perspectives. Based on these assumptions the research problem fits within a naturalistic/relativist inquiry, with an ontological viewpoint of constructivism (Lincoln & Guba, 1985; Denzin & Lincoln, 2000 and 2005). The constructivist ontology is described by Guba & Lincoln (1994) to address

The development of a cultural maturity model for lean organisations as described in Chapter 3 Research Conceptualisation will rely upon the researcher’s critical interpretation of descriptions of the real-world problem of lean implementation as discussed by individuals involved in lean organisations. A constructivist approach to the research can become problematic, although considerations have been made to provide more credibility to the critical interpretation of the research strategy and are discussed in greater detail later in the chapter (refer to 4.3.1 Constructivism).

Gray (2004) suggests that underpinning ontological issues of research is the need to identify and contextualise the research problem as either ideographic or nomothetic. According to Gray (2004), an ideographic and nomothetic approach to cultural and human behavioural research is influenced by the traditional inductive or deductive approach to research. Gray
(2004) further distinguishes between ideographic and nomothetic considerations within research. An ideographic approach emphasises:

…. that explanation of human behaviour is only possible through gaining access to participants’ subjective interpretations or culture (Gray, 2004: 400)

On the other hand, a nomothetic approach seeks:

… to construct deductively tested set of general theories that explain and predict human behaviour (Gray, 2004: 401)

Marshall (1998) provides a much more detailed understanding of the differences between ideographic and nomothetic research studies:

An ideographic approach refers to those methods which highlight the unique elements of the individual phenomenon. The contrast is with the nomothetic, which seeks to provide more general law–like statements about social life, usually be emulating the logic and methodology of the natural sciences. (Marshall 1998)

Past lean implementation cultural studies in construction management research have tended to embrace a nomothetic approach detailing specific cultural responses about specific process elements. This is typically approached using a case study that is described and analysed in isolation of the whole implementing environment, such as leadership, partnerships and contracts. There is no significant study that widens the understanding of lean implementation detailing cultural behaviours, values or attitudes. In this dissertation, the aim is to build and examine a pluralistic picture of the lean implementation process.

The process of lean implementation is unique to each implementing construction organisation. To be more specific, the uniqueness of the process is influenced by the existing cultural environment, strategic decisions and operational considerations of the organisation. However, there may be broad similarities between the process in organisations through external partnerships and contracts or third-party exposure to operations. Furthermore, each organisational environment may utilise similar mechanisms to support the development of workforce lean knowledge and interaction. The maturity of organisational environments is assumed to be different; however, similar maturing characteristics may also appear across the organisations according to the categorisation of strategic and operational culture.

The methodological approach of this thesis will take a broad identification of supporting mechanisms with a deep picture of the lean implementation process and maturing culture. The lean implementation process and maturing culture is core to the model, as described in Chapter 3, with workforce mechanisms supporting the process. As such, the research supports
ideographic considerations as it assists in developing an understanding of lean implementation and cultural maturity.

4.2.3 Epistemological Issues

Epistemology influences the rationale of the research study. Epistemology is concerned with the nature, scope and limitations of knowledge within the social world (Snape & Spencer, 2003) investigated through the relationship between the inquirer and the known (Denzin & Lincoln, 2011). Typically, epistemological considerations are guided by the posing of three questions: What is the basis of the knowledge? What is the nature of the relationship between the knower and the would-be knower? What is valid to be known?

Two schools of thought divide epistemological considerations:

- rationalism: before experience (deductive); and
- empiricism: through experience (inductive).

A rationalist approach to research sees the researcher deducing a hypothesis or hypotheses based on specific theoretical considerations within a domain and then subject these to empirical scrutiny (Snape & Spencer, 2003; Bryman, 2008). The deductive approach defines the hypothesis and model based upon theory and then tests that the hypothesis and underlying theoretical assertions are correct and, hence, the model is correct (Layder et al, 1991).

However, the orientation still remains deductive (Bryman, 2008). One problem with the deductive approach in research investigations is the tendency that the empiricism of theory can be rejected if not valid or possible in the approach.

An empirical approach to research sees the researcher acknowledging that the worlds of the researcher and social world impact and interconnect with each other (Gray, 2004). This inductive approach begins with detailed observations of the world and moves toward more abstract generalisations and ideas (Guba & Lincoln, 1994; London, 2004). How these two worlds interact and impact within a specific research domain is unknown. This ‘unknown’ is investigated through the use of experiences and observations of the researcher, which can derive an outcome through the generation of theory or through the collation of patterns or themes, which is then supported by empirical generalisations (Bryman, 2008; Guba & Lincoln, 1994).

The inductive approach defines a proposition based upon framing questions situated within a theory and then takes observations to build a model. This is done rather than stating that the world is black and white: you construct your view of the research phenomenon rather than test and evaluate it so strictly. You learn from the observations of the real world and you give voice to the experiences of the people you are researching; you want to get
closer to the subjects, while rationalists want to see research participants as ‘objects’ and things to manipulate and measure.

Selected studies within the field of lean construction have attempted to describe culture through the lean implementation process. These studies have tended towards the rational and deductive approach to what a lean organisational environment should look like culturally. The approach behind this research has assumed that the process of lean implementation is not complex, with the workforce overwhelmingly supportive of the process and responding positively to change. In these studies, researchers sought case studies that compared with this ideal reality type. These studies represent a fundamental deductive approach to identify an ideal cultural environment for the implementation of lean.

The problem arises because the construction environment is not an ideal; rather, the environment is complex. This complexity is typically described by the presence of such characteristics as fragmentation, temporary organisations and project conditions. As such it should not be interpreted within an ideal context as represented within research thus far. Within construction, the ideal interpretation of cultural reaction associated with lean implementation is a positive outcome; however, other studies within lean implementation and adoption counteract this ideal type with a negative interpretation. Viewing the adoption of lean strategising from these two ideal perspectives does not explain the reasoning behind why and how organisational culture matures; rather, it serves to limit understanding of organisational culture.

A recent approach towards understanding lean implementation was developed by Green (2011). Green’s study involves the interpretation of lean implementation metaphorically considering culture as a lens of understanding. However, Green advocates exploitative representations of the cultural environment. The research investigation serves to build upon Green’s metaphorical interpretation of lean implementation through the acknowledgement and consideration of strategic and operational cultural group interpretations. The research approach serves to guide the investigation in simplifying the lean implementation process to interpret and understand the maturing of organisational culture. The research is therefore considered to be inductive as the study utilises the experiences of those individuals currently involved in the implementation of lean. The undertaking of an inductive approach to the research investigation enables the recognition of varying experiences, values and attitudes towards lean while serving as a preliminary basis to further explore how organisations adapt culturally to social phenomenon. The research approach differs from other lean studies through the presence of a diffusion theoretical framework that maps the social system, communication, process and challenges over time.
The inductive approach allows for the researcher to take an interpretist perspective and explore how the different realities of the construction environment interconnect to influence and mature culture. Further, the research investigation is different as it empirical, inductive and constructed in its approach, whereas past studies have tended to be deductive and quantifying in the analysis of construction culture. Methodological contexts underpinning the investigation will now be discussed.

4.2.4 Methodological Considerations

Methodological considerations of the research are guided by the framework about finding what can be known to the research; this begins by observing how research has been conducted. It has been observed that if one considers the way research is approached in the field of construction management there is narrowness to the methods employed (Dainty, 2008). In his research, Dainty called for a greater emphasis for qualitative enquiry. Qualitative data studies are designed to contextualise, explain, evaluate and generate knowledge of phenomena within a specific discipline (Gray, 2004), whereas investigations that use quantitative data typically quantify and determine a specific phenomenon within a specific environment (Neuman, 2006; Creswell, 2009). Recently there has been a move within construction management research to specifically outline the methodological approach as a means of better understanding methodologies for construction; this has been specific in studies involving construction informality, such as Barrett & Sutrisna (2009) and Gajendran et al (2011).

The methodological approach for the research problem is the merging of the lean construction and cultural maturing theories. The lack of methodological discussion within selected lean implementation studies has resulted in an overwhelming failure of cultural understanding. Current cultural interpretations of the lean implementation process occur due to the use of deductive testing and prior theory. This deductive testing embraces the use of surveys or questionnaires as data collection methods to group and justify cultural responses.

The aim of the research in this dissertation is to understand the lean implementation process, culture, interaction and behaviours of the workforce and then understand how and why the organisation culturally matures. For an understanding of this, the workforce of the organisation can provide insight of real-life events associated with the process. The research is therefore guided by a philosophical understanding, proposed by Sutrisna & Barrett in their research about picture diagrams and case study modelling. The authors proposed that:

While the product of the construction process can be considered an object that can be physically examined, the different perceptions of the stakeholders to the construction
process can be understood as socially constructed phenomena. Sutrisna & Barrett (2007)

Taking this into consideration the methodological approach proposes the use of a case study approach. A case study approach provides reliability in capturing rich information for the purpose of the study (Sutrisna & Barrett, 2007). This approach is considered well suited to the thesis and is considered in further detail in section 4.3.3 Case Study Research.

4.3 Research Design
4.3.1 Constructivism
The research falls within the ontological paradigm of constructivism, which acknowledges the constructed realities of the social phenomenon to be guided by the reality of the individual. Bryman discusses the constructivist approach as a research paradigm that ontologically:

… asserts that social phenomena and their meanings are continually being accomplished by social actors. Bryman (2008: 492).

Lincoln & Guba discussed the original ideas of constructivism, suggesting the purpose of the paradigm is directed to be more idealist:

That is, they assume that what is real is a construction in the minds of individuals. Lincoln & Guba (1985: 83)

It is common in when investigating lean implementation from a cultural perspective to simply quantify organisational culture and then generalise the culture across multiple organisations. This quantifying of culture isolates the construction organisation as a singular reality that is similarly affected by social phenomena. This isolation of the construction organisation is challenged by research that approaches and understands construction as a socially constructed reality (Cooke-Davis et al, 2007; Small & Walker, 2010). Gajendran et al (2011) suggest that qualitative research approaches assist in the development of insights into cultural behaviours, particularly in relation to knowledge sharing, communication and relationship building. This is particularly relevant in Fox’s 2007 study into construction sub-cultures. The study identified the cultural environment of construction organisations to be directly influenced by organisational dynamics, industry, project, and team dynamics. The nature of the sub-culture system described by Fox collates to form a unique strategic and operational environment.

The underlying assumption of the study is that the individual within the organisational environment constructs an understanding of the social phenomenon based on the existing constructed realities of the working environment. The existing constructed realities are considered unique to the social actor; how the constructed realities influence cultural understanding and responses to the social phenomenon have not been explored in detail.
However, it is assumed that management employs some form of supporting mechanism as a way to guide the development of knowledge and interaction of social actors around the social phenomenon. This links in well with cultural maturity theory; specifically, in the need to understand that cultures mature as the workforce responds to and is supported throughout implementation, also identified as the organisation being in a constant state of construction and reconstruction (Strauss et al, 1973; Becker, 1982; Bryman, 2008).

The nature of the constructivist ontology in relation to the research study further raises questions concerning the reporting of lean implementation and cultural maturity relationship and the describing of cultural maturity. This questioning raises the debate about whether the research is idealist (Lincoln & Guba, 1985) or relativist (Bryman, 2008) in its approach. The research study is about lean implementation investigated through a metaphorical cultural lens, undertaken by speaking to individuals working within organisations implementing lean. The study therefore falls within the relativist approach and is now discussed.

4.3.2 Causality
The research design also needs to consider causality also referred to the relation between two events, the first the cause and the second the effect and whether the second event is understood to be a consequence of the first event (Michotte, 1963). The two events in this study are representative of lean implementation and the evolving cultural maturity in construction organisation. The logic surrounding causality is interpreted three ways, as presented by Pearl (2000):

- A necessary cause describes the causal logic as x being a necessary cause of y, it is therefore assumed that the presence of y implies the presence of x; furthermore the presence of x does not imply that y will occur;
- A sufficient causes describes logic as x to be a sufficient cause of y, it implies the presence of x necessarily implies the presence of y, the causing of y may in fact be through z; this implies that the presence of y does not imply the presence of x;
- Contributory cause describes logic that is the presumed cause precedes the effect and altering the cause alters the effect.

Considering the three causality relationships the research study falls within the definition of a necessary cause. This will now be addressed. The research study is about construction organisation culture (identifiable as y) and lean implementation (identifiable as x). For an innovation to be implemented there is a need or desire within the organisation for the change to occur; this implies the presence of y informing the presence of x. It is assumed that in some instances the implementation of lean may not mature an organisations’ culture; this addresses
the final descriptive logic of the necessary causal logic. This latter idea is addresses in detail in chapter 6.

4.3.3 Case Study Method

Yin (2009) proposes the selection of a case study is dependent on three conditions:

(a) the type of research question posed, (b) the extent of control an investigator has over actual behavioural events and (c) the degree of focus on contemporary as opposed to historical events. Yin (2009: 8)

Not considered in Yin’s (2009) interpretation is the decisive factor in setting the boundaries or “casing” (Ragin, 1992); for Flyvbjerg (2011) the selection of a case study is not about a methodological choice but rather what the investigator is studying. Flyvbjerg (2011: 301) further discusses the selection of a case study to be influenced by the individual unit of study, the “intensiveness” of case studies comprising rich data, completeness and variance and the “developmental factors” of case studies in evolving over time. Flyvbjerg (2006, 2011) proposes the selection of the case study approach to be guided by the sample selection and the information-selection of the research design.

Both Yin (1984, 2003, 2009) and Flyvbjerg (2006, 2011) will be considered in their simplest form to determine whether case studies are appropriate. The construction organisation is the research study data type; therefore, the organisation needs to be viewed within the framework of the research problem. The research problem can be clearly be assessed to the conditions presented by Yin (2009). The first the type of research question, the first research question is asking a “what” which is typically representative of research that is validating; answered typically though the use of surveys or experiments (Yin, 2009). The research design however is about “how” and “why” type responses which fits within the explanatory, description and exploratory based ideals of case study research. The second condition to consider is the extent of control of the investigator over actual behavioural events (Yin, 2009); in this study behavioural events are the reflections of organisational personnel discussing lean implementation and its cultural influence within the organisation. There is no requirement within the study to control behavioural events. The third condition to consider about the investigation of the implementation of the lean phenomenon within a real-life context. The research is more contemporary in the identification and discussion of events associated with the lean phenomenon. Particularly the investigation involves the direct observation and study of events associated with the lean phenomenon and the interviewing of individuals who have a direct contact with the lean phenomenon events. Also needing consideration is the boundaries between the phenomenon and context, which are not clearly evident. This also involves the examination and observation of contemporary events, particularly in terms of
understanding the *behaviours* and awareness of individuals who have a direct contact with the *lean phenomenon* events. This simple assessment has determined that the case study approach is best suited to the research design.

The type of case study approach underpinning this thesis is now considered. Stake (2000, 2005), Flyvbjerg (2006, 2011) and (Yin (1984; 2003; 2009) all present different approaches concerning case study prototype and design. Yin (2009) states the research design for case study is to be guided by five components: a research question; research propositions; the unit of analysis; the linking logic; and interpretative criteria for the findings. Three of the five components of case study design have been discussed prior in this chapter in Section 4.2. The latter two guiding components of case study design will be addressed and discussed in more detail in sections 4.4.2 *Data & Unit Analysis*, 4.4.3 *Data Typing* and 4.4.4 *Data Collection Instruments*. Underpinning and preceding Yin’s (2009) case study design is the construction of a preliminary *theory* in which to *explore, develop or test* theory about a phenomenon. Diffusion theory is the theoretical foundation in which to explore the *lean phenomenon* and *cultural maturity* within organisational environments. The development of theory guiding this research investigation has been addressed in greater detail in Chapter 3, Section 3.3.4. The nature of the theory is *societal* in its approach to understanding lean implementation and the maturing of organisational culture. Case study designs will now be considered and discussed.

Although Yin (1984; 2003; 2009) does not consider the sample type and information-orientated selection on the other Flyvbjerg (2006, 2011) does propose the need to consider the sample and selection as part of the case study structure. This is of particular importance as the objective of the study is to:

* Achieve the greatest possible amount of information on a given problem or phenomenon. (Flyvbjerg, 2011: 306)*

Taking this into consideration, the type of sample for this study would be stratified allowing for generalisations to be made about selected organisational subgroups within the larger study population. If thinking about the information-orientated selection of the case the study would approach selection as a maximum variation in which information is obtained about significant circumstances of the process and outcome (Flyvbjerg, 2011). This simply means a multiple-case study approach where one variant is different across all cases e.g. organisational size, implementation approach or location. Yin’s (1984, 2003, 2009) approach to case study prototype design is guided by four general characteristics which serve as a background for the consideration of a more specific approach. Yin’s approach to case study design is supported by a 2 x 2 matrix which highlights the design, contextual conditions and boundaries, different design reflections, variants and unitary or multiple units of analysis, shown in Figure 4.1
Case-Study Methodological Structure. According to Yin (2009), the selection of the case study methodology is dependent on the prototyping of the research design and strategy. Yin proposes two methodological variants of the case study methodology: single-case and multiple-case. The two variants are similar characteristically, differing only in the approach to the research through holistic and embedded considerations. In a single-case study, holistic considerations approach the unit of analysis singularly and within the context of the case. The single-case approach investigates multiple units of analysis embedded within the context of the case. Whereas in multiple-case studies the holistic and embedded considerations are explored across multiple cases. In selecting the best case study approach Yin (2009) developed a five-step rationale decision process that assists in selecting the best methodological approach for case study research. The rationale of this decision process however focuses heavily on the single-case approach through the objectifying of theory as a provisioning mechanism. As the study is exploring lean implementation and cultural maturity across a number of organisational environments, drawing generalisations of the process, the single-case method is not suitable for the methodological approach. Therefore a multiple-case design is considered.

Multiple-case designs emerge when research studies contain more than a single case (Yin, 2009). The logic guiding the selection of the multiple-case approach for the study needs careful consideration, as studies involving multiple-cases are ‘replications’ (Yin, 2009). According to Yin, replication within multiple-case design is viewed either as a literal prediction of similar results across 6–10 cases, with 2–3 addressing literal replications or a theoretical prediction of contrasting results but, for anticipatable reasons, across 4–6 cases. As the thesis is exploring lean implementation and cultural maturity, the replications of the process will be representative of a theoretical prediction highlighting contrasting thoughts and observations of the social actors within the organisation. Although Yin suggests 4–6 cases, this research study involves 7 cases; however, the cases have been conducted across two countries. Figure 4.1 Case-Study Methodological Structure highlights the case-study design for the research thesis.
The variation in design perspective of multiple-case studies also needs to be considered and established. The perspective of case study design refers to the approach consisting of multiple holistic cases or multiple embedded cases (Yin, 2009). According to Yin, an embedded multiple-case design may include the collection and analysis of quantitative data within each case, as part of the research, whereas a holistic multiple-case is typically used when either ‘no logical sub-units can be identified’ or when the theoretical framework is ‘holistic in nature’. As Rogers’ diffusion theory provides a holistic theoretical framework to interpret the lean implementation process and understand cultural maturity, this thesis will use a holistic multiple-case study approach.

Stake (2000, 2005) provides more specific researcher-based case study prototypes than Yin (1984, 2003, 2009), with Stake suggesting the presence of three approaches: intrinsic, instrumental and multiple/collective. According to Stake (2000, 2005), an intrinsic approach is influenced by the researcher wanting a better understanding of the case and the illustration of a ‘particular trait or problem’ (Stake, 2000: 437) and with the case being ‘of interest’ (Stake, 2000: 437) to the researcher. The purpose of the intrinsic approach is not specifically about theory building, but the researcher can address this within the approach (Stake, 2000; 2005). An instrumental approach, according to Stake (2000, 2005), is influenced by the researcher wanting to provide insight into an issue or a generalisation and the pursuit of ‘external interest’. The purpose of the approach is to provide ‘advance understanding’ (Stake, 2000: 437) of ‘other interest’ (Stake, 2000: 437). The final prototype discussed by Stake
(2000, 2005) is the multiple/collective approach. This approach involves the researcher jointly studying a number of cases as a means of phenomenon investigation. The purpose of this third approach as presented by Stake (2000, 2005) concerns the ‘better understanding’ (Stake, 2000: 437), ‘theorising’ (Stake, 2000: 437) of larger case collections. Although Stake (2000, 2005) provides a different approach and understanding to case study design, Yin provides a more detailed framework in which to place and design the study around.

The research study is about the lean implementation process and the maturing of culture that occurs. The research is representative of holistic directed multiple-case design with theoretical replications and considerations within the data. The approach is supported by Yin’s multiple-case framework of utilising 4–6 cases to address theoretical replications. Twenty-eight individuals of varying knowledge and organisational groups, across seven construction organisations in two countries were included in this research study. It is anticipated that seven case studies will provide sufficient understanding on the implementation of the lean phenomenon and cultural maturity. The selection approach for the research study is highlighted below:

- **United States of America**: 18 individuals across five USA construction organisations were selected for the research investigation. The method for selection was based on existing research highlighting lean awareness level and rates of implementation, as well as a willingness to participate. The USA is one of the leading construction industries currently implementing or utilising lean strategies; pursuing lean as a way of improving not only organisational practice but also as an entire industry. The five construction organisations represent a large cross-section of the USA construction industry and lean delivery approaches; all five organisations are actively involved in the Lean Construction Institute. The involvement in institute activities has assisted in the commitment and willingness of the organisations decision to participate.

- **Australia**: 10 individuals across two Australian construction organisations were selected for the research. The method for selection was based on existing research highlighting lean awareness level and rates of implementation as well as a willingness to participate. Australia is not leading lean implementation; rather, lean is gaining some awareness. The two construction organisations represent a small cross-section of Australian construction lean delivery.

The case studies highlight two geographically different construction industries. Potentially there may be quite different country characteristics. The theoretical replications approach will reflect country characteristics in the identification of implementation process stages and cultural similarities arising as part of lean implementation. For this study the theoretical
replication of the multiple-case design and analysis will assist in the general identification of themes and cultural maturity across the seven case studies, with each study analysed individually to identify themes and explanations for their occurrence.

4.3.3 Triangulation

Triangulation is

The use of multiple methods and measures of an empirical phenomenon in order ‘to overcome problems of bias and validity’ (Blaikie, 1991: 115)

In this research study triangulation will be approach methodologically; Denzin (1978) describes methodological triangulation as using multiple methods of data collection. In this research study two methods of data collection will be used interviews and observations; observation will be used in one of two ways the observations of interview participants while discussing culture and lean implementation and the viewing of organisational implementation data such as golden rules, assessments of personnel or organisational strategising. Furthermore, triangulation in this research study is about

developing a more effective method for the capturing and fixing of social phenomena in order to realize a more accurate analysis and explanation (Cox and Hassard, 2005: 111).

The use of triangulation in the research study will also consider the view of Jick (1984) and Eisenhardt (1995) in that it enables the capturing of a more holistic and contextual understanding and stronger substantiation of constructs.

4.3.4 Data Collection

The data was primarily obtained through semi-structured interviews across varying organisational groups. The final interview document went under an extensive ethical review process, which included a Faculty Ethics Methodology Peer Review Committee. The purpose of this committee is to oversee, audit and provide peer review of the research within the Faculty. After this approval process, the ethics application was submitted to the University’s Human Research Ethics Committee (HREC) for relevant approval. The application for ethics was further guided by the National Statement on Ethical Conduct in Human Research. The primary purpose of the National Statement is the protection of the welfare and rights of participants in research. The application was granted final approval in February 2009 under H-2009-0396.

The collection of data is guided by the requirements outlined in the University of Newcastle’s Responsible Conduct of Research Policy, Policy No. 000873.
Semi-structured focus groups became another instrument of for data collection. This data collection method was used on three occasions, as per requests from participants. The three focus groups that became part of the research study were located across three separate organisations, with the groups containing like-minded and non-like-minded individuals. Although unexpected, the focus groups provided clarification and validity of the data being collected as respondents spoke informally amongst themselves about the process and their experiences and shared knowledge of lean.

The process associated with collecting the data from each organisation was flexible and conducted over a day (or number of days) depending on wants and needs of the participating organisation. If needed, repeat interview sessions were undertaken, with interviews generally ranging from 30 minutes to an hour. The typical length of each interview was around 45 minutes.

The guidelines and questions forming the interview instrument for the research have been included in appendix A.

A mixture of open-ended questions formed the interview tool used to collect data concerning lean innovation, cultural maturity and lean culture. The nature of the questions focused on such elements as:

- **Social Structures**: According to the Rogers’ framework of diffusion theory, the social structure of the social system refers to the patterned arrangements of the system unit. The social structures present within the social system are designed to provide regularity and stability to human behaviours within the system. Further underpinning the social structure is the:
  - formal social structure representing the organisational structure; and
  - informal social structure representing the communicative structures of the organisation. Rogers’ defines these communicative structures as being hetrophilic and homophilic in nature.

- **Communication**: Communication within Rogers’ diffusion theory framework is often created in a system where homophilic groups are grouped together in cliques. Communication networks are commonly either:
  - homophilic, which is the degree to which two or more individuals talk with others who are similar to themselves; or
- heterophilic, which is the degree to which two or more individuals talk with others who aren’t similar to themselves.

- **System Norms:** The presence of system norms within Rogers’ diffusion theory framework assists in the identification of established behaviour patterns for the members forming the social system unit. Norms are identifiable as forming a standard guide for member behaviours.

- **System Opinion Leaders & Change Agents:** Rogers’ diffusion theory framework incorporates the presence and role of opinion leaders, change agents and aides within the social system as part of the process the unit undertakes. Each grouping places has a different role within the unit, with the role dependent on the environment of the unit. The groupings forming this part of the framework include:
  - The Opinion Leader, who is more influential within the immediate communication network;
  - The Change Agent, who is more influential in the introduction of innovation within the client system; and
  - The Aide, who is linked to the change agent, whose role it is to intensively contact clients and influence their innovation-decisions.

- **System Decision:** The decision is one of the most important aspects of the diffusion theory framework. It is the way the unit makes the decision behind innovation that greatly influences the process and cultural characteristics emerging as part of the process. Three system decisions form Rogers’ diffusion theory:
  - Optional Innovation Decision;
  - Collective Innovation Decision; and
  - Authority innovation Decision.

- **System Consequences:** According to Rogers’ diffusion theory, system consequences are changes occurring to the individual or to groups within the social system as a result of the implementation of the innovation. Three consequence groupings are present within the diffusion theory framework:
  - Desirable versus Undesirable;
  - Direct versus Indirect; and
Anticipated versus Unanticipated

At the core of Rogers’ diffusion theory foundation is communication. Particularly the way the innovation is implemented and communicated throughout the social system unit.

The interview questions are divided into a number of core sections associated with the nature of the research and research problems. The two data instruments were divided into three sections investigating the organisational environment, implementation process and communication. These are now discussed.

Section 1: Organisational and Managerial Contexts

Section 1 of the interviews specifically focused on establishing the general contextual background of the firm. Questions were directed towards management, requesting information regarding structure, size, operations, roles innovation and management approaches, for example:

Senior management directed:

What type of project works does your company undertake?

Question triggers:

In your opinion, is this affected by location? Company strategies? Culture?

Middle management directed:

Has the firm undergone any form of change other than lean change during your employment?

Question triggers:

If so why did the firm undergo this change?

What type of impact within the firm did this ‘change’ bring, e.g. was the change culturally, structurally or process orientated?

How was this change different from the current lean implementation?

Project team directed:

How long have you been employed with the firm and within the construction industry?

Question triggers:

In your opinion does the company value your training and knowledge? Please explain.
Questions regarding the firm’s context and background were also asked in order to identify basic elements and characteristics present within the organisation that affect culture, cultural understanding and perceptions of culture. Furthermore, the aim of questions within this section was to begin to establish how the structure of the organisation changed as lean implementation occurred.

Participants were asked questions relating to the structure to assist in identifying groups present within the organisation, in order to further assist in assessing these based on perceptions and experiences of groups within the firm. Questions specifically asked participants to reflect on cultural characteristics such as general relationships, working relationships, cultural perceptions and individual value within the firm.

The identification of cultural characteristics and perceptions in culture form a significant part of the research. Participants were asked questions that were aimed to collect the richest data for the research investigation. Questions needed to be clear, concise and unbiased to allow open reflection of the participants to changes within the organisational environment.

**Section 2: Communication Contexts**

Section 2 of the interviews and focus groups addressed communication contexts present within the organisation. The purpose of these questions was to link the theoretical framework to the lean implementation process, asking participants to reflect on the communication links present between individuals and groups within the firm. The purpose of the questions here were to start to identify the presence of specific cultural and non-cultural working groups within the organisation. For example:

**Senior management directed:**

Does the firm value knowledge transferability between groups active within the organisation?

**Question triggers:**

Provide ‘how’ and ‘why’ examples to explain your answer.

**Middle management directed:**

How often would you communicate and interact with other groups within the firm?

**Question triggers:**

What type of working relationship is this? Please describe the relationship.

**Project team directed:**
Who are you more likely to have a working relationship with?

Question triggers:

Do you value this relationship? Please explain

Questions here also address operational and strategic organisational and cultural groups. For example:

Senior management directed:

Who are you more likely to have a working relationship with?

Question triggers:

How would you describe this relationship?

Middle management directed:

What type of working relationship do you have with management?

Question triggers:

Please describe this relationship.

Project team directed:

What type of working relationship do you have with management?

Question triggers:

In your opinion do you feel this relationship valued?

Questions in this section of the data collection instrument addressed the perceptions of both individuals and groups. The questions seek to identify ‘how’ and ‘why’ reflections on lean implementation.

Section 3: Process Contexts

Section 3 of the interviews and focus groups specifically asked participants to reflect on the lean implementation process. The questions within this section were directed towards the different organisation groups, for example:

Senior management directed:

Can you map the typical implementation process undertaken when new innovative systems of management are implemented?

Question triggers:
Provide how and why examples to explain your answer.

Middle management directed:

How has the structure of the organisation changed over the last five years?

Question triggers:

What were your feelings on this change?

Project team directed:

When the company has undergone change in the past, how was the change communicated and implemented?

Question triggers:

Did you feel that you understood the process and purpose of the change?

The organisation groupings provide a greater understanding of the cultural environment of the organisation and specific individual understanding the lean implementation process. The questions asked of participants approach the topic similarly with the purpose of gaining a richer understanding of the process.

4.5 Data Analysis

This section describes the method of analysis. The primary method of data analysis that will be undertaken is thematic coding. Boyatzis (1998) identifies five phases of thematic analysis.

Phase 1: Collection of Raw Data

This method structure approaches the collection of raw data through a data collection method; this study collected raw data through semi-structured interviews and focus groups. The organisations forming the research study are identified as having implemented or are currently implementing lean principles and strategies. Raw data was collected over 28 semi-structured interviews and focus group sessions across seven organisations in America and Australia.

The 28 individuals who formed the study represented a large cross-section of the construction organisational environment. Focusing on a larger cross-section of the organisational environment allows a richer and deeper understanding of the lean implementation process and cultural maturity across the organisation to be studied. This type of study allows multiple perspectives to be explored with an understanding of individual cultures and behaviours to emerge. Study participants included senior executives, middle management, project managers
and project team members. All interviews were recorded, with additional shorthand notes taken.

Phase 2: Transcription and Data Reduction.

The transcription process was undertaken by the researcher with the transcription of interviews guided by University Policy No. 000417 Interview Recording and Transcribing: Human Research Ethics Procedure. The transcription of the interviews was undertaken over a period of three months by the researcher.

As interviews and focus groups were recorded and notes taken, the reduction of raw data through transcription was supported by a number of approaches, including:

- Rough drafts of tape recorded interviews and interview notes;
- rough drafts and placement of data typing within the interview framework; and
- descriptive rewriting of each interview highlighting perceptions, attitudes and behaviours.

Phase 3: Context Identification and Data Analysis

The raw data collected was further reduced into the five categories of Rogers’ diffusion theory framework. The purpose of further reducing the raw data collected was to enable the data to be collectively grouped and then analysed based on the reflections of the individual. The raw data was analysed and coded into the following categories:

- organisation environment;
- lean implementation process; and
- cultural consequences.

Table 4.3 Organisation Data Codes highlights some examples of the coding system used to establish the organisational environment.
<table>
<thead>
<tr>
<th>Data Type</th>
<th>Elements</th>
<th>Attribute</th>
<th>Description</th>
<th>Measurement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Organisation</td>
<td>Innovation</td>
<td>The factors underpinning the decision to implement lean principles.</td>
<td>Collective Innovation Decision</td>
<td>The decision underpinning the adoption of an innovation for the social system has been made collectively by all individuals of a social system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decision</td>
<td></td>
<td>Authority Innovation Decision</td>
<td>The decision underpinning the adoption of an innovation for the entire social system has been made by a few individuals in position dog influence or power.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formal Social</td>
<td>The structured patterned arrangements of the system units within the organisation. Presence of potential sub-themes can be individual to a specific organisation or share common elements between multiple organisations.</td>
<td>Organisation</td>
<td>The social system unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structure</td>
<td></td>
<td>Homophily</td>
<td>The degree to which a pair of individuals who communicate are similar.</td>
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<td></td>
<td></td>
<td>Heterophily</td>
<td>The degree to which pairs of individuals who interact are different in certain attributes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social Norms</td>
<td>Established behaviour patterns for the members of a social system.</td>
<td>Behaviour Patterns</td>
<td>Identification of social behavioural attributes in the organisation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opinion</td>
<td>Formal avenues of leadership and governance within the innovation process.</td>
<td>Opinion Leaders</td>
<td>Leader whose influence is within the immediate communication network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leaders &amp; Change</td>
<td></td>
<td>Change Agent</td>
<td>Leader who is influential in the introduction of innovations into a client system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agents</td>
<td></td>
<td>Aide</td>
<td>Sub-change agent who intensively contacts clients to influence innovation-decisions.</td>
</tr>
</tbody>
</table>
Appendix 2 *Data & Coding* reinstates the data codes of the analysis of each case study. Also addressed in this table are sub-themes that further assist in creating an understanding and exploratory base to further investigate the environments emerging when the lean innovation is implemented. Supporting the presence of the sub-themes is a description and coding example of how the sub-theme emerged to be of importance to the data type and attributes.

**Phase 4: Lean Implementation, Cultural Maturity and Data Display**

The fourth phase involved the reporting and displaying of the data type results emerging within each case study. This phase is supported by the model of cultural maturity developed in Chapter 3 *Research Conceptualisation*. The approach to the reporting of the data focused establishing the organisational environment prior to the reporting of the lean implementation process, event recognition and cultural challenges. General observations of the cultural environment for each organisation were then made, before a cross-case analysis of emerging themes was undertaken.

**Phase 5: Data Storage**

The storage of data for the research investigation and thesis is guided by University of Newcastle ethics policies. In accordance with ethical policies:

- Research Data Storage Facility Procedure Policy No. 000922;
- Research Data and Materials Management Procedure Policy No. 000870;
- Research Data and Materials Management Policy, Policy No. 000869, and
- Ethics application No. HREC-0396-2009.

All collected raw data, transcribed interviews, data analysis and the thesis itself, are to be stored in a secured location for a period of five years.

**4.6 Conclusion**

This chapter outlined the rationale for the methodology for the empirical investigation. Considerations into the analysis of data and methods of data collection were also addressed. The following chapter presents the results from the empirical investigation that supports the research study.
The chapters in this section present the in-depth results of each case study, exploring the respondent’s attitudes, behaviours and opinions of lean implementation in their organisation. The analysis utilises thematic analysis to identify and assess the main themes of each case study and then brings them together in a cross-case analysis. The cross-analysis in Chapter 5 further assists the discussion in answering the two research questions posed in Chapter 2 and Chapter 3.
Chapter 5 Results

5.1 Introduction
This chapter presents the results of the empirical study addressing the diffusion of the lean innovation and maturing of construction organisational culture. These results are presented in the following parts:

- Summary of the interview process and interview participant selection.
- Descriptive analysis of the within case.
- Cross-case analysis.

The first part highlights the interview process and interview participant selection. This part concludes by providing a further summary of the cases forming this real world investigation.

Following on from this, the description of each case is undertaken. This section of the results is further divided into three sections highlighting the descriptive analysis of the within case and leading to the cross-analysis of the similarly shared trends identified in the within cases. These sections are divided as follows:

- Section 1: Organisational Grouping 1 – 0–4 Year Lean Implementation.
- Section 2: Organisational Grouping 2 – 5–9 Year Lean Implementation.
- Section 3: Organisational Grouping 3 – 10+ Year Lean Implementation.

These address the descriptive analysis of each case forming the study. The descriptive analysis of each case follows the same structure as the interviews; that is, each case is divided into five parts highlighting observations of:

- participant knowledge, awareness and organisational role;
- organisational and managerial environments;
- implementation process;
- communication; and
- implementation challenges.

The time continuum has been identified in the study as forming a significant component of the model; this is reflected in the division of each organisation according to their current timing of implementation. Each of the cases concludes with real-world observations of the
current cultural climate of the organisation; these observations assist in providing a better understanding of where each case of the study is aligned with the diffusion of the lean innovation.

The chapter concludes with a cross-case analysis of the similarly shared and emerging trends identified within each case. This analysis simply presents the results, observing and correlating the trends within and across each case; Chapter 6 further interprets these observations to answer the research questions and further discuss the literature. The results tend to focus upon the individual lean implementation journey of organisations and the role-drivers and implications in altering the diffusion process. Also highlighted are the varying levels of cultural maturity present within each case and how this affects the diffusion of the lean innovation.

5.2 Summary of Interviews

The results describe the seven case studies, incorporating 20 face-to-face interviews and three focus groups that form the research study. Five cases represent data collected in the United States of America and two represent data collected in Australia. The selected organisations are in varying stages of lean implementation ranging from 9 months through to 10 years. Two of the American case studies only had one interviewee each (Organisation C and D); these cases are still presented in the results section to highlight similarly perspectives shared amongst sub-groups.

Interviews typically took 45–90 minutes, except in occasions where interviewees were interviewed as a focus group. Such instances for focus groups included time constraints of participants, extending a level of comfort and grouping similar individuals in one session. The interviewees, their observations and experiences of lean implementation and cultural maturity are described in more detail in the following three sections.

The results from the interviews in each organisation are presented considering the conceptual model presented in Chapter 3. The results highlight elements of the journey of lean implementation and the strategies organisations employ as a means to support organisational groups; this is represented from multiple perspectives from personnel within the organisation.
Part 1 describes the results of those organisations in the early adoption of lean. The organisations forming this first grouping reflect a range of implementation approaches and strategies. Organisations forming this group include Organisation B (USA), Organisation F (Australia) and Organisation G (Australia).
5.3 Case Study Results: Case Study 1 (United States of America): Organisation B

5.3.1 Overview

Organisation B is located in northern California, delivering primarily commercial infrastructure and utilising a design/build contractual and procurement approach. In project work they are identified as the general contractor.

Eight interviews were conducted within the organisation, with organisational roles representative of three levels of the organisational structure: senior management, middle management in two organisational streams, and project teams. Two management streams are present in the organisation highlighting a focus by management on projects and operations; these management streams are guided by the contractual and procurement design/build approach of the organisation. The difference between management streams in the organisation emerges in their delivery objectives and communicational networking.

Table 5.1 Interviewee Categorisation Organisation B highlights the organisational position of each interviewee. The interviewees have been categorised during the analysis into one of four groups based on their organisational role; here, interviewees are representative of senior executives, champions and innovators, and project managers. The table also identifies the main management stream of the organisation that each interviewee belongs to.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Executive 1</td>
<td>Operations Manager</td>
<td>Senior Manager</td>
</tr>
<tr>
<td>Senior Executive 2</td>
<td>Head Divisional Manager</td>
<td>Senior Manager</td>
</tr>
<tr>
<td>Senior Executive 3</td>
<td>Regional Manager</td>
<td>Management Group 2 – Senior Manager</td>
</tr>
<tr>
<td>Champion and Innovator 1</td>
<td>Team Manager</td>
<td>Management Group 1 – Middle Manager</td>
</tr>
<tr>
<td>Champion and Innovator 2</td>
<td>Project Engineer</td>
<td>Management Group 1 – Middle Manager</td>
</tr>
<tr>
<td>Champion and Innovator 3</td>
<td>Project Engineer</td>
<td>Management Group 1 – Project Team Project Engineer</td>
</tr>
<tr>
<td>Project Manager 1</td>
<td>Estimating Manager</td>
<td>Management Group 1 – Project Team Project Engineer</td>
</tr>
<tr>
<td>Project Manager 2</td>
<td>Draftsperson</td>
<td>Management Group 1 – Project Team Project Engineer</td>
</tr>
</tbody>
</table>

The organisation’s lean transformation has been predominately influenced by internal managerial change and external contractual partnerships. The time in which these changes
(according to Senior Executive 1) were spearheaded with the death of the founder and CEO for or five years earlier:

Box 1.1: Organisation Overview – Senior Executive Perspective

‘... the company had changed dramatically in the last four or five years largely because [the founder and CEO] passed away and when he passed away instead of, well we had a board of directors when he was alive and we had upper management of course but it was always [the founder and CEO] making most of the critical decisions. When he passed away that went to a board which is much more active now that looks at business a little bit different, the culture is still largely intact but the approach is certainly different.’

The market positioning of the organisation is guided by management’s external trade partner contractual agreement with organisation A (refer to 5.9 for descriptive analysis), which (according to Senior Executive 1) has forced the organisation to implement lean and as such has quickened the implementation process timeframe. This external requirement to implement lean (according to Senior Executive 1) has provided management with an educational framework in which to ‘become aware’ of lean principles, strategies and implementation processes and how to best approach implementation within the organisation.

Project Manager 1 similarly discussed external exposure to be guiding implementation within the organisation, highlighting this exposure to be more about the individual, as personal exposure to the lean innovation is influenced by office locations and environments. For example, those individuals located in the main office have a greater exposure to lean than those individuals in smaller locations. The benefit of this external exposure according to Project Manager 1 is having the ability to see how individuals within the organisation use authority and lean knowledge to transform the organisation within the industry, though conflicts can emerge as some believe others receive ‘special treatment’.

Further internal changes within the organisational and managerial environments (according to Senior Executive 1) have also occurred with the establishment of organisation-specific educational programming. The presence of educational programming within the organisation (according to Senior Executive 1) further supports the implementation of lean, awareness, interaction and education.

Such changes that have occurred over the last five years have significantly influenced the organisation environment; however, the management structure has remained relatively unchanged. This is discussed further in the following section.
5.3.2 Organisation and Management Environments

Despite managerial change, Organisation B’s formal ‘social’ structure remained a stable constant according to Senior Executive 1, Senior Executive 2, Senior Executive 3, Champion and Innovator 2 and Project Manager 2. Each of these interviewees highlighted how relatively easy the transition in management had been since the CEO and founder’s death; Champion and Innovator 2 particularly suggested that this occurred as the organisation had always considered itself innovative and open to change.

Figure 5.1 *Organisation B Formal Organisational Structure* addresses the formal ‘social’ structure of the organisation. The structure has been developed based on the observations of the interviewees when discussing such elements as structure, management and the organisational environment. The structure incorporates four organisation tiers, with the structure as follows:

- Top tier management incorporating CEO and board of directors who govern the organisation.
- Second tier management incorporating senior executive roles; e.g. operations manager and regional office manager.
- Third tier management incorporating specific organisational objectives; e.g. general contracting and special contracting.
- Fourth tier management group reflecting organisational project teams underpinning third tier management groupings.

Also representative in the figure is the underlying collaborative work practices present throughout the organisation, with communication consistently flowing throughout the organisation. Framing these collaborative work practices is the presence of tertiary and integrated team environments in the third and fourth tiers; it is interesting to note that the organisation has no designated ‘lean group’. According to the majority of interviewees, management tended to move away from such groupings as senior management endorses organisational relationships that cross organisational boundaries. Champion and Innovator 1 touched upon this when discussing the presence of the educational programmes as part of social norms for the organisation:

**Box 1.3: Organisation & Managerial Environments – Champion & Innovator Perspective**

*With this group it’s a lot of individuals just wanting to get better and to learn, improve themselves and just a desire across the board.*

Champion & Innovator 1
Figure 5.1 also highlights the organisation’s communicative networks, in which:

- red indicates managerial communicative networks;
- blue indicates upward communicative networks; and
- orange indicates project team communicative networks.

Figure 5.1: Organisation B Formal Social Structure

Table 5.2 Informal Social Structure Characteristics, Table 5.3 Social Norms and Table 5.4 Opinion Leaders and Change Agents address and analyse the observations made by interviewee participants regarding the organisation. The purpose of these tables is to highlight elements of the social environment that have and are guiding lean implementation; where possible, the direct reflection of lean change within the environment is identified and further discussed. Furthermore, in instances where observations are shared or confirmed, observations are grouped together. It should also be noted that on occasions interviewees reflected and observed multiple aspects of lean implementation; where this has occurred only an analysis is present.

The interviewees, when reflecting upon lean implementation within the organisation, made observations on the informal social system; these observations are addressed in Table 5.2. Interviewees reflected upon two communication styles as forming the informal social system of the organisation:

- homophilic communication or the communication between like minded individuals; and
- hetrophilic communication, or the communication between non-like minded individuals.

Perspectives of these communication styles highlighted lean implementation within the organisation leading towards the development of significant external contractual relations as well as internal contractual relations and the presence of tertiary working groups, also referred to as ‘cluster groupings’. Interviewees noted a positive change within the organisation; although many reinforced that much of the change was not significant as for those individuals in management positions as the organisation had always encouraged informal communication. The change for those individuals in project team environments was significant, particularly in the emergence of lean-oriented ‘hetrophilic’ study action teams, showing a distinct difference in organisational concerning the lean innovation:

**Box 1.4: Informal Social System – Champion & Innovator Perspective**

In fact we’ve had some of our labourers and our union guys wanting to know if they can also do an SAT because they felt that they were missing out on knowledge and wanting to do it also – particularly asking ‘well; why can’t I do it?’. So we are starting to try and implement a little bit of that, especially on the safety culture and getting them involved in that per their request because they had seen the changes it had been making.’

Champion & Innovator 1

Perspective similarly approach and confirmed by SE1, SE2 and CI2, in separate interview sessions.
<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| SE1         | **Perspective:** External *contractual relations*  
              The interviewee highlighted how the organisational environment is guided by the client and the alignment of the organisational environment to client satisfaction. This has ultimately emerged within the organisation in conjunction with the organisation’s trade partner contractual agreement with organisation A and its move towards the acceptance and implementation of the lean innovation.  
              The interviewee noted that the movement towards the lean innovation is guided and governed by the organisation’s commitment to client satisfaction in the delivery of construction projects.  
              *This perspective was discussed when the interviewee observed the process of lean implementation.* |
| SE2         | **Perspective:** Internal *contractual relations*  
              The interviewee discussed the presence of internal contractual relations within the organisation environment; explaining the presence as more of a mission to eliminate waste which turned into something more meaningful and philosophical for the organisation and its employees.  
              *This perspective was discussed when the interviewee observed the process of lean implementation.* |
| CI1         | **Perspective:** Internal *contractual relations*  
              The interviewee highlighted contractual relations are created within the organisation to as a desire or want to embrace lean. The approach undertaken by the organisation’s management sees the establishment of improved communicational streams and access to the project site at organisation A.  
              Also noted was that implementation is only in its developmental stages, however there level of exposure to the lean innovation has enabled them to begin to see and feel the movement towards change occurring within the organisation.  
              *This perspective was discussed when the interviewee observed the process of lean implementation.* |
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Homophilic Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Social System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>CI2</td>
<td><strong>Perspective: Tertiary working groups or ‘cluster groupings’</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The organisation utilises a fourth tier management group of project teams that undertake project specific works and phases of construction. Tertiary working groups within the organisation are guided by a collaborative environment and governed by two higher tiers of management.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It was noted by the interviewee that the presence of clusters groups within the organisation has been stable. Since the organisation has started to undergo lean implementation existing cluster groups have strengthened while new cluster groups between each organisational location have emerged.</td>
<td></td>
</tr>
</tbody>
</table>
| | The success of homophilic tertiary working groups or ‘cluster groupings’ as part of the informal social structure has worked as the company is relatively small and also because the employee is also considered an owner ‘so everybody has the same goals and the same investments’.
| | This perspective was discussed when the interviewee observed communication in the organisational environment. |
| | Perspective similarly shared and confirmed by CI3, in a separate interview session. |

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Heterophilic Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Social System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>SE1</td>
<td><strong>Perspective: Contractual relationships</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The interviewee highlighted the organisation’s mutual contractual relationship with organisation A. Discussed how the organisation has had a 15-year relationship with organisation A which has lead to the deepening and strengthening of bonds between the organisations. The interviewee finds that the relationship between the two organisations is positive.</td>
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<tr>
<td></td>
<td>This perspective was discussed when the interviewee observed the process of lean implementation.</td>
<td></td>
</tr>
<tr>
<td>Theme</td>
<td>Sub-Theme</td>
<td>Heterophilic Communication</td>
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</tr>
<tr>
<td>Informal Social System</td>
<td></td>
<td><strong>Interviewees</strong> SE1, SE2, CI1, CI2, CI3</td>
</tr>
</tbody>
</table>
| SE1                      | Perspective: *Enhanced relations* | The interviewee highlighted the changing environment of enhanced relations within the organisation not how enhanced relations have encouraged a positivity to emerge within the organisational and project cultures concerning the lean transformation:  

‘I am very surprised because we haven’t had success a lot of the time with non-design/build contractors on design/build projects getting them to participate in any other way except you know a command and control response perspective. We the general contractor, say it and they do it. But the very same sub, the very same guy is now at [the project] and offering all kinds of opinion because it’s being asked and its valuable opinion, its valuable information that he is giving and that’s been the biggest surprise the cultural change.’

Perspective similarly shared and confirmed by CI3, in separate interview session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CI1                      | Perspective: *Tertiary working groups* | The structure and collaborative nature of the organisation headed by the presence of *tertiary working groups* has lead to ‘deeper bonds and relativeness between all tiers of the organisation’.  

The development of stronger and deeper bonds amongst according to the interviewee there is also present in *study action teams*, which are specifically designed to integrate ‘non-liked minded individuals’.                                                                                                                                                                                                                                                                                                                                 |

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Interviewees also made observations on the behaviours that form the social environment of the organisation, also known as ‘social norms’. Observations made are addressed in Table 5.2 with interviewees reflecting upon education, integration, advocacy and stability. Of particular importance to organisational management is education, particularly the development of an educational platform that encourages knowledge development, stability and interaction amongst the workforce:

**Box 1.5: Social Norms Stability & Education – Senior Executive Perspective**

‘... we want to keep growing and keep learning so as a result of those two things we have what we call a PDC (Professional Development Committee), of which I am a member. We’re trying to improve the old way we would do things ... We are doing, we are pretty early in the process but we have created courses now, we’ve created 22 this year, there is about another 120 on our list to do and including several that are lean orientated of courses to make it simpler to transfer that knowledge.’

**Senior Executive 1**

Social norms were similarly discussed across the interviewee participants for the organisation.
### Tables 5.3: Social Norms

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norms</td>
<td>Education</td>
<td>CI1</td>
<td><strong>Perspective:</strong> Organisational specific development of collaborative work practices and relationships centred through education.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The embracing and integration of collaborative work practices within the organisation according to the interviewee has influenced the embracing of the want for further <em>education</em> at all levels within the organisation: ‘With this group it’s a lot of individuals just wanting to get better and to learn, improve themselves and just a desire across the board.’ The embracing of <em>education</em> has also been influenced by higher management’s decision to implement an organisation specific educational programme.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE1, CI1, CI2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stability</td>
<td>CI1</td>
<td><strong>Perspective:</strong> Commitment of higher management to lean specific education.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Although in the early stages of the lean and implementation transformation the commitment of higher management to a lean specific education programme assists in creating a sense of stability within the organisational environment: ‘... everybody is a company person and even if they are not growing statue wise they are growing as a person and what duties they can do and very much already we are a learning culture. I think this is helped and people are getting more and feel more involved as part of the team and they are seeing corporate decisions being based on what they are learning so it is helping I think the whole team building as a company and when you are team building as a company that’s a lot about finding your culture a little bit.’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE1, CI1</td>
<td></td>
</tr>
</tbody>
</table>

Perspective similarly shared and confirmed by SE1 and CI2, in separate interview sessions.
### Tables 5.3: Social Norms

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewees</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| Social Norms| Culture   | SE1          | **Managerial approach and philosophy.**  
               |            |              | The *culture* of the organisation is ‘strongly influenced by a design/build philosophy’ which promotes ‘collaboration’, ‘mutual respect’ and ‘integrated team environments’. The presence of such cultural characteristics within the organisation has assisted in the easier transition of lean adoption within the organisation compared with other organisations. |
| Social Norms| Advocacy  | C11, C12, C13| **Collaborative work practices and relationships.**  
               |            |              | *Advocacy* is directly linked to the collaborative work practices and the relationship based properties of lean:  
               |            |              | ‘… lean is a very relationship based process with collaboration and team work which is really bringing everybody together as advocates for the project and the client as a team….so our culture marries in well with that; but it kind of takes it a little step further … in our company we concentrate on providing the best value for the owner.’  
               |            |              | **Perspective similarly shared and confirmed by C12 and C13 in separate interview sessions.** |

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| SE1         | **Perspective:** Managerial approach and philosophy.  
               | The *culture* of the organisation is ‘strongly influenced by a design/build philosophy’ which promotes ‘collaboration’, ‘mutual respect’ and ‘integrated team environments’. The presence of such cultural characteristics within the organisation has assisted in the easier transition of lean adoption within the organisation compared with other organisations. |
| C11         | **Perspective:** Collaborative work practices and relationships.  
               | *Advocacy* is directly linked to the collaborative work practices and the relationship based properties of lean:  
               | ‘… lean is a very relationship based process with collaboration and team work which is really bringing everybody together as advocates for the project and the client as a team….so our culture marries in well with that; but it kind of takes it a little step further … in our company we concentrate on providing the best value for the owner.’  
               | **Perspective similarly shared and confirmed by C12 and C13 in separate interview sessions.** |
### Tables 5.3: Social Norms

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| PM1         | **Perspective:** Value bringing principles of the lean transformation for those employed in trade. Integration is viewed as more of a learning process for trades and all organisational groups:  
*I’m learning quite a bit about some of the intrinsic values of the trades and seeing the benefits of the design team getting feedback from the drywall subcontractor, mechanical, electrical, plumbing, window subcontractor – we’ve got major trades there that are having a direct input on how the design can make the project more cost-effective and cost efficient and easier and better to build in the field.* |
Opinion leaders and change agents were identified by interviewees as playing a role in the implementation of lean; this is further addressed in Table 5.3. When discussing lean implementation, Senior Executive 1 alluded to the role of change agents in the organisation, particularly in educating senior management in lean:

**Box 1.6: Change Agents – Senior Executive Perspective**

“To a degree some of our upper managers right now there is a real excitement about it, about lean techniques and the knowledge of what those techniques are, what the philosophy that holds the techniques together and it’s not understood to the degree that it needs to be by upper management. I think a lot of the pushing for our lean growth right now is middle management and job site driven and I don’t know if that’s a problem but sometimes our highest company leaders don’t have the clearest vision of what we are talking about yet. So they are being educated just like everyone else.”

**Senior Executive 1**

Although identified by some interviewees, particularly those in more senior and project management roles, the majority of participants suggested that opinion leaders and change agents are not identifiable as official roles. According to these interviewees this emerges as organisational management are committed in promoting collaborative and integrated team environments; that encourage information sharing, education and knowledge:

**Box 1.7: Change Agents – Champion & Innovator Perspective**

‘…our exposure at [organisation A] has just opened up the company to it and it’s great that we have a few key people, myself being one of them, actually involved over there and we can kind of spread the word here.’

**Champion & Innovator 3**

This is of particular relevance for the organisation in its position as a trade partner with Organisation A, as well as the utilisation of tertiary change agent aides to further learn about lean implementation within project environments.
Table 5.4 Opinion Leaders and Change Agents

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Opinion leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opinion Leaders &amp; Change Agents</td>
<td>Interviewees</td>
<td>SE1, CI3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| SE1 | **Perspective:** Core cultural competencies of *advocacy* and *integration* emerge as influencing *innovation* specific opinion leaders, particularly in becoming a leader of the organisation and the innovation.  

The organisational environment is unique centred around five core cultural competencies. These competencies influence the presence of organisational specific opinion leaders. According to the interviewee the organisational structure management approach utilised within this organisation has created a unique working environment with specific social norms centred on four primary behaviours. Two behaviours in particular link themselves to the presence of lean opinion leaders and leadership ideals within the organisation, those of advocacy and integration.  

‘What we’re learning here [in this office], right here is a line between [one half of the organisation] and [the other half of the organisation] and these folks are, we co-mingle, we discuss things, we talk about things, we have speakers from [organisation A] over so the exposure is greater than just the immediate team involved in [organisation A] or the immediate team involved in LCI.’  

The social norms present in the organisation centre on the belief and attitude that to learn is to communicate with knowledgeable individuals and be exposed to working examples of lean implementation. For the organisation according to the interviewee this is achieved through the contractual relationship with organisation A.

Of particular importance to the interviewee when discussing organisational specific opinion leaders was their ability to:

- Encourage individuals to take control of their learning and knowledge; and
- Encourage and advocate individual desires about the need to learn and sharing knowledge.

**Perspective similarly shared and confirmed by CI3 in a separate interview session, who stated:**

‘… our exposure at [organisation A] has just opened up the company to it; and its great that we have a few key people, myself being one of the; actually involved over there and we can kind of spread the word here.’

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<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opinion Leaders &amp;</td>
<td>Sub-Theme</td>
<td>CI3</td>
<td>Perspective: Assist the lean transformation at a project level.</td>
</tr>
<tr>
<td>Change Agents</td>
<td>Aides</td>
<td></td>
<td>The presence of an aide provided a clear understanding on how to identify waste and</td>
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<tr>
<td></td>
<td>Interviewees</td>
<td></td>
<td>overcome waste creating activities:</td>
</tr>
<tr>
<td></td>
<td>CI3</td>
<td></td>
<td>‘When I was at [a project site] they did have someone come out who was a lean</td>
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<td></td>
<td></td>
<td></td>
<td>specialist and walk the job with us and just look at how we did our; work on daily</td>
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<td></td>
<td></td>
<td></td>
<td>basis, how efficient it was, where we could cut out waste and; he walked the job for</td>
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<td></td>
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<td>about three days and then did a presentation to us on; his findings in areas where we</td>
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<td></td>
<td></td>
<td></td>
<td>could actually lean up our day-to-day; activities.’</td>
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</tbody>
</table>
5.3.3 Process
The describing of lean implementation by interviewees highlighted diverse process observations. The diverse observations made by interviewees cover a number of implementation stages and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.

- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.

- **Implementation** will highlight those observations that describe the process of lean implementation.

- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.

These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.5 *Implementation Process Component 1: Lean Knowledge & Exposure* addresses the knowledge and exposure of interviewees to lean innovation, describing these alignments with low, moderate and high levels. Interviewee positioning was addressed in table 5.1.

<table>
<thead>
<tr>
<th>Knowledge &amp; Exposure Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>Not Specified</td>
<td>SE2 did not specify the level of lean exposure</td>
</tr>
<tr>
<td>Low Level</td>
<td>SE1, SE3, PM1 and PM2 are identified as having lower levels of exposure to the lean innovation having limited exposure through organisation A</td>
</tr>
<tr>
<td>Moderate Level</td>
<td>CI2, CI3 are identified as having moderate levels of exposure to the lean innovation through access to organisation A</td>
</tr>
<tr>
<td>High Level</td>
<td>CI1 is identified as having a high level of exposure to the lean innovation having been exposed through LCI membership and contractual obligations</td>
</tr>
</tbody>
</table>

The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been diversely observed and described by interviewees; incorporating such perspectives as social norms, the formal social structure and informal social structure. Table 5.6 *Implementation Process Component 2: Persuasion* addresses the persuasive techniques identified by interviewee participants as assisting the implementation of lean within the organisation. The table divides the main persuasion theme into a series of sub-themes representative of the
interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with persuasion and persuasive techniques.
### Table: 5.6: Implementation Process Component 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Formal Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE1</td>
<td><strong>Perspective</strong>: Project team lean awareness levels.</td>
</tr>
</tbody>
</table>

The organisation is a trade partner in the formal social structure of organisation A the interviewee and PM1 both discussed how individuals and specific project teams have direct access to the lean tools and management approaches utilised at the organisation A project site. Particularly, the interviewee highlighted that organisation A is often viewed within the organisation as a lean laboratory.

‘We are starting to see value from some of these techniques and what is the least obtrusive way to incorporate those into our culture, because when you change a culture even just a little bit there is a big bang and I’m trying to look at ways to minimise that or make it ducktail a little bit easier than just jumping in with both feet. We have the luxury of time right now with the down market and being able to participate in the laboratory that is [organisation A].’

This direct access and exposure according to the interviewee has allowed the organisation to be educated and persuaded to begin implementation of the last planner (lean planning tool) on smaller jobs as a means of understanding the tool while allowing individuals and teams within the organisation to start ‘stretching, thinking and wanting to learn more’.

**Perspective similarly shared and confirmed by SE2 and PM1 in separate interview sessions**
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Informal Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td>Interviewees: CI1, CI3, SE3</td>
</tr>
</tbody>
</table>

**Interviewee | Description & Analysis**

**CI3**

**Perspective:** Homophily communication.

The interviewee acknowledged how the trade partnership between the two organisations [A and B] have assisted in the persuasion of the organisation to adopt the lean innovation, particularly in the ability for the organisation to enhance and maintain its client relationship while further learning from the project client. The establishment, enhancement and maintenance of the contractual [trade partnership] relations between organisation A and organisation B according to the interviewee is strengthened with the embedding of individuals from organisation B into the culture and projects of organisation A.

‘… we are the ones who are kind of educating everybody else just because we have the knowledge and we are being exposed to it so it’s kind of upon that small group of people but I think all of the designers and trade partners who are involved in the [organisation a] project are also spreading the word.’

The interviewee did specify that the presence of support networks at organisation A, as well as local industry lean chapters and university research has assisted in the persuading of the organisation to implement the lean innovation.

**Perspective similarly shared and confirmed by CI1 and SE2 in separate interview sessions.**

Further to this CI1 noted that the support networks present at organisation that surround the individuals and teams of the organisation is one of the strongest forces in the persuasion of individuals and teams within the organisation concerning the innovation.

‘I think, that because [the company] and the culture of from growing from within everybody knows each other from the time that they were in college on so there is a, there is a set communication thing that is very informal and we are small enough to make that work. But we are getting bigger but we are small enough to make that really work but from the outside because I’m not part of that chain and there are quite a few of us that aren’t part of that communication chain I think I can see that helping us and formalising the communication better and bringing us more into the [company] family then what we would have been under just you’ve got to be here long enough to be apart of that chain.’

With SE2 further stating:

‘So we intentionally took field superintendents from one business unit and put them with project managers and estimators from another business unit just to make sure there really was a cross contamination or cross pollination of opinions. So that while it was done intentionally so different perspectives came to the table it also fostered corporate logs about what was going on in the business world, what’s going on in your market? So from that standpoint well at least from my perspective it has performed, the outcome has been higher what was even intended.’
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Social Norms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE1, PM1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>SE1</td>
<td>Perspective: Culture</td>
<td>The interviewee stated that the culture of the organisation has assisted in seeing and understanding the values of the innovation and its techniques and the most obtrusive way to introduce the innovation and persuade the adoption or rejection of the innovation. In persuading individuals within the organisation to accept the innovation, the interviewee has taken on an investigative role specifically exploring the best cultural way of introducing and persuading individuals to accept or reject the innovation: ‘…when you change a culture even just a little bit there is a big bang and I’m trying to look at ways to minimise that or make it ducktail a little bit easier than just jumping in with both feet. We have the luxury of time right now with the down market and being able to participate in the laboratory that is [organisation A].’</td>
</tr>
<tr>
<td>PM1</td>
<td>Perspective: Education and study action teams</td>
<td>The interviewee discussed how the organisation uses education to bring together individuals who may/may not hold different values, morals and beliefs and persuade these individuals to adopt lean. The structure of such study action teams within the organisation are focused towards the introduction of the innovation through the use of a common book or reading materials. Each study action team is made up of individuals from different positions and roles within the organisation, this is done according to PM1 to ‘provide a broad spectrum of understanding and allow members of the organisation to communicate with other members who they may not communicate with in day-to-day duties’. From this point the book or reading materials is introduced to the study team, read and then discussed at length in terms of the ‘application of principles to the industry and company.’ The interviewee did highlight that exposing individuals to the innovation through the study action team environment allows individuals within the organisation to learn and understand the strengths and weaknesses as well as other’s opinions associated with the innovation before making a decision to accept or reject the innovation.</td>
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</table>
Table: 5.6: Implementation Process Component 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewees</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td>Social Norms</td>
<td>C11, C12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interviewee</td>
<td>C11</td>
<td>Perspective: Advocacy.</td>
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<tr>
<td></td>
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<td></td>
<td>The interviewee discussed the presence of advocacy within the organisation to assist in the development of collaborative practice through the internal and external relations: '... lean is a very relationship based process with collaboration and teamwork which is really bringing everybody together as advocates for the project and the client as a team...so our culture marries in well with that; but it kind of takes it a little step further... in our company we concentrate on providing the best value for the owner.' The nature of advocacy is supported within the organisation by opinion leaders and change agents who assist in the implementation process and transformation of the organisation. Perspective similarly shared and confirmed by C12 in a separate interview session.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewees</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td>Opinion Leaders &amp; Change Agents</td>
<td>C11, C12, C13, PM1</td>
<td></td>
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<tr>
<td></td>
<td>Interviewee</td>
<td>C13</td>
<td>Perspective: Identification of change agent role</td>
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<td>According to the interviewee change agent presence within the organisation is underpinned by the notion of individuals within the organisation working with organisation A, becoming educators and change agents and assisting the persuasion of other individuals to accept rather than reject the innovation. The role of change agent within the organisation according to the interviewee is described as involving: '... we are the ones who are kind of educating everybody else just because we have the knowledge and we are being exposed to it so its kind of upon that small group of people but I think all of the designers and trade partners who are involved in the cathedral hill project are also spreading the word.' C11, C12 and PM1 either identified themselves or were identified by others as change agents in separate interview sessions.</td>
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</tbody>
</table>
The lean decision was not explicitly described by interviewees; however, on a number of occasions the decision was eluded to, particularly through the education and training framework. This eluding was not limited to one or two interviewees but was confirmed by all interviews in each interview session. Whereas implementation was openly discussed by interviewees highlighting a diverse range of observations and reflections which were again guided by lean knowledge and organisation positioning. For many the existing cultural environment is guiding the implementation:

<table>
<thead>
<tr>
<th>Box 1.8: Implementation – Champion &amp; Innovator Perspective</th>
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</thead>
<tbody>
<tr>
<td>‘… as a culture we are implementing slow and so once you accept that you know that they’re going to implement slow but they are going to implement fast once they decide it is successful they are going to do that very quickly then it’s ok. It doesn’t really bother you that bad.’</td>
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<tr>
<td>Champion &amp; Innovator 1</td>
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And

<table>
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<tr>
<th>Box 1.9: Implementation – Senior Executive Perspective</th>
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<tr>
<td>‘The culture has always been on continuous improvement in learning, the culture has always been on investing in our employees, the culture has always been in don’t take the short gain always look for the long haul, it’s what in the long haul is what is best and we’ve always been because we’re so engineer heavy even without saying the words I think there is some commonality between some engineers, you know they have these like balsawood bridge competitions – you’re taught early that the beauty of engineering is to get out of you as much as you can out of as little as possible or to at least understand your objectives and use as little effort and resource to achieve that end goal. So eliminating waste is just another way of saying that. So I don’t think is had changed our culture but certainly it has given us more focus, it’s given us a framework in which to operate, which I think engineers a lot of times don’t like, no external constraint, they don’t like feeling like they are floating and or lost. So to have this concept philosophy well tested, well-practiced it’s got names for the tools, I think it gave a lot of people here a framework to focus on.’</td>
</tr>
<tr>
<td>Senior Executive 3</td>
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</table>

Table 5.7 Implementation Process Component 3: Decision and Implementation addresses the lean implementation observations of those interviewees within the organisation and highlights diverse reflections including implementation through contractual obligations, managerial excitement and middle management influence. The table divides the main process theme into a series of implementation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation.
Table 5.7: Implementation Process Component 3: Decision and Implementation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Implementation</th>
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<tbody>
<tr>
<td>Process</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE1, CI1, CI2</td>
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<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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</thead>
</table>
| SE1         | **Perspective:** Contractual relationships and market downturns.  
According to the interviewee, the organisation is in a unique position to implement the lean innovation with the current contractual trade partnership with organisation A. The interviewee discussed how through this partnership the organisation is able to in a way watch, learn and improve the way organisation A has implemented the lean innovation:  
'**We are starting to see value from some of these techniques and what is the least obtrusive way to incorporate those into our culture, because when you change a culture even just a little bit there is a big bang and I’m trying to look at ways to minimise that or make it ducktail a little bit easier than just jumping in with both feet.**'  
Furthermore, the current economic downturn in the United States has enabled management of the organisation to:  
'**We have the luxury of time right now with the downturn and being able to participate in the laboratory that is [organisation A]...can kind of wait and see how this simmers and see what works and; what doesn’t and a little bit of a time pull is on.’**  
**Perspective:** Approach.  
The interviewee noted that approaches to implementation of other innovations in the past within the organisation have typically been introduced slowly and when a general acceptance or understanding of the innovation has been reached then the implementation becomes more rapid. SE1 described the current lean innovation process as:  
'**We’re starting with implementation, it’s the philosophy as we have these minor victories along the way, and they start an aggregate quite a bit. So I think that’s how we are going to get there.’**  
**Perspective similarly shared and confirmed by CI1 in a separate interview session.**
### Table 5.7: Implementation Process Component 3: Decision and Implementation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Implementation</th>
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<tbody>
<tr>
<td>Process</td>
<td>Interviewees</td>
<td>SE1, CI1, CI2</td>
</tr>
</tbody>
</table>

#### Interviewee Description & Analysis

**SE1 Perspective:** Managerial excitement.

The interviewee discussed how within the upper management groupings there is a high level of real excitement present concerning the lean innovation, its techniques and the knowledge with which lean brings to an organisation. According to the interviewee high excitement levels within upper management groupings are assisting in the streaming of the awareness of the lean innovation throughout the entire organisation. ‘To a degree some of our upper managers right now there is a real excitement about it, about lean techniques and the knowledge of what those techniques are, what the philosophy that holds the techniques together and it’s not understood to the degree that it needs to be by upper management, I think a lot of the pushing for our lean growth right now is middle management and job site driven and I don’t know if that’s a problem but sometimes our highest company leaders don’t have the clearest vision of what we are talking about yet. So they are being educated just like everyone else.’

**Perspective:** Process – Middle management influenced.

The interviewee described how and if changes occur at organisation A which would be beneficial for the organisation to adopt then they will be introduced through middle management ranks, who are working with organisation A, stating:

‘I think that as things [at organisation A] change [is] made following some lean; philosophies succeed then upper management is going to accept changes. We are going to drag them into it but it’s going to be lead by people in the; middle ranks up which I don’t have a problem with and I think once we have; some successes that there won’t be resistance other than a positive; resistance in trying to figure out how to do it better.’

Perspective similarly shared and confirmed by CI2 in a separate interview session.
<table>
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<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>Implementation</td>
<td>SE1</td>
<td>Perspective: Process – Activity influenced.</td>
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<td>The interviewee described the current implementation of the lean innovation as being influenced by top-down as well as middle-management approaches:</td>
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<td>‘We’ve implemented some things and we are still looking at some things and other things and how they would work – I would say we’re furthest down the road right now in the last year, year and a half we’ve looked at the majority of both our administrative processing capabilities and in a couple of cases job site work processes for you know, we do a lot of structural concrete work so some of those work activities from benefit of using lean observation techniques, work flow structuring, flow charting and those activities and those types of things.’</td>
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<td>The activity-implementation understanding emerges for the interviewee in terms of lean innovation understanding and the application of lean tools and strategies within a specific activity level, particularly when through technology the organisation is forced to implement change at a faster pace.</td>
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<td></td>
<td></td>
<td>CI1</td>
<td>Perspective: Process – Higher management influenced.</td>
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<td>The interviewee described implementation to be being driven by success:</td>
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<td>‘It’s kind of segment of the company from the top all the way down to some; field engineers that are being successful because they are using it and other; field engineers are seeing that and what these guys are doing and liking it; so, and now they are wanting to get involved.’</td>
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<td>The interviewee also noted that the nature of innovation implementation in the organisation typically begins as top-down however usually results in an overall outward growing approach. Interviewees agreed with how the interviewee described the implementation process of the lean innovation, however in terms of time and pacing of the implementation</td>
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<td></td>
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<td>Perspective similarly shared and confirmed by SE1, CI2 and PM1 in separate interview sessions.</td>
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</table>
Confirmation of the lean innovation is a significant aspect of the process as it assists understanding the progress of implementation. Interviewee observations and reflections are limited as the organisation is in the early stages of implementation, with Senior Executive 1, Champion and Innovator 2 and Project Manager 2 discussing confirmation. Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation in terms of the theoretical, philosophical and process related ideals and implementation at the organisational level. The confirmation perspectives also provided clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator, project management and project team levels of the organisation perceive lean innovation to be.

Table 5.8 *Implementation Process Component 4: Confirmation* addresses the observations and reflections of those interviewees who have experience lean innovation confirmation, including the lean journey and process as well as organisational theory. The table divides the main confirmation theme into a series of confirmation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.
Table 5.8: Implementation Process Component 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>Confirmation</td>
<td>SE1, CI2, PM2</td>
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</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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</table>
| SE1         | **Perspective:** The Lean Journey, process and philosophy.  
Fundamental to the interviewee’s perspective is the awareness by those individuals in higher and middle management that the lean journey is continuous in nature, particularly in the notion that lean should not be viewed as a means to an end:  
‘... we’re pretty new as a company on our journey with lean. So we are not; there yet but I guess that’s kind of the philosophy of lean is that your never; there yet, you know, you’re always growing, you’re always improving; you’re always looking to anyway and there is no ends to the means. Its kind; of like life, well there is an ultimate end to life.’  
The continuous nature of the lean innovation according to the interviewee means ultimately that organisation’s can increase waste if the innovation is not completely understood, however if one views the innovation for what it is then ultimately an end can be achieved within the organisation. The interviewee also discussed theoretical and process ideal and the link to the continuous nature of the innovation in terms of the organisation’s own strategy to implementation.  
**Perspective similarly shared and confirmed by CI2 in a separate interview session, highlighting**  
The current approach to the implementation of the lean innovation is more about modest yet critical tweaks of current organisational, management and operational approaches:  
‘It’s just, it’s very minor things I think are going to adjust very quickly but; it’s a recurring theme that, well to me anyway. That the changes with lean; that we will run into are going to be very modest tweaks on how we do it but they’re critical tweaks and if you don’t quite get them then you’re going; to waste a lot of time.’ |
### Table 5.8: Implementation Process Component 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
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<tbody>
<tr>
<td>Process</td>
<td>Confirmation</td>
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<td></td>
<td>Interviewees</td>
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<td>SE1, CI2, PM2</td>
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<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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</table>
| CI2         | **Perspective:** The individual in a lean organisation  
Fundamental to the interviewee’s perspective on confirmation is the alignment of all individuals and groups within the organisation to the innovation and the theory which supports the innovation:  
‘… the lean experience has been a good one, very good I mean it shows a lot of promise in design and construction where everybody, the contractor and contract is very well written and the message is very loud and clear that actually aligns everybody in the same direction. The risk sharing and taking the guaranteed prices and the caps off the number and really putting the team at risk for a portion of that alliance in aligning everybody in the same direction.’  
For the interviewee the confirmation of the lean innovation for all individuals within the organisation is about  
‘… working with the team and committing to the team that we are all working towards this target price together.’ |
| PM2         | **Perspective:** Philosophy  
The interviewee highlighted the way the business plans and how the business is used as a basis can the organisation embrace and become lean. For the interviewee and their position and role within the organisation the application of their philosophical perspective of confirmation is representative of moving out of existing office space into new office space which will allow for more collaboration within the organisation and the overall acceptance of the lean innovation.  
‘… as we do our business plans we are trying to think more and more about how do we become more of a lean organisation.’ |
5.3.4 Communication

Senior Executive 2, Project Manager 1 and Project Manager 2 all observed and discussed one primary and one secondary strategy in use by the organisation to assist the communication of the lean innovation within the organisation and onto project teams. The communicative approach in the organisation was often described as a ‘tool’, with the ‘tool’ typically discussed aligned with a secondary strategy. For example, communication is a ‘tool’ that assists the implementation of the innovation through the use of a study action team strategic agenda.

Study action team objectives emerged within the organisation through the utilisation and establishment of an organisation-specific educational program. According to Senior Executive 2, Project Manager 1 and Project Manager 2 senior management encourages verbal, visual and written communication throughout the organisational through the development and advocating of study action team objectives as part of a larger communicative strategy. Senior Executive 2 further discussed how study action teams were used as an informal way of educating and training all employees while also assisting in the establishment of awareness for those employees who may not have a formal education and not completely understand the concepts behind the innovation:

Senior Executive 2 also noted that the organisation is only in its second cycle of utilising study action teams as part of the communicative framework and has had varying degrees of success and failure for the organisation. Project Manager 1 and Project Manager 2 also agreed with the use of study action teams within the organisation. Project Manager 2 discussed their role as a study action team education facilitator, whereas Project Manager 1 further explained that the current economic downturn in the US economy had enabled the organisation to take advantage and use more time to plan and time the lean transformation and the communication and training of the lean innovation to organisational employees.

The presence of only the study action team theme suggests that this tool is crucial to the communication of the implementation of the lean innovation within the organisation. Furthermore, the three communicative mechanisms underpinning the communicative theme of study action teams suggest so far an underlying favourability reaction to and successful integration of the lean innovation within the organisational and management environments.
Although only discussed by three interviewees, a shared and mutual understanding is still present between all interviewees concerning the importance of communication within the organisation in the understanding of the lean innovation and the implementation process. This is particularly evident in the shared perspective of all individuals who discussed the presence of study action teams from the perspective of planning and training. Challenges associated with the implementation of lean for Organisation B will now be discussed.

5.3.5 Implementation Challenges

Throughout the interview sessions, interviewees favourably described, reflected and observed the implementation of the lean innovation within the organisation. Interviewees, including Senior Executive 1, Senior Executive 2, Senior Executive 3, Champion and Innovator 1 and Champion and Innovator 2 were quick to point out the challenges that emerged within the organisation associated with lean implementation. Many of the challenges described by interviewees were associated with such issues as organisational conflict, communication and trust. Champion and Innovator 2 in particular spoke about the indirect challenge to organisational management and the issue of trust at a project level with outside trade partners that have limited ‘exposure’ to lean:

**Box 1.11: Project Trust – Champion & Innovator Perspective**

> ‘…we are having a lot of challenges with outside trade partners that we are bringing on board they are not used to this process, they are not used to reliable promising, we are having a rough time trusting them – I mean we trust everybody on the team but we put that trust into them and we’re not getting a lot of the commitments meet that we should be.’

Champion & Innovator 2

Champion and Innovator 2, in describing the challenge, also highlighted how organisational management was making attempts through education to assist the learning process of these other organisations. The purpose behind this educational approach was to make the other organisations more a part of the team, with this said to be ‘one of the major hurdles that we are having to overcome’.

Champion and Innovator 1, when reflecting on their own lean journey, described their frustrations with the process, particularly highlighting the continual and constant discussions about process and project elements. The way in which Champion and Innovator 1 described these frustrations suggested undesirable cultural attitudes of the individual to emerge:
Champion and Innovator 1’s recognition of their own impatience highlights how varying degrees of knowledge concerning an organisation can impact the organisation’s innovation transformation.

Table 5.9 *Direct versus Indirect Challenges* and Table 5.10 *Desirable versus Undesirable Challenges* address the observations and reflections of those interviewees who described lean challenges. The table divides the main challenge theme into a series of challenge related sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation challenges.
Table 5.9: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Direct versus Indirect</th>
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<tbody>
<tr>
<td>Challenges</td>
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<td>Interviewees</td>
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<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>SE2</td>
<td><strong>Perspective:</strong> Internal change and conflict – communication. Direct versus indirect.</td>
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<tr>
<td></td>
<td>One direct perspective emerged regarding the participant discussion concerning inner change and conflict of the lean innovation in the organisation. The consequence is identified as minimal in its impact. This direct perspective was discussed by the interviewee and highlighted the impact of the organisation’s decision to implement lean within the project environment particularly in the presence of ‘multiple levels of documentation’. Individuals particularly at a superintendent level according to the interviewee prefer to manage work progress through simpler means like a ‘Gantt chart’ using the chart as ‘a schedule and modifying it as they need to as work progresses’. According to the interviewee ‘the resistance has been towards the documentation and the confrontation part of it’. <strong>Perspective similarly shared and confirmed by CI1 in a separate interview session</strong></td>
<td></td>
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<tr>
<td>SE3</td>
<td><strong>Perspective:</strong> Contractual relations. Direct versus indirect challenges.</td>
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<tr>
<td></td>
<td>The interviewee discussed from both direct and indirect perspectives of minimal consequence. The direct perspective highlighted the impact of the organisation’s contractual relations on the cultural environment particularly in the expectation that ‘the light bulb is going to go off’ and forgetting ‘how difficult this concept is to many of our peers within the industry’. The indirect perspective highlighted by the interviewee concerned the organisation’s contractual relations and the selection project partners. Particularly selecting ones that will ‘add to that positive environment’, a ‘positive experience’ and ‘knowing that focus is going to be there’.</td>
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</tbody>
</table>
Table 5.9: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Direct versus Indirect</th>
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<tr>
<td>Challenges</td>
<td>Interviewees</td>
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<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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</table>
| CI1 | **Perspective**: Communication. Direct versus indirect challenge.  
One direct perspective emerged regarding the participant discussion concerning communication of the lean innovation in the organisation. The consequence is identified as minimal in its impact. This direct perspective was discussed by the interviewee and highlighted the impact of the sharing of information and communication of ‘organisational’ processes in mutual contractual relations. The interviewee in particular discussed how ‘information sharing across the whole thing is so broad’ and ‘overpowering. The interviewee also highlighted a major challenge of communication is the attention of detail that needs to be considered which the interviewee describes as a ‘double edged sword’, ‘time consuming’ and ‘frustrating’.  
Although the interviewee sees communication as an essential element of the process the shear amount of communication between parties ‘does create a more quality; project you get all of the things exposed very quickly, but gosh it churns’. |
| CI2 | **Perspective**: Project planning. Direct versus indirect challenge.  
One indirect perspective emerged regarding the participant discussion concerning the project planning and financial management of the project once the lean innovation has been implemented. The consequence is identified as minimal in its impact. This direct perspective was discussed by the interviewee and highlighted the financial and planning impacts on the organisation through the use of the lean innovation:  
‘One of the struggles with the lean and the integrated form of agreement is that the cash flow happening very much earlier in the project... I think that’s something that looks like something [organisation A] is struggling with trying to make sure they’ve got that cash flow in place to keep things moving: along...’ |
Table 5.9: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Themes</th>
<th>Sub-Theme</th>
<th>Interviewees</th>
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<tbody>
<tr>
<td>Challenges</td>
<td>Desirable versus Undesirable</td>
<td>Interviewee Description &amp; Analysis</td>
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<tr>
<td>Interviewee</td>
<td></td>
<td>SE1: Perspective: The organisation. Desirable</td>
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<td>versus undesirable challenge</td>
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<td>One undesirable perspective of minimal impact</td>
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<td>emerged. The perspective as discussed by the</td>
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<td>interviewee particularly highlighted the</td>
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<td>undesirable cultural attitudes of some</td>
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<td>individuals within the organisation concerning</td>
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<td>the transformation and implementation of the lean</td>
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<td></td>
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<td>innovation:</td>
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<td></td>
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<td>‘I mean there is some frustration right now up</td>
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<td>here [in the office] because we are seeing lots</td>
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<td>of benefit and people being the way people are;</td>
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<td>temperamentally you want that immediate change….’</td>
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<td></td>
<td></td>
<td>The cultural attitude of employees wanting</td>
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<td>immediate change according to the interviewee</td>
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<td>shows enthusiasm, there exists a problem in terms</td>
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<td>of the best way to communicate and promote</td>
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<td>knowledge of the innovation across the</td>
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<tr>
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<td>organisation were knowledge and education is</td>
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<tr>
<td></td>
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<td>diverse.</td>
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</tbody>
</table>
5.3.6 Organisation B Researcher Reflections

The following researcher observations were made during the analysis of this organisation.

The organisation is influenced by the presence of an influential external contracting party. This external party has supported the organisation in its lean journey through the provision of exposure and knowledge of their own journey. Such an opportunity has enabled the organisation to take specific strategies that work and apply them within their own organisation.

The operative environment of the organisation has assisted in the lean journey. As a design/build contractor the organisation has always encouraged open and flexible collaboration and communication amongst its employees and subcontractors. For the majority, this existing environment has been core to the successfulness of the journey.

The cultural environment itself is guided by an adaptive organisational structure with employees more resilient and open to change. However, problems emerged in terms of the distribution of resources and education throughout each office location. This issue is prominent with the organisation closest to Organisation A currently benefiting more in the lean transformation.

Three specific phases of implementation that lead to cultural maturity emerged within the organisational environment: the establishment of the strategic direction through tool and policy development; the establishment of the process or implementation; and then the establishment of organisational practice.

The organisation seems culturally mature in some organisational areas despite being in the early implementation.

There are diverse levels of lean understanding, with organisational management targeting education and training as well as communication as mechanisms to support implementation, lean knowledge and interaction within the organisation.

The process and direction within this organisational environment shows an organisation that is influenced by external contractual relations that assist in understanding the innovation but also affect the provision of tools and strategies developed specifically for the external organisation. The reliance on such approaches, although beneficial, can cause exposure and knowledge issues further on in the implementation process and affect the cultural maturity of the organisation associated with the lean transformation.
5.3.7 Case Conclusion

The discussion in this section established the organisational, management and communication environments in which the organisation underwent a lean transformation. The interviewees interviewed within the organisation highlighted diverse organisational roles, cultural attitudes and behaviours as well as lean understandings. Despite a diverse representation of the organisation, the majority of interviewees shared and confirmed similar aspects of the organisation environment, process, communication and challenges.

Over the course of the lean transformation the organisation underwent significant maturing of its culture, particularly in terms of the establishment of education and training programs, advocating informal communication, and social interaction with Organisation A projects. Specifically, those individuals interviewed within the organisation had favourable experiences and exposures of lean through the confirmation of the lean philosophy and personal confirmation. The interviewees were also happy to acknowledge the presence of non-favourable challenges, such as decision making, trust and project planning.
5.4 Case Study Results: Case Study 2 Organisation F

5.4.1 Overview

Organisation F is located in New South Wales, Australia. The organisation is a steel manufacturer delivering materials, such as reinforcement bars, to the construction industry.

<table>
<thead>
<tr>
<th>Text Box 2.1: Organisational Overview – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Well we make various things [the organisation]. In this particular organisation we make rail wheels and bar for, which I think might be used for, certainly used in the construction industry, for example in bridges and things. [The organisation] is across locations internationally and Australia...We also have operations in Canada, and Mexico and Chile which was a part of the manufacturing organisation’.</td>
</tr>
</tbody>
</table>

Project Manager 3

The organisation is representative of a manufacturing/construction hybrid and is important to the study, particularly in understanding the transferability of lean theory across industries. This has been a topic of contention amongst many researchers, including London (2001), Winch (2000, 2003) and Dauber (2002).

Three interviews and one focus group with three interviewees were conducted within the organisation, with organisational roles representative of one level of the organisational structure, middle management across three organisational streams. Four management streams are present in the organisation, highlighting a focus by management on general management duties and specific steel products such as rods and bars, rail products and wire. From this point forward the steel product management streams will be referred to as ‘sub-organisations’ and general management as the ‘location organisation’. The only difference between management streams is the product, as delivery and management are similarly approached – although implementation is not concurrent across sub-organisations.

Table 5.10 Interviewee Categorisation Organisation F highlights the organisational position of each interviewee. The interviewees have been categorised during the analysis into one of four groups based on their organisational role; here, interviewees are representative of senior executives, champions and innovators and project managers. The table also identifies the main management stream of the organisation to which each interviewee belongs.
Table 5.10 Interviewee Categorisation Organisation F

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Champion and Innovator 1</td>
<td>Lean leader and innovator for the organisation.</td>
<td>Middle management.</td>
</tr>
<tr>
<td></td>
<td>Main role is to educate and train the workforce about lean.</td>
<td>Location Organisation.</td>
</tr>
<tr>
<td>Project Manager 1</td>
<td>Team leader for shift workers in the delivery of rail construction products.</td>
<td>Middle management.</td>
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<tr>
<td></td>
<td></td>
<td>Sub-organisation 3</td>
</tr>
<tr>
<td>Project Manager 2</td>
<td>Team leader for shift workers in the delivery of rail construction products.</td>
<td>Middle management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sub-organisation 3</td>
</tr>
<tr>
<td>Project Manager 3</td>
<td>Team leader for shift workers in the delivery of rod and bar construction products.</td>
<td>Middle management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sub-organisation 1</td>
</tr>
<tr>
<td>Project Manager 4</td>
<td>Team leader for shift workers in the delivery of rod and bar construction products.</td>
<td>Middle management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sub-organisation 1</td>
</tr>
<tr>
<td>Project Manager 5</td>
<td>Team leader for shift workers in the delivery of rod and bar construction products.</td>
<td>Middle management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sub-organisation 1</td>
</tr>
</tbody>
</table>

The organisation’s lean transformation has been predominately influenced by internal and external managerial changes, reflective of company takeovers, buy-outs and mergers over the last 10 years. According to Project Manager 3, and confirmed by Project Manager 4 and Project Manager 5 in their focus group session, such internal and external change has significantly impacted the organisation’s cultural and operational environments – particularly in the department ‘battles’ present within the organisation:

Text Box 2.2: Organisational Overview – Project Manager Perspective

“It is an interesting site, this one because this site has had several owners. In more recent times it has gone through two organisational ownership changes. Because of another mill closed down within the current organisational ownership, some of those employees came across to work on this site. So there have been a few cultural issues there, there was the organisational ownership battle between employees, and then there was operators and trades versus management, operations versus maintenance and then the departmental and the shift’.

Project Manager 3
Furthermore, Project Manager 3 acknowledged the more recent organisational change towards the implementation of lean tools and systems had seen previous department conflicts ‘mostly gone away’, though accepting culturally that there is some presence still of ‘anti-management’ attitudes and opinions:

**Text Box 2.3: Organisational Overview – Project Manager Perspective**

*I don’t see too much still going on, but occasionally you might see a little something anti-management*.

*Project Manager 3*

According to Champion and Innovator 1 a ‘pilot’ study of lean implementation occurred in 2008 in the rod and bar sub-organisation (alternatively sub-organisation 1). However, Project Manager 3, Project Manager 4 and Project Manager 5 in the focus group stated and confirmed that implementation occurred in 2009:

**Text Box 2.4: Organisational Overview – Project Manager Perspective**

*I think we had a bit of a false start on this site and then [Champion and Innovator 1] came on board for the Waratah Bar Mill pilot lean diagnostic process. When was around.*

*Project Manager 4: 2009*

‘... yeah at the end of 2009. And we’ve been progressively improving and implementing different elements of the lean toolkit since.’

*Project Manager 3*

The approach by organisation management towards the implementation process across the organisation network has been authoritative; Champion and Innovator 1 described the decision to be influenced the organisation’s consulting group. The consulting group has worked primarily with another external company assisting in the implementation of basic tools, with the decision to be ‘holistic’ upon their lean knowledge specific recommendation:

**Text Box 2.5: Organisational Overview – Champion and Innovator Perspective**

‘… which is culture and people as well as the tools and the management systems was made here because I proposed that they do that.’

*Champion and Innovator 1*
All interviewees noted that the organisation is currently undergoing a lean transformation, with the lean transformation at varying ‘sustainable’ stages depending on the sub-organisation of the larger organisation. The processes across the sub-organisations are identified to be at early stages of transformation and it was suggested by interviewees that social norms may reflect this early lean transformation. The decision to implement lean in this manner, according to Champion and Innovator 1, was made on assessment and point of view ‘business needs’. This is discussed further in the following section.

5.4.2 Organisational & Managerial Environments

Despite managerial change, Organisation F’s formal ‘social’ structure (i.e. the organisational structure) has remained relatively the same despite change over the last 10 years. The only change, according to Project Manager 3, has been the amalgamation of organisational subsidiaries when mergers and internal or external change has occurred. Each of the interviewees highlighted how difficult the transition in management and working conditions has been over the last 10 years, particularly culturally.

Figure 5.2 Organisation F Formal Organisational Structure addresses the formal ‘social’ structure of the organisation. The structure is a representation of the organisation based on the observations of the interviewees when discussing such elements as structure, management and the organisational environment. The structure incorporates seven organisational tiers, as follows:

- top tier management, incorporating CEO and board of directors who govern the network of organisations;
- second tier management, incorporating senior executives and management who assist in the governing of the organisational network;
- third tier management, incorporating an organisation-specific (location-based) general manager;
- fourth tier dividing the location-based organisation into sub-organisations;
- fifth tier management, incorporating sub-organisation-specific middle management;
- sixth tier team leader management, managing seventh tier management groups; and
- seventh tier structure, reflecting organisational project teams underpinning sixth tier management groupings.

Communication is representative in the figure as well, with two network styles present. The downward (red) arrows are representative of ‘managerial’ communication that is considered
authoritative. The upward (blue) arrows are representative of the ‘informal’ communicative networks. The purpose of these networks is about the informing and reinforming of decisions associated with lean innovation.

![Diagram of Organisation F Formal Social Structure]

**Figure 5.2: Organisation F Formal Social Structure**

Table 5.11 *Informal Social Structure Characteristics* addresses and analyses the observations made by interviewee participants regarding the organisation. The purpose of this table is to highlight elements of the social environment that have and are guiding lean implementation, where possible the direct reflection of lean change within the environment is identified and further discussed. Furthermore, in instances where observations are shared or confirmed, observations are grouped together. It should also be noted that on occasions interviewees reflected and observed multiple aspects of lean implementation; where this has occurred, only an analysis is present.
The interviewees, when reflecting upon lean implementation within the organisation, made observations on the informal social system; these observations are addressed in Table 5.11. Interviewees reflected upon two communicational styles as forming the informal social system of the organisation:

- homophilic communication, or the communication between like-minded individuals; and
- hetrophilic communication, or the communication between non-like-minded individuals.

Perspectives of these communication styles highlighted lean implementation within the organisation leading towards the development of tertiary working groups, study action team and enhanced relations. It is interesting to note that this organisation shares similar hetrophilic and homophilic communication styles that are also present as in Organisation B. Hetrophilic communication was similar to Organisation B, which was evident in the form of study action teams and tertiary working groups or ‘clusters’; however, unlike Organisation B, this organisation introduced Kaizen Blitzes – an example of homophilic communication.

**Text Box 2.6: Homophilic Communication – Project Manager Perspective**

“We’re doing kaizen blitzes…. management, they’ve sponsored that we do one kaizen blitz per month, just continuously. We’ve got the authority to take five operators out of their roles each month for five days with the focus task of getting a step-change. What I can’t get commitment to is superintendents, managers coming out of their roles for five days to learn how to facilitate and run a activity. The kaizen blitzes are the biggest, and probably the only tool we have on site that actually allows us to turn the pyramid upside-down. Start supporting the people at the top rather than directing down.”

Project Manager 2

Furthermore, the approach to hetrophilic and homophilic communication is about a consensus effort by management to enhance all relationships across the organisation, whereas in Organisation B communication was more about strengthening existing relationship bonds.

Interviewees noted a positive change within the organisation, although many reinforced that much of the change is not significant for those individuals – particularly in management positions as the organisation has always encouraged informal communication. The change for those individuals in project team environments is significant, particularly in the emergence of lean-oriented ‘homophilic’ study action teams and information centres, with employees showing a desire to learn more about the lean innovation:
Text Box 2.7: Homophilic Communication – Project Manager Perspective

‘When we started this I would go onto the shop floor and everybody would just go and scatter. Now we go onto the floor and if there is no one there I would just stand there and they would just come up and ask “Well, what is happening? Where are at? What’s going to happen next?” and generally having a conversation’.

Project Manager 3
### Tables 5.11: Informal Social Structure Characteristics

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Homophilic Communication</th>
</tr>
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<tbody>
<tr>
<td>Informal Social System</td>
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<tr>
<td></td>
<td>Interviewees</td>
<td>CI1, PM2, PM3</td>
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</table>

#### Interviewee Description & Analysis

**PM2 Perspective:** Tertiary working groups
Management of the organisation enhance communicative relations within working groups through the facilitation of education and training methods such as study action teams (known as Kaizen Blitzes) and visual information centres:

> ‘The kaizen blitzes are the biggest and probably the only tool we have on site that actually allows us to turn the pyramid upside-down. And start; supporting the people at the top rather than directing down.’

*Perspective similarly approach and confirmed by CI1 and PM3, in separate interview sessions.*

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<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Heterophilic Communication</th>
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<tr>
<td>Informal Social System</td>
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<tr>
<td></td>
<td>Interviewees</td>
<td>CI1, PM3, PM4</td>
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#### Interviewee Description & Analysis

**PM3 Perspective:** Enhanced relations
According to the interviewee the undertaking of daily walk-throughs on the shop floor has enhanced relations between middle management, team leaders and operators/trades at a basic communicative level:

> ‘… we have a lot of time out on the shop floor, talking, communicating, and monitoring the standards, auditing compliances and standard work. So we do spend a lot of time face-to-face with every operator and trades.’

**PM4 Perspective:** Study action teams
The most significant change for the interviewee is the newly developed study action teams for education and training. According to the interviewee the provision and opportunity of weekly study action teams (referred to as Kaizen Blitz workshops) to present to the GM and other managers about their experiences and understanding of lean, giving:

> ‘… the managers the opportunity to see the groups positively reinforce; what they have done and I think the managers can see how the groups are; nervous about it but it allows a non-judgemental communication between; management and worker groups.’
### Tables 5.11: Informal Social Structure Characteristics

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Heterophilic Communication</th>
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<tr>
<td>Informal Social System</td>
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<td>Interviewees CI1, PM3, PM4</td>
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<tr>
<td>Interviewee</td>
<td>Perspective:</td>
<td>Description &amp; Analysis</td>
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<tr>
<td>CI1</td>
<td>Study action teams</td>
<td>Leading to enhanced relations</td>
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<td></td>
<td>Their role as head lean facilitator enables them to be at the forefront of lean implementation for the organisation and the development of more personal relations with management, team leaders and operators through the study action team educational agenda. The interviewee discussed hetrophily communication in two differing contexts highlighting:</td>
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<td></td>
<td></td>
<td>1. The communication capacity between supervisors/superintendents and team leaders in training sessions;</td>
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<td></td>
<td></td>
<td>‘... we do have kinds of events where operators primarily involved to get their ideas to the surface and to implement some of the things that they’ve been asking for, for years, normally, and management not listening to them. So when I facilitate those I develop very strong relationships with those that participated through the kinds of events but in my role, my objective is to get other people to facilitate them so.’</td>
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<td></td>
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<td>2. The difficulty in extending hetrophily networks to individuals below team leaders within the organisational structure:</td>
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<td>‘... the major cultural change, I think that we need is the understanding from leaders that the most important thing is the people and the process... the people on the process... So the hardest work I do is on valuing their people. That’s the main cultural shift that I think that they need. Instead of being tellers being teachers. Coaches. Because it’s only by doing that that they will release all that ... all that power. There’s so much power in people.’</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Enhanced relations perspective similarly approach and confirmed by PM3, in a separate interview session.</strong></td>
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</tbody>
</table>
Interviewees did not make explicit observations on the behaviours that form the social environment of the organisation, also known as social norms. Social norm observations were alluded to by interviewees, including Champion and Innovator 1, Project Manager 2 and Project Manager 3 (concerning advocacy of the individual within the organisation) and Project Manager 3, Project Manager 4 and Project Manager 5 (concerning integration of the workforce in tertiary working groups).

Not explicitly describing social norms in the organisation suggests that the behaviours of the workforce is yet to be established or is not considered important. This is different to Organisation B where the norms of education and stability are considered fundamental to the organisation. The difference in social norms between Organisation B and Organisation F could emerge, as Organisation F is considered to be project-influenced with the workforce undertaking shift work, 24 hours a day, seven days a week, with work that is more physically demanding. Work in Organisation B is less physical but more mentally demanding, which is evident in education and stability norms. Of particular importance to interviewees within the organisation was advocacy and the creation of an open and collaborative environment amongst the workforce.

Where social norms were not explicitly observed, opinion leaders and change agents were identified only by Champion and Innovator 1 as playing a role in the implementation of lean. This is a direct opposite to Organisation B where opinion leaders and change agents were only alluded to. When discussing lean implementation, Champion and Innovator 1 identified themselves as opinion leaders for the organisation, reflecting on their own lean role not only in the organisation but throughout their working life.

<table>
<thead>
<tr>
<th>Text Box 2.8: Opinion Leaders &amp; Change Agents – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘I train up people in each area and then lead people forward so I can spread out a bit more so, under the current circumstances with, with only one person for the whole of [the region] who has a really good appreciation, you know, a really profound understanding of lean, it’s the only way to do it’.</td>
</tr>
</tbody>
</table>

Champion and Innovator 1, in their experience as lean leaders, have over their working lives developed a philosophy of ‘leading forward’. The concept of ‘leading forward’ refers to the use of your own knowledge and experience as a means of education and interaction:
Text Box 2.8: Opinion Leaders & Change Agents – Champion and Innovator Perspective

‘So for me, for this business, my process is ‘lead forward’ so I take; someone from the area that’s going to be next and I have them with me by; my hip and I let them see one phase, you know, one go around of the, of; the process then I go with them and I watch them do it and coach them; and then the next time they can pretty much go on their own’

Champion and Innovator 1

5.4.3 Process

The describing of lean implementation by interviewees highlighted diverse process observations. These diverse observations cover a number of implementation stages and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.

- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.

- **Implementation** will highlight those observations that describe the process of lean implementation.

- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.

These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.12 *Implementation Process Stage 1: Lean Knowledge and Exposure* addresses the knowledge and exposure of interviewees to lean innovation, describing these aligned with low, moderate and high levels. Interviewee positioning was addressed in table 5.10.
Table 5.12: Implementation Process Stage 1: Lean Knowledge, Exposure and Awareness

<table>
<thead>
<tr>
<th>Knowledge &amp; Exposure Level</th>
<th>Awareness</th>
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</thead>
<tbody>
<tr>
<td>Low Level</td>
<td>PM1, PM4 and PM5 are identified as having low levels of exposure to the lean innovation within this organisation.</td>
</tr>
<tr>
<td>Moderate Level</td>
<td>PM3 is identified as having a moderate level exposure to the lean innovation having had knowledge through work with another organisation in coal services</td>
</tr>
<tr>
<td>High Level</td>
<td>CI1 and PM2 are identified as both having high-level exposure to the lean innovation. The interviewees have experienced exposure and knowledge through their role of developing ‘cultural processes and management systems which sit behind lean’ (CI1) and knowledge of planning and scheduling involving ‘information centres and visual factories’ at a previous coal-orientated organisation (PM2).</td>
</tr>
</tbody>
</table>

The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been diversely observed and described by interviewees, incorporating such perspectives as social norms, the informal social structure and communication. These persuasive-approach tools differ slightly from Organisation B, which is representative of different cultural attitudes, behaviours and considerations towards the lean innovation. Table 5.13 Implementation Process Component 2: Persuasion addresses the persuasive techniques identified by interviewee participants as assisting the implementation of lean within the organisation. The table divides the main persuasion theme into a series of sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with persuasion and persuasive techniques.
5.13: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Informal Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM2, PM3, PM4, PM5</td>
</tr>
</tbody>
</table>

### Interviewee Description & Analysis

**PM2 Perspective:** Heterophilic relationships

The problem with current persuasive techniques is that there is no embracing of heterophilic relationships between management and operators/trades. Overcoming that problem of miscommunication and education within the sub-organisation environment PM2 developed a personalised system known as ‘Secret Scoreboard’:

‘… my secret scoreboard is when I walk through and one of the operators; grabs me and says ‘Can you explain a little bit more to me about that stuff; we did the other day?’ So I know it’s making sense to him, it’s in his head; and he wants to have a go whereas a lot of people discredit that and look; for results. What I’m looking for is, when he comes and says that to me; and asks for additional training – discretionary effort – to explain; something further to him, we are starting to turn the pyramid upside-down; because by him asking that open question to me is him actually saying; ‘can you come and help me support this 5S or TPM or QCO or Standardised Work, whatever it may be’

The whole purpose of such a system is designed at ‘looking at momentum’ within the workforce and identifying understanding, awareness and issues.

**PM3 Perspective:** Educational programmes

Described strained relations to also be present within sub-organisation 1, also identifying those relationships to be between management and operators/trades; the problem is linked to the organisation’s mass educational programme. The utilisation of a mass educational programme by the management of the organisation guided by study action team agendas (or Kaizen Blitzes) as a way to enhance relationships between like minded individuals.

‘… the very first workshop we had some interesting operators come in with their arms folded, with the attitude that the workshop would be a waste of time and by the end of the workshop there was a completely different attitude about the whole process and they were so proud to be able to present to the general manager about their experience. That is something that is unique is that we have the operators within this style of workshop report and present to the general manager about what they had done during the week, what they had learnt and how they are going to apply that to their day-to-day duties. Those events have had amazing changes and something that is evident across the workshops, whether it is a Kaizen workshop or a activity based workshop or a standard team work building workshop for team leaders. It’s just really good to watch and see how it progresses.’

The idea behind such programming according to the interviewee is to provide more direct and intensive understanding of the lean innovation within specifically smaller environment pockets.

**Perspective similarly shared and confirmed by PM2 in separate interview session as well as PM4 and PM5 in same interview session.**
### 5.13: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Informal Social Structure</th>
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<tbody>
<tr>
<td>Persuasion</td>
<td>Informal Social Structure</td>
<td>Interviewees&lt;br&gt;PM2, PM3, PM4, PM5</td>
</tr>
</tbody>
</table>

#### Interviewee Description & Analysis

**PM3 Perspective:** Educational programmes

Although similar in nature to PM2’s ‘Secret Scoreboard’ PM3 and PM4 utilise a more deductive approach to overcome problematic issues within their sub-organisation associated persuasive techniques. Sub-organisation 1 according to PM3 collects data through sub-organisational specific surveys on the workforce:

‘We actually use and collect data to see what the problem areas are. That’s how and where we decide to target the Kaizen Blitz...we then; design workshops around those problem areas and give operators a; problem and ask them ‘well how are you going to fix this?’ and the; operators have come up with new methodologies. The last time we talked; about having issues, the issue being discussed has just gone away.’

**Perspective:** Educational programmes and Study action teams

Organisational specific data collection enables management of the sub-organisation to specifically target and select known individuals who will become activate in **advocating** the innovation to other individuals within their tertiary working group:

‘The operators that we choose are the one’s that work within that area. And there might be a few but obviously we went through a list, myself and; [project manager 4] and looked at who would be or who are very influential out; there, people who will get in and behind and get some runs on the board.’
### 5.13: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Heterophilic Communication</th>
</tr>
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<tbody>
<tr>
<td>Persuasion</td>
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<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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<tbody>
<tr>
<td><strong>PM3</strong></td>
<td><strong>Perspective:</strong> Study action teams and sub-organisational tertiary working groups. The presentations according to PM4 are to the general manager and other managers of the sub-organisation group, PM3 described the process as: ‘... something that is unique is that we have the operators within this style; of workshop report and present to the general manager about what they had done during the week, what they had learnt and how they are going to apply that to their day-to-day duties. Those events have had amazing changes and something that is evident across the workshops, whether it is a Kaizen workshop or a activity based workshop or a standard team work; building workshop for team leaders. It’s just really good to watch and see; how it progresses.’</td>
</tr>
</tbody>
</table>
The lean decision guiding the communication of the implementation in the organisation was observed by Champion and Innovator 1, Project Manager 1 and Project Manager 2, described through perspectives of study action teams, visual communication and opinion leaders, and change agents. The approach of the decision within the organisation suggests management informally notifies the workforce of implementation-specific decisions as a means to assist workforce adjustment. Although not specifically addressed in Organisation B, the nature of the decision approach is similar, with communication typically alluded to through education and training frameworks.

According to those participants who openly discussed the decision, the organisation is currently undergoing three varying phases of lean implementation, which has been present in some form since the pilot implementation in Sub-organisation 1 in 2009. The nature of the implementation process across the organisation network has been authoritative; Champion and Innovator 1 described the decision to be influenced the organisation’s consulting group. The consulting group worked primarily with another external company assisting in the implementation of basic tools. Champion and Innovator 1 described the decision as ‘holistic’ based upon their lean knowledge specific recommendation:

Text Box 2.9: Decision & Implementation – Champion and Innovator Perspective

‘… which is culture and people as well as the tools and the management systems was made here because I proposed that they do that.’

Champion and Innovator 1

For those interviewees (Project Manager 1 and Project Manager 2, who manage and work alongside the workforce in Sub-organisation 3) it was observed that more practical approaches guide the communication of the decision. Project Manager 2 particularly reflected on the use of visual information centres, highlighted the positive aspects the centres have on developing communication networks, heterophily and homophily, and more efficient work practices in the approach and role the centres play in communication particularly between shifts. The presence of the information centres also enables the transferring of central ‘shift-specific’ knowledge in an informal environment:

Text Box 2.10: Decision & Implementation – Project Manager Perspective

‘… when a shift comes in to take over another shift before they start the working shift we actually stop for about 15 minutes to do an information centre. So we discuss what happened on the previous shift, we discuss the targets for the next shift and what sort of hurdles we are going to come across on that shift. So we spend around 15–20 minutes at the start of the shift. The information centres have provided a positive working environment.’

Project Manager 2
Three perspectives of implementation were observed by interviewees in the organisation. According to Champion and Innovator, the implementation approaches reflect a changing attitude in the strategic direction as the innovation has been diffused throughout the sub-organisations.

Text Box 2.10: Implementation – Champion and Innovator Perspective

'I've done it a number of ways historically and because [sub-organisation 1] site was relatively new, it really does depend on the maturity of the business and how much, how much there is to do. In wire, for example, they’ve probably been faster at spreading it across the business more holistic ... more generally but I find that umm one has more effective deployments when one connects the deployment to a real business need and one sets clear results outcomes as well as, well we’ve done ‘5-S’ or whatever, so we, what we’re trying to achieve is specific business outcomes ... my experience is you have to put in all the elements, you have to change, make a veritable change in all the elements of a system to really make it have some potential cause for lasting sustainability, so to do that, in a broad sense is very difficult, so my preference is to, to have a clear plan, to progress...'

Champion and Innovator 1

The diffusion of lean implementation has been approached differently in Organisation F when compared to Organisation B, mainly through the strategic direction of management to undertake pilot or activity-based implementations. The approach was strategic in nature as the organisational environments are essentially different, with Organisation B more about implementation dealing with management and Organisation F highlighting implementation throughout the organisation. Table 5.13 Implementation Process Component 3: Decision and Implementation addresses the lean implementation observations of those interviewees within the organisation and highlights diverse reflections, including implementation through contractual obligations, managerial excitement and middle management influence. The table divides the main process theme into a series of implementation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Decision</th>
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<tbody>
<tr>
<td>Process</td>
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<tr>
<td>Decision</td>
<td>Interviewees</td>
<td>CI1, PM1, PM2</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
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<tr>
<td>PM1</td>
<td><strong>Context:</strong> Organisational specific educational programmes utilised through study action team agendas.</td>
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<td></td>
<td><strong>Perspective:</strong> discussed the educational approach in the form of education around specific tools such as 5S, which for the sub-organisation was the point of lean introduction. Such tooling was used a basis in which to improve particularly work practices:</td>
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<td>‘The 5S was one of the first things that I could remember that was; implemented here, just to minimise the, well because we do a lot of change-overs and a change-over from someone like yourself who’s not familiar; with some of our practices.’</td>
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<td></td>
<td>Perspective similarly shared and confirmed by CI1 in a separate interview session.</td>
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| PM2       | **Context:** Organisation and innovation specific opinion leaders and change agents. |
|           | **Perspective:** the presence of opinion leaders and change agents suggested their education is underpinned by the organisation’s want to implement more system-based applications, rather than adaptive strategies more designed for the organisation environment. When describing this approach PM2 reflected back on their own knowledge and exposure: |
|           | ‘So it didn’t matter whether they were adding value to the company or we; were working on the top issues – the most important things – or; constraints/bottlenecks, as long as I was ticking all the boxes to show I; was using the lean tools it was all hunky dory.’ |
|           | The interviewee suggests that a more appropriate approach for success is human-centric which incorporates the critical mass of people working towards and wanting a common work goal, which needs to be reflected in education: |
|           | ‘... the new approach now which is more of a systems-based approach: go in, do the diagnostic, identify the gaps, implement the tools as required.’ |
# Table 5.13: Implementation Process Stage 3: Decision and Implementation

<table>
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<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Implementation</th>
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<td>Interviewees</td>
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<td></td>
<td></td>
<td>CI1, PM1, PM2, PM3</td>
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<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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<tbody>
<tr>
<td>CI1</td>
<td>Perspective: Overall strategic approach of lean implementation (Staged Implementation). With guidance historically based on the sub-organisational environment: ‘I’ve done it a number of ways historically and because sub-organisation; site was relatively new, it really does depend on the maturity of the; business and how much, how much there is to do.’ The interviewee did reiterate that the goal for implementation within the each sub-organisation of the greater organisational network is supported by sustainability. <strong>Perspective similarly shared and confirmed by PM1 and PM3 in separate interview session.</strong></td>
</tr>
<tr>
<td>PM1</td>
<td>Perspective: Sub-organisational environment specific towards implementation is characterised by both staged and trial and error systems (Trial and error implementation). The filtration of knowledge occurs in a top-down approach where, sub-organisational management is first informed of the innovation; before further filtration down the structure: ‘First of all they sort of informed us of what lean was about and how we can actually make the organisation a better organisation by implementing lean. So it was as simple as letting all the supervisors and all the people; staff, just letting them know what lean is all about’. <strong>Perspective:</strong> Application of tools (Trial and error implementation). The trial and error influences within the process emerge in the actual application and implementation of lean tools: ‘I do believe we have approach the implementation as more of a trial and error system with the tools and strategies. We have tried something and if; it doesn’t really work, it doesn’t mean that we throw it away but we sort of; try something else. I think the reason behind that is because if they see; things that are helping them they might sort of come back to the ones that; they didn’t sort of take to on the first go-around’. The trial and error approach sees the removal of tools or systems if not working efficiently are immediately removed from the strategy and replaced with another tool.</td>
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### Table 5.13: Implementation Process Stage 3: Decision and Implementation

<table>
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<tr>
<th>Theme</th>
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<tr>
<td></td>
<td></td>
<td>Interviewees</td>
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<tr>
<td></td>
<td></td>
<td>CI1, PM1, PM2, PM3</td>
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<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM3</td>
<td><strong>Perspective:</strong> Sub-organisational environment specific towards implementation is characterised by both staged and trial and error systems (trial and error implementation). Discussed within the sub-organisational environment (identified as Sub-organisation 1), the staged approach is supported by a staged diagnostic, which collects organisational specific data: ‘We did a diagnostic of our current state and identified were we would like to be in a future state and identified the gaps or the barriers which; were causing us issues at the moment and then worked out some action; plans highlighting the process we were going to take to close the gap, well; actually gaps.’ After the assessment of data the implementation process involved: ‘… we started a process that was focused on lean tools and utilising the; lean tools on particular problem solving for some, 5S, quick change-over; standardised work and more recent Interviewee 3 has implemented; leaders standardised work for the front-end leaders of the team. So each; with step we have got some lean improvements’.</td>
</tr>
<tr>
<td>PM4</td>
<td><strong>Perspective:</strong> Application of tools (trial and error implementation) Lack of lean model adaptability was also discussed by PM4 in their focus group: ‘… we keep on butting up against the issues of maintenance and the; maintaining of things at each stage of the implementation process. You; know getting the traction and getting people to understand that is apart of; the process and sustainability for the organisation. It is a huge challenge; Every time we have tried to implement a new stage, this remains an; underlining element’. The way the process impacts the greater organisational, sub-organisation and personal environments of the individuals is quite significant and is represented in the confirmation of the general acceptance or rejection of the innovation.</td>
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</tbody>
</table>
Confirmation of the lean innovation is a significant aspect of the process as it assists understanding the progress of implementation. As with Organisation B, the interviewee observations and reflections for Organisation F are limited as the organisation is in the early stages of implementation. All interviewees observed some form of lean innovation confirmation, highlighting working environment, personal and process confirmation perspective. Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation. The confirmation perspectives also provided clear examples of how the understanding and awareness of the innovation differs between champion and innovator and project management individuals in the organisation.

Table 5.14 *Implementation Process Component 4: Confirmation* addresses the observations and reflections of those interviewees who have experience lean innovation confirmation, including the lean journey and process as well as organisational theory. The table divides the main confirmation theme into a series of confirmation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Process and cultural environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
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<td>CI1, PM1, PM2</td>
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</tbody>
</table>

**Interviewee Description & Analysis**

**CI1 Perspective:** The lean transformation of the organisation

Discussed heavily the link between the implementation process and the organisation's cultural environment:

‘... the major cultural change, I think that we need is the understanding; from leaders that the most important thing is the people and the process ... the people on the process.’

Highlighted in the discussion is the traditional nature of the organisation being a highly hierarchal and dictatorial environment. People value was highlighted as the key for a successful transformation. However in order to achieve and seek support for this move within the organisation the interviewee recognises the need for management to understand the human-side of implementation and the power of people within the process:

‘So the hardest work I do is on valuing their people. That’s the main cultural shift that I think that they need. Instead of being tellers being teachers ... Coaches. Because it’s only by doing that that they will release all that ... all that power. There’s so much power in people.’

Acknowledging the need for the recognition of a more people power approach to the lean innovation also identifies the presence of a high awareness of their role and understanding of lean.

**Perspective similarly shared and confirmed by PM2 in a separate interview session**

**PM1 Perspective:** Lean innovation awareness and sub-organisation success.

Awareness of the lean innovation became established once they began to see the associated benefits:

‘But like everything else once you start to implement it and see the benefits from it, then yeah, it was received a lot better ... I guess really you just have to try things and see the benefits.’

The confirmation perspective highlighted some personal challenges and frustration in terms of the introduction of lean within the working environment.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Working Environment</th>
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<tbody>
<tr>
<td>Confirmation</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM3, PM4</td>
</tr>
<tr>
<td>PM3</td>
<td>Perspective: Communication.</td>
<td>According to the interviewee confirmation of the lean innovation within the working environment:</td>
</tr>
</tbody>
</table>
|              |                 | ‘When we started this I would go onto the shop floor and everybody would just go and scatter. Now we go onto the floor and if there is no-one there I would just stand there and they would just come up and ask “Well what is happening? Where are at? What’s going to happen next?” and generally having a conversation’ …. through the implementation of lean experiences ‘For me it’s actually a way of life. It’s doing business differently. It’s a structured approach for continuous improvement through the use of a set of tools to be applied consistently to give us a much better outcome. I’m a little different to Interviewee 3 about whether its changed me as a manager, I would say absolutely. It has changed the way I think.’
|              |                 | **Perspective similarly shared and confirmed by PM4 in the same interview session, highlighting** |
|              |                 | ‘For me lean is about the visualisation and the solving of problems by everyone, all day every day. It’s about people being 100% engaged and working as a team. It’s all about being a learning organisation and challenging things and proving things and understanding things.’ |
| PM5          | Perspective: Utilisation of tools. |For the interviewee the nature of lean has not changed their managerial opinion or approach rather it has provided further tool-based resources: |
|              |                 | ‘Lean for me is essentially about eliminating waste, which obviously; helps us be more productive which gives us the dollars on the bottom line; To me that’s about it.’ |
5.4.4 Communication

Communication is approached differently in this organisation compared to Organisation B; while Organisation B uses a study action team agenda for communicative purposes, Organisation F uses multiple sources of communication. All interviewees within the organisation observed communication and its presence to inform the workforce of lean innovation, including integrated learning through education, reflective learning through personal scoreboards, and study action team agendas. Within each strategy of communication, interviewees highlighted a range of sub-mechanisms, which are identified as sub-elements of the strategy.

Integrated learning was observed by multiple sources, including Champion and Innovator 1, Project Manager 1, Project Manager 3, Project Manager 4 and Project Manager 5. Each observed integrated learning from a different perspective, highlighting visual, verbal and written forms of communication. Champion and Innovator 1, for example, discussed integrated learning by reflecting on their own role as a ‘lean opinion leader’ and their role in developing lean orientated education and training programs. For Champion and Innovator 1, integrated learning is about getting everyone within the workforce, or those individuals who work closely together on the same ‘lean’ page.

**Box 2.11: Integrated Learning – Champion and Innovator Perspective**

> "I do formal two hours a week I do team leader one week, training to get them all off shift. I do at least three times a week an hour walk with the manager. I walk with the superintendents on the shop floor as teaching mechanism and coach the information in the visual information centre … Yeah, I think compared to deployments that I have seen before it’s much, you get a much better rate of acceptance more quickly than ones that I have seen before which didn’t have a structured training process like that’

Champion and Innovator 1

Upon reflecting on integrated learning, Champion and Innovator 1 made a relevance on their past experience as a ‘lean facilitator’ that integrated learning as a form of communication assisting in the workforce embracing and accepting lean more quickly as information is readily shared amongst the ‘team’. For Champion and Innovator 1, integrated learning is about teaching, coaching and motivating the workforce to develop knowledge, skills and interact to share this knowledge and skill.

Project Manager 1 highlighted the presence of information centres as part of the organisation’s integrated learning communication approach to support the implementation process. Information centres are identified as a core lean strategy underpinning the organisation, through visual, verbal and written communication forms. In describing the information centres as an approach to communication, Project Manager 1 described the
influential and positive aspects the centres have on developing and maintaining heterophilic and homophilic communication relationships, leading towards more efficient work practices. These elements are highlighted in the approach and role the centres play in communication, particularly between shifts and in forming new communication relationships between shifts through that have never been present.

Box 2.12: Integrated Learning – Project Manager Perspective

"Something that is very different from a lean perspective is the information centres that we have now. We, well in the time that I’ve been here, we’ve never had information centres where we all sort of gather together and sort of discuss the events that happened on the previous shift. What’s coming up and what’s going forward. That to me is quite a good system there is a lot of information that is transferred section to section, that is quite useful’

Project Manager 1

Upon reflecting on integrated learning, Project Manager 1 also observed reflective learning in the form of information centres. The purpose of reflective learning for Project Manager 1 is about assisting the workforce to embrace and develop knowledge from within. Information centres as a form of integrated and reflective learning was also identified and confirmed by Project Manager 3, Project Manager 4 and Project Manager 5 in their focus group session. As a strategic means, the information centres enable the tracking of individual learning through the lean strategies in place, including 5S and Information Centres. Project Manager 3 particularly observed that despite the move by management to towards integrated learning, there are still individuals within the workforce who view lean negatively and probably won’t ‘change’ their opinions.

Box 2.13: Integrated Learning – Project Manager Perspective

“I see one or two operators a day standing there and reading the information centre, which to me is like "Wow, they want to know stuff about the business; what are they reading it for?" Admittedly, some of them are reading it to go and tell their mates this is a load of bullshit and they understand all about it but others I see read the information centre trying to [or actually being able to] understand some things that are on there and then come and say “You know we missed the target last night? I was just down there and saw you miss the target. Did you know you could get an extra two tonnes per hour out of that machine if you used a left-handed screwdriver?” So they can start to see a couple of things. They get that sense of achievement but they can see how they can contribute to the success and the most important thing is know their contribution is valued by the organisation because there is now a mechanism for them to contribute to the success of the business whereas often, we don’t give our employees, which are our biggest asset, the opportunity to contribute to the business.’

Project Manager 1
For Project Manager 3, integrated and reflective learning is about the momentum of learning for the individual within the workforce, rather than how much one knows.

Box 2.13: Reflective Learning – Project Manager Perspective

*We also use information centres, we have several centre locations, and there is one here, one in maintenance and a couple through the shop floor. The site centre one is managed by the general manager, the bar and grinding centre is managed by a number of us there is also one for the network team.*

**Project Manager 3**

Reflective learning was also observed by Project Manager 2, who focused on the enhancement of communication through reflective learning strategies through the utilisation of a personal ‘Secret Scoreboard’. For Project Manager 2 the ‘Secret Scoreboard’ values both verbal and visual mechanisms:

Box 2.14: Reflective Learning – Project Manager Perspective

*I have this thing called a secret scoreboard … my secret scoreboard is when I walk through and one of the operators grabs me and says “Can; you explain a little bit more to me about that stuff we did the other day?” So I know it’s making sense to him, it’s in his head and he wants to have a go whereas a lot of people discredit that and look for results. What I’m looking for is, when he comes and says that to me and asks for additional training – discretionary effort – to explain something further to him, we are starting to turn the pyramid upside-down because by them asking that open question to me is him actually saying “Can you come and help me support this 5S or TPM or QCO or Standardised Work?”, whatever it may be … I’m looking at the momentum.*

**Project Manager 2**

As a strategic means, the secret scoreboard system for the interviewee enables the tracking of individual learning through the lean strategies in place (including 5S, Information Centres etc.). For the interviewee, such a reflective learning tool is about the momentum of learning, rather than how much one knows. Verbal communicative mechanisms are present in the communication between the interviewee and operators on the floor, whereas visual communicative mechanisms are present in the scoring of each operator. Project Manager 2’s ‘Secret Scorecard’ is important in the diffusion of lean innovation as it provides a framework in which to explore and identify how the workforce approaches, understands and interacts when innovation is adopted. The ‘Secret Scorecard’ can be viewed as a driver of implementation as it allows management to directly map the process and alter implementation according to assessment and review of the scoreboard.

Project Manager 1 – like Project Manager 3, Project Manager 4 and Project Manager 5 – also observed reflective learning through the use of information centres. Project Manager 1
highlighted how information centres provide a verbal, visual and written communication framework to assist the workforce in enabling a transferring of a central ‘shift-specific’ knowledge in a formal as well as informal environment; also referred to as reflective learning.

Box 2.15: Reflective Learning – Project Manager Perspective

‘... when a shift comes in to take over another shift before they start the working shift we actually stop for about 15 minutes to do an information centre. So we discuss what happened on the previous shift, we discuss the targets for the next shift and what sort of hurdles we are going to come across on that shift. So we spend around 15–20 minutes at the start of the shift. The information centres have provided a positive working environment’

Project Manager 1

The information centres are important in the diffusion of lean innovation as they provide management with a direct point of contact with the workforce, their understanding and attitudes towards the innovation. Information centres can be viewed as a driver of implementation as they allow management to direct contact with those individuals applying principles as part of the management strategy; adoption can be altered based on feedback through these centres.

Study action teams were the final communication approach observed in the organisation, with confirming reflections made by Project Manager 3, Project Manager 4 and Project Manager 5.

The observations made by the interviewees highlighted the use of an organisational study action team agenda to enhance verbal and visual communication of the lean innovation implementation. The nature of the organisation’s study action team agenda is designed around workshop-style Kaizen Blitzes. Such agendas incorporate basic level homophily communication through the bringing together of like-minded individuals in communicating the lean innovation:

Box 2.16: Study Action Teams – Project Manager Perspective

‘We’ve done some lean workshops where we take people on a one- or two-day training course where we talk to our operators about what is lean and what its purpose is and get them to build an opinion. But to give our trades and operators books, no, some would, with some it would probably make its way to the first garbage bin and some people don’t like reading too much and are very slow, unless of course it is a textbook. And sometime it’s seen ok we’re doing lean now so this is the latest flavour, a lot of the team members here have been through continuous improvement quality circles, QUC, TQM, all these and now we are going down the lean path. So they are a few people going well what’s the point. So it’s seen as something else they have to learn. They see it as an initiative rather than a way of doing business.’

Project Manager 4
For the organisation as a whole, verbal/visual-centric study action team agenda is considered an important driver of implementation; more visual forms, such as reading resources, are not as efficient for the type of organisation workforce. This is directly opposite to the views held by Organisation B concerning their predominant use of reading materials as part of their implementation and study action team agenda.

It is interesting to note that each sub-organisation has similar communicative tools and strategies in place to assist the implementation; this presence is supported by the greater organisation’s ‘blanket communicative strategy’, as suggested by CI1. Furthermore, it is interesting that organisational management utilises only visual and verbal communication to support integrated learning, reflective learning and the study action team agenda; with Project Manager 3 identifying the workforce to be the contributing factor for the decision.

There is present across all the interviewee observations an underlying favourable reaction to and successful integration of the lean innovation within the organisational and management environments. It is interesting to note the presence of the study action team theme again here in the discussion concerning communication; this suggests it is a key driver to implement the lean innovation and support the workforce. There is also present a shared and mutual understanding between all interviewees concerning the importance of communication within the organisation in the understanding of the lean innovation and the implementation process.

Challenges associated with the implementation of lean for Organisation F will now be discussed.

5.4.5 Implementation Challenges

Implementation challenges are considered unique to each implementing organisation; however, it is interesting to see that Organisation F’s interviewees observed more challenges or impediments to lean implementation than Organisation B. This could emerge as Organisation F delivers products through physical labour and as such has a workforce that is considered unskilled or that Organisation B has utilised their trade partner relationship with Organisation A to their advantage and learnt through the mistakes of others.

Throughout the interview sessions, interviewees favourably described, reflected on and observed the implementation of the lean innovation within their organisation. Interviewees, including Champion and Innovator 1, Project Manager 1, Project Manager 3, Project Manager 4 and Project Manager 5, were also quick to point out the challenges that have emerged within the organisation associated with lean implementation. Many of the challenges described by interviewees were associated with such issues as organisational conflict, education and performance. Champion and Innovator 1 particularly spoke about the indirect
challenge to organisation management through education and the educating of a large organisational workforce, divided into three sub-organisations and providing three different services and products. Champion and Innovator 1 spoke directly and indirectly about the challenges associated with their position and ‘coaching’, although the challenge of coaching is not considered to impact negatively:

Box 2.17: Education – Champion and Innovator Perspective

‘So the challenges with coaching ... I tend to have a couple going in that phase and it’s hard for me to get the time that, but as long as I can be with them the challenges are relatively minor, you know, it’s the normal; change management challenges; challenge with once they start to go on their own, again it’s for me, logistics. Giving them enough time so that they don’t go too far wrong before they can get back on track ... It’s a completely new way of thinking and some people will take to it quickly and some won’t and inevitably stumble over sufficient involvement of people and the biggest, the biggest challenges, the mindset change so that they can make that click to thinking about people as, as important instead of as cogs in a machine.’

Champion and Innovator 1

According to Project Manager 2, education is an issue in the organisation not because it is not supported by management but that management is not committed to partaking in the programs with operators.

Box 2.18: Education – Project Manager Perspective

What I can’t get commitment to is superintendents, managers coming out of their roles for five days to learn how to facilitate and run a activity. The; kaizen blitzes are the biggest and probably the only tool we have on site; that actually allows us to turn the pyramid upside-down. Start supporting the people at the top rather than directing down. Yet our managers question what level of work that is. I’d be working at the wrong level if come out of my role to run a kaizen blitz with operators for five days. To me, the link they haven’t found is the thinking and the philosophies of the operations and kaizen blitz which is all about the PDCA cycle – the ultimate working together that a manager shouldn’t have the answers he should have the questions that lead the people to the answers. But we still have that direct-down “I’m smarter ... couple of PhDs ... I’m the manager ... I must maintain my status” person on site’.

Project Manager 2

For Project Manager 2 this shows:

- functional elements in the aspect that management supports the education of operators; and
- dysfunctional elements in the aspect that management don’t feel a need to participate as part of the group education.
Throughout their interview session, Project Manager 2 regularly observed the challenge of managerial expectations of the workforce in achieving and meeting performance goals and objectives. In reflecting upon management, Project Manager 2 noted that this form of challenge for the organisation is not measurable but can indirectly impact the workforce and their understanding of the lean innovation:

### Box 2.19: Managerial Expectations – Project Manager Perspective

"... you get so bogged down in the “doing”. I think part of the biggest problem, especially people in my role and others is managers want tangible results, and they want to see them quick, and they’ve read the books and lean can deliver them quick, and improve flow and through-put and output and quality and all those sorts of things. So they’re the measures they want to see.’

Project Manager 2

Expectations of management were discussed in two similar approaches by the interviewee, with both having similar direct and indirect consequences for the organisation. The context in which management expectations was discussed, included:

- the want for tangible results, which focuses on the expectations of a quick change-over in productivity and waste levels; and

- higher management expectations, which highlights the expectations of higher management in hitting and maintaining specific lean targets.

For the interviewee, the direct consequence for the organisation of such expectations is associated with time, in particular the setting of non-realistic goals and want for the returns to be rapid.

### Box 2.20: Managerial Expectations – Project Manager Perspective

"They still need to hit targets because that’s been told to them in their role descriptions. So they’re pushing for results rather to a five-year vision of where we want to be, which is understandable. I think the thing that gets me is because we haven’t looked at it as a total package and everyone fundamentally changes the way we work, we delegate people to roll out the lean tools while management can go on with business as usual.’

Project Manager 2

Indirect consequences are linked to higher management not understanding the human side associated with the lean process implementation.
According to Project Manager 2, one of the main challenges in the organisation achieving and maintaining managerial expectations is age. Noting that currently the organisation has a lot of its workforce in the age bracket of 50–55 years of age, within 10 years, 50% of the workforce will have to be replaced. Although Project manager 2 does highlight that age should not be identified as a barrier to lean innovation implementation.

This challenge has both direct and indirect consequences for the organisation:

- direct in terms of education and replacement of older workers, which can be viewed as a current waste for the organisation in terms of time and finances; and
- indirect in terms of providing the organisation with an opportunity to groom a new generation of younger workers in the lean innovation.

However, in removing older workers another direct consequence emerges with the loss of knowledge-sharing between the generations. Both consequences for this challenge are identified as moderate; however, the approach management undertakes can make these consequences minimal as well as high.

Other managerial expectations of management as observed by Project Manager 4 and Project Manager 5 highlighted the lack of strategic direction organisational management has taken in the implementation process. This is highlighted by a link to direct consequences associated with management of the implementation.

**Box 2.21: Managerial Expectations – Project Manager Perspective**

‘Finding that real clear link between upper management and the guys on the floor is the secret to what we truly haven’t exposed yet. Peel that onion back to get to the middle of it.’

Project Manager 2

**Box 2.22: Age – Project Manager Perspective**

‘… our biggest age demographic on-site is 50–55 years old. In the next 10 years we are going to have to replace 50% of our workforce. When you are talking about people like that – using an analogy where you can’t teach an old dog new tricks – but we have a lot of work to do to change; our biggest age demographic around. If you want to look around in five or 10 years, even that big demographic that we’ve turned around – we’ve got to do that for the next generation.’

Project Manager 2
This was confirmed by Project Manager 5 in the same interview session.

Table 5.15 *Sub-Organisation 1 Challenges* highlights challenges from Sub-organisation 1’s perspective; Table 5.16 *Sub-Organisation 3 Challenges* highlights challenges from Sub-organisation 2’s perspective. These address the observations and reflections of those interviewees who described lean challenges. The tables divide the main challenge theme into a series of challenge related sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation challenges.
Table 5.15: Sub-Organisation 1 Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Desirable versus Undesirable</th>
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<tbody>
<tr>
<td>Challenges</td>
<td></td>
<td>Interviewees PM4, PM5</td>
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<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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<tr>
<td>PM4</td>
<td><strong>Perspective:</strong> Performance and management’s approach to the implementation process. Desirable versus undesirable challenge. Highlighted how management throughout the process have attempted to fix the lean model to the organisational environment, rather than adapting the model to the organisational environment: ‘… we have tried to fix the lean model across all areas rather than adapt; the lean model to fit to suit our organisation and make ownership of it. We have rather taken the approach of religiously focusing on the structured formula of lean. I think where we have had some measures of success was where we had stepped back and said “Well we actually own this system and we can tweak it to how we like.”’ Although some measures of success have occurred with the approach, the dysfunctional nature of the challenge suggests the organisational management and the environment is not adaptable to the requirements of lean. Consequences of this challenge were not identifiable by the interviewee.</td>
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<tr>
<td>PM5</td>
<td><strong>Perspective:</strong> Performance, change resistance and advocacy. Desirable versus <strong>undesirable</strong> challenge. The interviewee reflected back on how education of the process focused primarily on one grouping (operators/trades), without getting the team leader involved as well: ‘We have gone to the extent where we get the operators involved in the; process and we have had some success. Ok so we get them involved and; they like own it. But where we probably fell down a bit is not getting the; team leader involved … so we get the operator involved and they go; out and they own it, but then they don’t have any authority around the; mill. So they are trying to implement something and get behind it but they; really don’t have the support of their team leader because the team leader wasn’t involved in that process and doesn’t understand how important it; is for the operator and the rest of the team. So that’s probably we have; failed and where we need to extend this leader standard workshop that; has started to get them involved and supporting their guys who have done the Kaizen blitz and other workshops’. For the interviewee, dysfunctional aspects emerge with the lack of authority the operator has within the working environment to further advocate and lead forward the innovation. The lack of operator support for the interviewee is underpinned by the team leader and not having both groups integrated into the educational programmes. For the interviewee this is a core challenge the organisation is currently facing.</td>
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### Table 5.15: Sub-Organisation 1 Challenges

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<th>Description &amp; Analysis</th>
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</table>
| Challenges| Desirable versus Undesirable               | PM4, PM5     | The interviewee highlighted the presence of resistance to change when an innovation is implemented, particularly those challenges between management and operators/trades in communicating the innovation:  
> ‘Sure, I mean anyone who gets used to undertaking tasks in a certain way; will resist when change is introduced that affects the way they do; something. Everyone is going to go through that resistance, they don’t; want or they don’t want to see, that sometimes doing it in a different way; is more efficient and beneficial to the process and work practices.. Especially if you have to deal with people who have been doing the same; job for 10 or 15 years and then you go “Well we no want to do it this way”, their first reaction is ”Well what’s the problem, because we’ve been doing; it this way for so long, why do we need to change?”.’  
> Although some measures of success have occurred with the approach, the dysfunctional nature of the challenge suggests the organisational management and the environment is not adaptable to the requirements of lean, particularly when resistance occurs:  
> ‘… the guys been working the same jobs, that it becomes easier for them; to do it that way. They then don’t see a need as far as they are concerned; to want to change. They view lean as fad that is just going to past and all; they have to do is wait it out’.  
> Consequences of this challenge were not identifiable by the interviewee. |
Table 5.15: Sub-Organisation 1 Challenges

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<tr>
<th>Theme</th>
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<th>Interviewees</th>
<th>Description &amp; Analysis</th>
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<tr>
<td>Challenges</td>
<td>Direct versus Indirect</td>
<td>PM1, PM2</td>
<td>PM1 Perspective: Communication and education. Discussed the nature of the working environment prior to the innovation and the first months of implementation. In particular highlighting conflicting relationships between each shift: ‘If anything there was a bit of a war between the two shifts. There was a little bit of conflict and sort of war like where one shift would leave things; in an unsatisfactory condition for the following shift.’ The presence of lean within the sub-organisation has been minimised with the introduction of the lean innovation, with a move towards integration (unity) and advocacy amongst shift crews: ‘But now knowing that the next shift is going to following through and it; going to have that information centre, then all of those things are going to; be brought out into the open. It has brought out a lot of unity between the; crews.’ Described this challenge as being low in its consequential impact within the sub-organisation.</td>
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<td>PM1 Perspective: Education. Direct versus indirect challenge. Discussed how some groups and individuals struggle with understanding the tools and systems underpinning lean, this occurs despite the utilisation of education specific information centres: ‘I guess with all that the guys don’t understand it. If they don’t understand it then they don’t tend to question about it. The information centre that we have on the way through to these offices, is quite large and it takes up both walls as you come through. The guys make an effort to understand what’s going on, but they feel that it is overcrowded and just too much information. Once that happens they tend to switch off; they tend to; not to worry about it.’ Although individuals/groups make a genuine attempt to understand the information, sometimes the information can indirectly cause fatigue and frustration: ‘Once they get to that stage then they go around with blinkers on and just don’t tend to accept that as much as they should.’ Such an indirect consequence tends to reduce the rate of acceptance of tools and systems within those groups or for those individuals.</td>
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### Table 5.15: Sub-Organisation 1 Challenges

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<tr>
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<th>Sub-Theme</th>
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<td>Challenges</td>
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<td></td>
<td>The interviewee addressed motivation at the operator level of the organisational environment. The nature of performance was discussed in terms of recent ownership and management change-overs:</td>
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<td></td>
<td>‘Every two years management turns over, as is the nature of the beast, and with that comes new initiatives, new directions, new ways to work. Each manager has the best way and the only way’.</td>
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<td></td>
<td>The nature of the direct and indirect consequences is linked to strategy fatigue at an operator level. However such consequences are not measureable.</td>
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<td></td>
<td>Perspective: Lean implementation, working culture, organisational direction and education. Direct versus indirect challenge.</td>
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<td></td>
<td>Core to the working environment is culture; however the organisation does not have a clear lean direction concerning process. As a result and due to western culture without a clear lean direction there is no presence of team unity and more instances of individual and team sabotage (direct consequence):</td>
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<td></td>
<td>‘… it’s a Western culture. The best way to look good is to make the other bloke look bad because then, you get left alone. While I can see he is; getting “bashed” they’re leaving me alone. And that’s because that pyramid is always up and we direct people what to do.’</td>
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<td></td>
<td>Understanding of the lean process is identified as an indirect consequence. Supporting the culture through a more structured strategic direction for the organisation according to the interviewee would minimise the potential for sabotage, however if not implemented well then similar direct and indirect consequences would still be present.</td>
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<td></td>
<td>‘We say the biggest thing in lean is about standards but what we don’t have is standards for our people. We have standards for our operations standards for our processes standards of how we work but then we don’t have standards for how we should communicate, how we should lead, how we should develop people. We get bogged down in wanting to see; that green metric at the end of the day…’</td>
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<td></td>
<td>Such direct and indirect consequences are not measureable.</td>
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Table 5.15: Sub-Organisation 1 Challenges

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<th>Theme</th>
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<tbody>
<tr>
<td>Challenges</td>
<td>Desirable versus Undesirable</td>
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**Interviewees**

PM2

**Interviewee Description & Analysis**

PM2 **Perspective:** Motivation. Desirable and undesirable challenge.

Discussed in the form of process and tool fatigue:

'It’s a good process. It’s focused. It forces you to focus but my honest opinion is we try to focus then repeatedly spread our wings and a lot of; our people see it as ‘death by a thousand initiatives’. Because we are; going through a rapid transformation in a short period of time…’

The rapid nature of implementation within this sub-organisation according to the interviewee has introduced a number of specific tools which are not fully understood before the next tool is introduced:

'Often, we don’t glue them together or align them to one common cause. They’re still seen as individual initiatives. “Are we really heading to a common goal?”’

For PM2 this shows:

- Functional elements in the sense that there are high level of strategy introduction and awareness of strategies in place; and
- Dysfunctional elements in the operators experiencing over exposure to the tools and suffering strategy fatigue.

Again the functional and dysfunctional aspects are not able to be rated.
5.4.6 Organisation F Researcher Reflections

The following researcher observations were made during the analysis of this organisation.

Although undertaking some form of lean transformation over the greater organisational environment and sub-organisational environments for a number of years, this organisation is identified as being in the early stages of the cultural maturity process. The earlier maturity phase is guided by the static implementation of lean tools in line with the organisation’s strategic direction, with organisational practice to be of a lesser focus. This is particularly highlighted in the presence of a number of direct and indirect challenges. Management is focused on the first two phases of maturity.

Within the sub-organisational environment there are some project managers with a greater understanding of the type of impact the adoption of lean will have – linking the presence of the third phase of cultural maturity. The development of such awareness has been supported by exposure to the innovation in other organisational environments as well as through educational programs. Underpinning such programs is the presence of organisational social norms designed to allow tertiary working groups to themselves embrace and become leaders within a more integrated focused working environment.

Education and training in homophilic groups and study action teams is used as a first instance exposure to the innovation. These groups then present their findings and understanding to management; the uniqueness of these groups is in the informal influence in the cultural environment, interaction and knowledge development. Members of the group are selected based on their skills to further communicate to like-minded individuals the benefits or successes of lean for the organisation. This informal interaction assists in gaining a momentum and desire of the workforce to learn more.

In some sub-organisations this informal interaction is more hetrophilic, with managers discussing tools or specific elements of lean informally through visual aids or ‘tool box meetings’. The informal communication allows for a greater interaction between those groups who would not initially talk or interact. Such interactions, particularly in this organisation, has enabled a greater level of awareness and interaction to emerge and filter through the organisation, thereby enabling a greater acceptance and understanding of the lean innovation.

The approach of lean implementation is targeted to activity bases in the first instance, before moving along to sub-organisational environments. As the lean innovation is diffused the strategic approach changes as management learns more about the impacts and effects on the workforce and the cultural environment. The organisation holistically has also undergone a
number of significant changes, which are reflected in the response to the lean innovation by the workforce.

5.4.7 Conclusion
The discussion in this section established the organisational, management and communication environments in which the organisation underwent a lean transformation. The interviewees interviewed within the organisation highlighted diverse organisational roles, cultural attitudes and behaviours as well as lean understandings. Despite a diverse representation of the organisation, the majority of interviewees shared and confirmed similar aspects of the organisation environment, process, communication and challenges.

Over the course of the lean transformation the organisation underwent significant maturing of its culture, particularly in terms of the establishment of education and training programs, advocating of informal communication and social interaction with Organisation A projects. Specifically, those individuals interviewed within organisation had favourable experiences and exposures of lean through the confirmation of the lean philosophy and personal confirmation. The interviewees were also happy to acknowledge the presence of non-favourable challenges, such as decision making, trust and project planning.
5.5 Case Study Results: Case Study 3 Organisation G

5.5.1 Overview

Organisation G is located in Victoria, Australia, with regional offices located throughout Victoria and New South Wales. The organisation is considered the third-largest domestic house builder in Australia and, like Organisation F, deals specifically with its customer base. The organisation is currently considering undergoing a lean transformation to eliminate organisational and project specific waste:

<table>
<thead>
<tr>
<th>Text Box 3.1: Overview – Senior Executive Perspective</th>
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<tbody>
<tr>
<td>‘One of the things we are looking to introduce is lean construction. We have an enormous amount of waste in our business given I guess the unsophisticated nature of the construction industry. We can’t call it lean, we just call it ETS, which is Extra To Schedule, which is margin erosion. We actually order our homes and our costs to homes and order that and its leakage to that’.</td>
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<tr>
<td>Senior Executive 1</td>
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Four interviews were conducted within the organisation, with organisational roles represented at two levels of the organisational structure – senior and middle management in one organisational stream. Three management streams are present in the organisation, highlighting a focus by management on operations, sales and project delivery. Only the management stream of operations forms the study and from this point forward the organisation will be representative of the organisation as it is assumed each management stream is similar.

Table 5.17 Interviewee Categorisation Organisation G highlights the organisational position of each interviewee. The interviewees have been categorised during the analysis into one of four groups based on their organisational role; here, interviewees are representative of senior executives, champions and innovators and project managers. The table also identifies the main management stream of the organisation that each interviewee belongs to.
<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
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<tbody>
<tr>
<td>Senior Executive</td>
<td>Operations manager for the main office of the organisation. The role involves the overall foreseeing of the business and other managerial duties.</td>
<td>Senior Manager</td>
</tr>
<tr>
<td>Champion &amp; Innovator</td>
<td>Employed with the organisation based on their lean background. Main role is to facilitate the implementation of lean.</td>
<td>Operations Team</td>
</tr>
<tr>
<td>Project Manager 1</td>
<td>Main role in the organisation is the managing of the education and training programme.</td>
<td>Operations Team</td>
</tr>
<tr>
<td>Project Manager 2</td>
<td>Main role in the organisation is the managing of operations and services.</td>
<td>Operations Team</td>
</tr>
</tbody>
</table>

The organisation has been in residential construction for around 36 years; over the last 10 years the organisation has undergone significant rapid growth. Project Manager 1 highlighted:

"... the business has been around for 36 years, it’s been, it was fairly small for the first 26 years and it has grown rapidly over the last 10–11 years. By rapidly I mean we went from 50 homes a year to building about 3,500 homes a year over that 10-year period.

Project Manager 1"

Project Manager 1 also highlighted how within the organisation there is no standardisation of processes or practices have occurred as part of the rapid expansion of the business, which has caused some issues to emerge – particularly concerning organisational culture and nature of practice. The organisation’s lean transformation has been predominately influenced by an internal desire by management to improve productivity and eliminate waste.

Furthermore, according to Project Manager 1 the organisation is currently addressing business improvement strategies as a means to introduce some form of standardisation within the organisation. This improvement process has been in place for the last two to three years.
This organisation was the only organisation where interviewees actively stated that the specific purpose of implementation was about the elimination of waste and productivity improvement. Both Senior Executive 1 and Champion and Innovator1 identified the approach to be underpinned by Extra To Schedule programming, alternatively referred to as ETS.

The presence of the ETS program is within initial implementation and has been for a period of 12–14 months. For Champion and Innovator 1, combining both the ETS program and the business improvement program would be more beneficial culturally in assisting the general acceptance of the lean innovation within the organisation.

The organisation is currently investigating the implementation of the lean innovation and tools within the context of waste, particularly physical and financial waste. The implementation of lean is seen as secondary by some interviewees, including Project Manager
1 and Project Manager 2, with these interviewees suggesting the existing culture of the business to be an impediment to successful implementation:

**Text Box 3.6: Overview – Project Manage Perspective**

“We are focused, we are an entrepreneur business so from a business culture point of view we encourage entrepreneurism and a competitive kind of spirit it’s one of our values. So we don’t necessarily like restriction and standardisation as a culture in the organisation …’

Project Manager 1

According to Project Manager 1, the organisation at this current point in time is more concerned with the establishment of an educational and training agenda to improve culture, using this framework later as a platform for implementation.

5.5.2 Organisational and Managerial Environment

Despite managerial change, Organisation G’s formal ‘social’ structure (i.e. the organisational structure) has remained relatively the same despite the more recent rapid growth, according to Senior Executive 1, Champion and Innovator 1, Project Manager 1 and Project Manager 2. Each of these interviewees highlighted the difficulty of the transition of management from a non-standardised or ‘entrepreneur’ environment to a standardised environment. This change has particularly impacted the organisation culturally.

Figure 5.3, *Organisation G Formal Organisational Structure* addresses the formal ‘social’ structure of the organisation. The structure has been developed based on the observations of the interviewees when discussing such elements as structure, management and the organisational environment. The structure incorporates seven organisation tiers, as follows:

- top tier management, incorporating CEO and higher management group;
- second tier management, incorporating senior executives and management;
- third tier management, incorporating middle management including operations, sales, customer support, building, estimating and drafting teams;
- fourth tier divides the organisation into city and regional specific groups headed by a general manager;
- fifth tier, further broken into project delivery groups headed by a building executive manager;
- sixth tier management group reflecting construction managers; and
- seventh tier management group reflecting site managers.
An eighth tier emerges with organisational management on residential construction acting as the general contractor with trades subcontracted out. There is no collaborative framework identifiable in this organisation as is in Organisation B and Organisation F; this may be as the organisation is structured to highlight internal entrepreneurism, as observed by Project Manager 1. According to Senior Executive 1, the nature of the organisation and its business environment is impacted from the organisation managing domestic construction through intensive overheads which creates a very decentralised operation:

**Text Box 3.7: Formal Social Structure – Senior Executive Perspective**

‘... the large business, we have 100 site managers, we have 1,000 people in this business nationally, and if you think about the role of, well in [the city] we’ve got 906 jobs under construction right now. So it is a very decentralised operation’.

Senior Executive 1
Figure 5.3: Organisation G Formal Social Structure

Figure 5.3 also highlights the organisation’s communication network. The red arrows indicate formalised managerial communicative networks present within the organisational environment.

Further underpinning the formal social structure is the way communication is utilised within the organisation environment. The static and direct approach occurs with the nature of decentralised reporting systems present within the organisational environment, Senior Executive 1 observed:
Project Manager 2 highlighted the presence of some city and regional organisational locations; they have in place leaders that heavily influence the nature in which homes are constructed, providing some form of standardised of communication and project delivery:

The independent nature of site managers is another feature of the formal social structure of the organisation, according to Champion and Innovator 1, who observed:

Table 5.18 Informal Social Structure Characteristics and Table 5.19 Social Norms address and analysis the observations made by interviewee participants regarding the organisation. The purpose of these tables is to highlight elements of the social environment that have and are guiding lean implementation; where possible the direct reflection of lean change within the environment is identified and further discussed. Furthermore, in instances where observations are shared or confirmed, observations are grouped together. It should also be noted that on occasions interviewees reflected and observed multiple aspects of lean implementation; where this has occurred, only an analysis is present.

The interviewees, when reflecting upon lean implementation within the organisation, made observations on the informal social system; these observations are addressed in Table 5.18.
Interviewees reflected upon two communication styles as forming the informal social system of the organisation:

- homophilic communication or the communication between like-minded individuals; also
- heterophilic communication or the communication between non-like-minded individuals.

Perspectives of these communication styles highlighted lean implementation within the organisation leading towards the development of improved internal relationships between organisational groups and the presence of tertiary working groups. Unlike Organisation B and Organisation F, the change in this organisation has been slow and has caused cultural distress for much of the workforce as the lean innovation has been viewed negatively. However, interviewees such as Project Manager 1 have noted positive changes within the organisation, particularly in the refining of the strategic direction to specifically target waste elimination and productivity improvement.

According to Project Manager 1, tertiary working groups is one such strategic approach being undertaken by organisational management to support the workforce in the implementation of innovation. The strategic approach first targets the education of the homophilic workforce; this strategy is important to the organisation as it is identified as the first step in improving strained relationships between the management streams of operations and construction, alternatively known as ‘off-site’ and ‘on-site’ organisational groups:

<table>
<thead>
<tr>
<th>Text Box 3.11: Communication – Project Manager Perspective</th>
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<tbody>
<tr>
<td>‘...we actually have started to embark upon trade quarterly meetings, so that’s run by the building manager within each of our districts and at each quarter we are now getting our trades together with our construction team to talk about what is going on with the business, what’s the business strategy, what’s coming forward, what are some of the challenges in the area, what are the needs we have of these and what needs that have of us – trying to really build that trade partnership type of environment’.</td>
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</table>

Project Manager 1
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Heterophilic Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Social System</td>
<td>Interviewees</td>
<td>CI1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>CI1</td>
<td>Perspective: Enhanced relations</td>
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<td></td>
<td>The interviewee described that the current implementation approach has enabled them to establish more personal heterophilic relations across the organisational environment. For the interviewee the development of these relations are essential for implementation to be successful:</td>
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<td></td>
<td>‘So one of the other things is go-look-see is one of the things I tell people is that the expert is the person who sees the job everyday…I try and spend and I have been successful in the last couple of weeks, I usually spend at least 1 day a week on the road and just go around and have a look at all of the different types of waste and issues in house’..</td>
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<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Homophilic &amp; Heterophilic Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Social System</td>
<td>Interviewees</td>
<td>CI1, PM1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>PM1</td>
<td>Perspective: Study action teams and enhanced relations</td>
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<td></td>
<td>Education and training for the interviewee has been an essential component in the establishment of an improved organisational cultural environment.</td>
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<td>According to the interviewee prior to introduction of functional team education and training as part of the excellence programme there was essential no homophilic communication amongst organisational teams:</td>
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<td>‘So what have tried to do is get all of the drafting team together, meet each other, have a team building experience together first, be on the same page, just be able to have a coffee and say hi to somebody that does the same role as you and maybe be encouraged to share some ideas across those barriers and is kind of where we started with that one’.</td>
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<td></td>
<td>Targeting functional organisational groups/teams has assisted in not only the development of better homophilic relations but also heterophilic relations.</td>
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<td></td>
<td>‘We knew we had a huge issue and our feedback from the team around that was really positive, you know people have new friends, new people that they can draw experiences from and share ideas with etc’.</td>
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</table>
Interviewees also made observations on the behaviours that form the social environment of the organisation, also known as ‘social norms’. Observations made are addressed in Table 5.17, with only Project Manager 1 reflecting upon education, integration, advocacy and stability. Of particular importance to organisational management is education, particularly the development of an educational platform that encourages knowledge development, stability and interaction amongst the workforce. This need for an education and training agenda was also discussed heavily in Organisation B, but not Organisation F; again, this could be reflective of the workforce and the nature of construction work the organisations undertake.

According to Project Manager 1, prior to the undertaking of specific group education and training there was minimal communication between similar working groups. This was due mainly to the nature of the organisational environment and how operations were approached as formalised practices, processes and procedures. For the interviewee, the introduction of specific group-education and training assisted in the opening of informal social structures, particularly homophilic relations in the organisation and the presence of greater integration of specific organisational groups:

Text Box 3.13: Integration – Project Manager Perspective

‘The conferences that we had definitely helped build team, well the team cohesiveness across all areas. It allowed people to meet other people from other areas of the business that are doing similar roles. So it increased relationships across the business and they felt like they weren’t being targeted and it wasn’t just them and it was applied to everybody so that was a good thing to do. It also managed to break down barriers between support services and the operational teams, because the support services attended the conferences and such and those teams have been involved in the training programme as well. So it has kind of helped build relationships in that area.’

Project Manager 1

The breaking down of barriers within the organisation between teams through improved heterophilic relations was also beneficial for the organisation’s cultural environment and was reflected in the observations of Project Manager 1.

Project Manager 1 also reflected heavily on the recent movement by organisational management to embrace standardised practices through the development of ‘golden rules’. The approach underpinning the organisational ‘golden rules’ was linked to the general cultural attitudes of employees. The ‘golden rules’ approach is the philosophy of the change focused on that of a cultural change rather than business and process:
The nature of the ‘golden rules’ is reflected in the key business strategies of the organisation and assist in the establishment of standardised processes and procedures (or social norms). The ‘golden rules’ are representative of organisational social norms, including advocacy, integration, stability and culture achieved through education.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norms</td>
<td>Education</td>
<td>PM1</td>
<td><strong>Perspective:</strong> Education.</td>
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<tr>
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<td>The nature of the education and training within the organisation for the interviewee is about more about the establishment of a cultural environment that supports the needs of the business. This cultural approach is representative in the approach of the organisational education and training programmes specifically targeting social norm and social norm development:</td>
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<td>‘So with our cultural stuff we have tried to do a lot of things around experience and having a experience rather than being sat in a classroom and having a lecture.’</td>
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<td></td>
<td>The interviewee here discusses how the approach to education and training is not only limited to a classroom setting but also encourages learning outside the organisation. Such education and training assists in further strengthening advocacy, integration, culture, education and stability:</td>
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<tr>
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<td>‘So trying to some learning with meaning behind, but it has always been an important message behind it at the end of the day.’</td>
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<td>Underpinning the approach is the basis that the organisation had a zero base in which to address issues of cultural importance. With such an innovative education and training programme management wanted their employees to go on the journey with them.</td>
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<td>However the interviewee did note that this philosophical approach was not initially understood well:</td>
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<td>‘… trying to drive a buffer line behaviour so everyone takes ownership and responsibility and is accountable for what they’ve done and we move away from blaming other people, excusing poor performance and denying we were ever in the room and heard that. So we have a language now where people would say, “Well that’s below the line” or “You’re not above the line today”.’</td>
</tr>
</tbody>
</table>
Unlike Organisation B and Organisation F, no interviewees in the organisation identified or observed the utilisation of opinion leaders or change agents. This lack of opinion leaders or change agents within the organisation may be reflective of the current phasing of lean implementation in the organisation.

5.5.3 Process

The describing of lean implementation by interviewees highlighted diverse process observations. The diverse observations made by interviewees cover a number of implementation stages, and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.

- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.

- **Implementation** will highlight those observations that describe the process of lean implementation.

- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.

These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.20 *Implementation Process Component 1: Lean Knowledge and Exposure* addresses the knowledge and exposure of interviewees to lean innovation, describing how these align with low, moderate and high levels. Interviewee positioning was addressed in table 5.17.
The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been diversely observed and described by interviewees, incorporating such perspectives as the formal social structure and informal social structure. Table 5.21 *Implementation Process Component 2: Persuasion* addresses the persuasive techniques identified by interviewee participants as assisting the implementation of lean within the organisation. The table divides the main persuasion theme into a series of sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with persuasion and persuasive techniques.
Table 5.21: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Formal Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
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<tr>
<td></td>
<td>Interviewees</td>
<td></td>
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<tr>
<td></td>
<td>SE1, PM1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| SE1         | Perspective: Educational programs.  
The interviewee, when discussing techniques associated with the refinement of current organisational practice, highlighted the presence of specific education/training programs to be apart of the new organisational direction. The interviewee highlighted that the persuasive techniques in place within the organisation are supported by the organisational specific education/excellence program:  
'We have done a lot of training with our site teams in terms of the way they engage and communicate with trades and give feedback.' |
| PM1         | Perspective: Heterophilic relationships.  
The nature of the business and its workforce is structured around individual entities. This type of organisational structure impacts on the nature of communication. Management of the organisation track the roll out of new practices, processes and procedures through management lines as a means of eliminating the dictatorial nature of communication within the organisation. For the interviewee this is seen as a way of assisting the cultural environment:  
'... we have been trying to track their management lines and get their managers to roll things out instead of it coming from a like a corporate services business, so it is rather seen as the managers process rather than a business process. And we have been doing it that way.' | Perspective: Educational programs.  
The interviewee described the nature of the cultural environment in implementation standardisation as a series of battles. According to the interviewee these smaller battles as utilised as part of persuasion to implement elements of standardisation and the excellence program:  
'... so we have been very selective about which battles we choose to fight to get standardisation. So the things that we don't have compromise on in terms of standardisation are safety, so safety is a non-negotiable, customer experience is a non-negotiable and so is quality; and its quality of other materials going to site and the finished home to the customer ... So there will be, well different teams will have different means to get to an ends in terms if their process but they will be producing the same quality of home at the end of the day. So we have kind of allowed and said final quality check is this, these are the steps that you go through, but how you get there is up to you, in some ways.'  
For the interviewee the presence of flexibility in negotiable elements of project delivery enables the cultural environment of the organisation to remain fairly constant.
Table 5.21: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Informal Social Structure</th>
</tr>
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<tbody>
<tr>
<td>Persuasion</td>
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<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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</thead>
</table>
| PM1         | **Perspective:** Educational programs.  
|             | The interviewee described the nature of the cultural environment in implementation standardisation as a series of battles. According to the interviewee these smaller battles as utilised as part of persuasion to implement elements of standardisation and the excellence program:  
|             | ‘… so we have been very selective about which battles we choose to fight to get standardisation. So the things that we don’t have compromise on in terms of standardisation are safety, so safety is a non-negotiable, customer experience is a non-negotiable and so is quality; and its quality of other materials going to site and the finished home to the customer … So there will be, well different teams will have different means to get to an ends in terms if their process but they will be producing the same quality of home at the end of the day. So we have kind of allowed and said final quality check is this, these are the steps that you go through, but how you get there is up to you, in some ways.’  
|             | For the interviewee the presence of flexibility in negotiable elements of project delivery enables the cultural environment of the organisation to remain fairly constant. |

| PM2         | **Perspective:** Educational programs.  
|             | The interviewee highlighted that there has been no formalised approach or structure that has developed as a means to introduce the lean innovation. However, in discussing this aspect the interviewee noted that they themselves and another individual (Interviewee 3) will be conducting a formal session for site managers. The nature of such training sessions seems directed towards a needs basis in line with the current strategic direction of the organisation:  
|             | ‘We are undertaking, well [Interviewee 3] and I have a session in two days time. In the session we are undertaking an analysis of how we can deliver homes in 20 weeks, that is starting off with a workshop and getting guys from the site management level up to the building management level in a room and talking through a day of exploring where the issues are.’ |
The lean decision was not explicitly described by interviewees; however, on a number of occasions the decision was alluded to – particularly through the education and training framework. This was similar to Organisation B where the decision was alluded to but specifically observed. This alluding was not limited to one or two interviewees but was confirmed by Senior Executive 1, Champion and Innovator 1, and Project Manager 2. Implementation was openly discussed by interviewees, highlighting a diverse range of observations and reflections which were again guided by lean knowledge and organisation positioning. Whereas in Organisation B and Organisation F the process was not specifically identified, interviewees (particularly Champion and Innovator 1 and Project Manager 1) observed specific implementation steps.

Champion and Innovator 1 identified two explicit steps in the strategic direction for lean implementation in the organisation, highlighting the need to undertake a visibility assessment of the business environment. Guiding this first stage is the education and communication of the organisation through study action teams:

<table>
<thead>
<tr>
<th>Text Box 3.16: Implementation – Champion and Innovator Perspective</th>
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<tbody>
<tr>
<td>‘... the first step I would take is to make the business visible. So having said you would probably run some workshops before hand to senior management, not just senior management but also the whole organisation as I think it is far more valuable.’</td>
</tr>
<tr>
<td>Champion and Innovator 1</td>
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<tr>
<td>PM1 confirmed stage in separate interview session.</td>
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</table>

The second step or stage observed by Champion and Innovator 1 is focused towards the application of specific tools being applied to specific activities, situations, tasks and processes associated with scheduling. Underpinning the current approach is the presence of the organisation’s ETS program.

<table>
<thead>
<tr>
<th>Text Box 3.17: Implementation – Champion and Innovator Perspective</th>
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<tbody>
<tr>
<td>‘... I’ve run a few Kaizen workshops. I’m trying to get practical problem solving up off the ground and concern, containment and counter measure. We are doing in sort of a round-a-bout way some sort of standardised work off the ground, something that the organisation is very poor on and there is a poor understanding of it.’</td>
</tr>
<tr>
<td>Champion and Innovator 1</td>
</tr>
<tr>
<td>PM1 confirmed stage in separate interview session.</td>
</tr>
</tbody>
</table>

According to Champion and Innovator 1 the ETS program about the minimisation of specific organisational wastes. In terms of the implementation process this ETS program is considering to be a second step in the implementation process highlighting ‘Tool Identification & Assessment’.
Text Box 3.18: Implementation – Champion and Innovator Perspective

‘… how I would approach that is I will go out and undertake some time studies and watch people put the job together and do like a standardised work valuation streams around it, starting off with some very basic value streams on workers as well’.

Champion and Innovator 1

PM1 confirmed stage in separate interview session.

Champion and Innovator 1 specifically focused on project delivery waste in terms of pre-fabrication wardrobes and hanging doors. Furthermore, discussing the desire to implement a system (known as ‘working menu’) as part of the ‘Tool Identification & Assessment’ stage of the implementation process. The nature of the discussion highlighted the organisation’s desire to approach lean implementation in terms of tool delivery.

Table 5.22 Implementation Process Component 3: Decision and Implementation addresses the lean implementation observations of those interviewees within the organisation and highlights diverse reflections, including implementation through contractual obligations, managerial excitement and middle-management influence. The table divides the main process theme into a series of implementation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation.
Table 5.22: Implementation Process Stage 3: Decision and Implementation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Implementation Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
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<tr>
<td>Interviewee</td>
<td></td>
<td></td>
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<tr>
<td>PM1</td>
<td><strong>Perspective:</strong> Overall strategic approach of lean implementation (Staged Implementation).</td>
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</table>
|            | According to the interviewee the organisation is investigating specific elements of lean implementation and adoption. For the interviewee the presence and adoption of the excellence/best performance programme offers a model and process in which to approach the adoption of lean: ‘... step 1 was getting 14–15 stakeholders from across the country just to agree on the standard process regardless of whether or not that’s best practice or the most efficient, step 1 was all about getting agreement for everyone to do the same thing ... So we are just about to embark on round two which is about reviewing the standard practice process that we have agreed on and then looking towards how we can make that better and ‘best in class.’ For the interviewee the process associated with the excellence programme is about specific steps:  
  - Step 1 is associated with the establishment of a standard practice process.  
  - Step 2 is a reviewal process of step 1.  
As the program is in its infancy only two steps or stages have been considered:  
‘So we haven’t launched lean as a concept or as a strategy, it’s just some disciplines around the business improvement culture and we don’t have space in people’s heads at the moment to adopt a method.’ However, for the interviewee the excellence program needs to be established prior to the implementation of lean. |
Confirmation of the lean innovation is a significant aspect of the process as it assists understanding of the progress of implementation. Interviewee observations and reflections are limited as the organisation is in the early stages of implementation, with all interviewees discussing confirmation. Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation in terms of the personal confirmation, communication, process and culture. The confirmation perspectives also provided clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator and project management levels of the organisation perceive lean innovation to be.

Table 5.23 *Implementation Process Component 4: Confirmation* addresses the observations and reflections of those interviewees who have experience lean innovation confirmation, including the lean journey and process as well as organisational theory. The table divides the main confirmation theme into a series of confirmation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.
Table 5.23: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
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<tbody>
<tr>
<td>Confirmation</td>
<td>Education</td>
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<td></td>
<td>Interviewees</td>
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<td>SE1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
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<tr>
<td>SE1</td>
<td>Perspective: Communication.</td>
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<td>The interviewee sees some benefit in the presence of the education/excellence program, particularly in its facilitation of informal communicative networks. For the interviewee there is a clear distinction of improvement present within the organisation from the introduction of the excellence program.</td>
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<td>The nature of the change for the interviewee is dependent very much on the culture and groups within the culture. The process associated with communication has been ongoing for a period of 14 months and, according to the interviewee, the training has become more intensive over the last six months:</td>
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<tr>
<td></td>
<td>‘That’s probably been somewhere around 12 months, probably 12–14 months. But we have probably really enhanced it, increased it over the last 6 months, six to eight months.’</td>
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<tr>
<td>PM1</td>
<td>Perspective: Lean innovation awareness and organisation success.</td>
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<td>For the interviewee this involves the application of strategies as part of a discipline approach and scoring small victories along the way to show how lean can be successful:</td>
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<tr>
<td></td>
<td>‘… we have to make sure that if we are going to apply these principles that we have to do it in a way that fits in with that model and then it will work. The approach that we have taken is, we’ve got small projects so let’s get these projects and get some runs on the board, let’s create some level of interest, let’s show some proof and some evidence, the acceptance will be there, we will build relationships along the way and then it is just a case of when the two will come together and it just merges in and it becomes the same thing.’</td>
</tr>
<tr>
<td>Theme</td>
<td>Sub-Theme</td>
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<tr>
<td>Confirmation</td>
<td>Process and Culture</td>
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</tbody>
</table>

**Interviewees**

PM1

**Perspective:** Implementation.

The interviewee highlighted their general opinion of lean and how it would be applied and approached within the organisational environment. For the interviewee the approach is more about the tools and lean discipline in general however for it to make a successful transition the cultural environment of the organisation needs to be established and be aligned with strategies of lean:

‘I look at lean and I’ve been to some lean workshops and we’ve done some stuff. To me there is just some element of common sense about it and it’s not, well there is nothing revolutionary in it for me so I sit back and have a look at it and say ‘well there’s nothing revolutionary in it for me in it from a tools perspective, everything about it is fundamental common sense’ but for me the thing about lean where all the value is, is in and around the cultural change. So getting people to think about things and getting a cultural change and with the work that we are doing you say a lot of effort has gone into trying to drive a cultural change. So I would definitely agree with that. I think there are some really great disciplines and tools and stuff that lean brings to the table that eliminates all the personal bias and the ‘I’ve been in the industry for 30 years, this is the only way to do it’ attitudes, so there is some great stuff around that and getting people’s heads into that space to actually use those tools to do that. I think it’s got it’s place but I think you have to be really careful about how you integrate it into your business particularly you need to look at your businesses maturity, the structure that you have, the capacity of your people to take on these things, where you are at in the continuous improvement journey and I think there are components integrate in and integrate out.’

CI1

**Perspective:** Lean innovation awareness and organisation success.

The interviewee reflected back on their own background in the industry:

‘Lean is all about reducing the time between order and delivery by eliminating waste at every stage of the process that is the fundamental thing about lean.’

PM2

**Perspective:** Lean innovation awareness and organisation success.

The interviewee reflected back on their own background in the military as a means of assessing the potential benefits lean could bring not only to the organisation but also the construction industry:

‘Sure enough there can be refinements made to any system but the true value of the system is if everyone uses it, it is easily understood, it is recognisable and it does the job.’
Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation in terms of the theoretical, philosophical and process-related ideals and implementation at the organisational level. The perspectives also provided clear examples of the similarities and differences of understanding and awareness of the perception of lean innovation between individuals in champion and innovator and project management levels of the organisation. The similarities present within the confirmation perspectives are of particular interest as each group of the organisation network does not communicate well internally. The communication of the innovation is another important aspect of the implementation process. Elements underpinning the communication of the lean implementation within this greater organisational network will now be discussed.

5.5.4 Communication

Project Manager 1 was the only interviewee who observed communication as a driver in lean innovation implementation. This is unlike Organisation B and Organisation F where the majority of interviewees observed communication to be an implementation driver. Like Organisation B, communication was considered a ‘tool’ and was thus reflected in observations.

Reflective learning, identified and discussed by Project Manager 1, in the context of the organisation-specific excellence program, which focuses on the establishment of organisation specific ‘golden rules’. The ‘golden rule’ approach encompasses both visual and verbal communicative approaches to support the workforce.

<table>
<thead>
<tr>
<th>Text Box 3.18: Reflective Learning – Project Manager Perspective</th>
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</thead>
<tbody>
<tr>
<td>‘So our training packages usually support one of these ‘golden rules’ and we deliver it in a way that you go, that you know that we want to be safe at all times here is a way that helps you do that. So as well as the physical on the day delivery, we also do like a take-away’.</td>
</tr>
<tr>
<td>Project Manager 1</td>
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</table>

More specifically, the interviewee highlighted that with the physical delivery of education and training they also incorporate elements of takeaway reflective learning in terms of multiple touch-points.

<table>
<thead>
<tr>
<th>Text Box 3.19: Reflective Learning – Project Manager Perspective</th>
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</thead>
<tbody>
<tr>
<td>‘So we have always tried to do multiple touch-points in our training because you know that one-off doesn’t really cut it or work. That is what we have been trying to do with our program’.</td>
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<tr>
<td>Project Manager 1</td>
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</table>
Project Manager 1 also observed integrated learning as a form of communication; this was also observed in Organisation F. The nature of the education and training programs within the organisation, according to the interviewee, is centred on engaging the workforce in terms of specific duties, particularly in enhancing the education and training through integrated learning. Workforce engagement encompasses both visual and verbal communicative mechanisms.

**Text Box 3.20: Integrated Learning – Project Manager Perspective**

“So what we have done with our program is we have, well when we agreed on what those key things were around safety, customer experience and quality we put together documentation around those and a training program to deliver those to the team. So everything that we have rolled out has been supported by a fairly robust training programme to go with it’.

Project Manager 1

The focus of communication in the organisation, according to Project Manager 1, is directed towards the organisation’s excellence program, which incorporates lean through the application of tools as a point of interest for problem solving.

**Text Box 3.21: Communication – Project Manager Perspective**

‘... that’s it for me with lean, we are working on tackling some problems in the business that have been there forever and a day and actually solving some root causes and then we can use that as evidence to say ‘well we applied due process, tools and other methodologies around this particular problem and we have overcome this problem through those mechanisms. So therefore we know this works, it fits in nicely and philosophically with everything else that we are doing, let’s do more projects following these ideas’. So it becomes a bit organic and that’s the way it grows’.

Project Manager 1

Challenges associated with the implementation of lean for Organisation G will now be discussed.

**5.5.5 Implementation Challenges**

Throughout the interview sessions, interviewees favourably described, reflected and observed the implementation of the lean innovation within the organisation. Interviewees, including Senior Executive 1, Champion and Innovator 1, Project Manager 1 and Project Manager 2, were also quick to point out the challenges that have emerged within the organisation associated with lean implementation. It is interesting to note again the number of challenges observed by interviewees in this organisation; similar observation numbers were addressed in Organisation F but not in Organisation B. This may be a result of the lack of external influence on the organisation.
Many of the challenges described by interviewees were associated with such issues as organisational conflict, cost efficiency, communication and trust. Senior Executive 1 in particular observed high levels of waste of project delivery and in general duties within the organisation.

**Text Box 3.22: Waste – Senior Executive Perspective**

‘I know that physical waste on site is a big issue we’ve got tighter sites that we have to construct on, because developers are building smaller lots and houses well they are trying to grow the size of that footprint. So being able to produce and construct efficiently and effectively, physically waste becomes very important and obviously the cost of physical waste is escalating at a rapid rate so we have to be mindful of that too and eliminate that.’

Senior Executive 1

Senior Executive 1 observed that the high levels of waste also impact directly and indirectly on cost efficiencies for the organisation:

**Text Box 3.23: Cost Inefficiency Senior Executive Perspective**

‘We also have a lot of waste in terms, well it’s one of our biggest waste issues is cost which is hidden in our efficiency. So we have quite an overhead intense business, we have about in [the city] about 100 site managers or construction personnel – that is a huge cost and we need them to build our homes as fast as possible to reduce that fixed cost component of that. So if we build slow, efficiency is down and our overheads go up comparative to the revenue we earn. So we call it white-space. White-space is no construction activity on site per day. We have a lot of white-space.’

Senior Executive 1

Such challenges were identified as being high-challenge contributors for the organisation. Project Manager 1 also observed waste within the organisation, reflecting on waste for the customer through project delivery and the need for a re-evaluation of the organisation through education.

**Text Box 3.24: Waste – Project Manager Perspective**

‘Before we started this program we had 14 different business units across three states in Australia all operating in a different way. So if you were a customer of [the organisation] you would receive a different customer experience and a different quality of home depending on where you were building and it was pot luck for you as a customer. So you may at some point have gotten a really great experience and a really fabulous home or you may not. As a business we have no control over that and we didn’t understand where that was coming from and our results across all of our business divisions.’

Project Manager 1
For Project Manager 1, direct challenges are associated with management not adapting the business, its procedures and practices aligned with expansion; whereas indirect challenges are associated with the type of customer experience the customer has in the delivery of their housing project. For Project Manager 1, the nature of such challenges has resulted in high impacts for the organisation, particularly in quality assurance and customer complaints to state bodies.

**Text Box 3.25: Waste – Project Manager Perspective**

‘We had huge issues with consumer affairs and customers making complaints with V-Cat and those types of things, and huge exposure as we offer a 25-year structural guarantee on our homes and we had a huge exposure there because we weren’t managing the quality aspect of it properly.’

Project Manager 1

Since the establishment of the new performance program, these complaints had decreased significantly aligned with new standardised practices for the organisation. The nature of this challenge is **moderately high** in its impact.

Such internal change, according to Project Manager 1, has also altered the culture of the organisation, resulting in internal conflict. Observing how conflict is not about the innovation but rather about the individuals who are champions and assist the process, Project Manager 1 said:

**Text Box 3.26: Innovation – Project Manager Perspective**

‘I think at the end of the day a lot of it comes down to the calibre of the individuals that you have championing the programme as well and the level of engagement you have with the business and the team, I think that is really important. As far as lean is concerned here I don’t think we have that yet’.  

Project Manager 1

For Project Manager 1, the organisation’s Champion and Innovator has yet to encapsulate the requirements of the organisation and its workforce. This shows a cultural behaviour from Project Manager 1 of a lack of confidence in the Champion and Innovator:

**Text Box 3.27: Innovation – Project Manager Perspective**

‘Our lean expert knows what they are doing but their level of engagement with the business isn’t there yet and that is the aspect that we need to work on’.

Project Manager 1
In contrast, Champion and Innovator 1 observes it is not about the champion as the individual but rather the cultural mindsets of the organisation workforce in wanting, desiring or needing change:

<table>
<thead>
<tr>
<th>Text Box 3.28 Culture – Champion and Innovator Perspective</th>
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<tbody>
<tr>
<td>‘The problem that I encountered over that period was from people within our industry is that we have a lot of people who have been in the industry for 30 odd years or 20 odd years and their way is the best way and there is no negotiation and its what they had done at the previous company and I’ve been doing it for 20 years so therefore that’s the way we should be doing it’.</td>
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</table>

Tables 5.24 Direct versus Indirect Challenges, Table 5.25 Desirable versus Undesirable Challenges and Table 5.26 Anticipated versus Unanticipated Challenges address the observations and reflections of those interviewees who described lean challenges. The tables divides the main challenge theme into a series of challenge related sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation challenges.
### Table 5.24: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Sub-Theme</th>
<th>Themes</th>
<th>Direct versus Indirect Challenges</th>
<th>Interviewees</th>
</tr>
</thead>
</table>
| CI1       | Perspective: Communication. Direct versus indirect challenges. | The interviewee highlighted another direct versus indirect challenge in the form of specific communicative issues within the organisation. The nature of the challenge highlighted both direct and indirect contexts:  
‘So you have these little packets who never talk to each other... That type of communication issue within this industry, partly because people would use the excuse of geographical issues but people also say that “If I send someone a piece of paper telling them something that I have communicated or if I put it in on an email or if I put it in on the computer then I have communicated”, because it seems difficult to get everyone together’.  
For the interviewee:  
- Direct challenges are associated with the lack of communication (homophilic) between organisation; and  
- Indirect challenges are associated with the impact the nature of organisational communication structures and networks have within industry.  
The nature of this challenge is minimal in its impact at the moment. | SE1, CI1, PM1 |
| PM1       | Perspective: Education – communication. Direct versus indirect challenges | When discussing the presence of education and training aspects of the organisation environment, the interviewee noted that management and their own department has a tendency to over communicate:  
‘So from a communication point of view in that we have over communicated and over supported it, you can’t do that with everything obviously. But I think communication for us is one of the biggest issues that we have in terms of rolling out new things, a large part of our customer base in terms of who we need to roll it out to aren’t really on computers or online or work remotely from the office so that is a challenge’.  
For the interviewee:  
- The direct nature of communication within the business is the ability to effectively roll out improved practices, procedures and processes.  
- The indirect nature of communication is that many of the employees of the business are not digitally connected to the business.  
The nature of this challenge is minimal in its impact. |
## Table 5.24: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Direct versus Indirect</th>
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<tbody>
<tr>
<td>Challenges</td>
<td></td>
<td>Interviewees SE1, CI1, PM1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
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</tbody>
</table>
| PMI | **Perspective: Organisation – Culture. Direct versus indirect challenges.**  
When discussing challenges within the organisation the interviewee highlighted that the organisational structure causes direct and indirect challenges. For the interviewee this is particularly evident in the nature of the cultural attitudes and thought processes within these organisational groupings. The interviewee linked this discussion back to the viewing of each organisational group as a separate entity:  
‘… so my business units think their businesses are different to other businesses within the organisation. So we have kind of split geographically and people tend to think the geography of their area means that they are different or the customer that they have are different or the environment and conditions are different – so therefore their process needs to be different. So we have to constantly manage that.’  
For the interviewee:  
- The direct challenge associated with this is that separate business units perceive their operations system is different to other business units.  
- The indirect challenge associated with this is that there is the potential for standardisation of the process to be more difficult in its implementation.  
The nature of this challenge is moderately high in its impact.  

**Perspective: Lean awareness. Direct versus indirect challenge.**  
The interviewee highlighted when discussing general challenges associated with the implementation and increasing lean awareness highlighted cultural attitudes of the organisation to be a key barrier to acceptance. The nature of the challenge as discussed by the interviewee is direct in relation to the presence of cultural attitudes associated with the process:  
‘… say you would need to take into account culturally is the western culture … If a process fails due to a lack of discipline in a western management style the first thing that will happen is people will reinvent the process, so instead of getting in a room and discuss what went wrong with the process they say ‘how can we do the process better’, invent a new process and that process will fail due to lack of discipline. It will then just repeat. The attitude is don’t come and tell me how to do my job, you give me the outcome that I want and how I get there is up to me. The Asian culture is yeah the concepts are really nice, tell me exactly step-by-step what to do and I’ll do it.’  
The nature of this challenge is *minimal to moderate* in its impact. |
### Table 5.24: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges</td>
<td>Direct versus Indirect</td>
</tr>
<tr>
<td>Interviewees</td>
<td>SE1, CI1, PM1, PM2</td>
</tr>
<tr>
<td><strong>Interviewee</strong></td>
<td><strong>Description &amp; Analysis</strong></td>
</tr>
<tr>
<td>PM2</td>
<td><strong>Perspective:</strong> Internal change and conflict – adaptability. Direct versus indirect challenge. The interviewee highlighted that the organisation is challenged by lean direct adaptability into the existing environment. It is of particular concern to the interviewee due mainly to size of live sites being managed as part of operations: ‘Look I guess the original point I would make is that the adaptability to our particular circumstance and our circumstance is different to a manufacturing warehouse where you have controlled conditions, controlled staff, you can dictate virtually what happens along each point of the manufacturing process’. The nature of this challenge is minimal in its impact at the moment.</td>
</tr>
</tbody>
</table>
Table 5.25: Desirable versus Undesirable Challenges

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI1</td>
<td><strong>Perspective:</strong> Technology. Desirable versus undesirable challenges. The interviewee highlighted current challenges associated with technological advancement within the organisation environment particularly highlighting both desirable and undesirable issues. For the interviewee although technological change is desirable and can force change within the organisation environment, the nature of current change has been focused towards the wrong organisational groups. This is particularly evident in the updating of and moving of resources to computer systems, which is beneficial. However, for those who use the systems the translation of change has been undesirable through the lack of access to the system: ‘... an enormous amount of resources have been committed at [the organisation] to putting things on computer systems, having beautiful reporting and one of the issues is that those systems aren’t available to those people at the coal-face.’ The nature of this challenge is minimal to moderate in its impact.</td>
</tr>
<tr>
<td>PM1</td>
<td><strong>Perspective:</strong> Organisation. Desirable versus undesirable challenge. Although change is wanted and desired by the interviewee that nature of the change and how it is communicated can affect how it is perceived within the organisational environment. Central to desired implementation outcomes for the interviewee is a standardised or central management system, without this then the outcome of implementation can be undesirable and dysfunctional: ‘We are quite spread out and in the culture that building is building, whilst you’ve have geographically areas you should all report up the one tree – which to an extent we kind of do but not really, guys do still go off and do their own thing.’ The nature of this challenge is minimal to moderate in its impact.</td>
</tr>
<tr>
<td>PM2</td>
<td><strong>Perspective:</strong> Communication. Desirable versus undesirable challenge. Although change is wanted and desired by the interviewee that nature of the change and how it is communicated can affect how it is perceived within the organisational environment. Central to desired implementation outcomes for the interviewee is a standardised or central management system, without this then the outcome of implementation can be undesirable and dysfunctional: ‘I fully think we could, if we were to put it into one big silo and have one man at the top of the tree, programmes like lean and any other initiatives we bring into the business would flowed to those guys a lot easier but due to the nature of the individuals themselves, you know, ‘builders being builders’ and the fact that they are so diverse and spread around.’ The nature of this challenge is minimal to moderate in its impact.</td>
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</table>
Table 5.26: Anticipated versus Unanticipated Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Anticipated versus Unanticipated</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges</td>
<td></td>
<td></td>
<td>CII, PM1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>CI1</td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>CI1 Perspective: The organisation – Culture. Anticipated versus unanticipated challenges.</td>
<td></td>
<td>‘People here tend to say that construction is unique, construction is only unique in my opinion that it is still a craft based industry and they have yet to take even the most basic steps towards not even the lean model towards the manufacturing model of quality and logistics. There are so many opportunities that it is probably a little overwhelming from the company’s point of view to try and put some of those concepts forward’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM1</td>
<td>Acceptance of the programme within the organisation and the time, which is taken in the education and training of people.</td>
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<tr>
<td></td>
<td></td>
<td>Lose of employees as a direct result of the education and training program.</td>
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<td></td>
<td></td>
<td>The nature of this challenge is minimal to moderate in its impact.</td>
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The nature of this challenge is minimal to moderate in its impact.
5.5.6 Organisation G Researcher Reflections

The following researcher observations were made during the analysis of this organisation.

The organisation has yet to undergo a full lean implementation; rather, management has focused first on improving the overall cultural environment of the organisation. The approach undertaken has been in place for around two to three years, with lean starting to be investigated over the last 12 months with a specific focus on eliminating waste through a program centred on ETS (extra to schedule) wastes. The movement towards lean implementation is guided by the presence of seven forms of waste within the organisation.

The cultural environment of the organisation is bureaucratic in nature and structure due mainly to the lack of standardisation of practices, processes and procedures as the business has grown. As a result the organisation is split into sub-geographical regions and independent business units. The impact on the cultural environment is significant as the culture has become decentralised. The business improvement program, focused on organisational excellence, is a step towards standardising at least some of the most important aspects of the business, including safety and customer experience.

The essential approach of the excellence program is to break down the existing cultural barriers within the organisation and rebuild the cultural environment to reflect the strategic direction of the organisation. There has been some success in this; however, the organisation has several cultural barriers influencing the program, particularly pre-existing cultural behaviours and attitudes towards change. Of particular importance is the changing of the organisation to incorporate open communication between organisational groups and create a cultural environment that is adaptive to change.

The excellence program is the first step in providing employees with some form of education and understanding of the changes being brought into the organisational environment. For some individuals the implementation of lean should be addressed as part of the excellence program. A further feature of the excellence program is getting the workforce out and engaging in teamwork activities that aren’t related to construction and are more directed towards teamwork, something that underpins lean.

5.5.7 Case Conclusion

The discussion in this section has established the organisational, management and communication environments in which the organisation has undergone a lean transformation. The interviewees highlighted diverse organisational roles, cultural attitudes and behaviours as well as lean understandings. Despite a diverse representation of the organisation, the majority
of interviewees shared and confirmed similar aspects of the organisational environment, process, communication and challenges.

Over the course of the lean transformation the organisation underwent significant maturing of its culture, particularly in terms of the establishment of education and training programs, advocating of informal communication and social interaction with Organisation A projects. Specifically, those individuals interviewed within organisation had favourable experiences and exposures of lean through the confirmation of the lean philosophy and personal confirmation. The interviewees were also happy to acknowledge the presence of non-favourable challenges such as decision making, trust and project planning.
Part 2 describes the results of those organisations in the mid-stages of adopting lean. The organisations forming this first grouping reflect a range of implementation approaches and strategies that support the workforce. Organisations forming this group include Organisation C (USA) and Organisation D (USA).
5.6 Case Study Results: Case Study 4 Organisation C

5.6.1 Overview
Organisation C is located in northern California in the United States of America, delivering primarily commercial infrastructure utilising a design/build contractual and procurement approach. This approach is similar to Organisation B, with the organisation also identified primarily as the general contractor in projects.

One interview was conducted in this organisation. The interviewee identified themselves as a, senior manager as well as lean champion and innovator. The organisation is structured to include senior management and management divisions, including projects and operations. Champion and Innovator 1 did not explicitly describe the organisational structure any further than this; the structure of this organisation is similarly representative of that of Organisation B. Such similarity between organisational structures suggests these are common practices for design/build-orientated construction companies.

Table 5.27 Interviewee Categorisation Organisation C highlights the organisational position of each interviewee. The interviewees have been categorised during the analysis into one of four groups based on their organisational role; here, interviewees are representative of senior executives, champions and innovators and project managers. The table also identifies the main management stream of the organisation that each interviewee belongs to.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Champion and Innovator</td>
<td>Lean education facilitator for the organisation, located in California.</td>
<td>Senior Management Group</td>
</tr>
</tbody>
</table>

As with Organisation B, Organisation F’s lean transformation has been predominately influenced by internal managerial change and external contractual partnerships. Champion and Innovator 1 observed that implementation of the lean innovation was influenced through contractual obligations from the client in Organisation A; this request was made in 2004. Furthermore, the market positioning of the organisation, like Organisation B, is guided by management’s senior management contractual agreement with Organisation A (refer to 5.9 for descriptive analysis).

5.6.2 Organisation and Management
Despite managerial change, Organisation C’s formal ‘social’ structure (i.e. the organisational structure) has remained a stable, according to Champion and Innovator 1. Champion and
Innovator 1 observed how easy it was for some within the organisation to move toward the transition in lean management principles; however, also noting the presence of conflict and of management to understand differing rates of personal diffusion and awareness:

**Text Box 4.1: Diffusion – Champion and Innovator Perspective**

'We need to give everybody a chance and we need to wait because a lot of guys are successful and they say why should we apply lean if we are already successful and instead of saying ok, we say but we want you to be more successful then you are. But we need to do that with respect because they have their own time, their own dynamic and we need to adapt everything to their own dynamic so for us it was kind of frustrating because you need to wait. Waiting is one of the most frustrating things you have in lean implementation and you need to be patience and it’s a risky approach as it trial and error at the same time and its interesting because a lot of things/team progress – but sometimes things happen and they confess to the business that the approach is useful and then you need to go there instead of blaming the team – you need to understand what’s going on, what are their frustrations, so you need to be very, very patient'

Champion and Innovator 1

Figure 5.4 Organisation B Formal Organisational Structure addresses the formal ‘social’ structure of the organisation. The structure has been developed based on the observations of the interviewees when discussing such elements as structure, management and the organisational environment. The structure incorporates four organisation tiers, as follows:

- top tier management, incorporating CEO and board of directors who govern the organisation;
- second tier management incorporating, senior executive roles (e.g. operations manager and regional office manager);
- third tier management, incorporating specific organisational objectives (e.g. general contracting and special contracting); and
- fourth tier management group reflecting organisational project teams underpinning third tier management groupings.

Also representative in the figure is the underlying collaborative work practices present throughout the organisation, with communication consistently flowing throughout the organisation. Framing these collaborative work practices is the presence of tertiary and integrated team environments in the third and fourth tiers. According to Champion and Innovator 1 the organisation structure allows for ‘high levels of creativity and interaction
across working groups’, endorsing organisational relationships that cross organisational boundaries.

Figure 5.4 also highlights the organisation’s communicative networks:

- red indicates managerial communicative networks;
- blue indicates upward communicative networks; and
- orange indicates project team communicative networks.

According to Champion and Innovator 1, the culture of the organisation has been influenced by management embracing a collaborative lean transformation process. This process encourages all employees to collaborate with management in the development of organisational missions, values and goals prior to the implementation of lean. In describing the process, Champion and Innovator 1 observed the cultural frustrations that emerged from the workforce and the lean transformation that was occurring:
Text Box 4.2: Collaboration – Champion and Innovator Perspective

‘…. we put everybody together … Just by bringing everybody here, we do a cross-functional team and talk and it’s a fight, it is crazy. I think [the organisation] is brave enough to go for this, I think it was one of our best things we did, you know we could overcome selfishness and allow everybody to talk, we didn’t control anything – the process as controlled for sure, but only certain things but what you want to say is not controlled and you can say whatever you want people need to listen and be respectful. So it took us a long time about 1 year and 2 months just to go over this process because putting all these people together the agendas didn’t fit and you go back and forth, then you have the frustration and then things didn’t go well and then you need to fix the problem again and then understand and put in other processes in place, create a new agenda so it took us a lot of time but now we see value in this because every time we have a problem we say pick the [organisation] way…. we have a booklet, so read it if you have a problem see the behaviour and assess the problem’.

Champion and Innovator 1

For Champion and Innovator 1, this collaboration is all about the learning process holistically and applying those lessons learnt into the organisation:

Text Box 4.3: Learning – Champion and Innovator Perspective

‘…. we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times we go through the counter measures and we test the counter measures and they become part of the process.’

Champion and Innovator 1

The collaborative approach has led the organisation to approach social norms or core cultural competencies in a holistic way of the employee advocating both leadership and personal management:

Box 4.4: Leadership – Champion and Innovator Perspective

‘When I talk about leadership I’ll be talking about the five elements of lean thinking and constancy of purpose and also achieving excellence. When I’m talking about management, I’m talking about the processes. But I need to combine both because the way we approach makes a difference in the results we get’

Champion and Innovator 1

Table 5.28 Social Norms addresses and analyses the observations made by interviewee participants regarding the organisation. The purpose of these tables is to highlight elements of the social environment that have and are guiding lean implementation; where possible, the direct reflection of lean change within the environment is identified and further discussed. Furthermore, in instances where observations are shared or confirmed, observations are
grouped together. It should also be noted that on occasions interviewees reflected and observed multiple aspects of lean implementation; where this has occurred, only an analysis is present.

Champion and Innovator 1 did not make any explicit observations on the informal ‘social’ structure of the organisation; this is in direct contrast to Organisation B, Organisation F and Organisation G. The interviewee did however make observations on the behaviours that form the social environment of the organisation, also known as ‘social norms’. Observations made are addressed in Table 5.28, with Champion and Innovator 1 reflecting upon education, integration, advocacy and stability, which were similarly observed in Organisation B. Of particular importance to organisational management is education, particularly the development of an educational platform that encourages knowledge development, stability and interaction amongst the workforce, underpinned by advocacy.

<table>
<thead>
<tr>
<th>Box 4.5: Education and Advocacy – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘So lean is the delivery of customer value through a stream line process practising continuous improvement we are going to make that happen by implementing the five elements of lean thinking they are customer value; chain of value, flow, pull and perfection and then we will develop scientific thinking, systematic thinking and constant self-purpose and we will achieve; excellence. Excellence when you have good business results, when everybody is empowered in your organisation to drive efficiency through processes that the customers want … So then we use this as part of the culture we say ok that the way you are going to approach this, that is the culture, that is the way you are going to behave and these are the things I want you to develop I always want you to practice and say reflection and think….’</td>
</tr>
</tbody>
</table>

Champion and Innovator 1 further observing more direct approaches of education, underpinned by advocacy, particularly in highlighting the importance of educating the workforce about the client or ‘customer’ as part of project delivery, both externally and internally:
Box 4.6: Education and Advocacy – Champion and Innovator Perspective

‘You change your basic underlying assumptions, if and only if you practice exercises and you show why you need to change … the first thing you do when you are implementing lean [ask yourself these questions] … first question that you ask … are [we] going to see a process or something? … the second question, what are the processes that you have in place that help understand your chain of value …. so we teach them that the first question that you should ask when you are a lean leader, when you are working on the culture is what’s customer value … so we start having these conversations about who is the customer and so.’

Champion and Innovator 1

Organisational stability is another social norm observed by Champion and Innovator 1 as being important to organisational management, particularly in achieving and maintaining a sense of workforce integration and standardisation.

Box 4.7: Stability and Integration – Champion and Innovator Perspective

‘…. we practice scientific thinking that means understanding the current situation and gathering data to formulate a hypothesis, understanding the root cause for the problem by asking why five times – put in counter-measures, test the counter-measures if they work they will become part of the improvement; if they don’t work, go back again, check again, that’s scientific thinking … systematic thinking is divided into three parts that we say holistic thinking [which is the] need to view the system as a whole, I need to have the big picture always. Dynamic thinking [is the] need to have this constant thing going on that is identifying the present situation, problem solving and continuous improvement. I need to be on that. And then I have the third one that is called [closed] loop thinking where I need to know the implications of my decision throughout the system once I make an improvement.’

Champion and Innovator 1

For Champion and Innovator 1, cultural stability is about strategic direction and the management of strategic direction through the utilisation of indicators, referred to as a ‘north indicator’. The purpose of such indicators is supposed to provide the individual with a responsive framework that guides their work practices; the presence of cultural indicators is also present for the organisational environment, which assists in frame working the strategic direction and management of the innovation.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norms</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI1</td>
<td><strong>Perspective: Personal leadership and management.</strong></td>
</tr>
<tr>
<td></td>
<td>The interviewee described the process to involve such stages as reflection, questioning, reasoning, acceptance and rejection without questioning. The presence of leadership and personal management within advocacy CI1 distinguishes the difference to be influenced by contextual means:</td>
</tr>
<tr>
<td></td>
<td>‘... leadership focuses on culture and management works on processes; within the culture ... when we focus on the culture and we were dealing with cultural issues you are a leader, when you are dealing with processes, we think culture that you are a manager – and for you to be respected you need to be working on both.’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perspective: Performance.</th>
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<tbody>
<tr>
<td>The performance of both advocacy styles according to CI1 is guided by individual performance:</td>
</tr>
<tr>
<td>‘... you are performing in a way that reflects the cultures so it will be a leader observing if you are applying the culture and also be a manager, understanding how you are managing flow, how you are being efficient and how you are removing waste working on the processes itself.’</td>
</tr>
<tr>
<td>The interviewee also discussed a number of processes or approaches the organisation uses to promote advocacy, particularly the use of something known as the ‘Gamba Wall’. The purpose of the Gamba Wall within the organisation is concerned with the making and management of project and individual assessments.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perspective: Personal leadership and management.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interviewee process to involve such stages as reflection, questioning, reasoning, acceptance and rejection without questioning. The presence of leadership and personal management within advocacy CI1 distinguishes the difference to be influenced by contextual means:</td>
</tr>
<tr>
<td>‘... leadership focuses on culture and management works on processes within the culture ... when we focus on the culture and we were dealing with cultural issues you are a leader, when you are dealing with processes, we think culture that you are a manager – and for you to be respected you need to be working on both.’</td>
</tr>
</tbody>
</table>
Opinion leaders and change agents were identified as forming part of the organisational environment by Champion and Innovator 1 in the implementation of lean. This is a direct opposite to Organisation B and Organisation G, where opinion leaders and change agents were only alluded to or not identified, and supports Organisation F in identifying opinion leaders and change. When discussing the organisation’s lean implementation process, Champion and Innovator 1 identified themself as an opinion leader for the organisation. This was not discussed further than a simple confirmation; rather, Champion and Innovator 1 reflected on the organisation becoming a lean change agent, using their influence and knowledge to assist lean implementation through external trade partners:

<table>
<thead>
<tr>
<th>Box 4.8: Change Agent – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>'We plan to create this thing that we call met-organisation – it’s organisations working together but with decentralised management .... How can we be more effective and efficient and its this that lean is allowing us to do, its like how Toyota works with suppliers we are starting to work with our partners now because we have something in common which is our training. So this training has become very strategic for us to develop leadership, to increase knowledge and also to modify the construction business because you cannot be lean by yourself'.</td>
</tr>
</tbody>
</table>

Champion and Innovator 1

Although, small steps have been made, the organisation (according to Champion and Innovator 1) is still in the early phasing of its change agent role.

5.6.3 Process

The describing of lean implementation by interviewees highlighted diverse process observations. The diverse observations made by interviewees cover a number of implementation stages and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.
- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.
- **Implementation** will highlight those observations that describe the process of lean implementation.
- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.
These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.29 *Implementation Process Component 1: Lean Knowledge & Exposure* addresses the knowledge and exposure of interviewees to lean innovation, describing these alignments with low, moderate and high levels. Interviewee positioning was addressed in table 5.27.

**Table 5.29: Implementation Process Stage 1: Lean Knowledge and Awareness**

<table>
<thead>
<tr>
<th>Knowledge &amp; Exposure Level</th>
<th>Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Level</td>
<td>The interviewee (CI1) is identified as having a high level of exposure to the lean innovation through their role as lean educator and facilitator within the organisation and through the organisation’s external educational programs.</td>
</tr>
</tbody>
</table>

The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been diversely observed and described by interviewees, incorporating such perspectives as social norms and the formal social structure. Table 5.30 *Implementation Process Component 2: Persuasion* addresses the persuasive techniques identified by interviewee participants as assisting the implementation of lean within the organisation. The table divides the main persuasion theme into a series of sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with persuasion and persuasive techniques.

A key to persuasive technique in the organisation is advocacy, particularly in making the workforce advocates of lean not only within the organisation but also through project delivery.

**Box 4.9: Advocacy – Champion and Innovator Perspective**

‘So lean is the delivery of customer value through a stream-line process, practising continuous improvement. We are going to make that happen by implementing the five elements of lean thinking they are customer value; chain of value, flow, pull and perfection and then we will develop scientific thinking, systematic thinking and constant self purpose and we will achieve excellence. Excellence when you have good business results, when everybody is empowered in your organisation to drive efficiency through; processes that the customers want … So then we use this as part of the culture we say ok that the way you are going to approach this, that is the culture, that is the way you are going to behave and these are the things I want you to develop I always want you to practice and say reflection and think….’

Champion and Innovator 1
Further observing, the need for individuals within the organisational environment to change their basic underlying assumptions of the lean innovation by embracing and leading the lean transformation through education:

**Box 4.10: Advocacy – Champion and Innovator Perspective**

“You change your basic underlying assumptions, if and only if you practice exercises and you show why you need to change … the first thing you do when you are implementing lean [ask yourself these questions] … first question that you ask … are [we] going to see a process or something? … the second question, what are the processes that you have in place that help understand your chain of value. so we teach them that the first question that you should ask when you are a lean leader, when you are working on the culture is what’s customer value … so we start having these conversations about who is the customer and so we then start talking about customer value.’

Champion and Innovator 1
### Table 5.30: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>The Formal Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CII</td>
</tr>
</tbody>
</table>

#### Interviewee Description & Analysis

**CII**  
**Perspective:** Awareness of adoption and process of the lean innovation.  
Identified as a core management group party in the formal social structure of Organisation A, the organisation is also identified as a trade partner in other lean projects across the USA. The organisation according to the interviewee has been in contractual relations with Organisation A for a number of years. In 2004 this relationship became more developed at the request from Organisation A for the organisation to begin implementing lean. This contractual relationship between the organisation and Organisation A has enabled according to the interviewee the exposure individuals and teams on a project-by-project basis allows individuals and teams within the organisation to learn and understand the benefits associated with the innovation before making a decision to accept or reject the innovation.  
Further to this persuasion approach used by the organisation, organisational management enabled all employees to participate in the rewriting of the formal missions, visions, goals and objectives underpinning the organisation. According to the interviewee, this approach was long and tough, particularly in gaining a mutual level of respect towards and understanding of the lean innovation across the whole organisation.

### Theme | Sub-Theme
---|---
### Persuasion | Culture

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
</table>
| CII         | **Perspective:** Cultural ideas and organisational cultural thinking.  
Discussed this idea that in the past organisations have tended to focus on the implementation of the lean innovation in terms of ‘tools’ and ‘principles’ rather than something on a deeper philosophical level. Culturally the organisation is attempting to persuade individuals through the organising of the organisation by:  
‘…to organise everything at [the organisation] we are focusing on thinking; because thinking drives everything, behaviour drives everything so we are; going to see … we are doing 5S but we’re not crazy about things but we are; crazy about making people understand about customer value, chain of value; flow, pull and pursue perfection because we believe that if we help them go; through this everything will be better at the end’ |
Both the lean decision and lean implementation was described by Champion and Innovator 1. This is directly opposite to the previous three organisations, where only one element was explicitly discussed and one element alluded to. Here, the lean decision implementation was openly discussed by Champion and Innovator 1, who observed decisions aligned with the implementation process and communicated through the education of the workforce.

According to Champion and Innovator 1, part of their organisation-specific education and training program was referred to as *Lean Training at [the organisation]*. The purpose of this organisational-specific training program is to provide reading resources to assist employees to understand the innovation, the process of implementation and the organisation’s decision with titles such as *The Toyota Way*, *Lean Thinking: The Machine which changed the World*, *The Toyota Culture* and *Toyota Talent*. The use of reading resources as part of the education and training agendas was also present in Organisation B. According to Champion and Innovator 1, the reasoning behind this approach is linked to providing the organisation’s desire to provide a larger knowledge base for its employees.

Furthermore, according to Champion and Innovator 1, study action teams are utilised by management as part of a larger educational program framework to educate the organisation concerning innovations and organisation-specific objectives. Underpinning the study action team approach within the organisation is the decision of ‘change’ through readings and training. The presence and content of the study action team agenda as part of a larger educational program for the organisation is supported, according to Champion and Innovator 1, through plus/delta learning.

The purpose behind the organisation utilising plus/delta learning as part of its education program framework is to provide employees with an outlet to express their opinions concerning innovations and the implementation of innovation.

<table>
<thead>
<tr>
<th>Box 4.11: Education – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘…. we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times we go through the counter-measures and we test the counter-measures and they become part of the process – so it’s something that we are applying to the current project right now and it’s about tracking costs … so – and we also guide them through this training, we have everybody there and at the end of the training they get a certificate and they have everything and it’s good to increase the collaboration while we are also implementing.’</td>
</tr>
</tbody>
</table>

Champion and Innovator 1

Elements of implementation for lean innovation are the second aspect to be discussed. The implementation of the innovation refers to the putting to use of lean within the organisational
and management environments. The interviewee did not openly discuss the implementation of the lean innovation into the organisation in detail; rather, the interviewee discussed specific elements and approaches that management has utilised. The first is more of an approach than an element of implementation; according to the interviewee, the approach utilised by management involved:

<table>
<thead>
<tr>
<th>Box 4.12: Process – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘…. we put everybody together … Just by bringing everybody here, we do a cross-functional team and talk and it’s a fight, it is crazy. I think [the organisation] is brave enough to go for this, I think it was one of our best things we did, you know we could overcome selfishness and allow everybody to talk, we didn’t control anything – the process as controlled for sure, but only certain things but what you want to say is not controlled and you can say whatever you want people need to listen and be respectful. So it took us a long time about one year and two months just to go over this process because putting all these people together the agendas didn’t fit and you go back and forth, then you have the frustration and then things didn’t go well and then you need to fix the problem again and then understand and put in other processes in place, create a new agenda so it took us a lot of time but now we see value in this because every time we have a problem we say pick the [organisation] way …. we have a booklet, so read it if you have a problem, see the behaviour and assess the problem’.</td>
</tr>
</tbody>
</table>

Champion and Innovator 1

Furthermore, the implementation of the lean innovation is underpinned by philosophical ideals. According to the interviewee, underpinning the organisation’s lean direction is the viewing of the innovation as something more than a tool domain:

<table>
<thead>
<tr>
<th>Box 4.13: Process – Champion and Innovator Perspective 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘You can implement a tool but the transformation is beyond the tool domain it’s about behaviour, it’s about the way we perceive things, the way we want to be. So how and where is the place we can to go to make that happen, we need to revisit the mission, vision and values of the company and that need to be put in place.’</td>
</tr>
</tbody>
</table>

Champion and Innovator 1

Confirmation of the lean innovation is a significant aspect of the process as it assists understanding the progress of implementation. Interviewee observations and reflections are limited as the organisation is in the early stages of implementation, with Senior Executive 1, Champion and Innovator 2 and Project Manager 2 discussing confirmation. Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation in terms of the theoretical, philosophical and process-related ideals and implementation at the organisational level. The confirmation
perspectives also provided clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator, project management and project team levels of the organisation perceive lean innovation to be.

Table 5.31 Implementation Process Component 4: Confirmation addresses the observations and reflections of Champion and Innovator 1 who have experienced lean innovation confirmation, including the education, leadership and learners.

The describing of a lean confirmation theme into a series of confirmation sub-themes is representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.

Champion and Innovator 1 observed leadership as the most significant confirmation of the lean innovation so far. This is particularly relevant to the interviewee, with external companies approaching the organisation to assist in their own lean transformations:

**Box 4.14: Confirmation – Champion and Innovator Perspective 2**

‘Leadership, it’s a huge success in leadership not only within the company but outside the company as well. We have other companies to us saying can you help us, so they are building trust with us based on our knowledge and its putting us into a position, we are happy to be in this position but it’s also a huge responsibility, because people start looking at you and your organisation. For example now we are creating a lean community at [the organisation] so all these guys that went through the training with us, were going to meet every two months to talk about lean and we are going to create a two way road training programme.’

Champion and Innovator 1
### Table 5.31: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation</td>
<td>Education</td>
<td>CI1</td>
<td><strong>Perspective:</strong> Extension of the underlying organisation’s educational agenda. According to the interviewee, management acknowledges that the lean innovation does not lead to the full achievement of perfection; rather, perfection is seen as a continuing improving and challenging one’s self. This underlying philosophical understanding of lean is represented in the organisation’s educational agenda. The interviewee discussed how as the organisation’s lean facilitator it is their role to develop and manage the educational agenda, addressing in particular their role in terms of the last planner system sub-educational agenda: ‘…. for [the] last planner system these are the steps, these are the things I; need to look at, the key points and that’s my leadership thinking, for; example for me to develop an educational plan. So one of the things we are; doing here when you are doing planning, you need to practice lets say; reflection … you need to do some preparation and it means you need to; understand the current situation … you need to identify the current conditions outside satisfaction, you need to take a look at the drawings, take a look at the specifications, prepare a first planner schedule … to know the current situation’ The interviewee reflected heavily on their role as the organisation’s lean facilitator. The strength of the educational agenda within the organisation is frame-worked by elements of individual reflection, questioning and reasoning behind the purpose, approach to and understanding of the lean innovation.</td>
</tr>
<tr>
<td>Confirmation</td>
<td>Learning</td>
<td>CI1</td>
<td><strong>Perspective:</strong> Frustration of the lean learning process. Discussed such learning process problems to be present in discussions concerning project breakdowns: ‘When we discuss breakdowns on the job, the solution is not always in your domain, but occurs somewhere upstream of the problem. We bring in the entire company to solve problems in order to reduce the calling of blame, particularly if someone does not attend all session meetings. You also need to be cautious how you approach the problem and the people involved in the; problem.’</td>
</tr>
<tr>
<td>Theme</td>
<td>Sub-Theme</td>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td><strong>Confirmation</strong></td>
<td><strong>Lean Challenge Assessment</strong></td>
<td>CI1</td>
<td><strong>Perspective:</strong> improvement of performance at project and personal levels. CI1 discussed through the development of a self-assessment tool the creation of lean knowledge and overcoming of challenges within the organisation associated with the lean innovation. At the first introduction of the self-assessment tool by management CI1 noted that employees almost immediately rejected the tool as they saw it as a way to ‘place and shift blame’. The fault in the assessment tool for CI1 was not so much the assessment tool but rather the attitudes of individuals in utilising and understanding the assessment tool. The interviewee discussed how the organisation’s management team went back to the drawing board to reassess and reflect on ways to overcome people’s natural inclinations to either shift the blame or disguise true feelings by not truly assessing performance based of fear potential backlash: ‘…. so you need to re-educate people about telling them the assessment tool; it is not about blame but rather there to help them improve but if they are buddies it’s hard for them you know and I need to be patience because if I push then they become defensive – so we need to go it’s a risk approach and go back and forth. So that is you hammer and hammer and hammer until you break the rock. It takes time’ As discussed, the interviewee particularly addresses issues of cultural behaviours, attitudes and values, and how these cultural attributes influence acceptance and rejection of innovation. Although the rejection of the assessment tool occurred in the first instance, through the persistence of the organisation’s management and the lean facilitator and the educational agenda individuals are able to understand purposes behind the use of particular tools in the organisation’s transformation to lean.</td>
</tr>
</tbody>
</table>
5.6.4 Communication

Champion and Innovator 1 also reflected on communication as a driver in lean innovation implementation. Champion and Innovator 1 similarly observed communication as a driver as Organisation B, Organisation F and Organisation G. Furthermore, communication was considered a ‘tool’ and was thus reflected as a ‘tool’ in the observations.

According to Champion and Innovator 1, organisational management encourages visual and written communication within the organisation through project-specific learning objectives. Project-specific learning objectives emerged as necessity within the organisation through the utilisation and development of the Gamba Wall, which enabled project executives within the organisation to ‘go to the project and assess what your team is doing’. The presence of the Gamba Wall as part of project-specific learning objectives was also discussed in the context of reflective learning objectives encouraging visual and verbal communications. The Gamba Wall was discussed by the interviewee in relation to reflective learning across three differing perspectives.

The first perspective highlighted the use of the Gamba Wall going above and beyond just the simple making of an assessment of an action or task. According to the interviewee the purpose of the Gamba Wall is actually being able to understand the place and how action occurs. Gamba Wall for the interviewee is about the need to talk to people involved in the task, the need to work with the people to provide a suitable action, and understand the challenges associated with the task and the action as well as people involved in the task and action. According to the interviewee, by spending time and working with people using the Gamba Wall can reduce the shifting of blame within the organisation:

<table>
<thead>
<tr>
<th>Box 4.15: Reflective Learning – Champion and Innovator Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘…. we understand their challenges and you help them improve their lean approach the assessment that you make will be taken as an opportunity for; improvement.’</td>
</tr>
<tr>
<td>Champion and Innovator 1</td>
</tr>
</tbody>
</table>

The second reflective learning perspective concerned the organisational education and training program. Underpinning all education and training within the organisation is the utilisation of plus/delta learning in the form of exercise commonality between each training group. In particular, the use of plus/delta learning highlights the calling of attention to specific areas of educational readings, revision of exercises and basic underlying assumptions.

The third reflective learning perspective is also linked to organisational education and training programs through the encouragement of written and verbal communications. The process of
reflective learning in education and training programs, as described by the interviewee involved, was:

**Box 4.16: Plus/Delta Learning – Champion and Innovator Perspective**

‘…. we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times, we go through the counter-measures and we test the counter-measures and they become part of the process – so its something that we are applying to the current project right now and its about tracking costs …. so – and we also guide them through this training, we have everybody there and at the end of the training they get a certificate and they have everything and it’s good to increase the collaboration while we are also implementing.’

Champion and Innovator 1

Study action teams, as a tool of the larger communicative tooling framework within the organisation and encouraging verbal communication, was also discussed by the interviewee. The use of study action teams as part of the communication tool framework has been used as an informal way to educate and train both organisational employees and external organisational trade partners.

**Box 4.17: Study Action Teams – Champion and Innovator Perspective**

‘…. we always have a mix at the beginning we just had people from [the organisation] but now we have trade partners, we have architects, we have owners together …. it’s always good to make a mix but what we’re focusing on right now is to give training to a project team because if I have people from different places I can put a case that will be something that I have in my mind that people suggest but if I have a team then we can use a real case and say alright tell me what your problem is’

Champion and Innovator 1

The presence of three different communicative tools in the communication of the lean innovation particularly linked to education and training shows a deep connection between implementation and supporting employees through the process. Also, the identification of three communicative mechanisms within the discussion of secondary themes also suggests the organisation has a deeper philosophical understanding of lean, not just as a tool-based implementation approach but also as a cultural understanding.

Challenges associated with the implementation of lean for Organisation C will now be discussed.

**5.6.5 Challenges**

Throughout the interview sessions, interviewees favourably described, reflected and observed the implementation of the lean innovation within the organisation. Champion and Innovator 1 was quick to point out the challenges that have emerged within the organisation associated
with lean implementation. Many of the challenges described by interviewees were associated with such issues as organisational culture, communication and time. Champion and Innovator 1 particularly spoke about the indirect challenge to organisation management and the issue of time and individual understanding of the lean innovation:

**Box 4.18: Time – Champion and Innovator Perspective**

‘… we need to give everybody a chance and we need to wait because a lot of guys are successful and they say why should we apply lean if we are already successful and instead of saying ok, we say but we want you to be more successful then you are. But we need to do that with respect because they have their own time, their own dynamic and we need to adapt everything to their own dynamic so for us it was kind of frustrating because you need to wait. Waiting is one of the most frustrating things you have in lean implementation and you need to be patience and it’s a risky approach as it trial and error at the same time and its interesting because a lot of things/team progress – but sometimes things happen and they confess to the business that the approach is useful and then you need to go there instead of blaming the team – you need to understand what’s going on, what are their frustrations, so you need to be very, very patient’

Champion and Innovator 1

Champion and Innovator 1 observed indirect consequences to emerge with this challenge, particularly for the workforce. These personal frustrations emerge in particular as a result of different acceptance levels of the lean innovation within the organisation and the need for individuals to process that fact:

**Box 4.19: Time – Champion and Innovator Perspective**

‘This is one of the biggest challenges we have in implementing lean is people going back to business as usual – sometimes you don’t have the same levels of implementation throughout the company, its different and you need to use the process to that – because you are not achieving perfection.’

Champion and Innovator 1

This then can have an effect within the organisation aligned with the implementation of the lean innovation. The interviewee highlighted that although the implementation process itself for the organisation is a desirable decision, a number of undesirable or dysfunctional elements emerge associated with time and cultural behaviours and attitudes associated with the lean innovation. The consequences are identified as moderately dysfunctional in its impact for the organisation and minimal-moderately dysfunctional for individual employees:
Box 4.20: Time – Champion and Innovator Perspective

‘It’s slow, that’s a frustration, the change is slow, you don’t change a company in one or two years it takes a lot of years because you need to transform behaviour and when you transform behaviour you transform your metabolism, when you change you change yourself… So it’s painful and it takes time. The process allows other problems to be addressed and solved liked trust – particularly when people talk about lean they don’t talk about that in detail. They don’t say in our company nobody trusts each other – it’s hard for you to accept the fact that people are pretending to trust each other when in fact they don’t. You need to build that trust and building trust takes time – because whenever you do something that harms the trust you go back to square one again. You need to start all over again and that’s frustrating when someone says something you just disrupt everything – it’s very delicate process.’

Champion and Innovator 1

The interviewee noted that the direct engagement consequence emerged as a result of the cultural attitudes and perceptions that individuals held regarding the lean innovation, in particular such attitudes were associated with self-assessments, the need to blame and questioning the reason behind the lean transformation. The impact of such direct consequences affects both individual employees and the organisation, in terms of acceptance, attitude adjustments and time.

Box 4.20: Cultural Frustrations – Champion and Innovator Perspective

‘Even having the commitment from the top, we want the top managers to enforce the process because it makes our lives easier. But in fact people don’t buy in, so it required a huge negotiation process in order to engage everybody because some guys were already doing something that we call lean and they said we are already doing this why should we change.’

Champion and Innovator 1

Tables 5.31 Direct versus Indirect Challenges address the observations and reflections of those interviewees who described lean challenges. The table divides the main challenge theme into a series of challenge related sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation challenges.
Table 5.31: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Direct versus Indirect</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges</td>
<td></td>
<td></td>
<td>CI1</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Description &amp; Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI1</td>
<td>Perspective: Communication and training. Direct versus indirect challenges. Highlighted the direct perspective to the application of the organisation’s lean training programme to organisational trade partners and its minimal impact on communication. According to the interviewee providing training to organisational trade partners causes communication and training issues through: ‘…we need to have everybody there, the owner, the architect, the trade partners, the general contractor, consultants – we have all of them in the room. Sometimes we don’t have all of them but we have people representing them at least. And then we go through that and we help them understand what lean is.’ The direct consequence in terms of communication and training affects the organisational trade partner more so than Organisation C management. However, Organisation C does experience indirect consequences through the provision of additional training programs that can cause external communicational strain according to the interviewee.</td>
<td></td>
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<tr>
<td>CI1</td>
<td>Perspective: The organisation. Direct versus indirect challenges. According to the interviewee the challenge with the organisation is identified as a moderate implication for the organisation and minimal-moderate for employees. The direct perspective highlights the need for management to be patient throughout the implementation process and to reiterate the reasoning behind the decision: ‘Focusing on why, why we are doing this, why the company has decided to do this and why we need to be patience. That’s one of the biggest challenges we have. But the company is transforming, it’s low but it is transforming – now we are at a point were we need to get together and give an extra effort again just to overcome this hill because you are almost there, in fact if you have a s curve we are currently here in the implementation of lean we are at a certain stage in the process where we need to start moving again and now we require more leadership’ The direct consequence also has a number of indirect flow-on consequences to individuals in middle and higher management levels within the organisation: ‘So what we require of our project executives is to get closer to the project and that’s the reason why we are increasing the number of meetings associated with the project and really use leadership to coach and not push them, be closer to them and make sure they are not being complacent in the assessment of themselves.’</td>
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</tbody>
</table>
5.6.6 Organisation G Researcher Reflections

The following researcher observations were made during the analysis of this organisation.

Cultural environment is influenced by the organisation’s own strategic direction as well as the external contractual partnership with Organisation A and an additional contractual partnership with another external contractual party. Although the decision was authoritatively based, the decision was influenced through a direct request from Organisation A.

The organisation has experienced some rejection of the lean decision and implementation in terms of tool application, purpose and reasoning.

Underpinning the process has been a desire for all employees to develop an organisational code of conduct, missions, values, visions and goals. Implementation and management of lean is guided through an extensive educational program and system which encourages and values varied learning capabilities – management views this approach as an essential learning process where an individual can learn more through the knowledge of others.

The cultural environment is guided by an adaptive organisational structure with employees to be more resilient and open to change. However, in the beginning of the lean journey this was not the case. The organisational structure has remained constant through the lean journey. Issues associated with organisation locations and sub-locations (project sites) were not addressed and their impact is not identifiable.

The organisation shows a clear transition across the three phases of cultural maturity (policy, tools and practice). The organisation has transitioned away from a more tool-based approach into a more practice-influenced approach; however, the maturity of the organisation is just beginning to allow practice to inform policy.

The implementation of lean shows a directive of organisational management, with some influence from external parties through contractual relations and partnerships. The knowledge of the organisation is also transitioned into other organisations with whom the organisation has relations with to assist in the lean transformation of these organisations. This type of program suggests a strong understanding to be present concerning lean.

5.6.7 Conclusion

The discussion in this section established the organisational, management and communication environments in which the organisation underwent a lean transformation. The interviewees highlighted diverse organisational roles, cultural attitudes and behaviours as well as lean understandings. Despite a diverse representation of the organisation, the majority of
interviewees shared and confirmed similarly aspects of the organisation environment, process, communication and challenges.

Over the course of the lean transformation the organisation underwent significant maturing of its culture, particularly in terms of the establishment of education and training programs, advocating of informal communication and social interaction with Organisation A projects. Specifically, those individuals interviewed within organisation had favourable experiences and exposures of lean through the confirmation of the lean philosophy and personal confirmation. The interviewees were also happy to acknowledge the presence of non-favourable challenges, such as decision making, trust and project planning.
5.7 Case Study Results: Case Study 5 Organisation D

5.7.1 Overview

Organisation D is located in southern Florida in the United States of America. The organisation delivers full-service mechanical systems and speciality metal fabrications. In projects they are identified as a subcontractor. The organisation undertakes more physical activities in the construction process and isn’t identified as being influential in the supply chain; the type of work undertaken is similar to that of Organisation F in that the organisation is representative of a construction hybrid organisation.

The interview took place at the second-largest office location of the company; the head office, located in Wisconsin, has multiple smaller organisations located throughout the American Midwest. Observations and reflections were made between organisational locations as a way of highlighting the differences in diffusion and cultural experiences of the workforce across the larger company. Each location of the larger organisation is identified and approached as a separate organisational enterprise.

<table>
<thead>
<tr>
<th>Text Box 5.1: Formal Social System – Senior Executive Perspective</th>
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</thead>
<tbody>
<tr>
<td>‘Generally, the way we operate, we operate as independent companies. So each branch is responsible for its own profit and loss and so we give them enough antimony to basically do what they want to do, but with lean they have the opportunity to do more or less.’</td>
</tr>
<tr>
<td>Senior Executive 1</td>
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</tbody>
</table>

One interview was conducted within the organisation with organisational roles representative of one level of the organisational structure, senior management. The interviewee is also identified as the Champion for the organisation in the implementation of lean.

<table>
<thead>
<tr>
<th>Text Box 5.2: Champion – Senior Executive Perspective</th>
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</thead>
<tbody>
<tr>
<td>‘I’m referred to as the lean champion for the corporation, and then we took it one step further and we are part of a larger corporation about one and a half billion dollars annual volume of about 30 companies and I began to then last year we took it to the parent company and taught classes for all of those companies so now each of those companies are supposed to have a lean champion.’</td>
</tr>
<tr>
<td>Senior Executive 1</td>
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</tbody>
</table>

Table 5.32 Interviewee Categorisation Organisation D highlights the organisational positioning of each interviewee.
The organisation’s lean transformation has been predominately influenced by the organisation’s need for change in its strategic direction, particularly in the simultaneous coordination of organisational trades. Senior Executive 1 noted that strategic direction to improve coordination in project delivery incorporated such lean strategies or ‘tools’ as daily huddle, visual placement and the last-planner system. Senior Executive 1 noted that the use of the last planner within the organisation had been beneficial, particularly for its own workforce. Organisation D’s lean transformation began in 2003.

5.7.2 Organisation and Management

Despite the lean transformation, the formal ‘social’ structure of Organisation F has remained a stable constant according to Senior Executive 1; this is similar to the previous organisations. However, Senior Executive 1 did note that with lean there has been an increase in cross-organisational communication, which had a positive effect in the organisation, particularly in education and training:

Table 5.32: Interviewee Categorisation Organisation D

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Executive</td>
<td>Vice-president of the organisation and head lean champion and innovator</td>
<td>Higher Manager</td>
</tr>
</tbody>
</table>

‘There is always separate teams developed, usually you may have a couple of people on the same teams but for the most part all the teams are different. One of the things that we have stressed over and over again there’s always a lady on the team, usually, and that’s because we want a different perspective and there’s always somebody from the area that is involved and there is always someone outside the area as well … Well, we try to make sure that all the people are involved in the teams. The way that teams are developed usually is people who might be equated with some of the aspects or whatever it is we are going to do, but then other people that are not at all involved at all with it because we want that different perspective.’

Senior Executive 1

Figure 5.5 Organisation B Formal Organisational Structure addresses the formal ‘social’ structure of the organisation. The structure has been developed based on the observations of the interviewees when discussing such elements as structure, management and the organisational environment. The structure incorporates three organisation tiers, as follows:

- top tier management, incorporating CEO and board of directors who govern the organisation;
• second tier management, incorporating core project delivery groups such as logistics, products, maintenance and sales; and

• third tier management group reflecting organisational project teams underpinning third tier management groupings.

The organisation undertakes construction work such as plumbing, heating, fire protection and excavation, with the nature of the work sometimes being made of a number of different trades with the organisation directly responsible for these trades.

![Diagram of organisational structure](image)

**Figure 5.5 Organisation D Formal Organisational Structure**

Figure 5.5 also highlights the organisation’s communicative networks, in which:

• red indicates managerial communicative networks;

• blue indicates upward communicative networks; and

• orange indicates project team communicative networks.

Also representative in the figure is the underlying collaborative work practice present throughout the organisation, with communication consistently flowing throughout the organisation between subcontracting groups. Framing these collaborative work practices is the presence of education and training-specific agendas that assist in increasing communication between groups in the organisation.
Text Box 5.4: Collaboration – Senior Executive Perspective

‘... that’s what’s different about this process to other processes used in the past. Because typically we have a couple of executives, a manager or two and we are making all the decisions – this time we are giving you objectives, you have the responsibility to figure out how to accomplish those objectives, the team is, I’m just facilitating and that was a big change for the group.’

Senior Executive 1

This collaborative framework is designed to motivate and encourage the workforce to develop new relationships across the organisational environment and has been enacted from learning from previous process pathways. This was of significant importance to Senior Executive 1 in terms of lean eventing team dynamics and employees understanding the innovation without the direct knowledge of training and implementation purposes. According to Senior Executive 1, management in the past had simply dictated ‘innovation’ process without encouraging open discussion and reflection.

Text Box 5.5: Learning – Senior Executive Perspective

‘... we started with our tool was one of our first 5S events where I would stand up and facilitate the group and there were about in that one about 10–12 possibly even more on this particular event, it was a large group as it was a large event which lasted about five days. When I would be addressing the group after some training I would say well what would you like to do and we went through all the different things that they thought were wasteful and then I asked them what do you think would be the best way to handle it, it was immediately, well ... “What do you want us to do?”.’

Senior Executive 1

Changes in the approach for the adoption of lean for the interviewee is linked to the encouragement of more open discussion and reflection between organisational groups. Although successful in some locations, other locations suffer from a lack of support from the head office.

Senior Executive 1 made observations on the behaviours that form the social environment of the organisation, also known as ‘social norms’. Observations made are addressed in Table 5.33, with Senior Executive 1 reflecting upon education and integration. Of particular importance to organisational management is education. As with Organisation G and Organisation C there was a strong focus by the interviewee on the importance of the education and training agenda in supporting the workforce in the lean journey. Senior Executive 1 highlighted the development of an educational platform that encourages knowledge development, stability and interaction amongst the workforce.
In discussing education, Senior Executive 1 reflects specifically on the communication aspect of lean implementation decision making and delivery; due to the size and localities of the organisation much of the education and training is undertaken biannually, with a heavy focus on tool identification and adoption.

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**Text Box 5.6: Education – Senior Executive Perspective**

‘… the first one it was a tool room and it was a fairly large area, if you can imagine you have 300 people to whom you must supply tools to in the field that is a pretty large area and you have tools coming and going on different job sites. There we had this variety of people and we start out by training for about half a day and then we start to brainstorm throughout the day and develop what it is we are going to do and then for the next three or four days we then actually do what they want to do. So what it is, is everyone plays a part so they are skilled, non-skilled and sometimes an unskilled person with a skilled person and basically they are accomplishing whatever the objectives were. First they learn about what they are going to do – so they; learn what the 5S is all about, then they figure out based on the objectives and the goals that they have – how they are going to accomplish that and then they vote on it, it’s a secret ballot vote and then we pick five to 10 depending on what we think we can accomplish.’

Senior Executive 1

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Senior Executive 1 did note that not all individuals in the organisation’s workforce are able to attend the biannual meetings. To overcome such issues organisational management – to overcome potential negativity in the workforce – devised workforce integration as an approach to assist the diffusion of the lean innovation across organisational localities. Organisational integration is aligned with visual-stream mapping and 5S principles (sort, set, shine, standardised and sustain).

**Text Box 5.7: Value Mapping – Senior Executive Perspective**

‘Oh yes, especially when we do value-stream mapping events and the 5S for that matter – you have people as I said before that have never worked together and so maybe just in general communication with one and other. Knowing the different steps we use for these events making sure each member follows up in a certain period of time – let’s say, if they say “ok I have a question and I need an answer – is it 48 hours or what is it?” – so they know that there has to be some limit to when you can get back to the person, so I would say from that perspective communication has improved. And this lean line that we produce communicates what we are trying to accomplish’

Senior Executive 1

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Senior Executive 1 identified themselves as the organisation’s opinion leader, describing their role and influence to be guided by the core cultural competencies of integration and education. The integration core cultural competency is particularly important to Senior
Executive 1, who alluded to the organisation undertaking a new endeavour approaching external trade partners to either learn about or undergo a lean transformation. This, according to Senior Executive 1, is only in the planning phases, but highlights a new strategic direction of the organisation, encouraging lean implementation, and in implementing lean more intensively something that has occurred in Organisation C and is ongoing in Organisation A.

5.7.3 Process
The describing of lean implementation described by Senior Executive 1 highlighted diverse process observations across varying organisational localities. The diverse observations made by Senior Executive 1 cover a number of implementation stages and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.
- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.
- **Implementation** will highlight those observations that describe the process of lean implementation.
- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.

These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.33 addresses the knowledge and exposure of interviewees to lean innovation, describing how these align with low, moderate and high levels. Interviewee positioning was addressed in Table 5.32.

<table>
<thead>
<tr>
<th>Knowledge &amp; Exposure Level</th>
<th>Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Level</td>
<td>The interviewee (SE1) has a high level of exposure through their role as an opinion leader, largely through self-education, lean manufacturing education and lean leadership.</td>
</tr>
</tbody>
</table>
The interviewee described their level of experience and exposure as:

**Text Box 5.8: Awareness – Senior Executive Perspective**

‘The first exposure to the lean process was when I was attending a trade association conference, I believe it was in Arizona, and at that time I stumbled across a seminar that was being held entitled “Lean Construction”. I’d never heard the term and I believe it was in 2002 and [individual] was doing a presentation essentially on the last planner and he mentioned that there were other folks who were involved with it … So I began to look into that and it was a very short period of time after that that I attended several other sessions of the lean construction institute one in Washington, one in Las Vegas and began to get a feel for the last planner.’

Senior Executive 1

The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been diversely observed and described by interviewees, addressing the social norm of education. According to Senior Executive 1, education and training agendas are not guided by any existing organisational or management rules or regulations. The interviewee noted that this occurs as each organisational location is treated as a separate entity of a larger corporation, which forms the organisational and management environments, the presence of separate entities means that each office location is responsible for its own implementation of the lean innovation. These offices still participate in the main education and training events held throughout the financial year for the larger organisation. The interviewee also discussed the presence of organisation-specific persuasion mechanisms in place across office locations, such as the ‘daily huddle’.

**Text Box 5.9: Education – Senior Executive Perspective**

‘So that’s more than anything else, this daily planning whether it’s in the office, whether it’s in the shop, whether it’s on the truck or our service guys we want them and I’ve seen some of their trucks and they sit on the dash we want them to just look at that and obviously we want them to think about it – we don’t expect them to be calling in and say oh ok I’ve just gone through my daily huddle – the idea is to eliminate. We have tracked that down to the point for our service – we know how long it takes them because we have GPS in all of our vehicles, we know how long it takes them to go to pick up some materials, how long they’re there how many times they do that – we have been able to decrease our gas consumption as a result of reducing the weight, as result of making less trips to the wholesale house – I think its been a great instrument to change our culture. The daily huddle has been in use about three years. So we are always trying something different, and this has been progressive and I’m sure we’ll try something else.’

Senior Executive 1
According to Senior Executive 1 the approach creates situation where it becomes the employee’s duty to question, reflect and make a consensus effort to understand lean.

**Text Box 5.10: Education – Senior Executive Perspective**

“We trained initially everyone in our workforce, over 500 employees, for about four hours each and we had our consultant who we felt better than well rather than I go through that process, it was decided that someone with more knowledge and background in lean should lead that which he did. And we had over 250 ideas that came up as a result of those meetings and basically I had one gentleman said, “You’ve been here for 25 years: what’s different of all these things to eliminate waste? Is there anything new?” and I said, “No”, he said, “Well what’s going to be different?” and I said, ”What’s going to be different is we are going to have teams to solved the problems not just someone like myself”.

Senior Executive 1

Senior Executive 1 identified this education approach as Lunch Learns/The Big Room. This is an organisation-specific education approach undertaken twice yearly as education and training programs for all employees of the greater organisation. The nature of such an approach enables the development of individual and organisational cultural attitudes, behaviours, values and opinions concerning lean. Elements underpinning the implementation of the lean innovation into the organisation will also be discussed.

The lean decision was explicitly described by Senior Executive 1, who identified themself as the lean champion, introducing lean to the chief executive officer of the organisation. This makes the decision to implement lean authoritative.

**Text Box 5.11: Decision – Senior Executive Perspective**

“… when I started looking at this lean construction I wanted to learn more about it other than the last planner or you know IPD [Integrated Project Delivery]. So I started looking around the country and I couldn’t find anybody who was teaching any type or form of courses on lean construction, I then started looking at lean manufacturing and of course read several books about lean thinking and they talked about using some of the principles associated with lean manufacturing trying to apply them to construction.”

Senior Executive 1

Organisation D is the only organisation thus far that explicitly observed the lean decision to be authoritative; in other organisations it was alluded to, and can be confirmed as authoritative. However, the implementation was not explicitly discussed beyond the use of education as supporting workforce driver; this emerged as the organisation has multiple locations, with only two having implemented lean strategies over a longer time frame.
has been some exposure to lean through biannual meetings, with a consensus decision made recently to mass-implement strategies across all organisations.

The perspective views and use of education and training programs as part of the decision stage of the implementation process highlights the importance education plays, particularly in this organisation. This shows a persistence of the organisation’s management as well as the lean facilitator to adapt to the different cultural attitudes, values and beliefs of individuals and groups internally and externally. The nature of such cultural values, beliefs, attitudes and opinions is also present in the process behind the implementation of the lean innovation.

Elements of implementation for the lean innovation are the second aspect to be discussed. The implementation of the innovation refers to the putting to use of lean within the organisational and management environments. The interviewee did not openly discuss the implementation of the lean innovation into the organisation in detail; rather, the interviewee discussed specific elements and approaches that management have utilised. One specific element and approach was identified and discussed by the interviewee highlighting implementation of the lean innovation. This discussion highlighted the actual implementation starting point and the flow-on effect from this point.

<table>
<thead>
<tr>
<th>Text Box 5.12: Process – Senior Executive Perspective</th>
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<tbody>
<tr>
<td>‘… it was started in [the Mideast] but then all the branches got training on it as well.’</td>
</tr>
<tr>
<td>Senior Executive 1</td>
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</tbody>
</table>

The approach to the implementation of the lean innovation within the organisational environment in a way also reflects confirmation of the process. Confirmation aspects underpinning the implementation of the lean innovation will be discussed in the next section.

Confirmation of the lean innovation is a significant aspect of the process as it assists understanding the progress of implementation. Interviewee observations and reflections are reflective of the stage of implementation the organisation is currently at. To provide a better understanding of the organisation holistically, Senior Executive 1 observed various confirmations of lean, discussing personal confirmation, organisation-specific confirmation and philosophical confirmation. The confirmation perspectives also provided clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator, project management and project team levels of the organisation perceive lean innovation to be.

Again, Senior Executive 1 observed and discussed the importance of education as a supporting driver in the organisation; it seemed that whenever the interviewee spoke about
education that this was the driver that supports the workforce. Senior Executive 1 observed how the workforce was embracing lean within their own duties, reflecting on the differences between younger and older workers.

**Text Box 5.13: Education – Senior Executive Perspective**

"... we have apprentices who we interview every six months and the younger people get it, they really understand how all we are trying to do is number one: eliminate waste, bring value to the customer and be much more competitive ... I would say yes, but I would say some of the older people who have embraced it they have been instrumental in helping people realise the benefits."

Senior Executive 1

Senior Executive 1 reflected heavily on the changing attitudes of particular employees when the lean innovation was first introduction into the organisation.

**Text Box 5.14: Education – Senior Executive Perspective**

"... we had one individual that was very staunch in their views in “I want to do it my way”, but he did have to admit that at least the company is trying to be better, they are not just, it’s not just status quo for the company."

Senior Executive 1

The strength of the educational agenda, knowledge of the lean facilitator and internal want for change within the organisation allowed for a natural acceptance towards the lean innovation to emerge. The interviewee highlighted specific tools the organisation’s management utilises to promote individual and group success concerning the lean transformation.

**Text Box 5.15: Communication – Senior Executive Perspective**

‘We have this thing called the “lean line”, which is like a newsletter which comes out quite frequently and every time someone comes up with an idea we celebrate that idea and some of those ideas have been tremendous. That communication is another form of communication that we use in addition to people just talking about it.’

Senior Executive 1

Senior Executive 1 also discussed how through being the lean champion employees were more open to discuss their own personal achievements in understanding the lean innovation. According to the interviewee, these personal discussions – although not represented in a tool form – help employees to understand how the lean innovation works.

Senior Executive 1 did highlight that the journey towards acceptance had been rocky; however, through persistence of management, open communication, questioning and reflection, acceptance had been achieved. The only time when lean implementation was a
standardised process within the organisation was during biannual education and training events:

**Text Box 5.15: Communication – Senior Executive Perspective**

‘One of the things that came from our discussions with the group and our consultant is that there wasn’t enough communication. And so his recommendation was once a month, well that’s good in a manufacturing sector, but for us when we have at any given time 300 jobs, even within one little location, it’s very hard to get that many people together. But we continue to make the investment, if you can appreciate that we spend an hour at these meetings twice a year and it gives everyone a chance to ask questions, we also have a Q&A session at the end of 15mins or longer and anybody can ask any question, whether from the floor or they can submit questions prior to the meeting.’

**Senior Executive 1**

Further to this, the interviewee did stress that acceptance of the lean innovation has been greater in organisations that have been exposed to the innovation on a larger scale; however, a mission of management is to further manage the exposure of the lean innovation and educational agendas for smaller organisational locations. The interviewee highlighted this to be occurring over the next one to two years and reflects an internal management commitment to lean, this links in with the next confirmation perspective.

Such acceptance of lean through education according to Senior Executive 1 has had a positive effect on the culture of the organisation through acceptance.

**Text Box 5.16: Culture – Senior Executive Perspective**

‘... with the lean process, as you know, it’s continuous improvement. So it just doesn’t seem people can be complacent under lean, just recently this office completed a project and I went up to the project manager and said, “Wow what a great job!” .... He stops me and says, “I know, [but] what can be done better next time?”... There are some stumbling blocks along the way but for the most part I think when they see things change, when they see the company is spending and investing a lot of money to educate people on this process, also spending the time in these events they do understand that we are trying to be much better at what we do.’

**Senior Executive 1**

This confirmation perspective, as discussed by Senior Executive 1, highlights that when employees see management taking an active role in improving the process of project delivery then their own acceptance or rejection of the lean innovation and the maturing of cultural attitudes, behaviours and values.

Views of acceptance and rejection within the office environment are highlighted in the following Senior Executive 1 story.
Table 5.8 Implementation Process Component 4: Confirmation addresses the observations and reflections of those interviewees who have experience lean innovation confirmation, including the lean journey and process as well as organisational theory. The table divides the main confirmation theme into a series of confirmation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.

5.7.4 Communication

Senior Executive 1 observed and discussed two primary and one secondary strategy to be in use by the organisation to assist the communication of the lean innovation within the organisation and onto project teams. This communicative approach, or ‘tool’, was identified as communicative tooling, with ‘tool’ discussed as a form of reflective and integrated learning. The identification of communication as a ‘tool’ was also discussed by Organisation B, with Organisation F and Organisation G suggesting communication is more of a strategy.

Reflective learning within the organisation, according to Senior Executive 1, encourages and motivates visual and verbal communication. The first reflective learning perspective discussed by Senior Executive 1 concerned the application of what is known or learnt into the working and field environments.
The second perspective of reflective learning discussed by Senior Executive 1 also concerned the application of what is known or learnt into the organisational environment.

**Box 5.19: Reflective Learning – Senior Executive Perspective**

‘... since lean is an important part of what I do all of my lean materials, I don’t have to move, it’s right there next to my table top because we don’t have desks – so it’s right there, so I don’t have to get up and move to get it. That’s the idea – 80% of what you need should be closest to you. And we have that rule anywhere, whether it’s a jobsite, an office, a truck, a shop – if I know what it is I need to find it in 30 seconds or less. So if I’m looking for a nut or a bolt I should be able to find it and as you walk around I’ll show you what makes it easier we called it visual arrangement – it makes it easier to be able to find.’

Senior Executive 1

Senior Executive 1 also discussed motivation to be a key communication technique used in the organisation. This organisation was the only one that uses motivation as a communicative technique for the workforce; this may be as the organisation and its locations are seen as independent entities with motivation streamlining communication. Within the organisation, Senior Executive 1 reflected on motivation being strategically linked to reflective learning.

The interviewee discussed that organisational management encourages written, verbal and visual communication through reflective learning objectives in two differing ways. The first reflective learning perspective discussed by the interviewee concerned the embracing of reflective learning and recognition of this learning within the organisation.
The second perspective of reflective learning discussed by Senior Executive 1 links in with the organisation’s management approach, mission and goals associated with the lean innovation.

The presence of two different communicative tools in the communication of the lean innovation particularly linked to education/training through reflective learning shows a deep connection between implementation and supporting employees through the process. Also, the identification of three communicative mechanisms within the discussion of secondary themes suggests the organisation has a deeper philosophical understanding of lean not as a tool-based implementation approach but also a cultural understanding as well.

5.7.5 Implementation Challenges
Throughout the interview session, Senior Executive 1 favourably described, reflected and observed the implementation of the lean innovation within the organisation. Senior Executive 1, while describing the implementation process, also reflected on the challenges that emerged within the organisation associated with lean implementation.

Many of the challenges described by Senior Executive 1 were associated with such issues as internal conflict and location-specific implementation. In particular, Senior Executive 1
described the impact of each organisation location being recognised as a separate entity and how implementation is moderately impacted as a result. According to the interviewee the viewing of office location as separate entities had in a way created an educational void between larger and smaller locations.

Text Box 5.21: Location Implementation – Senior Executive Perspective

‘I would say the smaller locations … everyone understands it in the extent that they’ve applied what they know in the smaller remote areas. Although the principles of trying to do things better I think has caught on … I think it’s more they haven’t seen as much exposure like a Florida or Wisconsin and as a result they don’t understand and until you see it first hand, it is just hard to imagine what it can do for you. Because people love to be in their comfort zone and when they step out of their comfort zone it is not always easy.’

Senior Executive 1

The direct consequence of this location perspective is the smaller offices. However, the organisation does experience indirect consequences particularly in the introduction, training and management of the lean innovation. The interviewee did highlight that it has been decided to focus more on the smaller office locations in the rollout of the innovation education and training.

Senior Executive 1 also highlighted internal conflict challenges when lean innovation is first introduced. According to Senior Executive 1 this challenge has moderately impacted on employees and their cultural mindsets. More specifically, the interviewee discussed how the innovation is primarily a scheduling program and this has indirectly impacted on the site foreman or the last planner.

Text Box 5.22: Internal Conflict – Senior Executive Perspective

‘… whenever you ask them how long is it going to take to do something, they will always inflate the number or they were concerned that if they gave us a certain number or answer we expected them to fulfil that no matter what and so they wanted some wriggle room (for the use of a better term) so their estimates for that week would be a little off but if you didn’t make it by the end of the week we weren’t going to berate them – but what we wanted to do was to find out what the constraints were or why couldn’t they finish that and we had a matrix of all the different things why they couldn’t finish the work including the lack of information materials, area was not ready etc. Once they understood this was a tool to help them and not necessarily to monitor then the culture began to change.’

Senior Executive 1

The direct consequence of this inner change and conflict is towards the site foreman or last planner as the introduction of the scheduling program directly impacts their role and position.
However, the organisation does experience indirect consequences particularly in the introduction, training and management of the program.

5.7.6 Organisation D Researcher Reflections
The cultural environment is guided by the organisational network to be focused towards independent organisation locations. The nature of this approach highlights a distinct strategic direction to be developed around the requirements of each organisational location. This fits within the notion that, culturally, one organisation can have several cultures.

There has been a clear transition of the organisation across two of the three cultural phases with a clear indication that the two larger organisations are currently a part of the third phase. Smaller locations are still within the first two phases; however, higher management made a commitment to improve the knowledge of individuals within these organisations.

Organisation-wide lean eventing (education) assisted in the blanket communication of the lean innovation to all individuals and the establishment of informal hetrophile and homophile communication networks. The type of events encourages and values varied learning capabilities – management views this approach as an essential part of the learning process, where an individual can learn more through the knowledge of others.

The cultural environment is guided by an adaptive organisational structure with employees to be more resilient and open to change; however, there have been pockets within the larger organisations of the organisational networks where there has been some significant resistance towards the lean innovation.

Several examples were provided as a means to show how the organisation and its culture have changed.

Informal social systems have assisted in the embracing of the lean innovation, particularly through the relations between differing organisational groups.

5.7.7 Conclusion
The discussion in this section established the organisational, management and communication environments in which the organisation underwent a lean transformation. The interviewees interviewed within the organisation highlighted diverse organisational roles, cultural attitudes and behaviours as well as lean understandings. Despite a diverse representation of the organisation, the majority of interviewees shared and confirmed similar aspects of the organisation environment, process, communication and challenges.

Over the course of the lean transformation the organisation underwent significant maturing of their culture, particularly in terms of the establishment of education and training programs,
advocating of informal communication and social interaction with Organisation A projects. Specifically, those individuals interviewed within the organisation had favourable experiences and exposures of lean through the confirmation of the lean philosophy and personal confirmation. The interviewees were also happy to acknowledge the presence of non-favourable challenges such as decision making, trust and project planning.
Part 3 describes the results of those organisations in the latter stages adoption of lean. The organisations forming this first grouping reflect a range of implementation approaches and strategies that support the workforce. Organisations forming this group include Organisation A (USA) and Organisation E (USA).
5.8 Case Study Results: Case Study 6 Organisation A

5.8.1 Overview

Organisation A is located in northern California in the United States of America, delivering primarily health care infrastructure. The organisation utilises a full-scale intensive application of lean strategies across the project network. In project works the organisation is representative of the client, owner and general contractor.

Five interviews were conducted within the organisation with organisational roles representative of three levels of the organisational structure: senior management, middle management and project team. These roles were within the senior management groups of the organisation, as described later.

Table 5.33 Interviewee Categorisation Organisation A highlights the organisational position of each interviewee. The interviewees have been categorised during the analysis into one of four groups based on their organisational role. Here, interviewees are representative of senior executives, champions and innovators, project managers and project teams. The table also identifies all interviewees to be a part of the senior management group.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Executive 1</td>
<td>Senior manager for the general contractor.</td>
<td>Senior Management Group</td>
</tr>
<tr>
<td>Senior Executive 2</td>
<td>Architect for the organisation.</td>
<td>Senior Management Group</td>
</tr>
<tr>
<td>Champion and Innovator 1</td>
<td>Managing director of the owner.</td>
<td>Senior Management Group</td>
</tr>
<tr>
<td>Project Manager 1</td>
<td>Project manager for the general contractor.</td>
<td>Senior Management Group</td>
</tr>
<tr>
<td>Project Team 1</td>
<td>Project team member for the general contractor.</td>
<td>Senior Management Group</td>
</tr>
</tbody>
</table>

The organisation is in a unique position in terms of project delivery as the management structure is guided through the use of mutual contractual relationships designed and implemented to undertake specific project works and construction stages. According to Champion and Innovator 1, such mutual contractual relationships have influenced and transformed the cultural environment of the organisation so much so that the client is enhanced and encouraged to move towards more intensive adoption and applications of lean.

Senior Executive 1 and Senior Executive 2 both discussed how the organisational and managerial environment of the larger organisation is guided by the owner’s authority-based decision to manage the process using lean tools and strategies. The approach, according to
Senior Executive 1 and Senior Executive 2, is underpinned by specific owner requirements; core to this approach is that all senior management and trade partners have either undergone or are undergoing lean transformation.

This was confirmed by those interviewees in Organisation B and Organisation C who are actively involved in this partnership.

5.8.2 Organisational and Managerial Environments

Organisation A is unique in how the organisation is structured. The organisation as it is, represents a strategic approach by the senior management group to develop a unified working scenario. According to Senior Executive 1, the organisation structure is guided by

<table>
<thead>
<tr>
<th>Text Box 6.1: Formal Organisation Structure – Senior Executive Perspective</th>
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</thead>
<tbody>
<tr>
<td>'The project under, well actually, within this office, partners and projects are managed through a mutual contractual partnership of a senior management group.'</td>
</tr>
<tr>
<td>Senior Executive 1</td>
</tr>
</tbody>
</table>

Figure 5.6, *Organisation A Formal Organisational Structure* addresses the formal ‘social’ structure of the organisation. The structure has been developed based on the observations of the interviewees when discussing or describing such elements as structure, management and the organisational environment. The structure incorporates two organisational levels, representative of a two-tier management system in which:

- the first level highlights the contractual and relational partnerships between the senior management group; and

- the second level highlights the contractual and relational partnership between senior management and the smaller and subcontractor units, referred to by interviewees as ‘trade partners’.
The interviewees, when reflecting upon lean implementation within the organisation, made observations on the informal social system. Interviewees reflected upon two communication styles as forming the informal social system of the organisation:

- homophilic communication, or the communication between like-minded individuals; and
- heterophilic communication, or the communication between non-like-minded individuals.

Perspectives of these communication styles highlighted lean implementation within the organisation leading towards the development of enhancing organisational relations between organisational groups as well as between organisational groups and management. Interviewees within these organisations also discussed the informal relationship between trade partners, which in this organisation were described by Project Manager 1 and Project Team 1 as an informal social element. The presence of tertiary working groups, similarly identified as ‘cluster groups’ (as in Organisation B) was confirmed Senior Executive 2, who described these groups as enhancing organisational relations and stability. Project Manager 1 described these relationships in the form of ‘tertiary working groups’ and ‘work cluster groups’ highlighting:
Project Manager 1 also observed tertiary working groups and their role within the organisation.

According to Champion and Innovator 1, the culture of the organisation is influenced by the management of four projects. All projects have the same core management team; however, trade partners for each project could and are different, based on brief requirements of the client. Despite this, Champion and Innovator 1 discussed that the culture of the organisation and each project is guided by four core cultural competencies: advocacy, integration, stability and education.

Champion and Innovator 1 first described advocacy and integration from a cultural perspective, highlighting the expectations of management towards organisational groups:

The organisation, according to Senior Executive 2, has designed a lean education program that specifically centres on the needs and requirements of lean within the organisation, thus leading to organisational stability. The purpose of such a program is to support the development of knowledge of management, trade partners and tertiary working groups through reflective ‘lean awareness’ and ‘learning culture’ practices.
Opinion leaders and change agents were identified by interviewees as playing a role in the maintaining of the lean implementation process. When discussing lean implementation, Senior Executive 1 described the role of opinion leaders in the organisation, particularly in educating senior management in lean:

> Box 6.6: Opinion Leaders – Senior Executive Perspective

> ‘We have people who assist; there is one particular person on the team that is focused on and is assisting us with lean facilitation. However, I think we have all taken pretty seriously that we are all lean leaders. So we’ve talked about this before, it’s important to have a person focused on lean facilitation but in order for lean to work on this project we all have to be lean leaders.’

Senior Executive 1 also alluded to the presence of change agents within the organisation, although these individuals were identifiable by Senior Executive 1. The management of four projects at the one office site makes integration hard to achieve unless change agents are present to assist in the management and maintaining of integrated project teams, according to Senior Executive 1. Both internal and external lean change agents are identifiable within this organisation, particularly in the presence of information-sharing duties between trade partners and tertiary working groups referred to within the organisation as cluster groupings. This was confirmed by both Senior Executive 2 and Champion and Innovator 1 in the same interview session.

Although identified by some interviewees, particularly those in more senior and project management roles, the majority of participants suggested that opinion leaders and change agents are not identifiable as official roles. According to these interviewees this emerges as organisational management is committed in promoting collaborative and integrated team environments that encourage information sharing, education and knowledge. This is a similarly approach identified in Organisation B.
5.8.3 Process
The describing of lean implementation by interviewees highlighted diverse process observations. These observations cover a number of implementation stages and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.
- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.
- **Implementation** will highlight those observations that describe the process of lean implementation.
- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.

These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.34 *Implementation Process Component 1: Lean Knowledge and Exposure* addresses the knowledge and exposure of interviewees to lean innovation, describing these align with low, moderate and high levels. Interviewee positioning was addressed in Table 5.33.

### Table 3.34: Implementation Process Stage 1: Lean Knowledge and Awareness

<table>
<thead>
<tr>
<th>Knowledge &amp; Exposure Level</th>
<th>Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Level</td>
<td>Senior Executive 2 and Project Manager 1 are identified as having only experienced lean within this particular organisation over three years, exposure is low.</td>
</tr>
<tr>
<td>Moderate Level</td>
<td>Project Team 1 is identified as having only a moderate level of exposure of lean within construction; the individual has further lean exposure from a manufacturing perspective.</td>
</tr>
<tr>
<td>High Level</td>
<td>Senior Executive 1 and Champion and Innovator 1 are identified as both having a high level of exposure to the lean innovation having experienced exposure and lean knowledge across multiple organisations.</td>
</tr>
</tbody>
</table>

The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been observed and described by interviewees, incorporating such perspectives as opinion leaders, social norms and informal social structure. Table 5.35 *Implementation Process Component 2: Persuasion* addresses the persuasive techniques.
identified by interviewee participants as assisting the implementation of lean within the organisation. The table divides the main persuasion theme into a series of sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with persuasion and persuasive techniques.
### Table 3.35: Implementation Process Stage 2: Persuasion

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Opinion Leaders</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td></td>
<td>SE1</td>
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</tbody>
</table>

#### Interviewee Description & Analysis

**SE1 Perspective:** The innovation.

According to the interviewee, although acknowledging the utilisation of particular team member leader, the core cultural competencies of advocacy and integration emerge as influencing innovation specific opinion leaders, particularly in becoming a leader of lean:

‘We have people who assist; there is one particular person on the team that is focused on and is assisting us with lean facilitation. However, I think we have all taken pretty seriously that we are all lean leaders. So we’ve talked about this before it’s important to have a person focused; on lean facilitation but in order for lean to work on this project we all have to be lean leaders.’

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Education</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td></td>
<td>SE1</td>
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</table>

#### Interviewee Description & Analysis

**SE1 Perspective:** The Organisation.

The interviewee discussed the use of a touch-base or first-contact type of approach the organisation uses to inform and educate new members coming into the project/s environment/s of the organisation about lean:

‘For each new team we bring in we educate through going over what we would change and how we would make it better and have them hear all that. And use that as a first opportunity of learning for them. So they hear from a more experienced team all of the lessons we’ve learned.’

The unique approach to this education allows not only the re-education of individuals already in the organisation but also allows management to identify potential problem and troubled areas affecting the implementation process of lean.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Informal Social System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interviewees</td>
<td>SE2, CI1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE2</td>
<td>Perspective: Homophily and hetrophily cluster groups. The interviewee’s discussion highlighted the struggles and challenges of some individuals in the acceptance of change and how it’s the culture that assists people within an organisation to accept or reject a notion of change. The interviewee further talked about how some people need exposure to multiple success cases of using the lean methodology in order to accept the longer term investment instead of believing in shorter-term gains, which is how many in the organisation felt at the beginning of [project 1]. Confirmed by CI1 in same interview session through supporting the need for individuals to be exposed to a strategy like lean to understand and see the benefits associated with the innovation before making a decision to accept or reject the innovation.</td>
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</table>

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Advocacy &amp; Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Interviewees</td>
<td>SE2, CI1</td>
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<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE2</td>
<td>Perspective: Culture. The interviewee discussed the need for individuals to be exposed to an innovation and its culture before a decision to accept or reject the notion of change. It was noted that the formal and informal social structures forming the organisational and management environments assist in overcoming such non-favourable opinions of lean innovation through integration. The forming of favourable opinions in the organisation has assisted in the moving of the organisation to provide what Champion and Innovator 1 describes as a ‘first of its kind’ project which has created, according to Senior Executive 2, the most ‘integrated teams’, ‘integrated processes’ and ‘integrated project delivery systems’. Confirmed by CI1, in same interview session</td>
</tr>
</tbody>
</table>
The lean decision and implementation process was not explicitly described by interviewees as lean has been implemented across the organisation for some time; rather, interviewees described how sub-decisions of the process are communicated to the workforce through informal education platforms, such as plus/delta learning, lunch-and-learn opportunities and big-room get-togethers. Senior Executive 1 noted that the educational strategies used within the organisational are a combination of a number of different implementation techniques used within their own organisation and one of the senior management’s organisation. Senior Executive 1 and Champion and Innovator 1 identified plus/delta learning as one of the key educational strategies utilised by the organisation. According to Senior Executive 1, the plus/delta learning approach is utilised by their organisation as well as Champion and Innovator 1’s organisation. Plus/delta learning as an educational strategy of implementation involves the recording of lessons learnt and lessons that need to be learnt in terms of specific project objectives.

Senior Executive 2 raised the use of Lunch and Learns/The Big Room as another two educational tools in use within the organisation. For this individual the use of lunch and learns as part of the lean process assisted in better understanding the purpose and decision behind the use of lean and advantages associated with the innovation. The interviewee also noted, in particular, that the use of lunch-and-learn sessions assisted in allowing them to accept and see changes associated with the use of an innovation such as lean.

Senior Executive 2 also described visual training management within their organisation to provide a unique way of communicating the decision and progress of implementation of the lean innovation. Champion and Innovator 1 noted that visual training management has been used specifically within this organisation as a means to communicate progress, cultural expectations and learning objectives.

Confirmation of the lean innovation is a significant aspect of the process as it assists in understanding the progress of implementation. Interviewee observations and reflections are limited as the organisation is in the early stages of implementation, with Senior Executive 1, Champion and Innovator 1, Project Manager 1 and Project Team 1 discussing confirmation. Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation in terms of the theoretical, philosophical and process-related ideals and implementation at the organisational level. The confirmation perspectives also provided clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator, project management and project team levels of the organisation perceive lean innovation to be.
Table 5.36 Implementation Process Component 4: Confirmation addresses the observations and reflections of those interviewees who have experience lean innovation confirmation, including the project reliability, education and awareness of theory. The table divides the main confirmation theme into a series of confirmation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.
Table 5.36: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation</td>
<td>Education and Communication</td>
<td>SE1</td>
</tr>
<tr>
<td>Theme: Confirmation</td>
<td>Perspective: Lean transformation.</td>
<td></td>
</tr>
<tr>
<td>Interviewee: SE1</td>
<td>The interviewee noted that the philosophy behind lean is difficult at times to understand and interpret due to the lean philosophy being grounded in manufacturing and production procedures:</td>
<td></td>
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<tr>
<td></td>
<td>’With that comes a challenge, though I wouldn’t call it a negative, but it is a challenge, so we have to learn to relate, to communicate, to behave in different ways then we have in the past because the old ways were more protective. So there were rules and processes in place before that we can no longer follow, that aren’t effective for us.’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The interviewee further expanded on this process confirmation by reflecting back on the implementation of the lean innovation within their organisation. The interviewee highlighted the use of re-education and plus/delta learning strategies within this organisation assisting in understanding the process through the experiences of others and lessons learned:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>’The new rules and processes we have to create, they are not all there, so the challenge is living in that uncertainty and environment where yeah we are working together much closely then we ever did before but we don’t have always the new rules and processes in place that define how we should be working together. So that’s a challenge and creating a new project cultural environment we don’t have it all defined. So it’s uneasy sometimes because we don’t know from day to day what the answer is always, we have to go find the answer.’</td>
<td></td>
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</tbody>
</table>
### Table 5.36: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation</td>
<td>Project Reliability</td>
<td>CI1</td>
<td>Interviewee Description &amp; Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CI1</td>
<td><strong>Perspective:</strong> Extension of the organisational social norms in the form of stability. The perspective is underpinned by the notion that the delivery of projects through lean philosophy and techniques brings with it stability and reliability of individuals and the project. The interviewee’s reflection on stability within the project is derived from the individual’s role, position and understanding of the process, with reliability achieved when the individual understands all the elements of the process, their own contribution to that process and finally the delivery of the product to the customer.</td>
</tr>
</tbody>
</table>
|                | Awareness        | PM1         | **Perspective:** Lean innovation. The confirmation of the lean innovation is about:  
1. Simplifying drawings: ‘Have assisted in multiple solutions to emerge and be discussed’;  
2. Redefined innovation;  
3. Working with manufacturers: ‘Lean innovation has simplified the relationship, delivering a super assembly line, and moving design and production off-site’;  
4. Move towards integrated 3D modelling: ‘Problems have arisen with different programmes and software packages of trade partners, however through lean the integration of all separate modelling components and modelling maturity has been achieved’; and  
Integrated team environments |
|                |                  | PT1         | **Perspective:** Lean innovation. The confirmation of the lean innovation is about:  
High-quality drawings, high-quality production plans (achieved through work of all trade partners); and better production flow. |
5.8.4 Communication

Senior Executive 2 and Champion and Innovator 1 observed and discussed four primary and one secondary strategy to be in use by the organisation to assist the communication of the lean innovation within the organisation and onto project teams. Similar to other organisations this communicative approach or ‘tool’ was identified as a form of communicative tooling with ‘tool’ discussed aligned to verbal communication within the organisation. According to Champion and Innovator 1, senior management encourages verbal communication of management, trade partners, tertiary working groups and individuals through project-specific learning objectives. Project-specific learning objectives emerged as a necessity within the organisation through the utilisation of another educational technique, that of plus/delta learning.

Champion and Innovator 1 also discussed senior management encouraging verbal communication with management, trade partners, tertiary working groups and individuals through reflective learning objectives. Reflective learning, according to Champion and Innovator 1, also emerged as a necessity within the organisation through utilisation and other educational techniques such as ‘plus/delta learning’.

Another approach, discussed by Senior Executive 2, described how senior management encourages verbal communication with management, trade partners, tertiary working groups and individuals through study action team objectives. Prior to this project and organisation, Senior Executive 2 had never seen the use study action teams as part of management and communication strategies.

Senior Executive 2 discussed engagement as a communication strategy used by the organisation. Senior Executive 2 described how senior management encourages verbal communication with management, trade partners, tertiary working groups and individuals through the engagement of integrated learning objectives. The nature of ‘integrated learning’ within the organisation is supported by the extensive educational program in use within the organisation.

Champion and Innovator 1 and Senior Executive 2 also discussed motivation and knowledge in terms of reflective learning through both visual and verbal communication perspectives. In terms of motivation, Champion and Innovator 1 described how senior management encourages visual communication as this form of communication is integral to the success of the project, as reflective learning within the organisation is supported by the extensive educational program in place. Senior Executive 2 described how senior management, through the utilisation of verbal and visual communication and development of knowledge and reflective learning objectives, is integral and unique to the organisation. According to Senior Executive
2 the presence has assisted in the emergence of the organisation embracing and advocating a learning culture.

Although a number of different primary and secondary communication themes emerged, there is present a shared and mutual understanding between all interviewees concerning the importance of communication within the organisation in the understanding of the lean innovation and the implementation process. Challenges associated with implementation of lean for Organisation A will now be discussed.

5.8.5 Implementation Challenges

Throughout the interview sessions, interviewees favourably described, reflected and observed the implementation of the lean innovation within the organisation. Interviewees, including Senior Executive 1 and Champion and Innovator 1, were quick to point out the challenges that emerged within the organisation associated with lean implementation. Many of the challenges described by interviewees were associated with such issues as organisational conflict, leadership and education.

Senior Executive 1 was concerned mostly about lean leadership and the presence of opinion leaders within the organisation. The discussion concerning opinion leaders, change agents and aides had Senior Executive 1 make some reflections on the use of such leadership groupings when their own organisation and the failings of delegated leadership duties, stating:

<table>
<thead>
<tr>
<th>Box 6.7: Leadership – Senior Executive Perspective</th>
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<tbody>
<tr>
<td>‘We don’t want to delegate the responsibilities to somebody else, we’ve seen that before, and in fact I’ve been in that situation before very, very early at [my company] of being a lean leader and then it’s up to the leader to make it happen and no-body else accepts the responsibility … The other thing that’s difficult with a designated lean leader is that you have to translate from manufacturing to project delivery and some of it is very easy to translate and some of it not so easy to translate – for one person there is just so many different perspectives so how it translates for [Interviewee C], is different to how it translates for me. So to leave it up for one person to make all those translations is pretty difficult, so I would be a little bit concerned at having a designated lean leader on a project.’</td>
</tr>
</tbody>
</table>

Senior Executive 1

The interviewee noted that through this was a challenging experience within their organisation it was decided that leadership duties would not be delegated; rather, individuals would become their own advocates of the innovation. The consequence is identified as minimal in its impact. This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for resistance of the lean leader towards the innovation and an indirect or second-order aspect for others.
Education was also identified as a challenge by both Senior Executive 1 and Champion and Innovator 1. Senior Executive 1 discussed the current educational barriers being experienced within the organisation and compared these barriers to the workings of a car, stating:

**Box 6.8: Education – Senior Executive Perspective**

“Well when we first started the project we did a lot of training and we did training as we moved along but its like the throttle on the car, its like the gas pedal as soon as you let go you kind of look around and realise that you’re not going anywhere you’ve gotten to a certain point but you haven’t gone any further and I think that’s where we are right now and I think we’ve got to push on the throttle again and push on the gas pedal and we’ve got to do more training and so it seems like it needs to be a continuous part of the process and project delivery – on going training.’

**Senior Executive 1**

This was similar to Champion and Innovator 1 who also stated that the challenges identified above are faced more from those individuals in higher positions of management making the executive decisions and managing education duties. The consequence is identified as minimal in its impact:

**Box 6.9: Education – Champion and Innovator Perspective**

‘... it’s hard to pay attention to the details of who’s been through it and who read what and when they participated in the study action teams and what’s the base set of readings that need to be, well that you hope people will understand in the project and who really understands them and who gets what out of what and it’s a hard thing to measure ... I just often wonder if there is enough and who actually has been through those processes and what processes are in place to keep track or that.’

**Champion and Innovator 1**

The interviewee did state that the challenges are faced more from those individuals in higher positions of management making the executive decisions and managing education duties. The consequence is identified as minimal in its impact. Education is representative of a functional aspect; however, the lack of management within this perspective makes this dysfunctional.

Tables 5.37 *Direct versus Indirect Challenges* address the observations and reflections of those interviewees who described lean challenges. The table divides the main challenge theme into a series of challenge related sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation challenges.
Table 5.37: Direct versus Indirect Challenges

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges</td>
<td>Direct versus Indirect Interviewees</td>
<td>SE1, CI1</td>
<td></td>
</tr>
</tbody>
</table>

**Interviewee**

**SE1**  
**Perspective:** Inner changes and conflict. Direct versus indirect challenge.  
The interviewee discussed the need for individuals to change their cultural ideals and environment in line with the lean innovation. The interviewee discussed the difficulty associated with working in an uncertain environment where the boundaries of work aren’t as clearly defined as in the old ways. The uneasiness and challenges arising within the environment according to the interviewee is made worse with the closer relationships and new cultural environments created. The interviewee did state that the challenges are faced more from those individuals in higher positions of management, however occasionally this can filter down through the formal and informal social structures. The consequence is identified as minimal in its impact. This perspective highlights a direct aspect. The direct aspect is present in the immediate for individual resistance of the lean innovation.

**CI1**  
**Perspective:** Inner changes and conflict.  
The interviewee presented an opinion linked directly to the client, client relations and cultural surroundings. The interviewee stated that it’s these elements that determine one’s cultural acceptance or resistance of the innovation. The interviewee did admit that within the current organisation were people come in and are resistant to seeing the benefits of the lean innovation. When asked the type of cultural impact that attitude has within the organisation the interviewee stated ‘they will either change or they won’t last’.  
The interviewee further explained that those individuals tend to culturally frustrate those individuals who are accepting and embracing change; however the consequence is minimal in its impact. This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for individual resistance of the lean innovation and indirect or second-order aspects for others.
5.8.6 Organisation A Research Reflections

This organisation is identified as having the most matured culture of all the case study organisations. This is highlighted through the intensity of lean implementation and the delivery of wholly integrated lean projects for a period of around 10 years. This organisation is also influential in the adoption of the lean innovation within other organisations, such as Organisation B and Organisation C.

The cultural environment which is represented within this organisation is governed by a mutual contractual partnership between four core management organisations forming the client, the contractor, the architect and the owner. The uniqueness of such a contractual partnership embraces all operational and cultural approaches present within the main management core. A contractual partnership is also in place between the core management group and the 13 trade partners forming the project team.

Another unique element of this cultural environment is that the organisation is currently managing four lean-intensive projects at varying stages from the one project site, all governed by the same mutual contractual partnership.

The nature of the cultural environment shows a progression throughout the three phases of cultural maturity, with the final phase now identified as informing the other two.

Organisational education-specific programs are another element which is essential to this cultural environment – with these programs designed to emphasise the importance of a learning culture. This could be identified as the distinct cultural attribute of last cultural phasing for the lean transformation.

Essential to the organisation is informal communication between tertiary working teams as a means to overcome smaller project-related issues – informal communication is also used in weekly lunch-and-learn sessions that assist in bringing issues to the forefront.

Social norms are core to the successful acceptance of the lean innovation within the organisation environment.

5.8.7 Conclusion

The discussion in this section established the organisational, management and communication environments in which the organisation underwent a lean transformation. The interviewees interviewed within the organisation highlighted diverse organisational roles, cultural attitudes and behaviours as well as lean understandings. Despite a diverse representation of the organisation, the majority of interviewees shared and confirmed similarly aspects of the organisation environment, process, communication and challenges.
Over the course of the lean transformation the organisation underwent significant maturing of its culture, particularly in terms of the establishment of education and training programs, advocating of informal communication and social interaction with Organisation A projects. Specifically, those individuals interviewed within organisation had favourable experiences and exposures of lean through the confirmation of the lean philosophy and personal confirmation. The interviewees were also happy to acknowledge the presence of non-favourable challenges such as decision making, trust and project planning.
5.9 Case Study Results: Case Study 7 Organisation E

5.9.1 Interview Overview

Organisation E is located in southern Florida in the United States of America, delivering water-infrastructure projects through the principles of lean. In project works they are identified as the general contractor.

One focus group with five interviewees was conducted, with organisational roles representative at three levels of the organisational structure: senior management, middle management and project management organisation, representing higher and project management levels of the organisation structure.

Table 5.38 Interviewee Categorisation Organisation E highlights the organisational position of each interviewee. The interviewees have been categorised during the analysis into one of four groupings based on their organisational role. Here, interviewees are representative of senior executives and project managers. The table also identifies the organisational role of each interviewee.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Organisational Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Executive 1</td>
<td>Managing director of general mechanical contractor</td>
<td>Primary Partner 1</td>
</tr>
<tr>
<td>Senior Executive 2</td>
<td>Retired director of general mechanical contractor</td>
<td>Primary Partner 1</td>
</tr>
<tr>
<td>Project Manager 1</td>
<td>Senior project manager for general mechanical contractor</td>
<td>Primary Partner 2</td>
</tr>
<tr>
<td>Project Manager 2</td>
<td>Senior project manager for general mechanical contractor</td>
<td>Primary Partner 1</td>
</tr>
<tr>
<td>Project Manager 3</td>
<td>Project manager for general mechanical contractor</td>
<td>Primary Partner 3</td>
</tr>
</tbody>
</table>

The organisation is in a unique position in terms of project delivery as the delivery of lean projects is governed by client requirements and mutual contractual relationships, called Integrated Project Delivery or IPD. This partnership was formed in 2000.

According to Senior Executive 1 and Senior Executive 2, this has occurred as a total lean transformation for the organisation and is not viable for the services they provide and the current market economy impacting the United States of America. In making this statement Senior Executive 1 observed:
Text Box 7.1: Organisation Overview – Senior Executive Perspective

‘I think it requires a more sophisticated owner because one of the keys I think for an IPD process to really be successful is owner involvement for one thing. You want to make sure you have an owner that’s involved in the process which we do have through [partner] and very much so on this one, actually more so on this plant than any of the other projects that we’ve done. The owner, this was his second project – he was the project engineer for the owner on the [project] and it was the first one that we worked on with him on and he was very much involved and engaged on a regular basis and enthusiastically so. So I think it requires the right kind of owner to realise the full benefit.’

Senior Executive 1

5.92 Organisation and Management

The organisational structure of Organisation E has not undergone significant change; however, when the IPD team comes together the structure does alter. Figure 5.7 Organisation F Formal Organisational Structure addresses the formal ‘social’ structure of the organisation. The structure has been developed based on the observations of the interviewees when discussing such elements as structure, management and the organisational environment. The structure incorporates four organisation tiers, with the structure as follows:

- top tier management, incorporating IPD primary partners;
- second tier management, incorporating core IPD contractors; and
- third tier management, incorporating sub-contractors.

Also representative in the figure is the underlying collaborative work practices present throughout the organisation, with communication consistently flowing throughout the organisation.

It is interesting to note that the formalised structure of the organisation assumes there is no informal structure. This was neither confirmed, alluded to nor denied by interviewees in the focus group session so it is only assumed that no informal networks exist.

Figure 5.7 also highlights the organisation’s communicative frameworks, in which:

- red indicates managerial communicative networks;
- blue indicates upward communicative networks; and
- orange indicates group communicative networks.
The purpose of the IPD team framework, according to Senior Executive 2, is the sharing of not only project risk but also project profits:

**Text Box 7.2: Formal Social Structure – Senior Executive Perspective**

‘You see, to share profit is different to sharing cost because you can all have your own costs and we could finish the job and share the profit but still be fighting for our own cost area because you know, its probably tied somehow to your share of the profit – but we are sharing the cost, that’s a different concept.’

Senior Executive 2

Senior Executive 1 and Senior Executive 2 highlighted that the utilisation of lean principles within the organisation is dependent on client–owner requirements. According to Senior Executive 1, successful lean project delivery within the IPD organisation:

**Text Box 7.3: Formal Approach – Senior Executive Perspective**

‘... requires a more sophisticated owner because one of the keys ... for an IPD process to really be successful is owner involvement for one thing you want to make sure you have an owner that’s involved in the process.’

Senior Executive 1

Tables 5.39 *Social Norms* address and analyses the observations made by interviewee participants regarding the organisation. The purpose of these tables is to highlight elements of the social environment that have and are guiding lean implementation; where possible, the direct reflection of lean change within the environment is identified and further discussed. Furthermore, in instances where observations are shared or confirmed, observations are grouped together. It should also be noted that on occasions interviewees reflected and
observed multiple aspects of lean implementation; where this has occurred, only an analysis is present.
### Table 5.39: Social Norms

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Advocacy</th>
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<tbody>
<tr>
<td>Social Norms</td>
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<tr>
<td></td>
<td>Interviewee</td>
<td>Interviewees SE1, SE2, PM1</td>
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<tr>
<td></td>
<td>Description &amp; Analysis</td>
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#### SE1 Perspective: Selfless acts.

The perspective concerned the presence of selfless acts being undertaken within the project as a means to maintain budget, time constraints and overall a positive cultural and working environment.

This was alluded to when the interviewee was discussing the formal relationships in the organisation between project partners.

Identified and confirmed by SE2, in same interview session

#### PM1 Perspective: Client/owner’s role.

The interviewee highlighted how the client/owner throughout the project become advocates for the team and project delivery and in a way for the lean innovation:

‘... absolutely, it’s a win/win across the board and the client which is really what its all about, its all about the client who has truly seen it as a win/win across the whole project and its sort of like a miracle to keep all of the savings after sharing it. You know.’

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<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Integration</th>
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<tbody>
<tr>
<td>Social Norms</td>
<td></td>
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<tr>
<td></td>
<td>Interviewee</td>
<td>Interviewees SE2, PM1</td>
</tr>
<tr>
<td></td>
<td>Description &amp; Analysis</td>
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</table>

#### PM1 Perspective: relationships.

The stabiling and integration of relationships within projects through the lean innovation. The interviewee particularly described integration within the project environment as:

‘... a key component to this whole deal that I see it breaks down the silos of independence – independent silos that everybody is trying to protect. So the culture was extremely positive and a lot of positive momentum and quite honestly all of the jobsite foremen that have all worked together throughout this whole job they are all sad to leave the job. They really are these big, scruffy big guys out there they have developed a kinship around this job and camaraderie.’

Identified and confirmed by SE2, in same interview session
### Table 5.39: Social Norms

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norms</td>
<td>Stability</td>
<td>PM1, PM2</td>
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</table>

**PM2 Perspective: Project delivery.**

The interviewee compared the different project delivery environments of a traditional project and a lean project. For the interviewee the processes linked to a lean project delivery has created a more stable, positive and friendlier working environment to what is typically experienced in more traditional project delivery methods:

'It is enjoyable. I mean, that’s a big difference from standard jobs. It’s always adversarial and you’re always looking out for that guy particularly wondering if he is going to stab you in the back or how he is going to treat you. But with this approach we know what the score is and we are comfortable in knowing what the relationship is.'

**Identified and confirmed by PM1 in same interview session.**
Opinion leaders and change agents were not discussed in this organisation. This may be a result of the lean approach the organisation undertakes.

5.9.3 Process
The describing of lean implementation by interviewees highlighted diverse process observations. The observations cover a number of implementation stages and as such will be described accordingly. The structure of this analysis is as follows:

- **Persuasion** will highlight those observations that describe the persuasive techniques in use within the organisation to assist lean implementation.
- **Decision** will highlight those observations that describe the elements that assisted management in making the strategic decision to implement lean.
- **Implementation** will highlight those observations that describe the process of lean implementation.
- **Confirmation** will highlight those observations that describe successful implementation and lean innovation change.

These process observations are developed by the individuals’ knowledge of and exposure to the lean innovation and their positioning in the organisation structure. Table 5.40 *Implementation Process Component 1: Lean Knowledge and Exposure* addresses the knowledge and exposure of interviewees to lean innovation, describing how these align with low, moderate and high levels. Interviewee positioning was addressed in Table 5.38.

<table>
<thead>
<tr>
<th>Knowledge &amp; Exposure Level</th>
<th>Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low/Moderate Level</td>
<td>Project Manager 1, Project Manager 2 and Project Manager 3 are identified as having low-moderate level of exposure to the lean innovation as lean knowledge was not specified.</td>
</tr>
<tr>
<td>High Level</td>
<td>Senior Executive 1 and Senior Executive 2 are identified as both having a high level of exposure to the lean innovation having experienced exposure and lean knowledge through the IPD framework over 10 years.</td>
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</table>

The use and presence of persuasive techniques as a means of assisting lean implementation within the organisation has been diversely observed and described by interviewees, incorporating such perspectives as social norms, the formal social structure and informal social structure. Table 5.41 *Implementation Process Component 2: Persuasion* addresses the persuasive techniques identified by interviewee participants as assisting the implementation of
lean within the organisation. The table divides the main persuasion theme into a series of sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with persuasion and persuasive techniques.

Only Project Manager 1 discussed to any extent the presence of the persuasion aspect associated with the lean innovation within the organisation. The perspectives discussed by Project Manager 1 highlighted views and opinions that were favourable. The lack of discussion by other individuals within the organisation may suggest that the persuasion aspect of the lean innovation process has not been achieved as the lean innovation is not currently undergoing a constant implementation. Rather, it was discussed throughout the interviews that lean is only utilised within a project setting if the client–owner dictates the use of the innovation. This dictating of lean use may have an unknown influence on how cultural attitudes, behaviours, opinions and views are formed regarding the lean innovation and its use within this organisation.

According to Senior Executive 1 and Senior Executive 2, the organisation is in a unique position in terms of project delivery as the delivery of lean projects is governed by client requirements and mutual contractual relationships, called IPD. According to Senior Executive 1 and Senior Executive 2 this occurred as a total lean transformation for the organisation is not viable for the services they provide and the current market economy impacting the United States of America.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Formal Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM1</td>
</tr>
<tr>
<td></td>
<td>Description &amp; Analysis</td>
<td></td>
</tr>
<tr>
<td>PM1</td>
<td>Perspective: IPD framework.</td>
<td>The interviewee discussed how the utilisation of the lean innovation within a project environment and being dictated by the client–owner has assisted in the overall improved project completion:</td>
</tr>
<tr>
<td></td>
<td>‘Lean has helped us complete the job, this may sound naïve but it’s; virtually eliminated the risk on the mechanical and electrical side [of the; project works].’</td>
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<td></td>
<td>According to the interviewee the integration of all project parties throughout the planning and construction phases of the project, particularly through more fluid communication streams, equal participation and shared risks and costs. This formal social structure persuasion perspective also links in with the next social norm focused perspective.</td>
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<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persuasion</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
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<td>PM1</td>
</tr>
<tr>
<td></td>
<td>Description &amp; Analysis</td>
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</tr>
<tr>
<td>PM1</td>
<td>Perspective: IPD framework.</td>
<td>The interviewee discussed in particular how through integration individuals and teams within the IPD framework have been persuaded that the lean innovation creates a holistic experience to project delivery:</td>
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<td></td>
<td>‘... it’s been a real teammate approach and I’ve got a superintendent that’s been in the trades for 30 years and has got literally tons of: experience in different and multiple trades and he says that this has probably has been the best experience he has been through in terms of being involved in the managing of a project.’</td>
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</table>
The lean decision or lean implementation approach was not explicitly described by interviewees; this was because the organisation applies lean principles on a client or project basis. This however does not mean that the organisation does not undergo elements of a lean transformation.

Confirmation of the lean innovation is a significant aspect of the process as it assists understanding the progress of implementation. Interviewee observations and reflections are limited as the organisation utilises lean on a client or project basis. Senior Executive 1, Project Manager 1, Project Manager 2 and Project Manager 3 all observed confirmation of lean. Each of the participants showed strong individual cultural attitudes and values concerning their confirmation perspectives of the lean innovation in terms of the theoretical, philosophical and process-related ideals and implementation at the organisational level. The confirmation perspectives also provided clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator, project management and project team levels of the organisation perceive lean innovation to be.

Table 5.41 Implementation Process Component 4: Confirmation addresses the observations and reflections of those interviewees who have experience lean innovation confirmation, including the lean journey and process as well as organisational theory. The table divides the main confirmation theme into a series of confirmation sub-themes representative of the interviewee observations. The sub-themes are further divided to highlight the perspective that the interviewee was reflecting about align with lean implementation confirmation.
Table 5.41: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Job Optimisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE1, PM2, PM3</td>
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</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE1</td>
<td>Perspective: IPD Team.</td>
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<tr>
<td></td>
<td>Fundamental to job optimisation is the approach and structure of the IPD framework underpinning the lean objectives of the organisational and managerial environments. The interviewee’s perspective focused on the collaborative process and equipment management in terms of job optimisation, stating:</td>
</tr>
<tr>
<td></td>
<td>‘I think because of the collaborative process through the design audit job allows that to happen because we’re not often making equipment selection decisions; for example, until after we have really thoroughly worked through the design process and often times we maybe even at a certain point on coordination you know to make sure a certain piece of equipment fits and those kind of things. You know, so, I just think that process itself kind of pushes you – I think that’s one of the reasons also that you, by the time you get to that certain point and you’ve had the engineers and you’ve had the installing contractor looking at the plan and working the plan, reworking it and then you decide on the best course of action for a particular piece of equipment, lets say, yeah you’ve done that, I think to a great extent you’re at that last responsible moment.’</td>
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<tr>
<td></td>
<td>Identified and confirmed by PM2 and PM3 in same interview session</td>
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</tbody>
</table>

Identified and confirmed by PM2 and PM3 in same interview session.
Table 5.41: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Communication</th>
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<tbody>
<tr>
<td>Confirmation</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE1</td>
</tr>
</tbody>
</table>

**Interviewee Description & Analysis**

SE1 Perspective: Networking.

Fundamental to the interviewee’s perspective on confirmation is the alignment of all communication streams within the IPD framework:

“Well I would say that another thing though that the IPD methodology does is because again going back to the owners involvement in the project that being one of the key principles I think of IPD is you have, the lines of communication are open between all the people that are really involved in the design process as well as from the owners standpoint. I mean they are the ones telling you what their needs are so because you have better communication, you know you have better information to make decisions on you may know earlier because you maybe be, you may have a lot of communication you might not otherwise have that gives you insights on a pending change or something there’s happening over here that may affect what we are building here. So you know then oh we need to hold off on this. And often times you don’t have those people communicating with each other then your not going to know that the owner may be you know dealing with a situation which could have an impact on that project.’
Table 5.41: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>IPD Framework</th>
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<tbody>
<tr>
<td>Confirmation</td>
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<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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<tbody>
<tr>
<td>PM1</td>
<td>Perspective: Structure. The interviewee discussed the perspective as an extension to the current management structure and the scepticisms the interviewee held towards the framework: ‘I was a little sceptical maybe at first and there’s maybe some sceptical issues first might have had to do with how’s my insurance company, my liability provider going to look at this arrangement. From a legal standpoint I had concerns about how the contract was written from [the organisation] to [another IPD party] there was a little loose, you know. But it was really predicated and focused on trust and I’ve never seen a contract predicated on such a large amount of trust so I mean that certainly was a breath of fresh air.’ Fundamental to the interviewee’s is the awareness by those individuals at a project management level are concerned about the potential impact the lean innovation has on existing project related concerns. The nature of the lean innovation and the structure of the IPD framework for this organisation is centred around the concept of trust as such opens up communicational networks, partner relationships, contractual obligations and construction processes. This perspective also links in with the second confirmation perspective.</td>
</tr>
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Table 5.41: Implementation Process Stage 4: Confirmation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Project Risk &amp; Costs</th>
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<tbody>
<tr>
<td>Confirmation</td>
<td></td>
<td>Interviewees</td>
</tr>
<tr>
<td></td>
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<td>PM1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Description &amp; Analysis</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Perspective: IPD Team.</strong></td>
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<td></td>
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<td>Fundamental to the interviewee’s perspective on this confirmation perspective is the alignment of all parties in gaining project funding and risk allotment. The interviewee’s discussion on this confirmation perspective also had some reflections on how different the lean approach to project delivery compared to the traditional project delivery:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘… we’re submitting our bills on a time and materials basis it cleans the whole process up – it sort of purifies it and the invoices are submitted and at the end of the day it is a cost to the group – not a cost really to me and its hard to shake that mind set, you know. That’s really a cost to me and I got to amend this and really it’s a cost to the group, you know. [The; company] doesn’t have to provide that cost and its worked the opposite way so many times.’</td>
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</table>
The confirmation perspectives provide clear examples of how the understanding and awareness of the innovation differs between individuals in senior executive, champion and innovator, project management and project team levels of the organisation perceive lean innovation to be.

No communication techniques or mechanisms were identified in the organisation. Challenges associated with the process will now be discussed.

5.9.4 Challenges
Throughout the interview sessions, interviewees favourably described, reflected and observed the implementation of the lean innovation within the organisation. Interviewees, including Senior Executive 1 and Project Manager 1, were also quick to point out the challenges that emerged within the organisation associated with lean implementation. Many of the challenges described by interviewees were associated with such issues as organisational conflict, communication and trust. Senior Executive 1 in particular spoke about the indirect challenge to organisation management and the issue of trust at a project level with outside trade partners that have limited ‘exposure’ to lean.

Although Organisation E has had a mostly favourable utilisation of lean within specific projects there exists a number of non-favourable experiences. Such challenges emerge within the nature of the implementation of the lean innovation within the organisational environment. The interviewee perspectives highlight the nature of the challenges impacting the organisation while also reflecting the current phasing of the implementation process. To appropriately reflect the challenges present within Organisation E, this discussion will highlight challenges emerging within the two primary challenge categories: Table 5.65 Direct versus Indirect Challenges and Table 5.66 Desirable versus Undesirable Challenges.
Table 5.65: Direct versus Indirect Challenges

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<thead>
<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Direct versus Indirect</th>
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<tr>
<td>Challenges</td>
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<td></td>
<td>Interviewee</td>
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<td>Perspective: The organisation. Direct versus indirect challenges.</td>
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<td>One moderately impacting direct and indirect perspective emerged regarding the participant discussion regarding the formal social structure of the IPD team (i.e. the organisation). The interviewee discussed the presence of the architect as part of the framework to occasionally indirectly impact the structure in turn directly impacts other IPD parties. This occurs despite a pre-existing good relationship with the architecture party:</td>
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<td>‘I would say that you know, I mean we have a very good relationship with our architect that’s on the team. But they are architects and that by nature, I mean there’s always a little bit of ego involved and in play with those guys and trying to and being so used to being the ones in control, you know. Some of that way of doing things sometimes has a tendency to creep into and you’ve got to step back and say wait a minute remember what we are trying to do here remember the process, you know. So I mean how do you overcome that, it’s tough unless all you’re doing is meaningful type work. I think that’s one of the challenges and I think all of us have that challenge to some extent and it goes back to the question interviewee 3 asked about the superintendent making that adjustment. I mean because we are operating in other market areas using more traditional project delivery methods and we are not doing these projects all the time and exclusively this way that’s where we have a little bit of breakdown sometimes – when we start one of these projects we have to kind of do a little retraining I guess within our own groups and our own teams sometimes, you know and the architects might be a little more challenging for them.’</td>
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<td>Perspective: Communication. Direct versus indirect challenges.</td>
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<td>One minimally impacting direct and indirect perspective emerged regarding the interviewee’s discussion into project specific communication and the adding of value throughout the project lifecycle. The interviewee in this discussion highlighted changing cultural attitudes and behaviours in direct relation to communication and the project as a whole and its indirect consequence on other parties within the IPD team:</td>
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<td>‘Well early on when the project first started. But we had project meetings for about 6-8 weeks on the early stages of the project, when we first broke ground, there were only some civil and structural issues to deal with and the architect was not invited to the weekly meetings because he didn’t bring added value and they took offense to that. I don’t know if they took offence to it but their feelings were hurt, well the individual’s feelings were hurt because they weren’t invited to the meetings. But you know the way we looked at it and the way the superintendent looked at it was hey unless they bring added value they don’t need to be here at this point and meeting because they’re billing us on an hourly rate and I’m totally on board for that I mean there was no reason for them to sit there and not provide any added value to the meeting.’</td>
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Table 5.65: Direct versus Indirect Challenges

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<tr>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Direct versus Indirect</th>
<th>Interviewee</th>
<th>Description &amp; Analysis</th>
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<td>Challenges</td>
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**Perspective:** Project planning. Direct versus indirect challenge.

The interviewee addressed the direct challenge of the IPD team and its to overcome problems within the delivery of the project. A number of cultural reflections are made by the interviewee regarding this moderately direct consequence:

'I was with a group and we were sitting at breakfast and our steel fabricator delivered 375 anchor bolts in one day and all the nuts were supposed to be tack-welded to the bottom of the anchor bolts per the structural drawings. Well our steel fabricator missed that so they shipped all the nuts out loose and every one of them was loose – so we had to assemble one of them and screw the nuts and washers on the top and bottom and we were going for a footing inspection the very next morning on a Friday morning because we wanted to pour the concrete foundations so we wouldn’t have to deal with the rain that was coming over the weekend and leave our excavations open. Well the nuts had to be tack welded, the bolts and the nuts had to be tack welded to each other – the steel contractor hey you know we missed it and they were trying to avoid any responsibility for it so the boss (superintendent) of [the organisation] said hey “I’ve got a tack welding machine or a welding machine back at our office, I’ll go pick that up right now”. This is at 3:30 in the afternoon on a Thursday afternoon and he said “I will come back and I will tack weld those nuts” – he worked for about three hours and tack welded everyone of those nuts so we could get our inspection the next morning and pour the concrete footings the next day.’

Although a small cost was incurred by the project team over this incident, the overall cost for this incident was significantly cheaper than what the price could have been.
### Table 5.66: Desirable versus Undesirable Challenges

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<td>Interviewees</td>
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#### Interviewee Description & Analysis

**PM1**

*Perspective: Costs. Undesirable challenge.*

One minimally impacting undesirable perspective emerged regarding the participant discussion concerning costs, in particular party payments. The perspective as discussed by the interviewee particularly highlighted the undesirable cultural attitudes of IPD team members concerning project participation and input into the construction process:

‘Well, there is an area that creates some friction and it probably needs some looking at because our approach to the architects and engineers is that we pay them per the hour, by the hour for whatever they do. I mean they don’t have a budget they’ve given us an estimate but whatever they take. They will spend it. And our thinking is any money that you pay a good architect or a good engineer for work that they are really doing for the project is worth it. If they are working on a project but then they do share in a little bit of the profit at the end of the job, but its not as much as a team member because they have no risk and we set that hourly rate out at the very top end of what they normally charge on any other job because we think they are better than most of the architects and engineers. They certainly perform well for us. But you are trying to minimise the cost on the job.’
The discussed challenges provide a wide scope of the current issues impacting the organisation; these elements may be present as the organisation uses the lean innovation on a project-by-project basis as dictated by client/owner requirements. The presence of these themes does suggest that constant maintenance of the innovation needs to be established and reviewed periodically, particularly in the nature of how the lean innovation is used within the organisation.

5.9.6 Organisation E Researcher Reflections

This organisation utilises lean on a project-by-project basis as dictated by either the project or client brief.

Although knowing the benefits associated with the lean innovation the organisation has not undergone the lean transformation from an organisational perspective as the operative market dictates a more traditional management approach.

The cultural environment does not show the three phases of cultural maturity – this is caused by the nature of the IPD framework and the dictator nature of the operative environment.

The cultural environment is still underpinned by some essential lean orientated social norms such as advocacy – however the extent of this is limited due to the nature of the operative environment. The cultural environment is also affected by similar challenges as other lean cultural environments.

The organisation is not guided by any specific educational programs, it is guided by more formal social structures, rather than informal social structures and communicative networks; however, these could be present more on a project-by-project basis.

5.9.7 Conclusion

The discussion in this section has established the organisational, management and communication environments in which the organisation underwent a lean transformation. Over the course of lean use the organisation underwent significant maturing of its culture particularly in terms of social norms, presence of opinion leaders and change agents and educating individuals within the organisation about the process and decision behind the transformation. Specifically, those individuals interviewed within organisation had favourable experiences and exposures to the lean transformation process and were happy to acknowledge the presence of non-favourable experiences and challenges presented to them as result of the lean transformation.
Part 4: Cross-Case Analysis

Part 4 describes and analyses the cross relationships of the results of all organisations. The cross analysis provides an overview of the main themes present in each organisation that assist in lean implementation and influence the maturing of organisational culture.
5.10 Process Characteristics

Three themes emerged across the seven case studies as supporting the lean implementation process, including:

- **Communication**: the use of communicative strategies by management that communicate and support the strategy, process and practice of lean implementation. Strategies employed also advocate a deeper awareness and understanding of the innovation, information-sharing and knowledge development within the individual, between individuals and across organisational groups.

- **Education**: the presence of programs or an agenda to support the communication of the decision and subsequent decisions associated with the process and cultural maturity.

- **Culture**: the emerging behaviours, attitudes, morals and values supporting the cultural maturity journey and emerging social norms of the organisational environment.

The degree to which they were present varied across each of the organisational environments as the above characteristics are influenced by existing internal and external subordinates.

5.10.1 Communication

Communication was the first of three themes identified as supporting an organisation’s lean implementation journey. Of the seven cases forming the investigation, six organisations identified communication strategies that support the strategy, process and practice of lean implementation. One case study that didn’t identify any communicative learning strategies utilising lean on a project-by-project basis as dictated by the requirements of the client; as a result, process-specific communication is not present. The structure and nature of communication strategies utilised as part of the lean implementation process within construction organisations are reflective of extensions of existing elements of the operational and managerial environments of the organisation including social structures and employee training. The nature of communicative learning reflects communication style (i.e. written, visual and verbal) employed by organisational management and the type of communication networks (i.e. intrapersonal, interpersonal, group and multi-group) that form the organisational environment. For the purpose of the study, intrapersonal communication is referred to as ‘reflective’, interpersonal is ‘integrated’ and group/multi-group is study action team’; this has been done to sustain the industry terminology used as part of lean implementation. Table 5.67 *Organisational Communicative Learning Strategies* highlights the presence of communicative learning across the seven case study organisational environments.
Table 5.67: Organisational Communicative Strategies

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<tr>
<th>Communicative Groupings</th>
<th>Organisational Environments</th>
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<td>Plus/Delta Learning</td>
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<td>Goal alignment</td>
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<td>Verbal: Integrated</td>
<td>Tertiary Working Groups (Hetrophilic)</td>
<td>Tertiary Working Groups (Hetrophilic)</td>
<td>Bi-annual eventing Lunch &amp; Learns The Big Room</td>
<td>Daily Work Meetings (Hetrophilic)</td>
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<td>Group study sessions (Hetrophilic/Physical)</td>
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<tr>
<td>Verbal: Study Action Team</td>
<td>Lunch &amp; Learns The Big Room Group/study sessions (Hetrophilic)</td>
<td>Group study sessions (Hetrophilic)</td>
<td>Group study sessions (Hetrophilic)</td>
<td>Group study sessions (Homophilic)</td>
<td>Group study sessions (Hetrophilic/Physical)</td>
<td>Group study sessions (Homophilic)</td>
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<tr>
<td>Visual: Reflective</td>
<td>Goal alignment &amp; project progress reporting</td>
<td>Reading</td>
<td>Gamba Wall Plus/Delta Learning Goal alignment &amp; project progress reporting</td>
<td>Field assessments Motivation</td>
<td>Daily Work Meetings Information Centres Self-assessment tooling</td>
<td>Golden ‘Organisational’ Rules Group study sessions (Hetrophilic/Physical) Metaphorical/ Engagement</td>
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### Table 5.67: Organisational Communicative Strategies

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<td>Visual: Integrated</td>
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<td>Written: Study Action Team</td>
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<td>Gamba Wall (Project specific)</td>
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Table 5.67 Organisational Communicative Strategies identifies the core communication strategies employed by six of the seven organisations to support the communication of the lean implementation process within the organisational environment. One organisation employs lean strategies and principles on a project-by-project basis as dictated by client requirements and as such the organisation shows no communicative strategies in supporting lean implementation. Despite this, the organisation experienced some change in the style of communication between lean and traditional procured projects, including deeper communicative bonds between project partners and parties, open collaboration and improved working relationships.

Across the organisational environments the strategies employed by organisational management show varying degrees and approaches to how communication is used to inform and support lean implementation; varying communicative strategies also highlight differing and constructivist perspectives and attitudes towards lean implementation. Although the communicative strategies vary between organisational environments, how the strategies inform and communicate lean implementation is similar, with homophilic- and hetrophilic-specific awareness strategies employed across verbal, visual and written communicative mediums.

The strategies identified as forming communication further highlighted the commitment by organisational management to advocate:

- **Intrapersonal (reflective) communication:** the reflective or intrapersonal communicator learner is representative of a single person or individual within the organisational environment communicating within themself. A reflective communicator communicates inwardly through personal thinking, reflection and self-education of their duties, role and knowledge.

- **Interpersonal (integrated) communication:** the integrated or interpersonal communicator is representative of two individuals within the organisational environment communicating. Integrated communicators communicate on a one-on-one basis or in a small group to establish/maintain relationships, development and share knowledge through learning.

- **Group/multi-group (study action team) communication:** the study action team or group/multi-group communicator is representative of a group or multiple groups within the organisational environment being communicated to by a singular for coordination and knowledge purposes. The nature of study action team learning is hetrophilic and homophilic.
The move towards advocating a deeper awareness and understanding of lean by organisational management at an individual, team and group level highlights a firm managerial commitment towards the implementation of lean and a deeper cultural desire, want and awareness of lean (refer to section 6.2 Diffusing Lean: Drivers of Support).

5.10.2 Education

Education was the second of three themes identified as supporting an organisation’s lean implementation journey. Of the seven cases forming the investigation, six organisations identified education or a program of learning as a strategic element to support the strategy, process and practice of lean implementation. The one case study that did not identify education or a form educational programming as part of lean implementation employs lean strategies on a project-by-project basis as dictated by client requirements. Education and educational programming is utilised within organisational environment as part of the communicative framework. More specifically, education is utilised to support the communication decision and subsequent decisions associated with lean implementation, including the strategic direction, process and practice within the organisational environment. Table 5.68 Organisational Educational Strategies identifies the education or educational programmes employed across the seven organisational environments forming the studied cases; also highlighted in the table are shared similarities between integrated and study action team communicative strategies and education programs utilised by organisational management. Education and educational programming will be similarly addressed as communication; however, the intrapersonal (reflective), interpersonal (integrated) and group/multi-group (study action team) groups will be identified as individual, team and multi-group.
Table 5.68: Organisational Educational Strategies

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<th>Educational Groupings</th>
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Table 5.68 Organisational Educational Strategies identifies the education framework and educational strategies employed by six of the seven organisations forming the learning environment. One organisation employs lean strategies and principles on a project-by-project basis as dictated by client requirements and as such the organisation shows no educational strategies in supporting the communication of lean implementation. The nature of education within the organisational environment is limited to existing communication networks underpinning the process. Across the organisational environments the strategies employed by organisational management show more common forms of education and educational programming to be present. Although the nature of education and educational programming is similar across multi-organisational environments, the way in which education is approached is varied, highlighting the presence of constructivist perceptions and attitudes. This is particularly present in that not one form of education program or strategy is represented across all of the organisational environments.

The nature of the educational programming employed by organisational management is evenly represented across the three educational groups, with the larger team and multi-group categories more prominently influenced by educational programs that incorporate active and communicative participation. This active approach highlights the interpersonal and group nature of construction organisations environment in overcoming ‘ad hoc relations’ to become more interactive through learning. This is particularly highlighted by the stronger presence of group study sessions, lunch-and-learns and big-room educational strategies across the organisational environments and the emergence of visual learning through information centres as an alternative educational approach. The presence of individual educational programs across five of the seven organisational environments is more reflective in nature, highlighting the intrapersonal perspective of individual learning (such as reading and visual learning). Education and educational programming is addressed in further detail in section 6.2.2 Education.

5.10.3 Social Environment
The social environment was the third of three themes identified as supporting an organisation’s lean implementation journey. All seven organisations forming the research investigation identified culture to be present within the organisational environment and used as part of the framework supporting lean implementation. Culture is representative of the behaviours, attitudes, morals and values of the organisational workforce influencing the lean implementation through acceptance (support) or rejection (no support) of the strategic direction, process and practice within the organisational environment.
Table 5.69 *Organisational Cultural Characteristics* identifies the cultural elements employed or emerging across the seven organisational environments forming the studied cases. The table also highlights the presence of opinion leaders and change agents who are typically representative as influential individuals or groups supporting the cultural development of the workforce throughout lean implementation. Cultural categories represent the cultural environment (social norms), social relations and supporting organisational and innovation opinion leaders/change agents.
### Table 5.69: Organisational Cultural Characteristics

<table>
<thead>
<tr>
<th>Cultural Categories</th>
<th>Organisational Environments</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
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<tr>
<td>Social Norms</td>
<td>Advocacy (Self, Organisation, Project)</td>
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<td></td>
<td>Integration (Team)</td>
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<td>Stability</td>
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<td>Education</td>
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<td></td>
<td>Study Groups (Hetrophilic)</td>
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<td></td>
<td>External Relations (Hetrophilic)</td>
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</table>
Table 5.69: Organisational Cultural Characteristics

<table>
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<tr>
<th>Cultural Categories</th>
<th>Organisational Environments</th>
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<th>E</th>
<th>F</th>
<th>G</th>
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</thead>
<tbody>
<tr>
<td>Organisational leaders/agents</td>
<td>Opinion Leaders</td>
<td>Opinion Leaders</td>
<td>Change Agents (External)</td>
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<td>Opinion Leaders</td>
<td>Change Agents</td>
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<tr>
<td>Innovation leaders/agents</td>
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<tr>
<td>Education leaders/agents</td>
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<td>Opinion Leaders</td>
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</table>
Table 5.69 identifies the cultural characteristics employed by all seven of the organisations and the supporting opinions leaders and change agents across five of the seven organisations. Similarly, cultural and social norms are shared across the organisations, particularly integration (all seven), advocacy (six out of seven), education and stability (five out of seven). The nature of the cultural and social characteristics across the organisational environments shows commonality towards lean implementation emerging when an organisation undergoes the transformation, particularly in the presence of heterophilic- and homophilic-specific relations. This is highlighted with the current identified cultural environments of each organisation and the influence that the informal nature of these relations and opinion leaders/change agents have on the cultural environment of the organisation moving towards an adaptive and collaborative environment:

- Four out of the seven organisations are identified as culturally adaptive and collaborative, showing a combination of all social norms, with opinion leader and change agent capacity across all organisations.

- Two out of the seven organisations are identified as culturally bureaucratic and divisional, showing a combination of all social norms, with opinion leader and change agent capacity across one of the organisations.

- One of the seven organisations is identified as culturally adaptive and divisional, showing a combination of all social norms, with no opinion leader and change agent capacity.

The phases of the implementation process will now be identified and discussed.

5.11 Lean Implementation and Cultural Maturity

Lean implementation and its process is concerned with maximising an organisation’s productivity through the elimination of waste; the nature of productivity across the seven cases is linked to the maturing of culture through improvement of organisational practice. Three phases were identified as forming lean implementation across the seven cases forming the research investigation into lean adoption and cultural maturity:

- **Phase 1: Strategic Direction**: the influences, decisions and directions underpinning an organisation’s desire, want and/or need to undergo lean implementation.

- **Phase 2: Tool Selection/Development**: the selection of and/or development of tooling strategies, programs and agendas to support the strategic direction and implementation.
• **Phase 3: Organisational Practice**: the operational and managerial environments of the organisation and the improvements or changes that occur with lean implementation.

Table 5.70 *Lean Implementation Time and Phase Characteristics* identifies the elements forming each phase of the lean implementation process in line with each organisation’s current timeframe. Also highlighted in the table is the evolutionary nature of the process itself, with the characteristics of each phase in terms of strategic direction, tool selection/development and organisational practice identified. The cultural characteristics such as challenges, confirmation identifiers and process identifiers that underpin the transformation and journey organisations undertake are also highlighted.
### Table 5.70: Lean Implementation Time and Phase Characteristics

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Lean Implementation Time Characteristics</th>
<th>Timeframe: 0–4 Years</th>
<th>Timeframe: 5–9 Years</th>
<th>Timeframe: 10+ Years</th>
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<tbody>
<tr>
<td>A</td>
<td><strong>Strategic Direction</strong></td>
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<td></td>
<td>1. Integrated suite on multiple projects.</td>
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<td>2. Collaboration and awareness of lean.</td>
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<td>3. Education of the public and private business.</td>
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<td>4. Lean implementation ongoing for a period of 10 years.</td>
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<td></td>
<td><strong>Tool Development</strong></td>
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<td>1. Integration of tools across multiple projects and throughout the organisation.</td>
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<td>2. Full suite of educational programmes in place.</td>
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<td>3. Open communication with formal and informal avenues integrated.</td>
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<td><strong>Practice</strong></td>
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<td>1. High, moderate and low levels of lean awareness.</td>
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<td>2. Full collaboration of organisational groups.</td>
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<td>4. Adaptive and resilient working environment.</td>
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<tr>
<td>Organisation</td>
<td>Lean Implementation Time Characteristics</td>
<td>Timeframe: 0–4 Years</td>
<td>Timeframe: 5–9 Years</td>
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<td>B</td>
<td>Strategic Direction</td>
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<td>2. External business review and analysis.</td>
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<td>3. Contractual obligation underpinning direction.</td>
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<td>4. Education of higher management initially with organisation to follow.</td>
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<td>5. Lean implementation ongoing for nine months.</td>
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<td>Tool Development</td>
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<td>1. Strong focus on education programmes with a pre-established educational agenda.</td>
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<td>2. Influenced by existing contractual relations with Organisation A.</td>
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<td>3. Focused towards projects and project activities.</td>
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<td>1. High levels of low lean awareness.</td>
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<td>2. High levels of ad hoc communication between organisational groups.</td>
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<td>3. High levels of homophilic communication within some organisational groups.</td>
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<td></td>
<td>4. Issues with project planning.</td>
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</table>
### Table 5.70: Lean Implementation Time and Phase Characteristics

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Lean Implementation Time Characteristics</th>
<th>Timeframe: 0–4 Years</th>
<th>Timeframe: 5–9 Years</th>
<th>Timeframe: 10+ Years</th>
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<tr>
<td>C</td>
<td><strong>Strategic Direction</strong></td>
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<td></td>
<td>1. Refinement of business profiling in line with lean implementation and changes in managerial and operational practice.</td>
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<td>2. Management of internal and external business analysis.</td>
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<td>4. Lean implementation ongoing for seven years.</td>
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<td><strong>Tool Development</strong></td>
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<td></td>
<td>1. Refinement of tools in line with projects and organisational environment.</td>
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<td>2. Refinement of review procedures in line with lean implementation such as performance and communication.</td>
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<td>3. Refinement of existing educational programming in line with move towards integrated lean environments (includes external relations for training purposes).</td>
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<td></td>
<td><strong>Practice</strong></td>
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<td></td>
<td>1. Moderate levels of lean awareness throughout the organisation.</td>
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<td>2. More open collaboration and communication between organisational groups.</td>
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<td>3. Acceptance of performance management.</td>
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<tr>
<td>Organisation</td>
<td>Lean Implementation Time Characteristics</td>
<td>Timeframe: 0–4 Years</td>
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<td>D</td>
<td><strong>Strategic Direction</strong></td>
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<td></td>
<td>1. Refinement of internal business environment in line with lean implementation progress.</td>
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<td>2. Move towards introducing lean into regional markets.</td>
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<td>3. Lean implementation ongoing for nine years.</td>
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<td><strong>Tool Development</strong></td>
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<td></td>
<td>1. Refinement of tools in line with the organisational environment (location dependent).</td>
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<td>2. Refinement of existing educational tools such as daily huddles.</td>
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<td><strong>Practice</strong></td>
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<tr>
<td></td>
<td>1. Moderate levels of lean awareness throughout the organisation as implementation is location dependent.</td>
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<td>2. More open collaboration and communication between organisational groups.</td>
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<td>3. Acceptance of performance management.</td>
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</table>
### Table 5.70: Lean Implementation Time and Phase Characteristics

<table>
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<tr>
<th>Organisation</th>
<th>Lean Implementation Time Characteristics</th>
<th>Timeframe: 0–4 Years</th>
<th>Timeframe: 5–9 Years</th>
<th>Timeframe: 10+ Years</th>
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<td>E</td>
<td><strong>Strategic Direction</strong></td>
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<td></td>
<td>1. Fully integrated lean suite system for lean only projects.</td>
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<td>2. Collaboration and awareness of lean.</td>
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<td><strong>Tool Development</strong></td>
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<td>1. Integration of tools across multiple projects and throughout the organisation.</td>
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<td>2. Open communication with formal and informal avenues integrated.</td>
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<td><strong>Practice</strong></td>
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<td></td>
<td>1. High, moderate and low levels of lean awareness dependent on contractual relations between IPD teams.</td>
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<td>2. Elements present of lean applications outside the IPD environment.</td>
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<td>3. Full collaboration of organisational groups.</td>
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<td></td>
<td>5. Adaptive but divisional working environment.</td>
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</table>
Table 5.70: Lean Implementation Time and Phase Characteristics

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Lean Implementation Time Characteristics</th>
<th>Timeframe: 5–9 Years</th>
<th>Timeframe: 10+ Years</th>
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<td>F</td>
<td>Strategic Direction</td>
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<td>1. Internal business review and analysis.</td>
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<td>2. External business review and analysis.</td>
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<td></td>
<td>3. Contractual obligation underpinning direction.</td>
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<td></td>
<td>4. Education of higher management initially with sub-organisational groups to follow.</td>
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<td></td>
<td>5. Lean implementation ongoing for two to three years.</td>
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<td>Tool Development</td>
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<td>1. Development of education and training programmes to support the introduction of lean.</td>
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<td>2. Development of sub-organisational specific tooling objectives (such as information centres, daily huddles etc.).</td>
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<td>3. Development of tools to target ad hoc communication network within the organisation.</td>
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<td>Practice</td>
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<td>1. High levels of low lean awareness.</td>
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<td>2. High levels of ad hoc communication between organisational groups.</td>
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<td>3. High levels of homophilic communication within some organisational groups.</td>
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<td>4. High levels of educational issues in terms of demographics of labour (age, educational levels and ethnicity).</td>
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<td>5. Issues with team performance.</td>
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<td></td>
<td>6. High levels of waste.</td>
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### Table 5.70: Lean Implementation Time and Phase Characteristics

<table>
<thead>
<tr>
<th>Organisation</th>
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<th>Timeframe: 0–4 Years</th>
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<td><strong>Strategic Direction</strong></td>
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<td>1. Internal business review and analysis.</td>
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<td>2. External business review and analysis.</td>
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<td>3. Education of higher management initially with organisation to follow.</td>
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<td></td>
<td>4. Lean implementation ongoing for six to 12 months.</td>
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<td><strong>Tool Development</strong></td>
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<td></td>
<td>1. Strong focus on education programmes with a pre-established educational agenda.</td>
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<td>2. Strong focus on improving communicational networks within and between organisational groups.</td>
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<td>3. Focused towards projects and project activities.</td>
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<td><strong>Practice</strong></td>
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<td>1. High levels of low lean awareness.</td>
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<td>2. High levels of ad hoc communication between organisational groups.</td>
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<td></td>
<td>6. High levels of waste.</td>
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Table 5.70 *Lean Implementation Time and Phase Characteristics* highlights a clear process of cultural maturity occurring throughout the organisational environments, the nature of the which is transformative. It is also interesting to see how the organisation in which lean is employed on a project-by-project basis showed unconscious application of lean principles and strategies within daily duties and processes, which has matured the cultural environment and outlook of the organisation. This will be explored in further detail in Chapter 6 *Discussion*.

5.14 Conclusion

The results chapter has highlighted and addressed the key data types and themes underpinning each of the seven case studies forming the research investigation through thematic and cross-case analysis methods. The chapter has identified the following key points that will be addressed further in Chapter 6 *Discussion*.
Chapter 6 Discussion

6.1 Introduction
Chapter 6 of the research thesis answers the two research questions introduced in previous chapters. This chapter sets out to address the primary aim of the research by developing a deeper understanding of lean implementation and cultural maturity in construction organisations. Secondary to this is the need to identify the drivers that support lean diffusion and cultural maturity.

The discussion is organised into two sections representative of the two research questions. Section 6.2 Diffusing Lean Drivers of Support addresses the first research question:

What are the drivers supporting an organisation’s lean implementation journey?

The first question identifies and discusses the similar characteristics of the implementation process across the seven case organisations. The in-case and cross-case analysis in Chapter 5 Research Results was dedicated to ascertain the characteristics of lean implementation.

Section 6.3 Diffusing Lean Implementation & Process Maturity and Section 6.4 Diffusing Lean: Organisational Cultural Maturity address the second research question:

How does the diffusion of lean in construction organisations influence cultural maturity?

The second question discusses in depth how lean is diffused in organisations and the cultural impacts of the process. The in-case and cross-case analyses in Chapter 5 were dedicated to establishing the processes that organisations have undertaken and the resulting perceptions associated with the implementing of the lean innovation.

6.2 Diffusing Lean: Drivers of Support
This section answers the first research question introduced in Chapter 2:

What are the drivers supporting an organisation’s lean implementation journey?

To answer this question we must first explain in detail how the drivers support lean diffusion in construction organisations. This section identifies and explains the strategic drivers developed by senior management across the seven case studies to support the workforce when lean implementation occurs. Empirical studies in the lean community that discuss lean implementation have typically focused on lean from a one-case perspective then presenting the results as generalisation across similarly organisations; Stake (2011) has discussed this within case study research extensively linking misconceptions to selection types. Orr (2005) discusses this with lean leadership as the missing key to understanding implementation,
conducting the research through a deductive means presented generalisations that contextualised a positive acceptance across groups. This approach was similar to research by Buch & Sander (2005) who also used a deductive case study to validate the use of lean strategies in subcontractor relationships. To overcome such prominent generalisations seven organisations were examined in detail; with each found to be guided by three common strategic drivers, though, in some organisations, only two common strategic drivers were identified which reflects the level of lean diffusion and influencing market conditions. These are explained in detail in Section 6.3. Within each organisation the drivers are approached aligned with a senior management-developed lean strategic direction resulting in differences in importance and approach to emerge.

The study identified three common strategic drivers that are important in supporting the workforce through the lean implementation journey. These common strategic drivers can be mapped across the seven case organisations and include:

- **lean knowledge centres;**
- **organisation networking; and**
- **supportive social environment.**

These are now explained in detail.

### 6.2.1 Lean Knowledge Centres

Lean knowledge centres are identifiable in some form across six of the seven case organisations. One case organisation utilises lean principles only on a project-by-project basis as requested or outlined by the client, and as such lean knowledge centres are not present in the same capacity as other case organisations. Lean knowledge centres were established by senior management in case organisations as a formal strategy to encourage lean learning across the workforce through interactive tool adoption.

Lean knowledge centres are seen by managers in case organisations as the first point of contact for the workforce in lean diffusion. For management, the lean knowledge centres are designed to provide a formal framework to guide the development of workforce understanding of lean and to guide interaction between organisation groups. The approach towards lean knowledge centres across the case organisations is similar with the main purpose of centres to nurture and support lean knowledge development.

Table 6.1 *Lean Knowledge Centre Strategies* maps the common education strategies employed by senior and middle management in the case organisations. The table indicates the approach of each strategy and the tools that are involved. Although similarities emerge across
the seven cases, the approach to lean knowledge centres is unique to each organisation and the strategic direction of implementation development by senior management. It can be seen in the table that lean implementation is more about developing a strategic direction around organisational goals then targeting specific tools of improvement as suggested in many lean research studies (Howell, 1999; Ballard and Howell, 1999; 2000; 2001; Green, 1999; 2000; 2005; 2011; Orr, 2005; Buch & Sander, 2005; Alves et al, 2010).

Differences between case organisations emerge in the structure as well as the selected tools forming the knowledge direction. In the majority of organisations, lean knowledge centres are managed and run by influential champions; these individuals are referred to as either ‘lean educators’ or ‘lean facilitators’. Their role is to motivate and encourage informal heterophilic interaction between members of different organisation groups through formal education agendas. In other organisations, lean knowledge centres are placed within the working environment thereby providing the workforce with a more practical centre that encourages and educates individuals at a level more aligned to their duties. One organisation that is considered to be a lean culture incorporates both lean knowledge centres identified in the other case organisations.
Table 6.1 Lean Knowledge Centre Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Reading Resource</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Training</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Plus/Delta Learning</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch &amp; Learns</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>The Big Room</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Opinion Leaders</td>
<td>×</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Formal strategy of individual lean learning.</td>
</tr>
<tr>
<td>× Formal strategy of individual lean learning.</td>
</tr>
<tr>
<td>✓ Formal strategy providing visual point of contact for daily productivity updates.</td>
</tr>
<tr>
<td>× Formal strategy providing visual point of contact for daily productivity updates.</td>
</tr>
<tr>
<td>✓ Informal strategy to learn from one’s or the group’s mistakes.</td>
</tr>
<tr>
<td>× Informal strategy to learn from one’s or the group’s mistakes.</td>
</tr>
<tr>
<td>✓ Informal strategy to learn about lean success and failures in projects and the organisation.</td>
</tr>
<tr>
<td>× Informal strategy to learn about lean success and failures in projects and the organisation.</td>
</tr>
<tr>
<td>✓ Formal strategy of lean learning, organisation aligned agenda.</td>
</tr>
<tr>
<td>× Formal strategy of lean learning, organisation aligned agenda.</td>
</tr>
<tr>
<td>✓ Formal strategy to influence and support.</td>
</tr>
<tr>
<td>× Formal strategy to influence and support.</td>
</tr>
<tr>
<td>Strategy</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Change Agents</td>
</tr>
</tbody>
</table>
The varied presence of lean knowledge centres across case organisations is representative of the unique strategic direction underpinning lean diffusion. Organisations with long-term lean diffusion are often more established, with centres incorporating employees employed throughout all management levels of the organisation and sharing and communicating their awareness and knowledge. This is a clear example of hetrophilic interaction within lean diffusion. In contrast, organisations with short-term lean diffusion often have less-established lean knowledge centres and instead focus on lean adoption within the team through implementation of specific tools, as per working requirements for job optimisation and improvement directed by homophilic interaction. This trend does not underpin all organisations with short-term lean diffusion. Two organisations identified the importance of lean knowledge centres in guiding lean diffusion through the motivation of employees to grow and develop new knowledge. The organisations partaking in this approach highlighted strong links to study action team scenarios. The reliance on study action teams as part of lean knowledge centres strongly supports existing studies into the relationship between study action teams and lean diffusion, particularly research undertaken by Hirota et al. (1998), Alves et al. (2010) and Lean Project Consulting (2010).

6.2.2 Organisation Networking
The study highlighted that the diffusion of lean is supported by senior management through the establishment of formal and informal networking. Formal and informal networking across the case organisations was representative of senior management advocating a deeper awareness of lean through information sharing for the individual worker, between workers and across organisational groups. These formal and informal networks are representative of reflective, integrated and team networking. Across the case organisations the transition of formal and informal networking was guided by verbal, visual and written strategies designed to homogeneously enhance the organisation. The enhancing of the workforce occurs as senior management develops a networking approach that supports the individual in developing their own lean knowledge. The advocating of a deeper awareness of lean knowledge in this study suggests lean diffusion is an organic transition rather than an immediate organisational change.

Individual networking across the case organisations was viewed in the form of reflection; that is, the individual within the lean diffusion inwardly develops communication skills that assist in developing an awareness or opinion of lean. Reflective networking was seen in the case organisation as the taking of lean tools introduced in lean knowledge centres and diffusing these as part of their role in the organisation. Characteristically, across the case organisation this individual becomes self-motivated, self-assesses their duty and role, and is self-critical. The approach of reflection in case organisations was varied. In some organisations reflection
was seen more formally as a means to support communication around lean knowledge centres through assessments of productivity contribution. In other case organisations reflection was more informal in approach, with assessment based on organisational positioning. Despite the differing approaches the purpose of reflection was similar in that lean diffusion was questioned and the learning of lean lessons was incorporated into a maturing strategy.

Reflective networking has been identified in numerous communication studies in construction, most notably Gorse (2002) who refers to reflection as a form of interpersonal communication. However, interpretations of interpersonal reflection do not fully understand the importance of the self-learning individual in diffusion. An outcome of this study is that in organisational maturity, reflective networking of the individual is highly critical of lean. However, through managerial support, the individual (as lean diffuses) becomes less critical and more open to change, thus further affecting other formal and informal networks.

Integrated networking was another formal and informal strategy present across the case organisations. Integrated networking is the interpersonal interaction between like-minded organisation group members; this integration displays homophilic tendencies. Integrated networking in the case organisations involved like-minded organisation group members developing outward communication skills. The development of such skills assists the organisation group to share its lean knowledge and lean opinion, thus developing a collective lean understanding. Characteristically, across the case organisations these organisation groups begin to embrace open communication and collaboration, motivate others within the group, and encourage the development of others. The approach of integrated networking in case organisations was similar in that senior management specifically developed formal strategies for group integration. These strategies in organisations that have diffused lean over the long term remained relatively unchanged. The purpose of integrated networking as part of supporting strategies for lean diffusion was to specifically (in case organisations) to target known waste-creating areas and relationships and improving these by enhancing internal relations. Integrated networking has been identified in numerous communication studies in construction; most notably Emmitt & Gorse (2000, 2002) and Dainty et al. (2006) refer to integration as a form of intrapersonal communication that is linear. However, interpretations of intrapersonal communication in organisation groups do not fully understand the importance of the integrated networking in diffusion. An outcome of this study is that in earlier organisation, maturity-integrated networking is about the development of relations and support agendas to assist in improving homophilic communications. As lean is diffused, senior management alters the purpose of integrated networking as a means to maintain developed homophilic structures; this is seen by senior management as a form of workforce support.
Team networking was the third organisation network identified across the case organisations. Team networking in case organisations is similarly aligned with integrated networking, only involving non-like-minded organisation group members interacting to develop a collective lean understanding. The team-networking driver is about developing hetrophilic relations across organisational groups from management to the labour workforce. Characteristically, across the case organisations these organisation groups mature by embracing a learning culture that openly shares lean experiences and thought. Only some case organisations identified team networking as part of their support framework, the organisations that did were those who diffused lean over the longer term. For other organisations, team networking is not considered strategically viable for lean diffusion; this attitude of senior management is guided by a lack of desire to integrate and communicate with individuals deemed to be uneducated. Team networking in construction studies is identified as a form of group or multi-group communication (Emmitt & Gorse, 2000, 2002), which is seen as linear (Dainty et al, 2006). An outcome of this study is that this group or multi-group communication is also approached as a strategic form of education through study action teams, which approach communication as a form of persuasion in lean diffusion.

6.2.3 The Social Environment

The social environment was the third driver identified across case organisations as supporting lean implementation. The social environment in case organisations was discussed aligned with workforce norms and behaviours, social systems and communication. The presence of such social environment elements is varied across the case organisations. The importance of the social environment is similarly approached by senior and middle management. Across the case organisations the social environment is about developing an environment that supports and nurtures the workforce as lean is diffused.

Table 6.2 Social Environment Characteristics maps the common social environment characteristics identified in the case organisations. The table indicates the approach and the application of each characteristic in the organisation. Although, similarities emerge across the seven cases, the developing social environment is unique to each case organisation.
Table 6.2 Social Environment Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Organisation</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Norms: Advocacy</strong></td>
<td>Workforce advocating lean in duties, the project, the office and to the client.</td>
<td>✓ Workforce advocating lean in duties, the project, the office and the team.</td>
<td>✓ Workforce advocating lean in duties, the project, and the office.</td>
<td>× Workforce advocating lean in duties, the project, the team and the office.</td>
<td>✓ Workforce advocating lean in duties, the project, the team and the office.</td>
<td>✓ Workforce advocating lean in duties, the project, the team and the office.</td>
<td>✓ Workforce advocating lean in duties, the project, and the office.</td>
<td>✓ Workforce advocating lean in duties, the project, and the office.</td>
</tr>
<tr>
<td><strong>Social Norms: Integration</strong></td>
<td>Organisation groups integrated homogenously.</td>
<td>✓ Organisation groups integrated homogenously.</td>
<td>✓ Organisation and project groups integrated homogenously.</td>
<td>✓ Organisation and project groups integrated homogenously.</td>
<td>✓ Organisation and project groups integrated homogenously.</td>
<td>✓ Organisation and project groups integrated homogenously.</td>
<td>✓ Organisation groups integrated homogenously.</td>
<td>✓ Organisation groups integrated homogenously.</td>
</tr>
<tr>
<td><strong>Social Norms: Education</strong></td>
<td>Strong focus.</td>
<td>✓ Strong focus.</td>
<td>✓ Strong focus.</td>
<td>✓ Medium focus.</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>Strong focus.</td>
</tr>
<tr>
<td><strong>Opinion Leaders</strong></td>
<td>Not role defined.</td>
<td>✓ Not role defined.</td>
<td>✓ Role defined.</td>
<td>✓ Role defined.</td>
<td>×</td>
<td>✓ Role defined.</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td><strong>Change Agents</strong></td>
<td>Not role defined.</td>
<td>✓ Not role defined.</td>
<td>✓ Role defined.</td>
<td>✓ Role defined.</td>
<td>×</td>
<td>✓ Role defined.</td>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>
The characteristics of an organisation’s social environment are often described in construction studies aligned with positive and negative opinions of construction culture, with reference to Hofstede’s national culture interpretative framework. Representation of the emerging social behaviours and attitudes of the workforce is usually reported one-dimensionally with the suggestion that culture statically changes and as such is simply an extension of the organisational environment (e.g. Duffy, 2001; Rooke et al, 2001). An outcome of this study is that the culture of the organisation is guided by a supportive social environment which encourages and nurtures interaction, integration and knowledge development of the workforce as innovation is diffused. The supporting social network provides a formal and informal framework for the workforce to better align itself within the organisation; the maturing of the social environment occurs over time and is impacted by both positive and negative experiences.

6.2.4 Summary
The identification and mapping of supporting drivers has developed an overall understanding of the strategic process of senior management in approaching and diffusing lean. The purpose of the identification and mapping of supporting drivers was to highlight the ways in which the workforce in construction organisations is encouraged and nurtured as part of the process. This was done as there is a tendency in lean construction and culture research to simply focus upon either the process or the culture or elements of both without understanding the relationship.

The claims by some lean researchers that lean implementation leads to cultural negativity in the form of employee dissatisfaction (see Chapter 2) can be seen in perspective. Cultural negativity is typically viewed as a rejection response to the change management introduced by senior or middle managers. This study found that cultural responses by the workforce are guided by whether management provides the necessary structure to support that change; in this study, these are representative of supporting drivers. An aim to support the workforce in lean diffusion is about the pursuit of lean knowledge through workforce interaction, achieved through the provision of lean knowledge centres, organisational networking and the social environment. Provision of workforce support was seen in short-term and long-term adoption frameworks, with the flexibility to alter these support drivers as lean is diffused. Developing a deeper understanding of lean diffusion was a major aim of this study, which has been achieved through the identification and mapping of support drivers.

The mapping of support drivers across the case organisations provides a picture of lean holistically while also providing the necessary missing link between diffusion and cultural maturity. This missing link provides an opportunity to understand lean diffusion aligned with
cultural maturity in construction organisations at varying process stages and this is now discussed.

6.3 Diffusing Lean: Implementation and Process Maturity

This section begins to answer the second research question introduced in Chapter 3:

How does the diffusion of lean in construction organisations influence cultural maturity?

To answer this question we must first explain in detail how lean is diffused in construction organisations; Section 6.4 then brings this together by describing the way in which diffusion influences cultural maturity. The two sections together explain how lean is diffused within the various case studies by describing how each organisation undergoes unique process transformations as the organisation’s culture matures. Seven organisations were examined in detail and each was found to be at different stages of implementation and different stages of cultural maturity. Even within the one organisation, different groups were found to be at different stages of lean understanding, and thus lean implementation and various sub-cultures were thus identified.

The study identified a number of factors that are important to understanding how lean is diffused within organisations. The factors affecting diffusion can be mapped across the seven case organisations. The diffusion of the lean innovation within the organisation is guided and influenced by drivers and impediments. The interaction between drivers and impediments is an important aspect of lean diffusion and this is discussed in detail later. The process of lean diffusion first needs to be explained.

The lean diffusion process incorporates five phases addressed in figure 6.1 *Phases of Lean Implementation Diffusion*. The five phases are identified as:

- Phase 1: Pre lean;
- Phase 2: Executive decision and making strategy setting;
- Phase 3: New processes;
- Phase 4: Embedded practice; and
- Phase 5: Lean culture.

The latter three phases of lean diffusion are interconnected and reflect the evolutionary approach of lean implementation.
Within each organisation there was a phase of executive decision making regarding the decision to adopt lean within the organisation. This was then followed by a time where each organisation created and developed new sub-processes to support lean implementation. It then became apparent after some time the processes became embedded within the organisations as commonly accepted work practices. This is addressed in detail in Table 6.3 *Lean Diffusion Characteristics*. During these latter two phases each organisation continuously modified and adapted various processes and practices to suit their unique situations.
<table>
<thead>
<tr>
<th>Organisation</th>
<th>Lean Implementation Diffusion</th>
<th>Process Approach</th>
<th>New Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation A</td>
<td>• Owner specific&lt;br&gt;• Authoritative&lt;br&gt;• Internal business environment</td>
<td>• Adoption on projects – some success and failure&lt;br&gt;• Adoption in technology – greater success and some failure&lt;br&gt;• Adoption in organisation – success&lt;br&gt;• Adoption in external organisations – various success</td>
<td>• Efficiency of work practices&lt;br&gt;• Policy changes&lt;br&gt;• Trust in trade partners and supply chain&lt;br&gt;• Informal social networks&lt;br&gt;• Innovation as a culture&lt;br&gt;• Intensive suite implementation&lt;br&gt;• Internally supportive culture&lt;br&gt;• Externally supportive culture</td>
</tr>
<tr>
<td>Organisation B</td>
<td>• Externally influenced decision&lt;br&gt;• Authoritative&lt;br&gt;• Generally accepted by those closest to lean&lt;br&gt;• Resistance in office localities&lt;br&gt;• Fast-tracking implementation</td>
<td>Approach 1: Initial&lt;br&gt;• Adoption on projects – failure (10 years prior to current implementation)&lt;br&gt;• Adoption in organisation technology – failure (10 years prior to current implementation)&lt;br&gt;Approach 2: Second Attempt&lt;br&gt;• Adoption on projects – some success and failure&lt;br&gt;• Success of adoption in Organisation A – changing attitudes&lt;br&gt;Approach 3: Third Attempt&lt;br&gt;• Adoptions of projects – success and some failure&lt;br&gt;• Education and training focus – success&lt;br&gt;• Adoption in other office localities – some success and failure</td>
<td>• Efficiency of work practices&lt;br&gt;• Policy changes&lt;br&gt;• Cutting of trade partner and supply chain waste&lt;br&gt;• Informal social networks&lt;br&gt;• Innovation as a culture i.e. entrepreneur&lt;br&gt;• Semi-intensive project implementation&lt;br&gt;• Internally supportive culture</td>
</tr>
</tbody>
</table>
### Table 6.3: Lean Implementation Diffusion

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Lean Implementation Diffusion</th>
<th>Process Approach</th>
<th>New Practice</th>
</tr>
</thead>
</table>
| Organisation C | • Externally influenced decision  
• High level of initial resistance  
• Organisational change i.e. loss of workforce  
• Authoritative | • Widespread adoption in the organisation – some success and failure  
• Development of new organisation direction including norms, visions, missions and values – greater success  
• Development of education and training programme – wider acceptance  
• Development of trade partner lean package for adoption in external organisations – success | • Efficiency of work practices  
• Policy changes  
• Philosophical maturity  
• Mental maturity  
• Informal social networks  
• Internally supportive culture  
• Externally supportive culture  
• Semi-intensive organisation leading towards intensive suite implementation |
| Organisation D | • Internal decision  
• Market influenced  
• Performance influenced  
• Authoritative | • Adoption of principles in head office – some success  
• Adoption of principles in second-largest organisation environment – success  
• Adoption of tools as part of project delivery – some success  
• Adoption of principles in other locations – limited success, forms next ‘big’ decision | • Efficiency of work practices  
• Policy changes  
• Philosophical maturity  
• Informal social networks  
• Internally supportive culture  
• Semi-intensive organisation with semi-intensive project attributes |
| Organisation E | • Team influenced  
• Market influenced  
• Authoritative, i.e. accepted as client specified or project dictated | • Adoption of lean on local projects – success | • Efficiency of work practices, i.e. lean only  
• Informal social networks  
• Internally supportive culture  
• Semi-intensive project |
Table 6.3: Lean Implementation Diffusion

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Lean Implementation Diffusion</th>
<th>New Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decision</td>
<td>Process Approach</td>
</tr>
<tr>
<td>Organisation F</td>
<td>• Internal decision</td>
<td>• Adoption of lean in pilot sub-organisation – some success and failure</td>
</tr>
<tr>
<td></td>
<td>• Market influenced</td>
<td>• Adoption of lean in Sub-organisation 2 – greater success minimal failure</td>
</tr>
<tr>
<td></td>
<td>• Tool orientated</td>
<td>• Adoption of lean in Sub-organisation 3 – high levels of resistance</td>
</tr>
<tr>
<td></td>
<td>• Authoritative</td>
<td>• Efficiency of work practices</td>
</tr>
<tr>
<td></td>
<td>• Generally accepted by management</td>
<td>• Underlying issue of managerial expectations</td>
</tr>
<tr>
<td></td>
<td>• High levels of resistance from workforce</td>
<td>• Informal social networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Internally supportive culture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Semi-intensive project</td>
</tr>
<tr>
<td>Organisation G</td>
<td>• Internal decision</td>
<td>• Development of education and training to standardised work practices – some success with high levels of resistance</td>
</tr>
<tr>
<td></td>
<td>• Performance driven</td>
<td>• Tool identification and adoption on project sites – some success</td>
</tr>
<tr>
<td></td>
<td>• Authoritative</td>
<td>• Championed work groups – not successful</td>
</tr>
<tr>
<td></td>
<td>• Mostly negative, with some of workforce</td>
<td>• No significant change</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Informal social networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Some internal cultural support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Decision</td>
</tr>
</tbody>
</table>
Table 6.3 is reflective of a directional change in lean innovation diffusion. The move away from lean adoption for waste elimination and productivity improvement towards process, practice and cultural improvement is important. The strategic change highlights senior management becoming more aware of the cultural implications of lean adoption for the workforce. Still, the decision across the case organisations was authoritative; that is, made by senior managers with little employee consultation. In making the executive decision, senior management was influenced by a range of factors including market conditions, organisational performance pressures, client requirements and external supplier network pressures.

Market and performance factors both reflect a need by senior management to improve productivity levels by eliminating waste. Performance factors typically influencing the decision are unique to the workforce achieving key performance indicators aligned with senior management requirements. Market factors are more complicated, reflecting both internal and external business agendas. Internal market factor agendas across the case organisations reflect a desire by senior management to make project delivery highly competitive through waste elimination and productivity improvement. External market factors are representative of market share or economic downturns; one case organisation with a smaller market share highlighted how lean adoption is less viable due to financial costs. The case organisation highlighted that lean adoption on projects was not undertaken unless specified by client requirements or project conditions with delivery through an integrated project delivery team. The influence of external market factors is a similar finding to that of the work of Winch (2000, 2003) and Dauber (2002) in their studies on lean theory transferability. It is interesting to note that their research found lean theory to be undesirable as transferability is difficult as processes and practices between manufacturing and construction are different. In this research the transferability is not difficult; rather, external market factors force some organisation to re-evaluate and adopt lean strategies in a way that is influential to their business environment.

Performance factors are representative of shorter-term diffusion strategising the targeting of waste elimination through the adoption of tools. Performance factors are typically approached by case organisation management in semi-intensive project situations before further long-term adoption in the organisation. Performance-related factors in the case organisations are representative of increased productivity levels and improved practice aligned with key performance indicator agendas. Senior, middle and project managers in the case organisations often viewed performance factors as essential indicators for further lean adoption in the organisation. Senior management in particular was expectant of immediate success and adoption, whereas middle and project management was seen to be more aware of the need to support the workforce throughout adoption. In many case, organisations’ middle and project
management emerged as implementation champions advocating lean knowledge programs and developing internal support networks. In case organisations where this type of influence was present the adoption of lean was fast-tracked, with higher levels of workforce acceptance. In organisations where middle and project management had less influence, the expectations of senior management putting unwarranted pressure on the workforce to fast-track adoption was counteractive. Unwarranted pressure by senior management typically resulted in higher levels of resistance amongst the workforce, further causing senior managers (upon seeing resistance) to believe that lean is not successful. This is a similar finding to numerous studies undertaken by Green (2000, 2002, 2003 & 2005) in which lean decisions are often described as being detrimental to workforce conditions, resulting in high levels of resistance and lean being unsuccessful. In this research, workforce resistance is not seen as detrimental but senior management has approached lean adoption too quickly without providing strategies that advocate a supporting culture.

As lean implementation occurred in the case organisations it was interesting to note the influence that some case organisations have on their immediate supply chain and supplier networks. This occurs as long-term diffusion becomes more aligned to organisational practice and continuous improvement throughout and across the organisation and organisational networks. This approach in the study is referred to as intensive suite implementation. Intensive suite implementation incorporates multiple implementation points, including the influencing of supplier networks to adopt and implement lean. Senior management is more open to varying sub-culture attitudes as sub-process decisions impact upon the workforce differently, with middle and project managers undertaking a more active champion and supportive role. Senior management in these organisations openly supports the workforce through lean knowledge centres; open, collaborative and communication networks; and a flexible social environment. These case organisations are characterised as supporting the workforce to achieve continuous improvement through the guidance of philosophical meaning.

Process approaches were addressed in Table 6.3 highlighting the adoption strategy of senior management in the case organisations. The process in the case organisation took time. Across each organisation the process has been similarly approached, reflecting a direct strategic pattern of adoption. This senior management strategic approach to lean adoption highlights a trialling of lean tools and principles at three strategic levels:

- **Semi-intensive project** is representative of the adoption of tools and principles within and across a singular project or organisation group.
• *Semi-intensive organisation* is representative of the adoption of tools and principles within and across multiple projects, organisation groups or whole organisation.

• *Intensive suite* is representative the adoption of tools and principles within and across multiple projects, the organisation and supplier networks.

The behaviours and attitudes of the workforce influence senior management’s approach to the implementation of new processes. These behaviours and attitudes affect sub-decisions and alter the adoption of new processes. The way that senior managers and project managers within organisations adapt and embrace lean implementation is not clear; however, it is well known that as lean is diffused the secondary decisions of management can be documented and traced.

As the adoption of lean diffuses over time so too does the influence of senior management in the process. The case organisations highlighted in early process phasing how senior management is more influential in lean adoption as it has been exposed more to the principles through the selection and assessment of tools. As the managerial workforce becomes educated and forms opinions to lean principles and tools, champions begin to emerge in middle and project management capacities. The relationship between middle and project management to the rest of the workforce through lean knowledge centres and hetrophilic communication networks further introduces additional influential champions within the remainder of the workforce. These workforce champions become influential in their role as the majority of the workforce feels more comfortable speaking to someone who is at a similar level to themselves; this is recognised as a homophilic network. For those workforce champions their networks become more hetrophilic as they communicate with their peers as well as management. The diminishing influence of senior management in the process is representative of a philosophical understanding of lean, enabling the whole workforce to become more influential in its work.

Another phase addressed in Table 6.3 is organisational practice. As lean is diffused, organisational practice matures from creating waste to improving productivity. Maturity of organisational practices is best described by understanding the drivers and impediments of lean implementation. Table 6.4 *Drivers and Impediments of Lean Diffusion* summaries the drivers and impediments of the seven organisations. There was a consistent pattern of dominant themes across all case organisations. It was interesting to note this pattern had an overarching similarity of driver and impediments to be underlining lean diffusion in each case organisation. The consistency of driver and impediment patterns across case organisations assists in identifying the cultural characteristic of lean organisations. Consistency of patterns further assists in mapping the maturity culture of case organisation as lean is diffused.
Inconsistent patterns of adoption were also identified across the case organisations. Inconsistent patterns of adoption contribute to understanding how lean diffusion is strategically diffused and altered aligned with senior management decisions.
### Table 6.4: Drivers & Impediments of Lean Implementation

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Drivers</th>
<th>Impediments</th>
</tr>
</thead>
</table>
| A            | ▪ All trade partners implement lean  
                  ▪ Open communication, informing sharing and collaboration  
                  ▪ Homogenous integrated teams  
                  ▪ Tertiary working groups - integrated heterophilic and homophilic  
                  ▪ Social environment - supportive, enhanced relations, formal behaviours of advocacy, stability, informal champions  
                  ▪ Education and training programmes and initiatives  
                  ▪ Communication | ▪ Maintaining training levels  
                  ▪ Leadership – support of those lean leaders  
                  ▪ Unclear working boundaries – associated with bringing new partners into the groups  
                  ▪ The client |
| B            | ▪ External contract and trade partnerships – enhancement of relations, collaboration and communication  
                  ▪ Social environment – supportive, formal behaviours of stability and advocacy  
                  ▪ Education and training programmes and initiatives – study action teams  
                  ▪ Communication | ▪ Incompatibility of external trade partners – expectations, cut ineffective relations  
                  ▪ Social environment – externally aggressive  
                  ▪ Technology – frustrations over financial costs  
                  ▪ Trust – frustrations over commitment levels  
                  ▪ Communication – frustrations over continual discussions of processes, impatience  
                  ▪ Internal conflict – new internal document controls  
                  ▪ Planning – financial issues  
                  ▪ Incompatibility of acceptance |
### Table 6.4: Drivers & Impediments of Lean Implementation

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Drivers</th>
<th>Impediments</th>
</tr>
</thead>
</table>
| D            | Education and training programmes and initiatives – study action teams, hetrophilic, enhanced relations  
               - Homogenous integrated teams  
               - Tertiary working groups – integrated hetrophilic  
               - Social environment – supportive | Incompatibility of localities  
               - Trust – scheduling of programmes |
| E            | Project networks  
               - Homogenous integrated teams  
               - Culture – positive, equal footing  
               - Social environment – supportive, selfless acts | Project/client process – as dictated by market conditions  
               - Trust – frustrations over commitment levels  
               - Project costs |
| F            | Education and training programmes – kaizen blitzes, integrated homophilic enhanced relations  
               - Inner champions  
               - Homogenous integrated teams  
               - Tertiary working groups – homophilic, enhanced relations, cross-shift relationships  
               - Communication – enhanced relations, information centres, hetrophilic and homophilic  
               - Social environment – supportive | Education – bringing management into workforce teams  
               - Authoritative culture  
               - Incompatibility between shifts – attitudes described as deliberate sabotage  
               - Incompatibility of expectations – added pressure = negativity  
               - Incompatibility of the process – across organisation localities  
               - Age  
               - Communication – between management and the workforce |
| G            | Education and training programmes – homophilic, influential champions  
               - Tertiary working groups – enhanced relations, homophilic  
               - Communication – quarterly trade partners, follow up, enhanced relations  
               - Social environment – informal champions | Incompatibility of standardised practice – existing environment  
               - Incompatibility of cross group communication  
               - Incompatibility of lean champion  
               - Incompatibility of opinions – i.e. ‘well it’s just common sense’  
               - Incompatibility of lean to organisational needs - the innovation |
Table 6.4 highlights the overarching drivers for organisations when lean innovation is diffused. Consistency of drivers is seen as supportive of change. Across case organisations, drivers included homogenous integrated teams, lean knowledge centres, supportive social and cultural environment and hetrophilic and homophilic communication. These drivers were identified and discussed in Section 6.2 and answered the first research question.

Different adoption patterns are sometimes a barrier to adoption of the lean innovation. This is a similar finding to that of the work by London et al. (2006) in their study on adoption of construction e-business innovations. However, it is interesting to note that in their study they found diffusion impediments to be more of a hindrance to innovation adoption through technology inadequacies, whereas in this research impediments are seen more as challenges that need to be overcome. Resistance amongst the workforce emerged at times because of the different patterns of adoption and the resultant incompatibility between the communication structure and organisational sub-cultures. In some organisations there was always an underlying conflict between management and project delivery teams and this was often referred to as almost a ‘battle’. Conflict in these organisations often resulted in direct sabotage of productivity levels through the deliberate creation of waste. Sub-culture conflict existed in organisations where there was either no lean champion or the lean champion was not very influential.

An outcome of the different adoption pattern is the cultural problems caused by inadequate strategies created by managers to support the development of lean knowledge. In organisations where there is a lack of understanding of the need to develop lean knowledge there is an accompanying attitude from management that they should not be associated with the staff at lower levels. Management don’t want to display any weaknesses in their knowledge levels. In turn, the inability of management to engage in knowledge sharing is often seen as a lack of commitment to the lean concept and lean learning by the workforce. In organisations that displayed the higher levels of cultural maturity there were lean knowledge centres. In these centres there are higher levels of integration between different groups of the organisation, with the focus of knowledge on homophilic and hetrophilic interaction as well as personal reflection.

The inability of senior managers to engage in learning situations around lean with different levels of groups in the organisation causes difficulties with communication. In particular it does not support hetrophilic relations as individuals withdraw and communicate only with others on a similar knowledge level. The withdrawing into homophilic groups causes trust issues between groups.
Lack of trust between groups in some organisations is influenced by location. Location becomes a problem in implementation through disparities in access to supporting process strategies such as education and training programs, sub-culture environment of the location and interaction between locations. Organisations with multiple locations identified significant challenges impacting the management of the implementation process, particularly in dealing with varying levels of organisational resistance. Within organisations where location is either central or worked closely, the process of lean implementation was considered more successful as the social environment, informal and formal relationships and educational programmes that support implementation were already in place.

These factors are important in the informing of attitudes and changed behaviours of the workforce throughout the implementation process, particularly in understanding those relationships between organisation localities. In organisations where localities were closely located or linked the process of implementation typically involved some resistance of the workforce in the initial implementation, with subsequent implementation process highlighting more favourable experiences as the workforce was able to see the 'practical' benefits of lean. This was particularly relevant for those organisations that are more project and physical-labour orientated. However, within organisations where locations were greater the implementation and attitudes towards implementation differed greatly, highlighting higher levels of frustration and negativity. This occurred as these organisation localities were considered more independent entities, with separate values, norms and behaviours, although for some organisational management there has been a move to standardise these organisations more. Thus, the outcome of this impediment is that the potential for lean applications of the innovation can never be simply transferred across organisational localities based on the attributes of one workforce to another but based on a whole range of pre-existing organisational conditions that determine the ease of adoption process, with the process approach to be altered according to the locality environment.

It is interesting to these findings to view the ways in which senior management approaches and handles impediments and barriers to diffusion. In organisations where the process has matured, aligned with the culture, impediments and barriers are seen simply as a notification to refine process elements as particular processes or practices have become obsolete in the strategic direction. In contrast, in organisations where the process is less matured these impediments and barriers are seen more as a failure of the workforce in adoption. This distinct difference in approach highlights an interesting finding that impediments can easily transform into drivers, which translates into further adoption in matured organisations. Although it is difficult to identify a clearly defined starting point of impediments becoming drivers, in organisations with a more mature implementation this is representative of a deeper
philosophical and mental maturing rather than a physical maturing, as seen in less matured organisations. The difference between organisational perceptions is guided by the maturity of the process, particularly the phasing of new organisational processes across implementation environments. These implementation environments are reflective of a semi-intensive project, semi-intensive organisational and intensive suite of adoption.

Table 6.5 *Process Maturity of Organisations* attempts to categorise each organisation based on the reflections of their workforce. The table incorporates the phases of lean implementation as discussed in Figure 6.4, using these phases to highlight the current maturity level of lean implementation across the organisations. The purpose of the table is to further understand the evolutionary nature of lean diffusion, particularly in the ways in which senior management uses impediments as drivers for further lean adoption; this is representative of the operational environment. In the table, ticks represent a successful confirmation of the process, while crosses represent not a failure of process but rather confirmation has not yet occurred. The findings of the study highlighted two organisations that have implemented lean focused on locality; this approach is represented in the process maturity table by highlighting both confirmation and non-confirmation of phases. The table also highlights the concept of a culture that is lean, something that has been addressed frequently in research.

**Table 6.5: Process Maturity**

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</thead>
<tbody>
<tr>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>B</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
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</tr>
<tr>
<td>D</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>F</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td></td>
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<tr>
<td>G</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

The table identifies the diffusion of the lean innovation to be guided by the operational environment where implementation has occurred, those of the existing, semi-intensive project, semi-intensive organisational and intensive suite. The findings of this study do suggest that the diffusion of lean innovation is a natural progression of maturity guided by the development of a philosophical awareness of the innovation and its importance in the organisation. Identifying the process of maturity in this study provides a framework to further
understand the maturing of culture aligned to lean adoption and implementation. This will now be considered in detail.

6.4 Diffusing Lean: Organisational Cultural Maturity

Across the seven case organisations, four phases of cultural maturity were identifiable. The cultural phases an organisation undergoes as lean is diffused are early, mid-early, mid-late and late maturation. These are now considered in detail.

The culture of those organisations that are entering the lean diffusion process is identifiable as early maturation. Typically, early maturation represents implementation in semi-intensive project and semi-intensive organisation scenarios. Early maturation cultures are often more likely to be influenced by higher levels of workforce rejection as change is not desired or sought by those in non-management roles. As the diffusion of lean is beginning there are support drivers in place, which further complicates workforce response and attitudes towards lean diffusion. Early maturation in organisations is also aligned to the need to improve productivity and waste elimination and is often by fragmented communication, adversarial relations and stagnant social environments. Organisation G is at this maturity level.

As lean is diffused by senior management into semi-intensive project and semi-intensive organisation scenarios the attitudes, behaviours and norms of the workforce mature, as senior management begins to support and nurture the workforce. This maturation is identified as the organisation transiting towards mid-early phasing. Mid-early maturation cultures show a definitive transition of workforce attitudes, behaviours and norms towards the lean innovation, with champions beginning to emerge that assist in this maturation. Also identified in these organisations are more-established supporting drivers that reflect the strategic direction for lean diffusion in the organisation. Organisations E and F are at this maturity level.

Mid-late maturation is representative of lean diffusion across semi-intensive project, semi-intensive organisation and intensive suite scenarios. This maturation represents these scenarios as senior management in organisations approaches lean diffusion aligned to a unique strategic direction, such as lean implementation to be influenced by locality or fast-tracked through external relations. Mid-late maturation cultures sees the workforce beginning to develop more philosophical lean awareness, the workforce (as lean diffuses) becomes, in this maturation phase, its own advocate. Also identified in these organisations is a direct change in interactions amongst management and the workforce, with open communication and collaboration becoming standardised practice within the organisation. Organisations B, C and D are at this maturity level.
The diffusion of lean in organisations is about the principles of waste elimination and productivity improvement through the concept of continuous improvement. Late maturation cultures are representative of this continuous improvement concept, that the lean implementation of lean is forever ongoing and that absolute perfection can never be achieved. It is not that it can’t be achieved; rather, perfection for the organisation is continually altered.

Late maturation is representative of lean diffusion across semi-intensive project, semi-intensive organisation and intensive suite scenarios. Late maturation cultures see the philosophical understanding emerging in mid-late maturation to be essentially established. Furthermore, the workforce in this maturation phase is representative of a complete transition of acceptance of the lean innovation. Within this maturation senior and middle management of the organisation is continually refining strategic directions, processes and practices within the organisation. Organisation A is at this maturity level.

Table 6.6 Characteristics of Cultural Maturity identifies those characteristics present within the organisations as determining their current level of maturity. The alignment of organisations to this table will be addressed in detail following the table. The way in which lean is diffused and the maturing of culture is not transparent is shown in Table 6.4; cultural maturity is also influenced by workforce responses to new processes and practices as lean is diffused. Workforce responses to new processes and practices can assist in the organisation, showing multiple maturation levels at varying rates. For example, Organisation B is in early semi-intensive project-level lean implementation; however, management is already implementing semi-intensive organisational-level lean implementation, influenced by the organisation’s contractual relationship with Organisation A. The rapid maturing of Organisation B in lean implementation is encouraged through the external exposure of the workforce to intensive suite organisational environment of Organisation A. Another example is Organisation E, although lean implementation has occurred for 10 years the structure of the organisation across multiple locations has assisted the organisation to be culturally matured but still in the semi-intensive project operational environment, though Organisation E does show cultural maturity levels associated with intensive suite implementation in two of its larger location offices.
<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Operating Environment</th>
<th>Semi-intensive Project</th>
<th>Semi-intensive Organisation</th>
<th>Intensive Suite</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early Maturity</strong></td>
<td>Existing</td>
<td>Semi-intensive Project</td>
<td>Semi-intensive Organisation</td>
<td>Intensive Suite</td>
</tr>
<tr>
<td></td>
<td>Resistance to change</td>
<td>Some resistance to change</td>
<td>Some resistance to change</td>
<td></td>
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<tr>
<td></td>
<td>Fragmented organisation</td>
<td>Some success</td>
<td>Some success</td>
<td></td>
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<tr>
<td></td>
<td>Fragmented communication</td>
<td>Some failure</td>
<td>Some failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aggressive internal culture</td>
<td>Opening of communication networks - homophilic</td>
<td>Opening of communication networks - homophilic</td>
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</tr>
<tr>
<td></td>
<td>Aggressive external culture</td>
<td>Education programming emerging</td>
<td>Education programming emerging</td>
<td></td>
</tr>
<tr>
<td><strong>Mid-Early Maturity</strong></td>
<td>Open to change</td>
<td>Moderate levels of resistance</td>
<td>More success than failure</td>
<td>Supportive external culture</td>
</tr>
<tr>
<td></td>
<td>Greater acceptance</td>
<td>Greater acceptance</td>
<td>Physical change</td>
<td>Acceptance of innovation adoption</td>
</tr>
<tr>
<td></td>
<td>Communication more heterophilic than homophilic</td>
<td>Communication more heterophilic than homophilic</td>
<td>Physical change</td>
<td>Supportive internal culture</td>
</tr>
<tr>
<td></td>
<td>Champions emerging</td>
<td>Champions emerging</td>
<td>Physical change</td>
<td>Supportive internal culture</td>
</tr>
<tr>
<td><strong>Mid-Late Maturity</strong></td>
<td>Acceptance of decisions and tools</td>
<td>Moving way from organisation to intensive suite application</td>
<td>Moving way from organisation to intensive suite application</td>
<td>Supportive external culture</td>
</tr>
<tr>
<td></td>
<td>Minimal resistance</td>
<td>Minimal resistance</td>
<td>Mental change</td>
<td>Acceptance of innovation adoption</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More champions emerging</td>
<td>Supportive internal culture</td>
</tr>
<tr>
<td><strong>Late Maturity</strong></td>
<td>Acceptance of smaller process decisions</td>
<td>Fast tracking of innovation application</td>
<td>Fast tracking of innovation application</td>
<td>Supportive external culture</td>
</tr>
<tr>
<td></td>
<td>Minimal resistance</td>
<td>Minimal resistance</td>
<td>Mental change</td>
<td>Supportive internal culture</td>
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<td>Supportive external culture</td>
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<td></td>
<td></td>
<td></td>
<td>Heterophilic and homophilic communication</td>
<td>Supportive social environment</td>
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<td></td>
<td></td>
<td></td>
<td>Extensive education and training programmes</td>
<td>Supportive social environment</td>
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<td>High levels of trust</td>
<td>Supportive social environment</td>
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<td>Open information sharing</td>
<td>Supportive social environment</td>
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<td></td>
<td>Everyone a champion</td>
<td>Supportive social environment</td>
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<td></td>
<td>Supportive social environment</td>
<td>Supportive social environment</td>
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6.4.4 Summary
The identification and mapping of lean diffusion and cultural maturity has developed an overall understanding of lean implementation process of organisations. The purpose of the identification and mapping of lean diffusion and cultural maturity was to highlight the connection between the two as well as to develop an understanding of how they are connected as a means of understanding lean construction culture. Additionally the mapping of diffusion and cultural maturity has also lead to better understanding the necessary causal relationship of lean implementation and construction organisation cultural maturity. Addressing the causal relationship between the two events highlights that y (maturity of construction organisation culture) is in fact impacted by the presence of x (lean implementation) and that is in the change that allows organisations to undergo a maturing of culture. The study does highlight in the presented that the nature of the relationship between the two events implies that y does occur; it is does not the other criteria of the necessary cause of which the presence of x not implying the occurrence of y. This was done as there is a tendency in lean construction and culture research to simply focus upon either the process or the culture or elements of both without understanding the relationship.

The claims by some culture researchers that the diffusion of innovations within organisations involves a number of statically connected stages or phase (see Chapter 3) can be seen in perspective. Cultural maturity is often viewed at specific stages of the maturing process, neglecting natural progressions of innovation adoption in the organisation (e.g. Curtis, Hefley & Miller, 2002; Wademan, Spuches & Doughty, 2007; Cassidy & Medsker, 2003; Carnegie Mellon, 2002). This study found that cultural maturity as lean is diffused is reflective of a transition or evolution of the workforce through responses to decisions and the forming of new attitudes, behaviours and norms aligned with a lean strategic direction. In this study, this is representative of organisational maturation at four levels. An aim of the study was to further understand this on a deeper level. The explaining of lean diffusion described in the seven case organisations indicates the process is not static; rather, it is integrated and is influenced by a natural progression of change over time. The mapping and description of lean diffusion and cultural maturity across the case organisations provides a picture of lean holistically while further contributing to knowledge associated with the notion of a lean culture.

6.5 Conclusion
This chapter sought to answer the two research questions posed in Chapter 2 and Chapter 3 respectively. The first section of the chapter sought to identify and describe the drivers that
support the workforce in the diffusion of lean. This section identified lean knowledge centres, organisation networking and the social environment to be those support drivers.

Lean diffusion and cultural maturity was then explained. These sections highlighted the connection between the two elements in providing a framework in which to understand the process and resultant culture that emerged in the case organisations. In particular, these sections highlighted the need to view cultural maturity aligned to the diffusion of innovation. Furthermore, it was identified that cultural maturity is an evolutionary transition of the organisation as the innovation is diffused.
Chapter 7 brings together all elements of the study to raise and present the main conclusions. The section also identified the limitations of the study and discusses further research opportunities.
Chapter 7 Conclusion

7.1 Introduction
The concluding chapter describes and discusses the overall conclusions to the research problem. The chapter begins by describing the conclusions within the framework of lean implementation and cultural construction organisations considering the primary objective:

To describe and explain lean implementation and cultural maturity in construction organisations through diffusion theory.

The chapter also describes research limitations and proposes further avenues for future research.

7.2 Conclusions to the Research Problem
The study addressed one research problem addressing two research ideas. The research ideas were representative of an industry and research problem; both problems reflect the lean movement and cultural attitudes and perceptions of lean.

The industry problem highlighted:

A need to better understand applications, implementation and the cultural environment of lean within construction organisations going beyond descriptions of improved productivity and waste elimination.

The research problem highlighted:

A need to identify, describe and understand the cultural implications associated with lean implementation within construction organisations and how the workforce is supported by mechanisms employed by senior management to assist in knowledge development.

An ontology incorporating critical realism and constructivist perspectives was taken, considering existing theoretical platforms and techniques from the fields of business management (cultural maturity) and sociology (diffusion theory). An inductive empirical epistemology was used to develop descriptions and explanations of real-world scenarios associated with lean implementation and cultural maturity within construction organisations. A qualitative methodology incorporating thematic techniques and methods was used for data collection and analysis. This involved 28 structured interviews and two structured group interviews studies conducted across five sites in the United States of America and two Australian construction organisations undergoing lean implementation. Individual and collective perceptions, attitudes and opinions concerning lean implementation and cultural
maturity were used to develop an understanding of lean implementation and cultural maturity across multiple implementing environments. Individual and collective perceptions, attitudes and opinions concerning lean implementation were also used to identify and understand the role of supporting mechanisms when lean is implemented within construction organisations. Lean implementation and cultural maturity was then mapped individually across each of the seven organisational environments using structural elements of Rogers’ diffusion theory as an interpretative and theoretical foundation. The individual descriptions and mapping of lean implementation and cultural maturity provided an in-time snapshot of cultural maturity within construction organisations implementing lean, addressing processes, challenges, the social environment and lean strategising. The individual description and mapping of lean implementation and cultural maturity also provided a framework to identify the mechanisms put in place by senior management to support the workforce when lean implementation occurs. A cross-case analysis of the seven case studies was then undertaken to identify similarly shared lean implementation phasing, cultural maturity phasing and supportive mechanisms. Four conclusions can be made regarding the research investigation into lean implementation and cultural maturity in construction organisations; these research conclusions reflect supporting implementation mechanisms, lean implementation approaches and phases, cultural maturity phasing and understanding the implementation and maturing process. These will now be discussed.

7.2.1 Supporting Mechanisms
The mechanisms identified as supporting lean implementation are reflective of a level of commitment by senior management within organisations to engage and encourage the workforce to develop an awareness of lean and lean knowledge, through:

- communicative learning as an individual, between two individuals and within a group;
- education programs and training initiatives; and
- the social environment.

How these mechanisms are utilised by senior management to support the workforce relates to the decisions that underpin the organisation’s strategic direction. It was found that the diffusion of decisions made as part of the strategic direction is formally and informally communicated throughout the organisation through the use of the supporting mechanisms. Perceptions and attitudes of the workforce towards strategic direction decisions are similarly fed back to senior management through the supporting mechanisms. This occurs as the nature and design of the supporting mechanisms within the organisation, when lean implementation
occurs, are reflective of formal and informal approaches by senior management to transition awareness and knowledge development, highlighted by:

- **informal** reflective, integrated and team communicative learning; group lunch sessions; and
- **formal** hetrophilic and homophilic education, lean-specific training, formalised lean-advocating through opinion leaders and change agents.

Furthermore, it was identified in the study that supporting mechanisms assist in the process of workforce-related lean acceptance by enabling workforce rejection to be embraced and guide current and future implementation decisions and strategic planning.

### 7.2.2 Lean Implementation Process

The lean implementation process was found to be similarly approached across construction organisation environments, with the process driven an authoritative ‘want’ or ‘need’ to ‘improve productivity and reduce waste’. Approaching the lean implementation process by senior management is reflective and dependent on the influential or informing environment; whether lean implementation has been influenced:

- internally; or
- externally.

The phasing of the lean implementation process was identified as being guided by four phases:

- Phase 1: The decision representing early strategic phasing and internal/external influences.

- Phase 2: The development of a strategic direction where major strategic decisions concerning the business environment are made including policy, supporting processes and systems and lean tool selection.

- Phase 3: Process of decision introduction where the decisions made as part of the strategic direction are introduced into the business environment; the nature of introduction is dependent on whether the implementation is occurring in an organisational, project or location environment.

- Phase 4: Organisational and managerial practice is where the decisions of the two previous phases inform and evolve the organisational environment.

It was further identified that over time, and as lean is adapted to address new organisational wants and needs, there is a clear shift in how the lean implementation process is informed;
this is influenced by the evolutionary and philosophical nature of lean. The nature of lean implementation phases are interconnected and structured to inform and be reinformed throughout the implementation, challenging existing perceptions; suggesting the process is staged or statically informs cultural attitudes of lean acceptance or rejection. The process and diffusion of informing and reinforming is guided by supporting communicative learning, education and social environment mechanisms. The informing and reinforming of the implementation process was identified as being through the workforce by means and initiatives forming organisation-specific communicative learning, education and training and the social environment mechanisms. The phasing of lean implementation across three phases within organisational environment assisted in further providing an investigative platform in which to understand the maturing of organisational culture from a bureaucratic and divisional management structure towards an adaptive and integrated matrix management structure.

### 7.2.3 Understanding Lean Implementation and Cultural Maturity

The perception that the maturing of organisational culture is statically structured is clearly a simplistic representation of a complex occurrence. There are elements of the cultural environment that can be described statically, such as perceptions and attitudes and elements that are representative of an organic transition such as perception and attitude reasoning. The simultaneously viewing of lean implementation alongside cultural maturity within the study provided a platform that explores and maps the maturing of culture that occurs when lean is implemented. The implementation platform identified within the study is representative of the four lean implementation phases addressing four transitioning operational environments:

- **The decision**: early phasing of the lean implementation process and cultural maturity starting point.

- **Semi-intensive project**: early to mid-phasing of the lean implementation process directed towards project specific requirements with some maturity of the cultural environment.

- **Semi-intensive organisational**: mid-phasing of the lean implementation process directed towards organisational requirements with maturity of the cultural environment through cultural unity advocating.

- **Intensive suites**: intensive phasing of the lean implementation process directed towards suite requirements with maturity of the cultural environment through cultural unity advocating and lean acceptance.

The maturing of organisational culture was identified as being further influenced by the direct and indirect decisions of senior management at each phase of the implementation process and
the challenges emerging from these decisions. The study found that similar challenges arose across construction organisational environments implementing lean, but differences emerged in how senior management used or did not use challenges to the advantage of the cultural environment. Challenges to lean implementation were representative of a cultural shift in embracing and driving the refinement of lean strategising (strategic direction), process and practice representative of an organisations maturity level. Although the description of lean implementation and cultural maturity is representative of static perceptions, the evolutionary nature of maturity emerges in the presentation and context of the process and how culture is continuously informed. The results of the empirical study have provided an understanding of lean implementation and cultural maturity within construction organisational environments highlighting a definite maturing of culture to occur.

7.2.4 Research Contribution
The use of diffusion theory as a theoretical and investigative platform to diffuse and understand lean implementation and cultural maturity within construction organisations has enabled maturity to be described as an evolutionary transition rather than a static process. The secondary central themes of the research were to understand how and why the culture of construction organisation matures and how the organisation is supported when lean implementation occurs. This discussion brings the research to the contribution of theory and new knowledge within the fields of lean construction and construction culture. The extent to which the study contributes to new theory and knowledge can be summarised as follows:

- **Lean implementation** is supported by the presence of communicative learning, education programmes and training initiatives and an adaptive social environment.

- **Diffusion theory** provides a set of techniques for identifying, capturing, specifying, understanding, mapping and documenting process, communication, social system and time associated with the implementation of lean from a theoretical and sociology perspective.

- The **nature of lean implementation** is interconnected with the process to be continuously informed and reinforced by each of the four implementation phases and the supporting mechanisms.

- The **nature of cultural maturity** is evolutionary with the process to be continuously informed and reinforced by each of the four maturity phases, the supporting mechanisms and operational environment.
• The maturity level of construction organisational environments is not dependent on the ongoing time of lean implementation but rather the assessment of the organisation against the operational environment.

• The framework that has been developed can be extended to investigate, develop and refine further the cultural maturity typologies associated with lean implementation across other construction environments, such as project supply chains and multiple organisational locations.

Although a contribution to new knowledge has been made in understanding lean implementation and cultural maturity in construction organisation environments, there are limitations to the research that should be acknowledged.

7.3 Research Limitations

The limitations to the research are the depth and extent of the relationship between lean implementation and cultural maturity. At this stage, only the processes of lean implementation and cultural maturity were captured, with some links made between the two processes. This relationship can be form an area of future research, thus providing a deeper understanding of lean implementation and cultural maturity.

The lean implementation and cultural maturity interpretations are also limited in that seven case studies form the investigative framework. This could be viewed as a limitation as each of the case studies may not be exhausted to full capability of understanding. However, each of the seven case studies highlight a different relationship between lean implementation and cultural maturity and provides a greater definition of maturity phases within the framework.

A further limitation of the research is the qualitative nature of the investigative approach. This could be viewed as a methodological limitation as the study does not use hard statistical facts to support and reason the presence of particular strategic directions and supporting mechanisms. Although a limitation, the seven case studies all highlighted the presence of strategic direction making by management as part of the lean implementation process and identified to some extent the use of mechanisms to support the workforce as lean is implemented.

One final limitation of the research is the cultural differences that emerge between American and Australian organisational environments. National cultural differences are limited within the study as this was not considered to be part of the larger study framework. The reporting of the process across the seen case studies, however, provides a framework in which to further explore and research the role of national culture within the lean implementation and cultural maturity process.
7.4 Future Research
The research investigation has created a valuable source and framework for future research into lean implementation and cultural maturity.

7.4.1 Project Environment
Diffusion theory assists in understanding how an innovation is diffused within a social system. It would be interesting to use the investigative framework and maturity to further investigate and map the cultural journey that occurs within and across multiple project environments.

7.4.2 International Comparisons
It would be interesting to further investigate at a deeper level to compare lean implementation and cultural maturity across multiple international construction environments and investigate the differences between western and eastern culture. There were a number of similarities between the westernised cultures of America and Australia that reflected and influenced the process; it would be interesting to see if similar issues are present.

7.4.3 Mass Cultural Perceptions
As the study is qualitative and inductive it would be interesting to use the investigative framework to investigate on a mass-scale implementation and cultural maturity deductively. A deductive study would enable more-specific generalisations concerning lean implementation and cultural maturity to be made.

7.5 Conclusion
The research has clearly demonstrated and established that there is a distinct relationship between lean implementation and cultural maturity within construction organisations. The nature of this relationship is interrelated and evolutionary.
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Cultural Maturity Modelling for Lean Organisations

By

B. L. Chesworth. B.ConMan (Building) [Hons 1]

Submitted for the degree of Doctor of Philosophy (Building)

Faculty of Engineering and the Built Environment

School of Architecture and the Built Environment

2012

VOLUME II
Appendix 1: Research Codes and Themes
<table>
<thead>
<tr>
<th>Original Topic Theme (Diffusion Theory related)</th>
<th>Topic Theme Explanation</th>
<th>Primary Theme</th>
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<th>Sub-Theme Explanation</th>
<th>Additional Themes</th>
<th>Additional Theme Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation Decision</td>
<td>The factors underpinning the decision to implement lean principles.</td>
<td>Collective Innovation Decision</td>
<td>The decision underpinning the adoption of an innovation for the social system has been made collectively by all individuals of a social system.</td>
<td>Authority Innovation Decision</td>
<td>The decision underpinning the adoption of an innovation for the entire social system has been made by a few individuals in position dog influence or power.</td>
<td></td>
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</tr>
<tr>
<td>Formal Social Structure</td>
<td>The structured patterned arrangements of the system units within the organisation. Presence of potential sub-themes can be individual to a specific organisation or share common elements between multiple organisations.</td>
<td>Organisation</td>
<td>The social system unit</td>
<td>Core Management Group</td>
<td>Core management team including the client, owner, main contractor</td>
<td></td>
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</tr>
<tr>
<td>Informal Social Structure</td>
<td>The interpersonal networks linking a system’s members, determining who interacts with whom and under what circumstances.</td>
<td></td>
<td></td>
<td>Trade Partners</td>
<td>Secondary contractual partnerships to undertake in smaller contractor and subcontractor works</td>
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<tr>
<td>Homophily</td>
<td>The degree to which a pair of individuals who communicate are similar</td>
<td>Tertiary Working Groups</td>
<td>Tertiary working groups formed to undertake specific elements of project tasks. This is directed towards organisations who partake in external contractual relations.</td>
<td>Project Teams</td>
<td>Organisational specific working groups undertaking construction works for the organisation</td>
<td>Internal</td>
<td>Within the organisation</td>
</tr>
<tr>
<td>Project Teams</td>
<td>Organisational specific working groups undertaking construction works for the organisation</td>
<td>Contractual Partnerships</td>
<td>Contracting specific project teams</td>
<td></td>
<td>External</td>
<td>Outside the organisation</td>
<td></td>
</tr>
<tr>
<td>Hetrophily</td>
<td>The degree to which pairs of individuals who interact are different in certain attributes. Liberty has been taken to include the creation of new relations between individuals with different cultural background and roles to be addresses within the hetrophily perspective</td>
<td>Tertiary Working Groups</td>
<td>Tertiary working groups formed to undertake specific elements of project tasks</td>
<td>Study Action Teams</td>
<td>Education specific based team integration</td>
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<tr>
<td></td>
<td>Important in carrying information about innovations.</td>
<td>Enhanced Relations</td>
<td>Deeper strengthen, bonding and integration of team</td>
<td>Study Action Teams</td>
<td>Education specific based team integration</td>
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<td>Tertiary Working Groups</td>
<td>Tertiary working groups formed to undertake specific elements of project tasks</td>
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<td>Study Action Teams</td>
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<td>Study Action Teams</td>
<td>Education specific based team integration</td>
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</table>
Research Codes – Developed through first and second round analysis of organisation A and B interview participants

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<th>Sub-Theme Explanation</th>
<th>Additional Themes</th>
<th>Additional Theme Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norms</td>
<td>Established behaviour patterns for the members of a social system</td>
<td>Advocacy</td>
<td>Established aiding of the organisation and process</td>
<td>Integration</td>
<td>The amalgamation of the working groups and individuals within the organisation</td>
<td></td>
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</tr>
<tr>
<td>Education</td>
<td>Develop the minds of individuals within the organisation through the facilitation of lean education</td>
<td>Innovation Specific</td>
<td>Making individuals aware and aiding individuals to better understand the process, decision behind and elements of the innovation</td>
<td>Non Specific</td>
<td>Making individuals aware and aiding individuals to better understand the process, decision behind and elements of the organisation</td>
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<tr>
<td>Stability</td>
<td>Setting up of a framework in which to support the innovation and people within the organisation</td>
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<tr>
<td>Culture</td>
<td>Pre-innovation established norms of individuals and/or the organisation</td>
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</tr>
<tr>
<td>Opinion Leaders &amp; Change Agents</td>
<td>Formal avenues of leadership and governance within the innovation process</td>
<td>Opinion Leaders</td>
<td>Leader who’s influence is within the immediate communication network</td>
<td>Lean</td>
<td>Leader/facilitator influential in the communication of lean and its principles to individuals within the organisation</td>
<td>Organisation</td>
<td>Leader/facilitator influential in organisational adoption of lean</td>
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<tr>
<td></td>
<td></td>
<td>Education</td>
<td>Leader/facilitator influential in lean education and training</td>
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<tr>
<td></td>
<td></td>
<td>Change Agent</td>
<td>Leader who is influential in the introduction of innovations into a client system</td>
<td>Internal</td>
<td>Change agent influences the innovation internally</td>
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<td>External</td>
<td>Change agent influences the innovation externally</td>
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<td></td>
<td></td>
<td>Aide</td>
<td>Sub-change agent who intensively contacts clients to influence innovation-decisions</td>
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<tr>
<td>Process</td>
<td>Steps or phases involved in the diffusion of lean innovation in construction organisations</td>
<td>Knowledge</td>
<td>The learning of the existence of the innovation</td>
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<td></td>
<td></td>
<td>Persuasion</td>
<td>The forming of a favourable or unfavourable</td>
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<td></td>
<td>Decision</td>
<td>The engagement of the unit in activities that lead to the choice to adopt or reject the innovation</td>
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<td></td>
<td></td>
<td>Education</td>
<td>Specialised and specific learning strategies assisting in understanding the lean innovation</td>
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<td>Top-Down</td>
<td>Utilised approach of the organisation in implementing the lean innovation</td>
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<td>Middle</td>
<td>Utilised approach of the organisation in implementing the lean innovation</td>
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<td></td>
<td>Implementation</td>
<td>The putting of the innovation to use</td>
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<td></td>
<td>Confirmation</td>
<td>The seeking of the reinforcement of the innovation</td>
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<tr>
<td>Communication</td>
<td>Specific features of the systems interpersonal networks present within the formal and informal social structures</td>
<td>Lean Tooling</td>
<td>The degree in which lean specific tools are used to educate, train and communicate the innovation.</td>
<td>Project learning</td>
<td>Education of individuals and teams concerning the project – addressing positive and negative aspects</td>
<td>Verbal</td>
<td>Communicative mechanism</td>
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<td>Reflective learning</td>
<td>Education of individuals and teams concerning the project – addressing positive and negative aspects</td>
<td>Visual</td>
<td>Communicative mechanism</td>
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<td>Study action teams</td>
<td>Education specific based team integration</td>
<td>Written</td>
<td>Communicative mechanism</td>
</tr>
<tr>
<td>Engagement</td>
<td>Bringing together of all organisational parties into the folds of lean innovation</td>
<td>Integrated learning</td>
<td>Bringing together of all parties within the organisation</td>
<td>Verbal</td>
<td>Communicative mechanism</td>
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</tr>
<tr>
<td>Motivation</td>
<td>Bringing together of all organisational parties into the folds of lean innovation</td>
<td>Reflective learning</td>
<td>Education of individuals and teams concerning the project – addressing positive and negative aspects</td>
<td>Visual</td>
<td>Communicative mechanism</td>
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<td></td>
</tr>
<tr>
<td>Knowledge Development</td>
<td>Bringing together of all organisational parties into the folds of lean innovation</td>
<td>Visual communication</td>
<td>Degree to which visual communication and its tools are used throughout the organisational environment</td>
<td>Written</td>
<td>Communicative mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation Consequence</td>
<td>Changes that occur to a social system or individuals a result of the adoption or rejection of an innovation</td>
<td>Direct versus indirect</td>
<td>Dependent on the categorising of direct cultural attitudes towards the innovation occurs in an immediate response or in the form of a second-order response of the innovation</td>
<td>Inner Conflict</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
</tr>
<tr>
<td></td>
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<td>Lean Leadership</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<td>Organisation</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<td>Contractual Relations</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<td>Communication</td>
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<td>Project Planning</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<tr>
<td>Education</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<tr>
<td>Training</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<tr>
<td>Engagement</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<tr>
<td>Time</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
<td>Impact</td>
<td>Degree, type and level of impact of the innovation on the targeted group</td>
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<tr>
<td>Desirable versus Undesirable</td>
<td>Dependent on whether the cultural attitudes towards the innovation within the social system is functional or dysfunctional</td>
<td>Education</td>
<td>Type of innovation consequence experienced or consequence that impacted individuals/groups within the social system</td>
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Appendix 2: Organisation A – Interview Transcripts, Interview Notes & Analysis
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its affects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and your exposure to lean.

Interviewee 1: I don’t understand the first question, the general idea of it is about what?

The question is about learning a little about the company you work for, your position at the company and your general exposure to lean construction, its philosophy and the principles.
Interviewee 1: Well its sizeable and its not something that we are going to cover in an hour and I wonder if its better if we are to provide her with or pledge to provide her with some historical information about some of our presentations, some power points that.

Interviewee 2: Let me try one for size here. So [interviewee 2], executive vice-president of both company, project executive for [primary contractor] on the [project]. 33 years experience in the construction industry, 10 years experience in lean transformation within the [primary contractor] company, 3 years experience in intense applications of lean and integrated project delivery with the cathedral hill team. Is that ok?

Thank you. Yes, that is exactly what I am after a little overview so then I can contextualise the experience when I’m undertaking data analysis.

Interviewee 3: For me its even easier. I’m [interviewee 1] with the [primary architect], vice president and project director for the architectural component of our team. I have about 34 years experience in managing projects and architecture and this project has actually been my first exposure to lean and integrated project delivery. So my experience is only 3 years.

Thank you. Would you like to try again?

Interviewee 1: So I’m [interviewee 1], programme manager for [the client]. 30 years experience in construction and 5 years experience in delivery projects on an increasingly or an increasingly lean basis.

Thank you, its nice not only for the purpose of the data analysis but also for myself to now be able to direct more focus question to your knowledge and exposure of lean, the implementation process and this ideal of cultural maturity which forms the basis of my research investigation. From you own experience and exposure to lean construction have you seen a shift in your culture?

Interviewee 2: Definitely.

How would you describe this cultural shift? Please provide examples in your explanation where necessary.
Interviewee 2: Its been a positive change. So far in the design of the project we have reduced the cost of the project. So through integrated design we’ve reduced the cost compared to what it would typically take to deliver this type of project to the market. And we will be going to construction with a much more integrated design so a lot of the problems you experience in construction, a lack of integration – a lot of that will be done prior to the start of construction.

Interviewee 3: I just remembered that I missed spoke about my experience its actually been about 38 years. I do tend to lie about my age frequently anyway. It is a very different culture for me, from what I had been exposed to before. It very definitely in my opinion is an improvement, I think the thing that strikes me in addition to anything [interviewee 2] just said which is certainly true and where this team is at this point in time, is as an architect I’m seeing a efficiency and a sense of more productivity from our work. Which in a more traditional method we are finding that we would be more likely to be doing things that would not be entirely for the good of the project as much as it is protecting the project and yourself from other things that may come up when you set these parties against one and other and you have responsibilities for the need to protect yourselves and other parties here. Whereas I’m really seeing here in this culture much more of a spirit of we are an integrated and we are all working toward the good of the project. So to every one of the people from my group that are working on this I see that more of there effort is spent working on things that will actually contribute to the construction of the project as opposed to documenting numerous alternatives and creating situation that and where you bid and you have to protect the kinds of responses you’d get from people who hadn’t been involved in the design earlier and so on. So I find it a more efficient and in fact more satisfying and a less stressful kind of environment to really feel that we kind of all are working on this together rather than as adversaries and protecting one and others individual interests.

Do you have anything you wish to add or even a different perspective?

Interviewee 1: Yeah, it just dawned on me that before you close this part of your research and document it. You should go online and get on YouTube and look up I guess you could search [project 3] and lean integrated project delivery or something like that, something along those lines and you will reveal two videos. One is a [primary architect] video that we did that explains a lot of what you seek here and one is a subsequent video it’s called integrated project delivery that is primarily the [interviewee 2] show.....

Interviewee 2: I didn’t even know it was up there.

Interviewee 1: and I think its going to answer a lot of these questions in a more fluid context for you that you would then be able to refer back to. If you need copies of those then I would be glad to give
Thank you for the tip, as soon as I can access the internet I’ll have a look at those videos and add them as part of this phase of the data collection process.

Interviewee 1: From the owners perspective this method of project delivery method offers stability of the project. So what that means from a corporate perspective is that it removes the questions and the fear around unpredictable delivery. So is a $1.6 billion (US) project going to be a $100 million (US) over budget and two or three years behind schedule and the stability and the predictability that comes with that is the biggest revelation in this project delivery method. And what that does from a project delivery perspective we think that we see that stability reveals the innovative energy or people, so they are no longer putting up walls and spending their energy doing that, they’re productive, they’re spending their time being innovative and creative which is what we want them to do in a design process anyway and so when you shift that setting then the result of stability at the corporate level – now they are no longer stressed, corporate executive management is no longer stressed about whether the project is going to be delivered as planned, there is stability in that arrangement now – they can concentrate their energy on how to best achieve that from a corporate advantage. So what is the right time to fund this project at the right time, so for example how since that and there is not a lot of energy being put on them, unknown delivery, the delivery is stable and reliable – so the actual building of the project will be reasonable predictable in terms of its progress and its cost and its affect.

They can, from a corporate perspective they can concentrate on market issues that are at hand, they are preparing themselves for that market, the enhancement in that market, you know, since it relies and releases creativity at all levels – so do we want to, you are able to from a corporate perspective if they are not that embattled of ‘well your not going to make that date’ and ‘your note going to make that cost’ and there’s all of that, that goes on all at a higher level. So that now they can start thinking more about ok ‘we can reliably expect this project to be delivered in this market during this rough, during this relatively rough period of time, predictable period of time’. So you know we hadn’t thought about this in terms, we’ve always been concentrating on getting the project on the ground, lets think about in terms of ‘how do we enhance that project by some decentralised clinics and do we take that on ourselves or does that go to a foundation’ – its enhancing the delivery of health care in the market because of the predictability of what can be an all consuming project subject.

That is a very interesting interpretation of how culture shifts and how the focus of implementing and using lean is based on the needs of achieving a certain level of project predictability. Have you found that type of cultural attitude used by the company has increased working relationships of different organisational groups and corporate levels? I.e. individuals and
groups are working together more and with different team members with whom they may not have worked with prior to lean and increasing or making new communication/social systems.

Interviewee 1: Yes, no doubt, at all levels. The electrical subcontractor has an enhanced relationship with the electrical engineer that they never had before. The owner has an enhanced relationship with the [core management group] and the architect that they never had before. The executive managers from the owners’ side have an increased level of relationship, a deeper and more collaborative, more integrated understanding and trusting and more innovative and more creative relationship with the project participants and senior management of corporations who are very, who are in this case also underwriters, so its not a parent company but the kind of parent company also provides the funding. So there are enhanced relationships that have been enabled because of this. And from a pure cultural and relational perspective there’s been a, this, the success of this culture on this floor that you are seeing has enhanced and has encouraged the ability for this particular affiliate to move towards lean principles and applying lean principles in the delivery of health care in order to eliminate waste and to provide direct health care to patients. So this effort right here has had all of those ripple effects all over those relationships and all over those cultural changes, the nature of the world today economically and organisationally is the nature of change. Organisations all over the world are changing the way they do business today and the success of this project, this floor has absolutely influenced the manner in which [the client] is changing.

Have you found in your exposure and use of lean any type of cultural negativity or connotations to emerge? Or has the process been mainly culturally empowering and accepting?

Interviewee 1: Well, from my perspective it’s a matter of whether the surroundings and the participants are resistant. So if you are in a period of time where the culture of, from the project perspective, the culture of the client – the direct client, is a culture of this is the way we’ve always done it and they are steadfast in their historical delivery of ‘they’re living in the past’ if they don’t live in an environment of acceptance or change then it, they’re not open to a collaborative environment or organisation in and around a project is resistant. If you are in a period of time now where organisations are differently in changing mode everyone in the world organisationally they are seeking change and so right now there is much more acceptance of what we do because we embrace change. And so there is still the occasional person that comes and joins the periphery that is resistant to seeing what we do, you know ‘this is not the way I’ve always done this’, ‘there is too many people here’ – you know kind of negative and they will either change or they won’t last. I partially answered your question there.
Well actually you answered how I wanted it to be answered, since the research is about gaining different perspectives on culture associated with the implementation and use of lean the question was directed to establishing any form of resistance present within the team and how if present the cultural resistance is dealt with.

Interviewee 1: So is it all positive, because from my perspective it is because its all change. There is some resistance, there is some scepticism. We’ve taken in over a $130million (US) out of this project, I don’t know what the total is now.

Interviewee 2: Its about that, its right there.

Interviewee 1: So there is the namesake saying ‘well its just the market’, ‘they would have done that anyway’, you know ‘they just got bids on the rebuilding of one of the bridges’, they thought it was going to be $94million (US) and the bids came in at $50 (million US) and $35 (million US). So there is the board member that has removed from us that’s going to see that and say ‘oh well, well how come we got 35million (US) of the project how come its not half price. So there is always the sceptic, there is the occasional sceptic – but from my perspective you just stay on the course, you just stay as positive as you can be and don’t allow yourself to be fearful of defending yourself. We don’t get defensive, so if someone wants the facts, we will give them the facts and well these are the facts.

What about either of you. Have you experienced the enhancement of working relationships? As well as positive and negative cultural aspects and attitudes that have emerged?

Interviewee 3: Its been very much along the lines of what [interviewee 1] was just describing is that we have as a community of architects, a broad range of people who have been doing things in a certain way either for a very short time or a very long time and some of those people who have been doing it for a very long time have gotten a comfort level from the culture that they grew up in and getting certain satisfactions out of it which are not the same as what is provided for in this culture. Ok, so there are the kind of people who [interviewee 1] just described who come to this and fell, well they don’t feel as comfortable or they’re not getting the rewards that they anticipated in getting and I think that in the long run having enough of the projects that use this methodology and it becomes clear that it is not just market conditions or this particular project but it’s a long term trend that this is a better and more cost effective you know project delivery methodology for all the parties involved and that people will look together and see that this is the reason for wanting to get involved and change the industry and follow these ways. So, but in the mean time individuals who can point at things like [interviewee 1] says you know the market conditions and choose not to see it – I think over a long period of time, I honestly believe that I can differentiate those things myself to see that when you
eliminate all those other considerations this is still in all economic situations is going to be a better way of working. So I see and I think that most of the people that do remain at this project site see this as a very positive thing. I get a little worried sometimes because we do have a number of clients and a number of different methods being used on different projects that here are these people that come and worked in our culture and it’s kind of the nature of our work, is that sometimes people come in and they go back out again and are doing the same kinds of projects or roles on different projects that they’re going to have a real time going back to the old ways and the positive way of looking at that is that those people that have left this project and have gone back and working on others are carrying the message back that you know ‘I’ve seen this being done better than the way we are doing it right now and let me tell you, you can improve’. So I think we are seeing it throughout our office now, those people that have been through this project and are going back to other ones are bringing the message back that’s starting to you know ripple through the entire organisation. So I think that’s very positive.

Interviewee 2: I think, actually I know for sure that this kind of project delivery, this type of project culture increases relativeness. So [interviewee 3] and I work together, [interviewee 1] and I work together, we all work together much more closely then we ever would have before on a project of this size. We’ve been together through the design phase every day and the same like [interviewee 1] said, the same is true for us at a leadership level and its true in the trenches, detailers and designers working together, structural fabricators, structural erectors working together with structural engineers. So they are related to each other they are much more closer then they ever have been before on other projects. With that comes a challenge though, I wouldn’t call it a negative but it is a challenge, so we have to learn to relate, to communicate, to behave in different ways then we have in the past because the old ways were more protective. So there were rules and processes in place before that we can no longer follow, that aren’t effective for us. The new rules and processes we have to create, they are not all there, so the challenge is living in that uncertainty and environment where yeah we are working together much closely then we ever did before but we don’t have always the new rules and processes in place that define how we should be working together. So that’s a challenge and creating a new project cultural environment we don’t have it all defined, so it uneasy sometimes because we don’t know from day-to-day what the answer is always, we have to go find the answer.

Have you found then through the presence and acknowledgement of that current cultural challenge that a leader has emerged? And is providing some foundations to the overcoming of the problems? Or has the movement towards been more of a collective drive?

Interviewee 2: We do have lean leaders. We have people who assist, there is one particular person on the team that is focused on and is assisting us with lean facilitation, however I think we have all taken pretty seriously that we are all lean leaders. So we’ve talked about this before its important to have a
person focused on lean facilitation but in order for lean to work on this project we all have to be lean leaders. So we don’t want to delegate the responsibilities to somebody else, we’ve seen that before, and in fact I’ve been in that situation before very, very early at [primary contractor] of being a lean leader and then its up to the leader to make it happen and no-body else accepts the responsibility. The other thing that’s difficult with a designated lean leader is that you have to translate from manufacturing to project delivery and some of it is very easy to translate and some of it not so easy to translate – for one person, there is just so many different perspectives so how it translates for Steve, is different to how it translates for me. So to leave it up for one person to make all those translations is pretty difficult, so I would be a little bit concerned at having a designated lean leader on a project.

Ok, I see. You mentioned this idea of translation and the difficulty of individuals translation. Does your company and this project site itself utilise any specific training or education systems/approaches to assist in understanding lean, its principles and philosophy?

Interviewee 3: Let me just say first because you’ll get the details better coming from [interviewee 1] and [interviewee 2]. You know, that for as long as I’ve been with my company when the owners of the company get together as we do periodically, every, well several times a year. There is always, the young people coming in the firm express this frustration over the fact there is so much knowledge out there embodied in these people that have been with the company for so long and experience in the profession and its like well why can’t we do more to share that knowledge and to get that knowledge in the heads of the young people and make that process more efficient. And you know, we always implement things and we say yes we are going to do that and so on and its not until this time when I became exposed to this project, well my response to that these days is for the first time in my life I’ve seen a culture which really, truly a learning culture, one which specifically went out of its way to provide training and to increase peoples knowledge and to improve their skills and particularly from the [primary contractor] organisation is the big room and I had never seen that before, there were people that were in the organisation that are dedicated to the continuing education of people and they have truly made a great investment of it and a number of those techniques and methodologies have been implemented here and I have been particularly impressed at you know the effectiveness of bring in people either from the outside or drawing on the experiences of the people that are here in the team and we were just talking yesterday about one for me personally has been extremely useful is these Study Action Teams. The study action teams are where you take a particular book or publication or something like that and you get a group of totally an interdisciplinary group, you know that consists of these contractors and design engineers and the architects and the owners and so on all reading the same material and then having a facilitator discuss with them what it is they got out of what they read and because of the fact that a lot of the origins of lean are coming from production as opposed to what it is we’re doing here is that there is a great benefit of people stretching to try and determine what it is
that they can extract from the material that we are reading – that may come from something that they might not ordinarily wouldn’t think of as being apart of their kind of work, its like you know well what I’m reading about is auto-production but how does that relate to it and its actually going through that mental exercise of asking yourself those questions and finding you answers to that question which makes it such a valuable one. So yeah I think if you take the time to walk around here you’ll also see there is a segment on the walls about all the things that are being done to train people here but its just the fact of all those things that are on the wall is just part of this learning culture that here I have never seen done better and I really am very pleased with it.

Are there any other perspectives or anything additional you would like to add?

Interviewee 2: I think [interviewee 3] said it very well.

Do you find that the presence of a learning culture in the environment has assisted in the greater acceptance of lean?

Interviewee 1: Absolutely no doubt. I just often wonder if there is enough and who actually has been through those processes and what processes are in place to keep track of that. But form a managers perspective its hard to pay attention to the details of who’s been through it and who read what and when they participated in the study action teams and what the base set of understandings, the base set of readings that need to be, well that you hope people will understand in the project and who really understands them and who gets what out of what and it’s a hard thing to measure.

Interviewee 2: I was going to add that exact same thing [interviewee 1], you know right now, well when we first started the project we did a lot of training and we did training as we moved along but its like the throttle on the car, its like the gas pedal as soon as you let go you kind of look around and realise that you’re not going anywhere, you’ve gotten to a certain point but you haven’t gone any further and I think that’s where we are right now and I think we’ve got to push on the throttle again and push on the gas pedal and we’ve got to do more training and so it seems like it needs to be a continuous part of the process and project delivery – on going training.

Interviewee 3: Its hard to explain, the Toyota situation, they ensure that the throttle stays down and it does it by-itself you don’t even have to press on anything. It just sticks.

Interviewee 1: You know, I’ve been thinking about this in terms of the [project 2’s] team, I’m just not familiar with the level of exposure of which those folks have.
Interviewee 2: That’s a good example of a team that needs training. A lot of what we do is plus/delta in terms of learning, so at the end of a meeting the last part we do is a session on what would we change next time and we are actually going to do that again for this project and in a couple of weeks what’s gone well over the last three years and what would we change and how would we make it better and we are going to bring in a new team, another project team and have them hear all that use that as a first opportunity of learning for them. So they will hear from a more experienced team all of the lessons we’ve learned, but it’s a start.

That’s raised an interesting query, has the current hospital project had a constant team of individuals and groups or has the project team constantly changed depending on the requirements and timeline of the project?

Interviewee 2: It’s been pretty constant.

Interviewee 3: Yeah

Interviewee 1: Yes, it’s constant.

Interviewee 3: There has been some additional members that are brought in as we get further into it, I’ve seen some of my people intend and individuals intend to come in and go out depending on tasks but in general it’s a very stable group here and we are able maintain that culture and it’s not a group of people that come in to replace them and you start all over again. It’s a flow I think that has been fairly constant.

Interviewee 1: When you say project on this floor you need to be careful cause there are three projects which are full time that are housed here. We have [project 1], [project 3] and [project 2] hospital and then periodically there’s a fourth that participates in this programme. So there are various people working on various stages as you move through the floor, so that presents some challenges and that presents some advantages and synergy.

Oh ok, I’ll try to be more clear when I structure and present questions. Have you found then between the four different projects currently there are different cultural environments present? Or due to the relativeness of relationships on the floor, the cultural environment are all reasonable similar?

Interviewee 1: Well there are fairly homogenous, well from my perspective there is idiosyncrasies of each of them just by the nature of the project and the stage that they are in, but they are fairly
homogenous because they’re overshadowed by the sheer momentum of this $2billion (US) project and the $250million (US) project team, well the project team for a $250million (US) hospital which is a perfectly and reasonable sizeable cost for a hospital. Its just caught up and brought along in the wake and effort of a $2billion (US) hospital. So its fairly constant from my perspective. But there are some differences and different people and different trade partners and different stages of learning.

Are there any cross relationships between the different team and projects?

Interviewee 1: All the time. And at all levels. There are people that are working on [project 1], that also work on [project 3] and there are people who are working on [project 3] and [project 1] that are also working on the [project 4] MOBs so there is a constant cross cultural. Not everyone at every single level the same but there is a constant cross cultural interaction. Its not monitored rigorously, it just happens. Its expected by us and it just happens.

As we are running out of time for the allocated 1 hour interview/focus group I would like to now offer you the opportunity to revisit or provide some additional thoughts about your exposure to lean, lean processes and the idea of cultural maturity.

Interviewee 1: Oh alright, well I encourage you look at those two videos, I encourage you there's some presentations that give the entire story of this effort, there’s information all over the floor from the clusters and you should be talking to the cluster leaders and the representatives and we haven’t even touched on the five big ideas and the advocacy and all of that. And you need to understand to do these questions justice for yourself and your research you need to understand whats going on this floor.
Interview Analysis

Each interview will be analysis separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organisational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analysed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes will be boldly green highlighted with underlined. Where features of diffusion groupings are not present a description of ‘not discussed’ be placed. A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue. The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 5

Results: Descriptive & Cross-Case Analysis.

As the first three interviewees were interviewed as part of a focus group the analysis of these individuals (Champion & Innovator 1, Senior Executive 1 and Senior Executive 2) is representative of the setting. The analysis particularly highlights a number of situations where each of the interviewees agreed or disagreed with each other, depending on the question.
### Interviewee 1: Champion & Innovator

#### Overview

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<th>Quote</th>
<th>Interviewee Attitude</th>
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<td>Overview</td>
<td>When describing the nature of the working environment of the organisation the interviewee highlighted that the environment is bound and guided by a mutual contractual relationship. The nature of the contractual relationship concerns the primary stakeholders or partners forming the senior management group of the organisation with a secondary partnership in place between the stakeholders or core management group and secondary trade partners who also form the organisational environment. The interviewee described the type of contractual obligations in place that informs the partnerships of the organisational environment. SE1 similarly discussed the mutual contractual agreement binding the organisation.</td>
<td>“Yes, this contractual relationship is between the owner the client (affiliate), the architect and main contractor”.</td>
<td>The interviewee highlighted an understanding and awareness of the nature of lean and their own understanding of its application within the organisational environment.</td>
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#### Organisation & Management Environment

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<td>Formal Social System</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks. When answering the question the interviewee highlighted how the formal social system of the organisation and on-site project teams are governed by heterophilic communicative</td>
<td>“Yes, no doubt, at all levels. The electrical subcontractor has an enhanced relationship with the electrical engineer that they never had before. The owner has an enhanced relationship with the CGMC and the architect that they never had before. The executive managers from the owners’ side have an increased level of relationship, a deeper and more collaborative, more integrated understanding and trusting and more innovative and more creative relationship with the project participants and senior management of corporations who are very, who are in this case also underwriters, so it’s not a parent company but the kind of parent company also provides the funding. So there are enhanced relationships that have been enabled because of this”.</td>
<td>The interviewee was very open about the nature of the organisational environment the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of creativity and interaction across working groups as a direct result of the contractual agreement in place.</td>
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Networks as outlined in the overarching contractual agreement. The nature of such heterophilic relations were described as enhancing relations within the business and organisational environment as all parties are formally committing to the advocating of heterophilic communicative networks. This is evident in the supporting of and enabling of lean implementation within the organisation and across project environments.

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<th>Informal Social Structure</th>
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### Organisation & Management Environment

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<td>Social Norms</td>
<td>The interviewee was also asked to describe the social environment of the organisational with reference to ‘changes’ that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments. The interviewee highlighted that within the greater organisational environment that there is a total of four projects being managed as part of organisation A, all projects have the same core management team however trade partners for each project could be different based on the client brief. The four projects although providing a similar product to the client and community are currently at different pre-construction and construction phases. Despite the presence of four different projects to be housed within the organisation, it is assumed that the majority of social norms present within the organisational environment should transcend...</td>
<td>“This is the only project team that I’ve worked with that been; able to set their personal interests aside and to focus on; becoming the advocate of the owner, the advocate of the project; and to do what is right by the project rather than doing what is; right for an individual or a small group”.</td>
<td>Interviewee was extremely positive in describing and discussing advocacy and the importance of advocacy in guiding and governing the social environment of the organisation and projects.</td>
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to the project environments.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of **advocacy**, **integration** and **stability** of all organisational levels.

**Advocacy** is representative of management, teams and the organisation becoming spokespersons of lean and the application of lean not only within the organisation but also the project and day-to-day life.

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### Organisation & Management Environment

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<td>There are people that are working on [project 1], that also work on [project 3] and there are people who are working on [project 3] and [project 1] that are also working on the [project 4] there is a constant cross cultural. Not everyone at every single level the same but there is a constant cross cultural interaction. Its not monitored rigorously, it just happens. Its expected by us and it just happens.</td>
<td>Interviewee was extremely positive in describing and discussing advocacy and the importance of integration in guiding and governing the social environment of the organisation and projects.</td>
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the organisational environment should transcend to the project environments.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of advocacy, integration and stability of all organisational levels. In particular the interviewee highlighted the nature of integration within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual. The nature of the interviewee’s opinion suggests that although integration is a core cultural competency within the organisation there is no way that this can be efficiently managed.

SE1 similarly discussed and agreed with CI1 on the present of integration.

The interviewee was also asked to describe the social environment of the organisational with reference to ‘changes’ that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

The interviewee highlighted that within the greater organisational environment that there is a total of four projects being managed as part of organisation A, all projects have the same core management team however trade partners for each project could be different based on the client brief. The four projects although providing a similar product to the client and community are currently at different pre-construction and construction phases.

From the owners perspective this method of project delivery method offers stability of the project. So what that means from a corporate perspective is that it removes the questions and the fear around unpredictable delivery......And what that does from a project delivery perspective is we think that we see that stability reveals the innovative energy or people, so they are no longer putting up walls and spending their energy doing that, they’re productive, they’re spending their time being innovative and creative which is what we want them to do in a design process anyway and so when you shift that setting then the result of stability at the corporate level. Now they are no longer stressed, corporate executive management is no longer stressed about whether the project is going to be delivered as planned, there is stability in that arrangement now – they can concentrate their energy on how to best achieve that from a corporate advantage.

Interviewee was extremely positive in describing and discussing advocacy and the importance of stability in guiding and governing the social environment of the organisation and projects.
Despite the presence of four different projects to be housed within the organisation, it is assumed that the majority of social norms present within the organisational environment should transcend to the project environments.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of **advocacy**, **integration** and **stability** of all organisational levels. In particular the interviewee highlighted the nature of **stability** within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual.

The interviewee discussed and viewed **stability** as a management mechanism used as a means to ensure the culture and **tertiary working groups** remain relatively constant. According to the interviewee **stability** is important as there are individuals within the organisation who are members of different tertiary working groups and further to this **stability** offers some level of control over the management and placement of new individuals within the organisation and assignments to **tertiary working groups**.
Opinion Leaders & Change Agents

According to the interviewee, change agents play an essential and significant role within the organisation when lean implementation occurs. Questions concerning opinion leaders and change agents were important as the interviewee is identifiable as a champion and innovator as defined by Rogers’ diffusion theory framework.

The interviewee was asked to describe their role within the organisational environment. The interviewee highlighted and discussed how rather than an individual or group of individuals the culture of the organisation has assisted in acting as a change agent of lean implementation.

According the interviewee the nature of the cultural environment of the organisation assists in providing a platform for other organisations to utilise as a framework of lean implementation.

From a pure cultural and relational perspective there’s been a, this, the success of this culture on this floor that you are seeing has enhanced and has encouraged the ability for this particular affiliate [the client] to move towards lean principles and applying lean principles in the delivery of health care in order to eliminate waste and to provide direct health care to patients. So this effort right here has had all of those ripple effects all over those relationships and all over those cultural changes, the nature of the world today economically and organisationally is the nature of change. Organisations all over the world are changing the way they do business today and the success of this project, this floor has absolutely influenced the manner in which [the owner] is changing.

This is the first project that we are aware of in the world that’s being delivered with lean principles and using the underpinnings of the philosophy of the 5 big ideas [from the project affiliate] that is to collaborate, really collaborate; to increase relativeness; to treat projects as networks of commitments; to optimise the whole and to tightly couple learning with action.

Cultural aspects present are the attitude and belief that the project affiliate is a world leader in the lean form of project delivery.

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<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has lead to their current role within the senior management team of the organisation. The interviewee described their current role as a leading lean specialist. The role description indicates that the interviewee is categorised as a champion and innovator for the purpose of the research and as set out in the theoretical framework.</td>
<td>5 years experience in delivery projects on an increasingly or an increasingly lean basis</td>
<td>Interviewee was open in discussing their role within the organisation and exposure to lean.</td>
</tr>
</tbody>
</table>
The exposure of the interviewee to lean is considered moderate however the level, intensity and awareness of the interviewee in implementing lean indicates a **high level of exposure** to lean innovation and lean transformation in organisational environments.

**Persuasion**

The process of lean implementation over the 10 year period was not openly discussed as many of the processes and strategies utilised in the initial implementation have significantly changed or have been altered in line with revisions of the strategic direction. The nature of the lean implementation process particularly within this organisation advocates the continuous nature of the process and the presence of a forming and informing of each implementation phase.

The interviewee when discussing current approach to the lean implementation process highlighted the persuasive techniques used to develop awareness within the organisational and project environments. Key for the interviewee is the **informal social system** (this was also identified by SE2).

The nature and context of the informal social system for the interviewee was **tertiary homophilic and heterophilic cluster groups** and how such informal communication assists in the sharing of knowledge, ideas, experiences and fears/failings of lean within and outside of the organisation. This was highlighted in the interviewee supporting SE2’s addressing for the need for individuals to be exposed to a strategy like lean to understand and see the benefits associated with the innovation before making a decision to accept or reject the innovation.

Refer to SE2 for quote

The interviewee was committal over with the success/experience so far with communication. The interviewee is encouraged by the success of communication.
| Decision/Implementation | The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation.

The interviewee identified and discussed one informal technique to assist in communicating decisions forming part of the implementation process. **Plus/delta learning** according to the interviewee is utilised by management as a means of mass communicating decisions informally through an assessment of lessons learned/learnt associated with the process. **SE1** also discussed **plus/delta learning** as a strategy of decision and implementation.

The interviewee noted that the educational strategies used within the organisational are a combination of a number of different implementation techniques used within their own organisation and one of the senior management’s organisation. **SE1** and **CI1** identified plus/delta learning as one of the key educational strategies utilised by the organisation. According to the interviewee, the **plus/delta learning** approach is utilised by their own organisation as well as **CI1**’s organisation. **Plus/delta learning** as an educational strategy of implementation involves the recording of lessons learnt and lessons needed to be learnt in terms of specific project objectives. The recording of such sessions according to **CI1** enables the learning and construction processes to be easily documented and managed.

**Plus/delta learning** as an educational strategy of implementation involves the recording of lessons learnt and lessons needed to be learnt in terms of

```
“A lot of what we do is plus/delta in terms of learning, so at the end of a meeting the last part we do is a session on what would we change next time and we are actually going to do that again for this project and in a couple of weeks what’s gone well over the last three years and what would we change and how would we make it better and we are going to bring in a new team, another project team and have them hear all that use that as a first opportunity of learning for them. So they will hear from a more experienced team all of the lessons we’ve learned, but it’s a start”.
```

| | The interviewee noted positively the success of such informal platforms in the communication of decisions associated with the implementation process. |
specific project objectives. The recording of such sessions according to CII enables the learning and construction processes to be easily documented and managed.

The nature of plus/delta learning was similar discussed in context to verbal communicative tools and strategies.

| Confirmation | As part of the interview process interviewees were asked to identify and discuss various confirmation or ‘success’ stories associated with lean implementation within the organisational or project environment. The interviewee highlighted the confirmation of organisational social norms, particular the social norm of stability. The interviewee’s interpretation is underpinned by the notion that the delivery of projects through lean philosophy and techniques brings with it stability and reliability of individuals and the project. The interviewee’s reflection on stability within the project is derived from the individual’s role, position and understanding of the process, with reliability achieved when the individual understands all the elements of the process, their own contribution to that process and finally the delivery of the product to the customer. This perspective fits in within a project reliability context. |
| Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation. |
reliability achieved when the individual understands all the elements of the process, their own contribution to that process and finally the delivery of the product to the customer.

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<td>Verbal Communication</td>
<td>When asked further questions concerning the communication of lean implementation of the workforce in regards to lean, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified communication to be guided by project specific learning. In the description and discussion of communicative tools plus/delta learning was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and heterophilic communication within and across the organisational and project environments. The presence of such informal communicative tools and methods also enables the transferring of central “shift specific” knowledge in an informal environment. Communicative mechanism underpinning secondary theme: Verbal Communication.</td>
<td>“A lot of what we do is plus/delta in terms of learning, so at the end of a meeting the last part we do is a session on what we would change next time and we are actually going to do that again for this project and in a couple of weeks what’s gone well over the last three years and what would we change and how would we make it better and we are going to bring in a new team, another project team and have them hear all that use that as a first opportunity of learning for them. So they will hear from a more experienced team all of the lessons we’ve learned, but it’s a start”.</td>
<td>Interviewee advocated the presence and importance of communicative tools and methods to assist in the communicating of decisions and the decision making sub-process of the larger implementation process.</td>
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<td></td>
<td>When asked further questions concerning the communication of lean implementation of the workforce in regards to lean, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified communication to be guided by reflective learning. In the description and discussion of</td>
<td>“For each new team we bring in we educate through going over what we would change and how we would make it better and have them hear all that [and] use that as a first opportunity of learning for them. So they hear from a more experienced team all of the lessons we’ve learned”.</td>
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Communicative tools and methods were discussed in a positive manner. This emerged as the nature of the communicative tool is more formal learning at a personal interaction with one’s self and their role and responsibility within the organisational and project environments. The nature of reflective learning is advocated within the organisational and project environments through the presence of social norms and interactions.

The presence of such informal communicative tools and methods also enables the learning of knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: Verbal Communication

| Visual Communication | Not Discussed | Not Discussed | Not Applicable |
| Written Communication | Not Discussed | Not Discussed | Not Applicable |

Challenges

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<tr>
<td>Direct versus Indirect</td>
<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are current being faced within the organisational and project environments as a result of implementation. The interviewee discussed and highlighted an opinion linked directly to the client, client relations and cultural surroundings (inner change and conflict). CII stated that it’s these elements which determine one’s cultural acceptance or resistance of the innovation. CII did admit that within the current organisation were people come in and are resistant to seeing the benefits of the lean innovation. When asked Interviewee was culturally open about the challenges associated with implementation within the organisation. The interviewee did show some frustration concerning the nature of change agents and cultural behaviours and how they impact others within the organisational and project environments.</td>
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the type of cultural impact that attitude has within the organisation CI1 stated “they will either change or they won’t last”. CI1 further explained that those individuals tend to culturally frustrate those individuals who are accepting and embracing change; however the consequence is minimal in its impact.

This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for individual resistance of the lean innovation and indirect or second-order aspects for others. The type of impact was minimal to the organisational and project environments.

Desirable versus Undesirable

The interviewee also discussed education as leading to undesirable challenges within the organisational and project environments. The difficulty for managers to pay attention and manage the education and training (and retraining) of individuals in the organisation.

The interviewee did state that the challenges are faced more from those individuals in higher positions of management making the executive decisions and managing education duties.

The consequence is identified as minimal in its impact. Education is representative of a functional aspect; however the lack of management within this perspective makes this dysfunctional.

“...it’s hard to pay attention to attention to the details of who’s been through it and who read what and when they participated in the study action teams and what’s the base set of readings that need to be, well that you hope people will understand in the project and who really understands them and who gets what out of what and it’s a hard thing to measure... I just often wonder if there is enough and who actually has been through those processes and what processes are in place to keep track or that”.

The interviewee was open to discussing the challenges that are faced from an organisational perspective, in relation to education programmes and training initiatives.
When describing the nature of the working environment of the organisation the interviewee highlighted that the environment is bound and guided by a *mutual contractual relationship*.

The nature of the contractual relationship concerns the primary stakeholders or partners forming the senior management group of the organisation with a secondary partnership in place between the stakeholders or core management group and secondary trade partners who also form the organisational environment.

The interviewee described the type of contractual obligations in place that informs the partnerships of the organisational environment.

CI1 similarly discussed the mutual contractual agreement binding the organisation.

### Organisation & Management Environment

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<td>Formal Social System</td>
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<td>Not Applicable</td>
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<td>Informal Social Structure</td>
<td>Not Discussed</td>
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<td>Not Applicable</td>
</tr>
<tr>
<td>Social Norms</td>
<td></td>
<td>“Integrated project delivery works first of all through an integrated team of builders and designers, consultants, trade partners all coming together and first of all understanding that they have to advocate the customer for all of the stakeholders in the project and for each other on the team to drive value into the building project”.</td>
<td>The interviewee highlighted an understanding and awareness of the nature of lean and their own understanding of its application within the organisational environment.</td>
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social norms have transcended from the organisational environments of the senior management group. This has enabled the organisation to embrace lean more intensively as years of lean knowledge is present.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of **advocacy**, **integration** and **stability** of all organisational levels.

**Advocacy** is representative of management, teams and the organisation becoming spokespersons of lean and the application of lean not only within the organisation but also the project and day-to-day life.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of **advocacy**, **integration** and **stability** of all organisational levels. In particular the interviewee highlighted the nature of **integration** within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual.

The nature of the interviewee’s opinion suggests that although integration is a core cultural competency within the organisation there is no way that this can be efficiently managed.

**CII** discussed integration in greater detail with **SE1** agreeing on the nature of the integration social norm within the organisational environment.
Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of advocacy, integration and stability of all organisational levels. In particular the interviewee highlighted the nature of stability within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual.

The interviewee discussed and viewed stability as a management mechanism used as a means to ensure the culture and cost remain relatively constant. According to the interviewee stability is important as there are individuals within the organisation who are members of different tertiary working groups and further to this stability offers some level of control over the management and placement of new individuals within the organisation and assignments to cost.

“So far in the design of the project we have reduced the cost of the project. So through integrated design we’ve reduced the cost compared to what it would typically take to deliver this type of project to the market. And we will be going to construction with a much more integrated design so a lot of the problems you experience in construction, a lack of integration – a lot of that will be done prior to the start of construction”.

This interviewee discussed the whole idea of integration at all levels of the organisation structure and project design, objectives and goals.

Favourable opinion, value and attitude towards the use of lean in managing all facets of the organisation and projects

| Opinion Leaders & Change Agents |
|--------------------------------
| The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the organisational environment advocates that everyone in the organisation is lean leaders (or opinion leaders). The discussion of opinion leaders within the organisation was done in context to organisational social norms. According to the interviewee the organisational structure management approach utilised within this organisation has created a unique working environment with specific social norms centred around stability. |
| “We have people who assist, there is one particular person on the team that is focused on and is assisting us with lean facilitation. However I think we have all taken pretty seriously that we are all lean leaders. So we’ve talked about this before it’s important to have a person focused on lean facilitation but in order for lean to work on this project we all have to be lean leaders”.
| The statement is about individual leadership, attitude, value and moral develop concerning the establishment of an opinion about the innovation. Also present is individual value systems of the lean organisational environment |
on four primary behaviours. Two behaviours in particular link themselves to the presence of lean opinion leaders and leadership ideals within the organisation, those of advocacy and integration.

The social norms present in the organisation centre on the belief and attitude that in order for lean to be successful, employees have to develop their own opinion and leader value about lean. This favourable belief and attitude about lean is evident in the interviewee’s statement about individual leadership.

According to the interviewee change agents play an essential and significant role within the organisation when lean implementation occurs. Questions concerning opinion leaders and change agents were important as the interviewee is identifiable as a champion and innovator as defined by Rogers’ diffusion theory framework.

The interviewee was asked to describe their role within the organisational environment. The interviewee highlighted and discussed how rather than an individual or group of individuals the culture of the organisation has assisted in acting as a change agent of lean implementation.

According the interviewee the nature of the cultural environment of the organisation assists in providing a platform for other organisations to utilise as a framework of lean implementation.

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<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry and their own organisation. This experience has lead them to their current position</td>
<td>“10 years experience in lean transformation within the [trade partner] company”. “3 years experience in intense applications of lean and integrated project delivery with [this particular project]”</td>
<td>Not Applicable</td>
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within the senior management team of the organisation.

The interviewee described their current role as a **senior executive**. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework.

This individual has had a **high level of exposure** to lean innovation and lean transformation in organisational environments. The level of exposure transcends this organisational environment as well as the individuals own organisational environment.

**Persuasion**

The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.

The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of **education programmes and training initiatives**. The interviewee discussed the use of a touch base or first contact type of approach the organisation uses to inform and educate new members coming into the project/s environment/s of the organisation about lean.

The interviewee’s opinion on this approach is favourable. The unique approach to this education allows not only the re-education of "For each new team we bring in we educate through going over; what we would change and how we would make it better and have; them hear all that. [And] use that as a first opportunity of; learning for them. So they hear from a more experienced team all; of the lessons we’ve learned”.

The interviewee was open in discussing the presence of persuasive techniques as part of the implementation process. The interviewee spoke favourable about education programmes and training initiatives.
individuals already in the organisation but also allows management to identify potential problem and troubled areas affecting the implementation process of lean.

| Decision/Implementation | The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation. The interviewee identified and discussed one informal technique to assist in communicating decisions forming part of the implementation process. **Plus/delta learning** according to the interviewee is utilised by management as a means of mass communicating decisions informally through an assessment of lessons learned/learnt associated with the process. **CI1** also discussed **plus/delta learning** as a strategy of decision and implementation. The interviewee noted that the informal decision/implementation approaches have been successful in being able to communicate on a mass scale the lean strategic direction of the organisation. |
|-------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|                         | “…at the end of a meeting the last part we do is a session on what would we change next time and we are actually going to; do that again for this project and in a couple of weeks what’s gone well over the last three years and what would we change and how would we make it better”. |                                                                                                 |
| CI1 also discussed **plus/delta learning** as a strategy of decision and implementation. The interviewee noted that the educational strategies used within the organisational are a combination of a number of different implementation techniques used within their own organisation and one of the senior management’s organisation. SE1 and CI1 identified plus/delta learning as one of the key educational strategies utilised by the organisation. According to the interviewee, the **plus/delta learning** approach is utilised by their own organisation as well as CI1’s organisation. **Plus/delta learning** as an educational strategy of implementation involves the recording of lessons learnt and lessons needed to be learnt in terms of specific project objectives. The recording of such sessions according to **CI1** enables the learning and construction processes |

CI1 also discussed **plus/delta learning** as a strategy of decision and implementation. The interviewee noted that the informal decision/implementation approaches have been successful in being able to communicate on a mass scale the lean strategic direction of the organisation.
The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation.

The interviewee identified and discussed one informal technique to assist in communicating decisions forming part of the implementation process. **Lunch & learns/The Big Room** according to the interviewee is utilised by management as a means of mass communicating decisions informally through an assessment of lessons learned/learnt associated with the process.

For the interviewee the use of **Lunch and learns/The Big Room** as part of the lean process has assisted in better understanding the purpose and decision behind the use of lean and advantages associated with the innovation. The interviewee also noted, in particular, that the use of lunch and learn sessions has also assisted in allowing them to accept and see changes associated with the use of an innovation such as lean.

These techniques have been used significantly in this interviewee’s organisation.

CI1 and SE2 similarly discussed the presence of **Lunch and learns/The Big Room**

The interviewee noted that the informal decision/implementation approaches have been successful in being able to communicate on a mass scale the lean strategic direction of the organisation.

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<td>“The study action teams are where you take a particular book or; publication or something like that and you get a group of totally; an interdisciplinary group, you know that consists of these; contractors and design engineers and the architects and the; owners and so on all reading the same material and then having; a facilitator discuss”</td>
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informal technique to assist in communicating decisions forming part of the implementation process. **Study action teams** according to the interviewee is utilised by management as a means of mass communicating and discussing decisions informally through small *hetrophilic* groups.

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<td>As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment. The interviewee highlighted the confirmation of education programmes and training initiatives as well as communication. The interviewee’s interpretation is underpinned by the notion that communication is fundamental for an organisation’s successful transition towards the lean innovation. The interviewee noted that philosophy behind lean is difficult at times to understand and interpret due to the lean philosophy to be grounded in manufacturing and production procedures. When asked further what the interviewee meant about their understanding on the importance of education and communication, they linked it to the process and in particular the challenges underlying the implementation process. The interviewee further expanded on this process confirmation by reflecting back on the implementation of the lean innovation within their organisation. This is particularly presence in the use of <em>re-education</em> and <em>plus/delta learning</em> strategies within this organisation assisting in understanding the process through the experiences of others and lessons learned.</td>
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</table>

| “With that comes a challenge though, I wouldn’t call it a negative but it is; a challenge, so we have to learn to relate, to communicate, to behave in; different ways then we have in the past because the old ways were more; protective. So there were rules and processes in place before that we can; no longer follow, that aren’t effective fore us. The new rules and; processes we have to create, they are not all there, so the challenge is; living in that uncertainty and environment where yeah we are working; together much closely then we ever did before but we don’t have always; the new rules and processes in place that define how we should be; working together. So that’s a challenge and creating a new project; cultural environment we don’t have it all defined, so it uneasy; sometimes; because we don’t know from day-to-day what the answer is; always, we have to go find the answer”. |

Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.
When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of **verbal communicative tools and methods**. The interviewee identified communication to be guided by engaging the workforce through **integrated learning**.

In the description and discussion of **communicative tools** the engaging of the workforce through **integrated learning** was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and hetrophilic communication within and across the organisational and project environments.

The presence of such informal **communicative tools and methods** also enables the transferring of central "shift specific" knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: **Verbal Communication**

"From my group that are working on this I see that more of their effort is spent working on things that will actually contribute to the construction of the project as opposed to documenting numerous alternatives and creating situation that and where you bid and you have to protect the kinds of responses you’d get from people who hadn’t been involved in the design earlier and so on”.

Interviewee advocated the presence and importance of communicative tools and methods to assist in the communicating of decisions and the decision making sub-process of the larger implementation process.
discussed in a positive manner. This emerged as the nature of the communicative tool is a more formal learning strategy designed for personal interaction with one’s self; particularly their role and responsibility with the organisational and project environments. The nature of reflective learning is advocated within the organisational and project environments through the presence of social norms and interactions.

The presence of such informal communicative tools and methods also enables the learning of knowledge and knowledge development in an informal environment.

Communicative mechanism underpinning secondary theme: Visual Communication

When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of visual communicative tools and methods. The interviewee identified communication to be guided by engaging the workforce through reflective learning.

In the description and discussion of communicative tools reflective learning was discussed in a positive manner. This emerged as the nature of the communicative tool is a more formal learning strategy designed for personal interaction with one’s self; particularly their role and responsibility with the organisational and project environments. The nature of reflective learning is advocated within the organisational and project environments through the presence of social norms and interactions.

“There is also segments on the wall about all the things that are being done to train people here but it’s just the fact that all those things that are on the wall is just part of this learning culture that here I have never seen done better and I really am pleased with it”.

Interviewee advocated the presence and importance of communicative tools and methods to assist in the communicating of decisions and the decision making sub-process of the larger implementation process.
The presence of such informal communicative tools and methods also enables the learning of knowledge and knowledge development in an informal environment.

Communicative mechanism underpinning secondary theme: **Visual Communication**

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<tr>
<th>Written Communication</th>
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**Challenges**

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<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Direct versus Indirect</td>
<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation. The interviewee discussed and highlighted an opinion linked directly to the culture of the environment and a need, want and desire to ‘change’ its impact on the implementation process of lean innovation (<strong>inner change and conflict</strong>). In particularly, the interviewee discussed the need for individuals to change their cultural ideals and environment in line with the lean innovation. Furthermore the interviewee discussed the difficulty associated with working in an uncertain environment where the boundaries of work aren’t as clearly defined as in the old ways. The uneasiness and challenges arising within the environment according to the interviewee is made worse with the closer relationships and new cultural environments created. The interviewee did state that the challenges are faced more from those individuals in higher</td>
<td></td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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</table>
positions of management, however occasionally this can filter down through the formal and informal social structures. The consequence is identified as minimal in its impact. This perspective highlights direct aspect. The direct aspect is present in the immediate for individual resistance of the lean innovation.

The interviewee also discussed lean leadership as another direct challenge, particularly in relation to opinion leaders, change agents and aides. The interviewee made some reflections on the use of such leadership groupings when their own organisation and the failings of delegated leadership duties.

The interviewee noted that through this challenging experience within their organisation it was decided that leadership duties would not be delegated; rather individuals would become their own advocates of the innovation.

The consequence is identified as minimal in its impact.

This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for resistance of the lean leader towards the innovation and an indirect or second-order aspect for others.

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<tr>
<th>Desirable versus Undesirable</th>
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“We don’t want to delegate the responsibilities to somebody else, we’ve seen that before, and in fact I’ve been in that situation before very, very early at [my company] of being a lean leader and then it’s up to the leader to make it happen and no-body else accepts the responsibility. The other thing that’s difficult with a designated lean leader is that you have to translate from manufacturing to project delivery and some of it is very easy to translate and some of it not so easy to translate – for one person, there is just so many different perspectives so how it translates for Steve, is different to how it translates for me. So to leave it up for one person to make all those translations is pretty difficult, so I would be a little bit concerned at having a designated lean leader on a project”.

Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.
### Organisation & Management Environment

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<td>Overview</td>
<td>Not Discussed</td>
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<td>Not Applicable</td>
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<tr>
<td>Formal Social System</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the presence of lean within the organisational and project environments.</td>
<td>“I think, actually I know for sure that this kind of project delivery, this type of project culture increases relativeness. So [interviewee C] and I work together, [interviewee A] and I work together, we all work together much more closely than we ever would have before on a project of this size. We’ve been together through the design phase every day and the same like [interviewee A] said, the same is true for us at a leadership level and its true in the trenches, detailers and designers working together, structural fabricators, structural erectors working together with structural engineers. So they are related to each other they are much more closer than they ever have been before on other projects”.</td>
<td>The interviewee was very open about the nature of the organisational environment the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of creativity and interaction across working groups.</td>
</tr>
<tr>
<td>Informal Social Structure</td>
<td>The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the informal social system in relation to the presence of lean within the organisational and project environments.</td>
<td>“I know for sure that this kind of project delivery, this type of project culture increases relativeness. So [interviewee C] and I work together, [interviewee A] and I work together, we all work together much more closely then we ever would have before on a project of this size. We’ve been together through the design phase every day and the same like [interviewee A] said, the same is true for us at a leadership level and its true in the trenches, detailers and designers working together, structural fabricator, structural erectors working together with structural engineers. So they are related to each other they are much more closer than they ever have been before on other projects”.</td>
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- **hetrophilic communicative networks**
- **hetrophilic relations**
- **enhancing relations**
- **hetrophilic and homophilic**
**communicative networks** throughout the lifecycle of the project and within the organisational environment. The nature of such **heterophilic and homophilic relations** were described as **enhancing relations** within the business and organisational environment as all parties are formally committing to the advocating of heterophilic communicative networks as part of the organisational and project environments.

The nature and context of the discussion highlighted the presence of deeper strengthening, bonding and integration of individuals and teams before on other project”.

**Social Norms**

The interviewee was also asked to describe the social environment of the organisation with reference to 'changes' that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of **integration** and **stability** of all organisational levels. In particular the interviewee highlighted the nature of **stability** and **integration** within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual.

The interviewee discussed and viewed **stability** as a management mechanism used as a means to ensure the culture and **tertiary working groups** remain relatively constant. According to the interviewee **stability** and **integration** is important as there are individuals within the “There has been some additional members that are brought in as we get further into it, I’ve seen some of my people intend and individuals intend to come in and go out depending on tasks but in general it’s a very stable group here and we are able maintain that culture and it’s not a group of people that come in to replace them and you start all over again. It’s a flow I think that has been fairly constant”. 
organisations who are members of different tertiary working groups and further to this stability and integration offers some level of control over the management and placement of new individuals within the organisation and assignments to tertiary working groups.

The interviewee was also asked to describe the social environment of the organisation with reference to ‘changes’ that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

The interviewee discussed how education has enhanced the development and sharing of knowledge between young apprentices/professionals and older trades personnel/professionals. The nature of education is dependent on the embracing of integration and stability of all organisational levels. In particular the interviewee highlighted the nature of stability and integration within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual.

The interviewee discussed and viewed stability as a management mechanism used as a means to ensure the culture and tertiary working groups remain relatively constant. According to the interviewee stability and integration is important as there are individuals within the organisation who are members of different tertiary working groups and further to this stability and integration offers some level of control over the management and placement of new individuals within the organisation and integration of stabilisation.

“The young people coming in the firm express this frustration over the fact there is so much knowledge out there embodied in these people that have been with the company for so long and experience in the profession and it’s like well why can’t we do more to share that knowledge and to get that knowledge in the heads of the young people and make that process more efficient. And you know, we always implement things and we say yes we are going to do that and so on and it’s not until this time when I became exposed to this project, well my response to that these days is for the first time in my life I’ve seen a culture which really, truly a learning culture, one which specifically went out of its way to provide training and to increase peoples knowledge and to improve their skills and particularly from [Interviewee 2’s] organisation is the big room and I had never seen that before, there were people that were in the organisation that are dedicated to the continuing education of people and they have truly made a great investment of it and a number of those techniques and methodologies have been implemented here and I have been particularly impressed at you know the effectiveness of bring in people either from the outside or drawing on the experiences of the people that are here in the team and we were just talking yesterday about one for me personally has been extremely useful is these Study Action Teams…..if you take the time to walk around here you’ll also see there is a segment on the walls about all the things that are being done to train people here but its just the fact of all those things that are on the wall is just part of this learning culture that here I have never seen done better and I really am very pleased with it”.

Lean Awareness

A cultural want of the new generation to become educated and learn from others within the organisation who have knowledge and experience

Also present here is the identification of specific formal and informal lean tools in use within the organisation.

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Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of integration and stability of all organisational levels. In particular the interviewee highlighted the nature of stability and integration within the organisation and the influence this has on management, trade partners, tertiary working groups and the individual.

The interviewee discussed and viewed stability as a management mechanism used as a means to ensure the culture and tertiary working groups remain relatively constant. According to the interviewee, stability and integration is important as there are individuals within the organisation who are members of different tertiary working groups and further to this stability and integration offers some level of control over the management and placement of new individuals within the organisation and assignments to tertiary working groups.

According to the interviewee, change agents play an essential and significant role within the organisation when lean implementation occurs. The interviewee was asked to describe their role and the following response was given:

| Opinion Leaders & Change Agents | According to the interviewee change agents play an essential and significant role within the organisation when lean implementation occurs. The interviewee was asked to describe their role | “We are seeing it throughout our office now, those people that have been through this project and are going back to other ones are bringing the message back that’s starting to you know ripple through the entire organisation. So I think that’s very positive”. Cultural aspects present are the belief and attitude that this project is a world first and that this will flow onto other parties who are contractual parties to the organisation. |
within the organisational environment. The interviewee highlighted and discussed how rather than an individual or group of individuals the culture of the organisation has assisted in acting as a change agent of lean implementation.

According the interviewee the nature of the cultural environment of the organisation assists in providing a platform for other organisations to utilise as a framework of lean implementation. This emerged as the formal social structure of the organisation is underpinned by two central contractual arrangements. The contractual agreements present in the organisation have led to the emergence of change agents. These change agents use the lean knowledge gained through information sharing capacities to introduce and implement the innovation into their own organisations.

The interviewee noted the presence of change agents within the organisation to be favourable particularly in making industry aware of the positive aspects of lean innovation.

According to the interviewee change agents play an essential and significant role within the organisation when lean implementation occurs.

The interviewee was asked to describe their role within the organisational environment. The interviewee highlighted and discussed how rather than an individual or group of individuals the culture of the organisation has assisted in acting as a change agent of lean implementation.

According the interviewee integration of the project and the project team is an important aspect that management is trying to achieve within this project office. The fact that four

"[The project] is a perfect project for us to work together to try and create the most integrated team, the most integrated processes and as a result the most integrated project delivery system".
Different projects are managed at the one site makes integration hard to achieve unless change agents are present to assist in the management and maintaining of integrated project teams.

Both internal and external lean change agents are identifiable within this organisation, particularly in the presence of information sharing duties between trader partner parties an cluster groupings. The interviewee noted the presence of lean change agents and their commitment in achieving an integrated project team.

### Implementation Process

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<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry through architecture. The interviewee described their current role as a senior architect. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework. The exposure of the interviewee to lean is considered low. The individual did identify that this is the first exposure to lean within an organisational setting.</td>
<td>Exposure is only 3 years.</td>
<td>Not Applicable</td>
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<tr>
<td>Persuasion</td>
<td>The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.</td>
<td>The interviewee was not committal over with the success/experience so far with the new training/education framework.</td>
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organisation.

The informal social structure of the organisation was identified by the interviewee to be guiding persuasive techniques and strategies used by senior management. The interviewee discussed the presence of persuasion in conjunction with the homophily and hetrophily cluster groups that form the social structure of the organisation. The interviewee in this discussion highlighted the struggles and challenges of some individuals in the acceptance of change and how it’s the culture that assists people within an organisation to accept or reject a notion of change.

The interviewee further spoke about how some people need exposure to multiple success cases of using the lean methodology in order to accept the longer term investment instead of believing in shorter term gains, which is how many in the organisation felt at the beginning of [project 1].

CII supported the need for individuals to be exposed to a strategy like lean to understand and see the benefits associated with the innovation before making a decision to accept or reject the innovation.

The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.

The interviewee discussed how organisational

“The most integrated team, the most integrated processes and as a result the most integrated project delivery system”.
Social norms, in particular the social norms of advocacy and integration underpin the second perspective of persuasion discussed within the interviews. The first persuasion perspective, as discussed by the interviewee was supported by CI1 discussed the need for individuals to be exposed to an innovation and its culture before a decision to accept or reject the notion of change.

It was noted that the formal and informal social structures forming the organisational and management environments assist in overcoming such non-favourable opinions of lean innovation through integration. Integration in particular is present at all levels of the organisational structure and the management approach to the projects present within this organisation particularly in the form of:

- **Homophily** and **heterophily** orientated cluster groups;
- **Heterophily** orientated study action teams;
- Individual, project and organisational advocacy; and
- Individual, project and team integration.

The forming of favourable opinions in the organisation has assisted in the moving of the organisation to provide what CI1 describes as a ‘first of its kind’ project.

| Decision/Implementation | The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation. | The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of the organisation. |
The interviewee identified and discussed one informal technique to assist in communicating decisions forming part of the implementation process. **Lunch & learns/The Big Room** according to the interviewee is utilised by management as a means of mass communicating decisions informally through an assessment of lessons learned/learnt associated with the process.

For the interviewee the use of **Lunch and learns/The Big Room** as part of the lean process has assisted in better understanding the purpose and decision behind the use of lean and advantages associated with the innovation. The interviewee also noted, in particular, that the use of lunch and learn sessions has also assisted in allowing them to accept and see changes associated with the use of an innovation such as lean.

These techniques have been used significantly in this interviewee’s organisation.

**CI1** and **SE2** similarly discussed the presence of **Lunch and learns/The Big Room**

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<tbody>
<tr>
<td>Feature</td>
<td>Analysis</td>
<td>Quote</td>
<td>Interviewee Attitude</td>
</tr>
<tr>
<td>Verbal</td>
<td>Communication</td>
<td>“You get a group of totally an interdisciplinary group, you know that consists of these contractors and design engineers and the architects and the owners and so on all reading the same material and then having a facilitator discuss with them what it is they got out of what they read and because of the fact that a lot of the origins of lean are coming from production as opposed...”</td>
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In the description and discussion of communicative tools study action teams was discussed in a positive manner. This emerged as the nature of the communicative tool can be incorporated formally and informally; allowing for collaborative and open homophilic and heterophilic communication within and across the organisational and project environments.

The presence of study action teams as part of communicative tooling enables the advocating of team specific communication and the transferring of central ‘shift specific’ knowledge within and across organisational and project groups or teams.

Communicative mechanism underpinning secondary theme: **Verbal Communication**

“The study action teams are where you take a particular book or publication or something like that and you get a group of totally an interdisciplinary group, you know that consists of these contractors and design engineers and the architects and the owners and so on all reading the same material and then having a facilitator discuss with them”.

When asked further questions concerning the communication of lean implementation of the workforce in regards to lean, the interviewee discussed heavily the utilisation of visual communicative tools and methods. The interviewee identified communication to be guided by visual training management.

The interviewee highlighted a unique way of communicating the decision and progress of implementation of the lean innovation within the organisation through the use of visual training progress and management. **This technique has been used specifically within this organisation however the technique is a form of visual management and lean value mapping.**

“**There is a segment on the walls about all the things that are being done to train people here but its just the fact of all those; things that are on the wall is just part of this learning culture that here I have never seen done better and I really am very; pleased with it**”. 
Communicative mechanism underpinning secondary theme: **Visual Communication**

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### Challenges

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<tr>
<td>Desirable versus Undesirable</td>
<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation. The interviewee discussed and highlighted an opinion linked directly is an extension of CI’s consequential perspective of education and training. The interviewee discussed the current educational barriers being experienced within the organisation and compared these barriers to the workings of a car. The interviewee also stated that the challenges identified above are faced more from those individuals in higher positions of management making the executive decisions and managing education duties. The consequence is identified as <em>minimal</em> in its impact. Education is representative of a functional aspect; however the lack of management within this perspective makes this <em>dysfunctional</em>.</td>
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<td></td>
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<td>“Well when we first started the project we did a lot of training and we did training as we moved along but its like the throttle on the car, its like the gas pedal as soon as you let go you kind of look around and realise that you’re not going anywhere, you’ve gotten to a certain point but you haven’t gone any further and I think that’s where we are right now and I think we’ve got to push on the throttle again and push on the gas pedal and we’ve got to do more training and so it seems like it needs to be a continuous part of the process and project delivery – on going training”.</td>
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The interviewee was open to discussing the challenges that are faced from an organisational perspective.
Interviewee 4: Project Manager

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<tbody>
<tr>
<td>Overview</td>
<td>Another perspective on the formal social system structure of the organisation emerged in the second session involving the interviewing of one of the organisation’s project managers. PM1 discussed the presence of trade partners as part of the organisation’s formal social structure particularly within the project office.</td>
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<td></td>
<td></td>
<td>“Trade partners are another management feature we have here in the project office”.</td>
<td>The interviewee highlighted an understanding and awareness of the nature of lean and their own understanding of its application within the organisational environment.</td>
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### Organisation & Management Environment

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<tbody>
<tr>
<td>Formal Social System</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
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<tr>
<td>Informal Social System</td>
<td>A third perspective of the organisational structure emerged in the second and third interview sessions involving one of the organisation’s project managers and a member of the project team. Both PM1 and PT1 expressed the presence of an integrated team environment to be underpinning the management approach of the organisation. PM1 and PT1 both identified that the work within the organisational environment is typically done utilising clusters of groups. PM1 expressed.</td>
<td>“The presence of an integrated team environment in the organisation lead by cluster groups of individuals assist in the creation of innovation for management.”</td>
<td>The interviewee was very open about the nature of the organisational environment and the concerns/issues the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of unnecessary waste.</td>
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<tr>
<td>Cluster groups</td>
<td>tertiary working groups formed to undertake specific project works and elements, for example PM1 said….</td>
<td>“In this process everybody is at the table at the same time you; get your plumbing perspective, you get your mechanical; perspective, you get your architectural perspective, your; planning perspective, your design perspective and they all come; together”.</td>
<td>Interviewee opinion, value and attitude is neutral, describing only the structure.</td>
</tr>
<tr>
<td>Homophily Cluster Groups</td>
<td>Management focuses on providing an integrated team environment focused towards cluster groups creating innovation.</td>
<td>The study action teams are where you take a particular book or publication or something like that and you get a group of totally, an interdisciplinary group, you know</td>
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that consists of these contractors and design engineers and the architects and the owners and so on all reading the same material and then having a facilitator discuss with them what it is they got out of what they read and because of the fact that a lot of the origins of lean are coming from production as opposed to what it is we're doing here is that there is a great benefit of people stretching to try and determine what it is that they can extract from the material that we are reading. That may come from something that they might not ordinarily wouldn't think of as being apart of their kind of work, its like you know well what I'm reading about is auto-production but how does that relate to it and its actually going through that mental exercise of asking yourself those questions and finding you answers to that question which makes it such a valuable one.

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<tr>
<th>Social Norms</th>
<th>Not Discussed</th>
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<tbody>
<tr>
<td>Opinion</td>
<td>Not Discussed</td>
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<td>Not Applicable</td>
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<tr>
<td>Leaders &amp; Change Agents</td>
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### Implementation Process

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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Knowledge</td>
<td>This individual has a low level of exposure to lean innovation and transformation. The individual did identify that this is the first exposure to lean within an organisational setting.</td>
<td>First exposure on a lean project</td>
<td>Not Applicable</td>
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<tr>
<td>Persuasion</td>
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<tr>
<td>Decision/Implementation</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
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<tr>
<td>Confirmation</td>
<td>The third and fourth confirmation perspectives were discussed within the second and third interview sessions, involving one of the project managers (PM1) and a member of the project team (PT1). The perspectives reflect how individuals at particular levels within the organisation have perceived the outcome of the implementation process. Both PM1 and PT1 had</td>
<td>1. Simplifying drawings “Have assisted in multiple solutions to emerge and be discussed”; 2. Redefined innovation; 3. Working with manufacturers “Lean innovation has simplified the relationship, delivering a super assembly line, and moving design and production off-site”;</td>
<td>Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.</td>
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similar confirmation perspectives concerning the presence of the lean innovation within the organisation. The perspectives are linked to the end-result that implementation process brings to the organisation.

4. Move towards integrated 3D modelling

‘Problems have arisen with different programmes and software packages of trade partners, however through lean the integration of all separate modelling components and modelling maturity has been achieved’;

and

5. Integrated team environments.

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<th>Analysis</th>
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<th>Interviewee Attitude</th>
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<tr>
<td>Verbal Communication</td>
<td>Heterophily</td>
<td>The study action teams are where you take a particular book or publication or something like that and you get a group of totally, an interdisciplinary group, you know that consists of these contractors and design engineers and the architects and the owners and so on all reading the same material and then having a facilitator discuss with them what it is they got out of what they read and because of the fact that a lot of the origins of lean are coming from production as opposed to what it is we’re doing here is that there is a great benefit of people stretching to try and determine what it is that they can extract from the material that we are reading. That may come from something that they might not ordinarily wouldn’t think of as being apart of their kind of work, its like you know well what I’m reading about is auto-production but how does that relate to it and its actually going through that mental exercise of asking yourself those questions and finding you answers to that question which makes it such a valuable one.</td>
<td>Sub-theme also present in the formal communication network forms with which the lean process is diffused.</td>
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<tr>
<td>Visual Communication</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
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<td>Written Communication</td>
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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tr>
<td>Direct versus Indirect</td>
<td>Not Discussed</td>
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<td>Desirable versus Undesirable</td>
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### Interviewee 5: Project Team Member

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<th>Interviewee Attitude</th>
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<tr>
<td>Overview</td>
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<td>Not Discussed</td>
<td>Not Applicable</td>
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<tr>
<td><strong>Organisation &amp; Management Environment</strong></td>
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<tr>
<td>Formal Social System</td>
<td>Not Discussed</td>
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<tr>
<td>Informal Social System</td>
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<td>Both PM1 and PT1 expressed the presence of an integrated team environment to be underpinning the management approach of the organisation. PM1 and PT1 both identified that the work within the organisational environment is typically done utilising clusters of groups. PM1 expressed “Cluster groups and teams are structured around similar work practices, knowledge bases and understanding.”</td>
<td>The interviewee was very open about the nature of the organisational environment and the concerns/issues the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of unnecessary waste.</td>
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<td><strong>Cluster groups</strong> – the organisation utilises a sub-team or tertiary system approach to the undertaking of project specific works and phases of construction. Cluster groups are underpinned by a collaborative environment. Within the organisation it was noted that there has been a certain level of success in the cluster groups in strengthening existing and creating new bonds between management and trade partners. PT1 in particular noted the success of cluster groups within the organisational environment from a collaborative perspective stating….</td>
<td>“One thing that does stand out is setting up the organisation for; success is through integrated team environments…we feel like; we talk and that we are collaborating and are collaborative; within our offices and all that”.</td>
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<tr>
<td>Homophily</td>
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<tr>
<td>Cluster Groups</td>
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<td>One thing that does stand out is setting up the organisation for success through integrated team environments...we feel like we talk and that we are collaborating and are collaborative within our offices and all that. Project teams are clustered together in terms of experience and similar work.</td>
<td>A favourable opinion, value and attitude.</td>
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<td>Homophily</td>
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In this process everybody is at the table at the same time, you get your plumbing perspective, you get your mechanical perspective, you get your architectural perspective, your planning perspective, your design perspective and they all come together. A favourable opinion, value and attitude.

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<th>Cluster Groups</th>
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<td>Homophily</td>
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<th>Opinion Leaders &amp; Change Agents</th>
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<th>Quote</th>
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**Implementation Process**

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<tr>
<td>Knowledge</td>
<td>This individual has a moderate level of exposure to lean innovation and transformation. The level of exposure transcends this organisational environment as well as the individuals own organisational environment. Furthermore this individual has also experienced lean awareness in a manufacturing setting.</td>
<td>Second or third time using lean in a project setting.</td>
<td>Not Applicable</td>
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<th>Persuasion</th>
<th>Analysis</th>
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<th>Analysis</th>
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For PT1 the confirmation of the lean innovation is about:

1. High quality drawings;
2. High quality production plans (achieved through work of all trade partners); and

Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.

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<th>Communication</th>
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<tr>
<td>Communication</td>
<td>Visual Communication</td>
<td>Written Communication</td>
<td>Challenges</td>
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Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and when the company decided to implement lean.

Ok, I’m [interviewee 1], and just to help with your note taking later I am the operations manager for the base building group of [organisation B] here in northern California, been with the company about 26 years my background was that of an engineer onsite and then a superintendent onsite running projects and ultimately up here so I’ve skipped the project managers position or duties to a large
degree although the way our superintendents are structured a lot of the traditional project management duties are done on the job-site anyway by the project superintendent. So [org B] kind of splits the project management activities between a project manager and project superintendent – so I am familiar with project management as we do it. I think that’s about it for me, unless you’ve got specifics.

In your capacity within the organisation what has been your exposure to lean thinking and the application of principles within the organisation?

My exposure to lean is largely through the [org A projects], we’ve been involved in on that site four years and they’ve been a couple of attempts of coming up with the best way to build this project and we were involved with a team previously that the route that was being taken wasn’t going to get the building [org A client] came back and created a new team of which we are still a member of and different other contractors and [org A client] really brought to the table their approach on trying to procure this project through lean management techniques and IPD and there were different elements that we hadn’t been exposed to on other jobs. I’m removed enough from the project, on a day in day out basis; I’m not officially assigned to it like some of the others that you’ll talk with later that I’ve been in kind of a nice position of being able to see what they are doing at some distance and reflect upon what that means to [org B] incorporating some of these techniques into our culture and the way that we do business. So that’s where we are at so I’m, I don’t think I’m exactly novice with lean techniques I have not built a job using them yet and nobody at [org B] has – we are all, well the joke is we drank the cool-aid we’re seeing some value here – I think my position right now is, now we are starting to see value from some of these techniques what is the least obtrusive way to incorporate those into our culture, because when you change a culture even just a little bit there is a big bang and I’m trying to look at ways to minimise that or make it ducktail a little bit easier than just jumping in with both feet. We have the luxury of time right now with the down market and being able to participate in the laboratory that is [org A projects].

You’ve mentioned the organisation looking into the application of lean strategies; however has the organisation already started the lean implementation or is the organisation still considering the approach?

It’s both, we’ve implemented some things and we are still looking at some things and other things and how they would work – I would say we’re furthest down the road right now in the last year, year and a half we’ve looked at the majority of both our administrative processing capabilities and in a couple of cases job site work processes for you know, we do a lot of structural concrete work so some of those work activities from benefit of using lean observation techniques, work flow structuring, flow
charting and those activities and those types of things. It’s gone a long ways administratively because we are forced now because of a technology that we’ve used for accounting software not being supported much longer, that we have to make a change – so those reviews of our processes have helped us decide which new vendor to go with and has given us a better understanding of how we do our work day in-day out in a number of areas that the programme writing for the new technology that we will be using in about a year is probably going to be a much better fit then it would have otherwise been looking at work flows, work processes we’ve done a lot of work on. Where we haven’t done much yet is building the work, you know like construction projects using some of the techniques on site – we’ve had kaizen events on three different projects looking at in, on our three main regions Hawaii, Southern California and Northern California looking at work operations that we do frequently from job-to-job and have been able to improve processes a little bit that’s a minor benefit – the real benefit at this point from that kaizen work is getting people familiar with some of the new things that lean techniques are to us. But as far as a lot of the last planner scheduling we have not implemented on job sites yet, we are looking at how to do that – that’s one of those techniques that actually, probably parallels what we do traditionally pretty closely but there’s enough nuance to change that we’ve got to be careful that we understand what we are doing. To me that is one recurring theme of lean is its very commonsensical most of these techniques are not difficult to understand, (sort of like a re-education), yes there’s a little nuance to what you are doing – it’s a little bit and if you don’t understand that little bit of change then you miss the whole point – i.e. your really doing it the way its always been done or you’ve done it. Our experience of that, actually, an example of that is we’ve done and its not an official lean technique but we’ve been very involved with in choosing by advantage and you know that’s, its almost too simple, you look at it you understand it, your reading Jim Sewers book, or going through one of his courses – you understand immediately what he is trying to do but the very slight differences in definitions of alternatives, attributes and how you prioritise things its very subtle it seems and we’ve stepped over it a few times and come up with results that weren’t really a true CBA. So I mean its just, its very minor things I think are going to adjust very quickly but it’s a recurring theme that, well to me anyway, that the changes with lean that we will run into are going to be very modest tweaks on how we do it but they’re critical tweaks and if you don’t quite get them then you’re going to waste a lot of time and that’s what I’m trying to decipher in a number of areas.

Although perceptively different, have you found that your exposure to lean has also made you aware of possible cultural maturity within the organisation? If so, how and if not why? Has this maturing culture been both positive and negative in its nature?

Our organisation? Yes. Yes, however the culture has been mostly positive and I’ll touch on the negatives in just a bit. But the changes in culture have been mostly positive in that it is, of the three
regions I would say Northern California has had the strongest and most complete exposure by virtue of [org A projects], by virtue of being involved in P2SL, by virtue of having several people regularly participate in the Northern California LCI for the last couple of years. The groups in southern California the LCI is much newer and just getting off the ground – they haven’t had a job and they haven’t had an owner that supports this education that we are getting up here – so we are, we’re quite a bit ahead of where our other groups are at but its all three of our offices in northern California, even the two offices that don’t have the most direct involvement with cathedral hill. What we’re learning here (interviewee is discussing the actual office itself), right here is a line between [org B] Builders and [org B] special projects and these folks are, we co-mingle, we discuss things, we talk about things, we have speakers from [org A projects] over so the exposure is greater than just the immediate team involved in cathedral hill or the immediate team involved in LCI. But one of the big improvements is, especially with the two groups here and to a lesser extent the group in [Northern California] is they have been the ones who have taken the lead in the evaluation of our existing work processes to get to the current state – because they understand the basic concept of what you are trying to do better and the argument has already been won in that it makes sense to review what you are doing, to see what you can improve in the future and its largely been this group that has taken that lead. The group that is involved in [org A projects] especially the MOB, where we’re the general contractor cause there is now currently three different parts of cathedral hill that we’re involved in, the MOB being the one, that got the most, the one project of the three – that we’ve got the most general contractor control one that group of folks that you will be talking to later this morning have certainly spear headed exposing the company to CBA techniques, to A3 techniques which different folks have picked on or have picked that up to different rates – I would not say that is a consistent technique that we are using yet, CBAs (choosing by advantage) are although sometime incorrectly, the group over here is (again indicating particular groups within the organisation) – has with the help of the folks from [org A projects] again are starting to incorporate the last planner on some of their smaller jobs to see how it works an so there’s lots of people stretching, thinking and wanting to learn more. Its spawned and again I’m not sure whether this is another true lean technique but the study action team concept we have used quite a bit for probably areas that might not have been intended to do we’ve started – we’ve had four or five groups up here now so probably forty-fifty people looking at the Toyota Way book, you know the basic starting book. But where we’ve really used it, probably having 70% per most of the salary folks have gone through its called the pathway to through zero injury culture – it’s a book based upon the construction industry institute surveys on how to get to a zero injury culture and been using the SAT as a format to compare and contrast what the book is saying compared to where we [org B] are at with our safety programme. We’ve just started using a sat-nav now, we’ve started down the road to trying to develop bar execution plans for using BIM on projects and we are using a SAT right now to start getting folks who aren’t immediately involved in that familiar with the concept and the benefits and the problems associated with BIM and creating and
execution plans so we are using that tool quite a bit. Where I think the negative have been its very easy to put lean – I’ve been involved with the industry long enough to have seen two or three waves of buzz words come through, 15 years ago total quality management was a big thing and everybody in the company was talking about it our upper managers were very excited about it and nobody had a clue as to what it was. Too a degree some of our upper managers right now and this is solely my perspective – but I think right now there is a real excitement about it, about lean techniques and the knowledge of what those techniques are, what the philosophy that holds the techniques together and its not understood to the degree that it needs to be by upper management, I think a lot of the pushing for our lean growth right now is middle management and job site driven and I don’t know if that’s a problem but sometimes our highest company leaders don’t have the clearest vision of what we are talking about yet. So they are being educated just like everyone else – so that’s the negative its too easy well in my view as a middle manager its too easy for upper management sometime to get very excited about an article they read and the lights go on and everything but you they don’t pay the power bill or something.

Have you found especially through the exposure to [org A projects], that internal and external company relations as well as your own relations have improved? If so, how and what has been the impact and vice versa if this has not occurred.

Yeah probably not as dramatically as other contractors a big part of [org B’s] culture especially the base building and special projects started much later chronologically then the original company of which base building is the original part of the company were founded by [the founder] who had headed a building division for [another building entity] in Southern California he left because they were more of a hard competitive bid contractor and he was convinced a better way to bring value to an owner was through design/build at that time. So our culture has been very strongly influenced by a design/build philosophy even a non-design/build projects and that philosophy well a big component of that has always been collaboration and we always have been a design/build project orientated or as we do them we are always contractor let because we are a contractor and so you know there is lots of collaboration and there is lots of mutual respect between the team members and lots of expectation based on what their responsible to deliver that’s exactly what’s happening at [org A projects] but [org A projects] is probably on steroids compared to where we’ve been you know on our design/build history. So it certainly is a change, its certainly, its been ramped up from what our history has been but its not like we were a bid contractor so this is a completely new brave new world.

If you could would you change anything about your own current external and internal working relationships within the company and their link to the [org A] project?
Well I think the relationships that we have with the team at [org A projects] I think are working very well. You know the only confusion is sometimes one organisation because the general contractor for the hospital is a joint venture so am I talking to a representative from [primary contractor 1] or [primary contractor 2], do I need to talk to two people – you know sometimes that’s a little unclear and that’s probably more true for me because I’m not immediately involved every week, the other folks you talk to probably have a much clearer, you know understand the patterns that much better than I do. But I would say that I’ve been very impressed with [org A] – but we’ve had a long relationship with [org A’s client] – so [primary contractor’s] that’s what’s really impressed me, the design team asking questions about the hospital of us, well asking us to contribute to the conversation for an area that we’re not going to have, we’re not even going to be on site for. We are the concrete trade partner we’re talking about head wall conditions, how are we going to build the bathrooms, those types of things that we’re certainly paid to be there but its, that’s not the reason we’re there – its there because everybody is working towards the common goal and everybody’s input is valued and considered.

Do you find that those elements lead to a cultural position to emerge as part of the organisations maturing within the process?

That’s very much a cultural positive but then again [org B] has had a lot of that, its just that this is just a much bigger slice of it. I am very surprised because we haven’t had success a lot of the time with non-design/build contractors on design/build projects getting them to participate in any other way except you know a command and control response perspective. We the general contractor say it and they do it. But the very same sub, the very same guy is now at cathedral hill and offering all kinds of opinion because its being asked and its valuable opinion, its valuable information that he is giving and that’s been the biggest surprise the cultural change from subservience – well that’s the wrong word, but my experiences has been most subs look to the general contractor to provide the leadership and the direction. That still occurs at [org A projects] but there’s much more discussion by a greater number of participants then is typical and that very much is a positive.

With the exposures to lean through external relationships within the industry has this lead to one specific person or a group of people to be known as the lean champion/s? And if so, do you believe that the companies decision to go lean has been based on the ideas and knowledge of this person and/or people?

Historically we have but that’s been more along the lines of we’ve had several that knew structural framing systems, you know [org B] has held a lot of patents in either a framing construct concept for structure or a means or method on how to do a framing structure and we’ve usually had champions
supporting those because they involved getting building code approvals and those types of things. For lean right now its new enough to the company that, that leader has not emerged, I think we are right on the cusp of that and we’ve had some, we’ve probably had a committee of change makers emerge already and those will be the folks that you talk too the rest of the day (the interviewee lists five names all of whom will be interviewed later). [Three of them in particular] as they’ve been working on, they are really doing the heavy lifting on using the concepts that Sutter is requiring, the lean concepts, the contractual concepts and adjusting those to be more in alignment with how [org B] typically does our work. So slowly but surely that committee is leading the change but there has not been a champion emerge from that yet.

In terms of the implementation process would you prefer the champion to be one person or a group of people, i.e. a more integrated approach?

I have no preference I mean there is some frustration right now up here (meaning the current office) because we are seeing lots of benefit and people being the way people are temperamentally you want that immediate change, but our other two regions are not nearly as far along so have of that change would be alien because they would not have had the time to assemble the framework in their own minds to see how this is going to fit and so we would just be pushing something on them and you know we are in a luxurious position being paid to participate in the laboratory that is cathedral hill. We are going to be required to do things by contract a little bit different to what we have, the market is slow we don’t have a lot of other jobs right now across the board in all three regions that immediate change is necessary we can kind of wait and see how this simmers and see what works and what doesn’t and a little bit of a time pull is on. So I think, if I had to bet right now I would say that in a year and a half – two years once this has started actually be implemented on site on cathedral hill that not only the three people I mentioned before but probably another, that would probably triple or quadruple the number of folks that would have actual experience on cathedral hill that, that committee would grow and I think there is going to be a natural growth without a champion at this point. If it were something we had to react to much quicker we would have to have somebody spear heading it. But right now just because of the way everything has been set-up I think we can do this at a more comfortable, measured, non-overwhelming manner.

Do you find that the gap as you’ve mentioned previously with the [cultural] frustrations associated with external communication points can adversely affect the process of lean implementation for your company?

No, I think its going to do the opposite. I think, you know actually, why I criticised our upper managers for not being as educated in some of the philosophy and some of the concepts of lean as the
three people you’re going to talk to later in the day that’s actually kind of a good thing because they are certainly interested in the concept because as owner is driving this – right, somebody who is paying us to work for them and that’s why we are in existence so if, I think, I think that as things on cathedral hill changes made following some lean philosophies succeed then upper management is going to accept changes. We are going to drag them into it but its going to be lead by people in the middle ranks up which I don’t have a problem with and I think once we have some successes that there won’t be resistance other than a positive resistance in trying to figure out how to do it better. So you know, again we’re in a good position because we are going to by contract were forced to do some of this – what a great thing. My bosses certainly understand contracts.

Its different to see this type of approach towards the implementation of lean strategies being used, with the process influenced by the knowledge and philosophical skills of middle management and external contracting forces.

Yes it is, and comparing that to, I used total quality management about 10-15 years ago that was some upper managers bringing it to the table and they had read a books or a magazine article and they, you know. There's a lot of stuff in TQM that’s absolutely valid and good but with any good idea or any good philosophy that you want to start you know incorporating understanding the idea is the easy part, being excited about the idea is the easy part, its implementation that’s really the difficult step on anything. We’re starting with implementation, it’s the philosophy as we have these minor victories along the way, and they start an aggregate quite a bit. So I think that’s how we are going to get there.

During the process of lean implementation has there been any movement towards the dictation of principles and processes within the organisation? Do you find this is negative towards understanding the philosophy behind lean?

We’ve had some dictation; we’ve had some miss communications with folks that thought we weren’t doing something lean enough. And there has been an upper manager within the company that directed a superintendent to start doing last planner and then went ‘see you’. And so there is all kinds of resistance to that, cause no-body understands what anybody is talking about – so we’ve had benefit of that when you compare it to other people that are doing it and in an owner driven, but we are part of the team manner like at cathedral hill we can see what didn’t work but now we can see how the very same thing is happening over here because we came at it from this perspective.

You’ve mentioned changes in the cultural environment at the company a number of times throughout the interview. How would you describe the changes in the culture of the company before and during this process of lean implementation?
With [org A] we have had a good working relationship over the years, again, well PSL was the one that brought [org B] organisation to [org A client] by doing some of the smaller jobs for them in existing hospitals. Their work occurs much quicker, on a smaller scale, its easier to budget with existing budgets that they have in house, so it occurs much quicker – we’ve had, we’ve probably have had a 15 year relationship with [org A client] that I think has always been very positive, I think that positive relationship is one of the reasons we’ve been involved in two teams there. I think, well I don’t know the original folks we’ve dealt with/in [org A client] are probably not the champions of lean construction and its [org A – interviewee 1] and his group looking for new construction and he was not the person, they were not the people we dealt with on the earlier smaller projects so it’s a different group. We had a good relationship before in a standard business procurement manner, we’ve got a very good one now but it’s the expectation by all parties is different, so I like the direction the culture is going I think there is a lot of value in the whole ineptness of having so much energy expended to design and develop the project before any work is done. But the real trick is going to be how many times and with regular private developers your going to have that ability – I may be wrong and hopefully I am wrong, I think its going to be hard to replicate this very often because it is a real commitment to an owner or by an owner and it’s a real financial investment by that owner way upfront and most owners especially on the private side but increasingly on the public side just don’t have that luxury of capital ahead of building construction. They just don’t, so culturally for us [and this might not be your question] we are trying to figure out a way where and we’re not there yet but how can we as [org B] may be do some of the things, take some of the risks that [org A client] is, but for our subcontractors when we go into a negotiated competition on some private work. You know there’s the IPD concept what can we do contractually that maybe makes everybody sharpen their pencils because there is less risk to them that we assume some of that risk and as a team we are just more competitive going into a project – we are looking at ways to do that. Cause some of these tools certainly seem if they’re implemented correctly would lead you that direction but it’s a matter of how do you handle the business relationship when the owner is not taking a large chunk of the risk right now. Two years from now they could decide that they don’t want to build it and we’ve all been paid and been able to go through this glorious education and yet there is still no project.

Just a little off topic, but what stage is the [org A project 1] project currently at?

Design wise I think they’ve got the hospital itself, they’ve got far enough along the, they’ve got to be into the construction document phase, as they have already submitted to ASPOT. They won’t start construction until, well my understanding January of 2011; they should start the abatement and demolition. We have been involved with the team at the capacity we are at right now with four people full time on MOB, three people but [interviewee 2] a big part of that so he would be the fourth,
[interviewee 2] and one other being involved and an estimator being involved pretty regularly on the hospital for a year and a half. And we’ve still got 9 months (at time of the interview) or 8 months what ever it is to get there and have you gone over to their office on 2nd street? (yes) well they’ve got about 100 people or 150 people there full time. I think the design is that far developed, they’ve gone into ASPOT for those jurisdictional reviews, there are three projects tied together and the environmental impact statements and all of the approvals from the city is in my understanding what is lagging behind everything else. So what is setting the start date of January has nothing to do with this audit. So we were planning on starting this summer but because of delays and entitlement procurement they backed off and took some pressure off and pushed the start date back to January.

To me some of those elements could cause negative cultural attitudes and frustrations start to emerge.

Certainly particularly in terms of entitlements, the owner still has a fixed budget and part of that budget is construction and part of that budget is pre-construction. And if this grows you either have to have few people involved to keep the budget or somebody is going to have to be a hiatus taken – which is a negative. But as a team we’ve been managing that and why it certainly is a negative if it stretches out with an owner willing and sees value in all this investment upfront in pre-construction it rare to find an owner who even sees that. They’re just looking at this and I think big picture wise a few successes like [org A – project 1] eventually might catch the attention on smaller developers and smaller projects to make that more attainable. We are certainly not there yet, we have proposed IPD contracts, prime contracts with some developers and they like all of the collaborative effort, they like all of that stuff but they are not going to foot the bill for it – that’s just not part of how they do business yet. So like everything its going to take some time to get there.

This is the last question for the interview, its about this idea of knowledge transferability and working relationships. Does the higher management within the company value the ideals of knowledge transferability and collaboration both in the internal working environment as well as external working environment? Particularly from an internal working environment provide opportunities to gain new knowledge and reward that gaining of knowledge?

Yes, and in fact that is a very well timed question. In fact we are in the middle of doing that. The company outside of lean right now, the company had changed dramatically in the last 4 or 5 years largely because [org B – founder] passed away and when he passed away instead of, well we had a board of directors when he was alive and we had upper management of course but it was always [org B – founder] making most of the critical decisions. When he passed away that went to a board which is much more active now that looks at business a little bit different, the culture is still largely in tack
but the approach is certainly different I certainly support the direction we have gone because it focuses on facts that are very important to me and my role in operations. It’s the level of quality people you can get for this industry is going down all the time, this is not an attractive industry compared to other industries as it used to be so that’s from tradesmen all the way up to managers, all the way up to superintendents and engineers and yet at the same time and I’m going to sound like an old floe for this, but the generation that is graduating from colleges now and coming on board expect to a greater degree than my generation did continuous education and growth. Not necessarily advancement I found but they want to keep growing and keep learning so as a result of those two things we have what we call a PDC (Professional Development Committee) of which I am a member we’re trying to improve the old way we would do things is have big group meetings, big company meetings that were very important they would certainly build up a lot of relationships and a lot of stories were told and in a lot of ways, there was a lot of means and method in how we do business kinds of knowledge transferred but it was not formalised. We are doing, we are pretty early in the process but we have created courses now, we’ve created 22 this year, there is about another 120 on our list to do and including several that are lean orientated of courses to make it simpler to transfer that knowledge. And it was a knowledge transfer that was exactly the reason why we use the study action team concept for that safety book I mentioned because that is a great way of communicating, of well providing information by a comparison and contrast perspective – we did that with the Toyota Way. What about the Toyota Way that is familiar to us and isn’t and what do we buy into and what don’t we – got us not talking about Toyota but talking about [org B] and it’s the same kind of thing.

Have you found that those type of SATs or approaches to the implementation process and understanding the philosophy behind lean have provided cultural positive and empowerment amongst team members?

Absolutely, the requirement when we sit down for an SAT is this isn’t a pass or no pass participation folks but you are expected to participate. In fact I’ve got a list here, my job as a facilitator is for you guys on the quite side I’m going to remind you we want your contribution – you guys that talk a lot which I tend to do a lot, I’m going to shut you up a little bit. And what happens you complete the SAT there’s been a great exchange of ideas, that continues after the session is over and the folks, they are people that are one or two years out of school now you’ve also given them an expectation – if there are some action items that come out of it which they do and there has been quite a few on the safety book, what are you going to do about it management? Are you going to track down some of these ideas we discussed? And one of my jobs, well goals is for this year is to come up with a better way to give them the follow through and follow up with these running ideas. So it is stimulated quite a bit of discussion that just keeps going. And I think if there was ever, [org B] has never been too with the exception of [org B founder] being [org B founder] I don’t think people have ever been too
overwhelmed by job descriptions to not voice their opinions when they wanted to or its just never been a rigged culture that way but we are much looser now just because, if nothing else using the SAT – I think they are just a great, easy, easy way to free some of that thought up and communication up.

**Are there any additional thoughts you wanted to share?**

Well I think you’ve heard a theme throughout we’re pretty new as a company on our journey with lean. So we are not there yet but I guess that’s kind of the philosophy of lean is that your never there yet, you know, you’re always growing, you’re always improving, you’re always looking to anyway and there is no ends to the means. Its kind of like life, well there is an ultimate end to life.
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its affects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and when the company decided to implement lean.

My role in the company for [org B], I’ve been with [org B] for oh gosh going on 6 years now; which is relevantly a newcomer for [org B]. [Org B] is I would say 70% well it’s a little less than what it used to be but approximately 60-70% of people in [org B], join [org B] straight out of college. And be with [org B], and know [org B] as the only company they have known their whole time. Our current president, our CEO, our CFO all of them started with [org B] out of college, so they do truly; acknowledge one of the growing from within, one of the lean things is very much a cultural thing
within [org B]. They don’t go a lot outside, they are starting to a little bit more for some positions but they try to continuous grow inside. So I am a relevantly newcomer, baby within [org B] so I’m probably the least experienced in their true culture although I’ve seen a lot probably from more of an outside level look at it because they don’t have many people, outsiders, looking at how they do things inside. But anyway as a project executive I obtain work, manage work, close out work, maintain customer relations that’s kind of an overall thing. Within [org B] we don’t necessarily have hand offs were one pre-construction group hands off, I’m in preconstruction now with another team, that same team including me will move into construction, close out and be responsible for warranty. So it’s kind of a one stop shop situation within [org B]. As far as lean, I am probably the oldest in the company as far as lean experience, in fact I was just looking at a certificate on the wall which stated I am LCI member 210 from 2005 so that’s when I started getting the experience and exposure to lean through [org A – client]. They basically were very high on it, they were encouraging people to learn, it was very interesting to me and, well so I got involved with that at that point in time and have been involved with it and stayed involved with it almost continuously since that point in time, and with different aspects of it – as far as going to monthly meetings with LCI, annual meetings for their congresses/conferences and have worked with [LCI – co-founder] and [LCI – co-founder] fairly closely on a lot of different things. Cause of my role within the company I don’t get to do the day-to-day with them but it has been, so I have not, there's a lot of stuff they do is very active and I used to be active in P2SL which is [LCI – co-founder’s] research arm of the LCI group so [org B] is also a member of that and we say very involved in trying to support his research. But anyway that’s about that I guess.

So with your exposure to lean and your position within the company – although it may be difficult as you classify yourself as a relevantly newcomer, have you found the working relationships and culture of the company has changed as a result of lean implementation and its processes?

Again one of the lean attributes, well looking at it in a lean way, you know study slowly and try and see what’s going to work for you and then implement quickly – kind of fits the way we’ve been doing it. 5 years ago when I started to get involved it was mostly just me, then I would say 4 years ago our special projects which turns over projects and you’re going to talk to [interviewee 8] later today is in-charge of that group. We started implementing there because they were doing more [org A – client] work and because of the quick nature of the projects it seemed to be that we could get a feel for the flow of from pre-construction to construction and so on. Lean takes more time and more prep time then what special projects would allow so it kind of had a shaky start there is just wasn’t as successful as we hoped it to be. We also, [org B] also has a manufacturing company that manufactures pre-cast, it stays pre-cast, now they started doing a 5S type operation in their plant, they started doing that and
it kind of evolved into, you know, more of mapping processes and using some of the lean tools I don’t necessarily want to say they were becoming lean but they were starting to implement some of the lean tools and they actually brought in some lean facilitators, I can’t think of the gentleman’s name right now, to help them. That was very successful and [org B] again at that point in time started implementing, became interested in the lean tools – the mapping processes, the elimination of waste and that kind of thing so at that point in time, we started doing, well it moved into our accounting, they started mapping our accounting processes – again low hanging fruit, a lot of waste and a lot of things within accounting the way that the process worked and works, again success with that within our corporate accounting which flowed down to our job site accounting and different processes. Over the next couple of years and then when I think about it a year, a year and a half ago maybe two years ago because of that slow process and that development they started to get more traction for a cultural lean change. We had been incorporating the tools, at that point in time and really surprising to me we started doing some study action teams, some SATs on the lean way. We had brought in a lot of our field staff and inter-mixed it with office staff and started reading the book and talking about how we could implement that with [org B] and it really truly took off – you wouldn’t think a lot of salty old construction workers are going to like a book club cause that’s basically what it is, read a book and discuss it – but really a lot of people like the improvement portion of it, a lot of people liked the way it could help improve them, they could see it as a tool for growth and improvement, the elimination of waste and it really started getting traction I want to say about 1.5-2 years ago. The SATs have actually started moving into our safety department, we are taking safety books and bringing that learning environment into our safety environment and it’s just really starting to spread.

Have you also found the way the implementation process has been undertaken by the company has also been an influencing factor in decreasing the potential for cultural negativity about lean to emerge? How would you explain this?

No. We have moved on from those things that are successful. Where we tried to say especially in special projects, where we tried to say ‘you’re going to accept lean, you’re going to do mapping, you’re going to last planner, you’re going to do all this stuff and you’re going to start it’ and without really the slow training that it requires and adequate growth and the culture to accept that kind of thing, there is more resistance that way. And [org B] in general has not really said well you’re going to do it and people have gone in, we did that on a couple of jobs and started a job because it was a contractual requirement – so everybody understands it’s a contractual requirement we’ve been able to pick the right people to move into that environment and so, its been more of a get it specific into processes and get it specific into a few projects, show that it is successful there and then it will start going out and getting accepted.
Does that make sense? Yes.

Have you found then through that particular [implementation] approach your personal working relationships have improved? If so how and why? Or if you have found no improvement how and why?

Two different answers. I’ve noticed that, we are typically a design-build which brings in a lot of the architect for early discussion and a lot of team type discussion I’ve noticed that on the lean on those teams the communication has improved and the structure has improved that communication, the culture has improved that communication and the [org B] team members have gotten a lot better at sharing and getting closer even within our own group, that are project specific. Because of that success, second part of the answer it’s just started that a lot of southern Californian people are now saying ‘how can we get involved in that, what can we do?’ and the communication within the company has started to improve and started to get better I can’t tell you that I’ve seen mass changes yet, but I can definitely feel, I can feel it moving that way very quickly.

Ok, so then do you believe that has been an overwhelming positive for changes within the culture of the company? How would you then describe the maturing process of the company culture in terms of communication?

I think, that because [org B] and the culture of from growing from within everybody knows each other from the time that they were in college on so there is a, there is a set communication thing that is very informal and we are small enough to make that work. But we are getting bigger but we are small enough to make that really work but from the outside because I’m not part of that chain and there are quite a few of us that aren’t part of that communication chain I think I can see that helping us and formalising the communication better and bringing us more into the [org B] family then what we would have been under just you’ve got to be here long enough to be a-part of that chain.

Oh ok, have you found then external relationships, especially those that are contractually based, have assisted in changing not only your perspective but also the company’s perspective on culture?

Again to a limited degree where we are really using it on the [org A – client] projects absolutely. I mean the, in fact it’s difficult sometimes. I have, I’m working with [org C] who is a competitor, a general contractor, a competitor of mine and [org A – primary contractor] who is a competitor of mine. We openly exchange all information we take our estimates and detailed estimates to the nth degree give them access to them, they give us access to theirs – it’s very difficult for one contractor to
share that information with another and not just that but how we do safety, how we do planner project, how we do conditions, our general requirements, our we set the project up, how we move it forward – we are sharing all that with other general contractors who are competitors, so there are ‘are we losing our edge’ type questions or a lot of ‘what can we really share?’ but Sutter expects a 100% sharing so we do. It has obviously helped Sutter and the team because they’ve; well I’m doing the MOB as well as the hospital, we are trade partner on the hospital but the general contractor on the medical office building across the street which is about a $200 million project, the hospital being almost a $1 billion project – so I get to see both aspects of it, but Sutter definitely as an owner and as a whole, for improving the whole, has no question we are doing that because they are taking my MOB information and using my unit cost to price out other MOBs that they are doing for [org A – client]. Which is again, with being a competitor kind of difficult to accept sometimes but it’s working.

Within the organisation is there a change leader identifiable as driving the process of implementation? And if so, what type of working and communicative relationship do you have with this leader?

Again [org B’s] culture because of all these, they very quickly assimilate things that work and there is a competitive nature among project teams, project managers, project superintendents that they want to do it better than the rest, the other teams. So the culture is, well its similar to an internal competition? Yeah, so when they see this, they share very openly. So when they something is working for a team it becomes part of the company culture very quickly because they don’t want to lose that edge that they may have or they feel their team could have. So successful things get incorporated with the company very quickly, but if it is border line or if they are not really seeing the improvement, its hard to get it incorporated. So that’s why the slow growth in [org B] over the last five years some of the things that I tried to force very quickly found out that I couldn’t force them – but things once we had the project going and people could see the success and could understand how its going and started doing the SATs and understanding the culture its going rather quickly and it is, well we have a new president who was the division manager here and this just happened last year he incorporated a lot of the lean things, the lean tools and took them with him to corporate. So we’re finding a quick change or a quicker change maybe and he’s kind of from top down implementing a lot of this stuff – I don’t know necessarily our whole, there is kind of like five party triumphant there, but there would be five people up there that are kind of the employ your own company, there are five majority partners and then there are like 30-40 minority partners. The 5 majority make most of the decisions of which he is one of them – I don’t know if all 5 are 100% bought into this lean, all 5 have bought into some of the tools, but lean and there is only a couple of them that really understand it’s a cultural change and struggling to go down that way.
You’ve mentioned throughout that the [org B] culture is internally competitive. Have you found that the implementation process has been driven by this internal competitiveness and as a result has found more awareness at a middle management and project team level, then an upper management level?

That was true, but right now it’s probably filtered into and being driven by the success. Its kind of segment of the company from the top all the way down to some field engineers that are being successful because they are using it and other field engineers are seeing that and what these guys are doing and liking it so, and now they are wanting to get involved. So we’ve got a kind of a slice of the pie cut all the way from the project people to the top and it’s kind of growing outward. If that makes sense. Yes it does make sense; it’s a unique way of implementation. Yeah, it’s kind of like we like to see success quite frequently.

I would like to move the interview to focus and discuss on working relationships particularly your own working relationships within the organisation. So you as an employee and in your role, who would you most likely, have the closest working relationship with? And does the working relationship remain constant? For example, are you more commonly to work in the same team or are team dynamics determined by the type of project?

Oh across the board, a little bit with Southern California, our southern California office but across the board I work with [interviewee 8], I work with his team in fact I’m one of the facilitators for some of their study action teams to try and help them and you know [interviewee 7] our division manager works directly with [interviewee 8] in a lot of cases as I do. So, its kind of a, our estimating department all of them, we are all kind of just like one family.

Have you found that your role as a Study Action Team facilitator has opened up more communicational networks for yourself? And has being a facilitator also helped your ability to integrate yourself more within the company?

Yes without question. With a small little, there is still the, [org B] is family and although I think I am considered a half brother, its nothing that I can put my finger on its just kind of a feeling that some of the stuff that I bring in would be more readily acceptable if I was a full brother. Maybe implemented more because maybe they would know that I understood more the current culture and I would understand what I am trying to change. So I think there is sometimes a little resistance not from everybody but in fact I would say very little from up here now because I have gotten to know everybody up here because I don’t see the rest of the people on a regular basis like in southern California there is still a well that is [me]. You know kind of thing.
Ah yes I see. Ok, well then do you find that attitude of individuals towards you assists in creating negative cultural occurrences to emerge? You know that resistance if any that you have felt.

No, no because I understand about being careful. I mean again as a culture we are implementing slow and so once you accept that – so what you’re saying it’s more of an adaption more so than change itself? – Yes, once you accept that you know that they’re going to implement slow but they are going to implement fast once they decide it is successful they are going to do that very quickly then it’s ok. It doesn’t really bother you that bad.

Do you find then if the individual, once the implementation process quickens that they start to resist and reject lean implementation?

Well that’s exactly what I said. When we, well when special projects tried to quicker and right now are trying to do it quicker maybe then what their training allows there is resistance. That is, its one more thing for me to do, I’ve got plenty to do and quite frankly lean is a lot and a little difficult as a lot of the tools is, a lot of the tools don’t replace existing tools – its one more thing that they’ve got to do. So if the process is a more structured accept this and get rid of these two things then its probably better, in fact I used to have a division and my boss he was a divisional manager and they used to say ‘no new full form can be implemented unless it takes the place of two existing forms’. All the information that we need is already taken care of in all the of the forms we already use – so if you want a new form, tell me what two forms is it going to replace – so that was the only way to implement a new form. And that kind of thing, lean doesn’t quite do that, lean doesn’t take the place of two existing forms it adds a additional paperwork to field staff in a lot of cases that aren’t willing to accept more paperwork.

That seems to be a general consensus across industry these days. But lets move onto an ideal concerned with the transferring of knowledge and experience also known as knowledge transferability. Have you found particularly in the utilisation of study action teams that the company values this ideal of knowledge transferability, training and education? Furthermore from your exposure to these study action team does this then lead to internal promotions or is the training held just to develop knowledge?

With this group it’s a lot of individuals just wanting to get better and to learn, improve themselves and just a desire across the board. Very little people just fill out the hours in [org B], everybody is a company person and even if they are not growing statue wise they are growing as a person and what duties they can do and very much already we are a learning culture. I think this is helped and people
are getting more and feel more involved as part of the team and they are seeing corporate decisions being based on what they are learning so it is helping I think the whole team building as a company and when you are team building as a company that’s a lot about finding your culture a little bit. So I think they are seeing that and they can see that they can make a difference, that I guess the shop floor we can make a change and that type of atmosphere and they can be more involved and its helping. In fact we’ve had some of out labourers and our union guys wanting to know if they can also do an SAT because they felt that they were missing out on knowledge and wanting to do it also – particularly asking ‘well why can’t I do it?’ So we are starting to try and implement a little bit of that especially on the safety culture and getting them involved in that per their request because they had seen the changes it had been making.

**Wow, well that’s a different way of approaching education, training and knowledge transferability – particularly in the demand and requesting to be educated.**

For me it’s a path of less resistance quite frankly. I mean we’re not hitting, well rather than keep hitting your head when we hit that stop thing we basically find that that’s where we need to go a little slower and do more training and get more people involved to see the benefits of it and then the kind of stop resolves us from hitting our head against the stop.

**Alright then, have you found then from the contractual relationships you have through the cathedral hill project that individuals within this office are becoming more accepting of lean, its principles and the philosophy?**

Oh absolutely.

**Have you utilised this contractual relationship by allowing individuals not connected with the project to visit the main office and spend some time in a fulltime lean environment?**

We’ve had visits from a lot of people to go over there and walk the floor and to understand the visual workplace that we’ve created. We do report outs for the entire company and let them know what’s going on, we are actually right now the people that are actually at CPMC are being asked to develop additional SATs like choosing by advantages (CBAs), we have teams that have taken 3-4 day courses on that to learn how to do it, they are becoming teachers and we are going to do company wide to try and spread it companywide. So all of the things that we’re learning are being asked to be spread through the company – we’ve in fact it surprised me that we’ve had a couple of guys from down south and I didn’t realise that its been talked about that much that basically said they were at a separate meeting talking to some architects and said how much they wanted to be somehow get involved with
this project especially once it gets going construction wise, that they were even considering moving up here to be part of it.

Actually I’ve done hospitals for around 35 years since 1974 that was my first hospital. The project was for another company I was actually hired 5 or 6 years ago by [org B] because they had gotten involved with this project CPMC project and it was a billion dollar project at that point in time, a whole different team, a turner construction was involved we were a partner with [an industry partner] as a general contractor, CGMC and I was actually hired by [org B] because of my hospital experience because they just didn’t have it in them internally and wanted to go forward with it so I’ve been working on that hospital project since I’ve joined [org B]. That’s been one of my sole things, and that’s kind of a standing joke whether or not I’m actually going to build anything.

After we get done with the design it takes a year to get the permit in California. Its not that way in the rest of the united states but in California that’s the way it is with ASPOT.

Sorry I’ve gone a little off topic with that last part. How have you found the relationships to be different working within this office and [org A – projects office]? Have you found any major difference such as communicative or even relationship wise? How would describe these differences?

Oh yes. The openness and information sharing is so complete from the top all the way to the bottom. We have full exposure, I mean we know how much the owner has in and is supposed to keep us informed, permits, the owner’s contingency as well as our own contingency. We see the full project budget and not just the construction budget which as a contractor a lot of times you don’t see – we help inform and look at the furniture, what it costs for medical equipment, all the different aspects. Here’s the entire project and what it costs to plan, demo all the different things – the cost of it and entitlements. We are directly involved with all of that from the very start and down to the fire sprinkler guy or to the guy that does the nuts and bolts of the project is exposing his, not just price but his unit prices – how many nuts and bolts are going into the job – the owner is seeing that, he is not just seeing the total price. So the information sharing across the whole thing is so broad and so sometimes overpowering because one of the things I say is ‘the fantastic thing about these projects is the attention to detail, the communication that is allows, the openness it allows’. One of the worse things that it creates is all of the communication, all the attention to detail you know it’s a double edged sword – the best of it, is also very time consuming and sometimes frustrating because you churned so much sometimes you think lets just move forward I’m tired of discussing, but that churn does create a more quality project, you get all of the things exposed very quickly – but gosh it’s a churns. So, but that open discussion and that knowledge of a project you don’t have that any place
else. So its very, very different and the communication. I’ve always said that the old, I have a very
difficult time at remembering the truth and what’s really going on without having to remember the lies
and this basically promotes that. There is just so much knowledge that there’s nothing but truth and it
kind of, well you don’t have time to remember the lies misleading, you know lump sum bid type of
thing, this is a change order, it’s just so open that, it allows you to really focus and move forward as a
team.

You have discussed a lot of positive cultural elements with [org B] and [org B’s] external
contractual relationship with [org A]. Have you experienced any cultural frustrations associated
with the current cultural environment within [org B] and its contractual relationship with [org
A]? Please explain.

There’s more churning – sometimes you just want to get up in a meeting and just say ‘stop, I’m tired
of this discussion, let’s just make a decision’. You know that type of thing. I sometimes get impatient
and wish decisions could happen a little quicker because you know the answer and at there’s a point in
time with 80% of information you know where the decision is going – let’s not talk about that other
20% that really is just rehashing and creating waste. And 99% of the time you are actually right,
sometimes there is a 1% thing in there that you weren’t expecting that’s going to change that decision
– so I can see the value of it but still it does get frustrating sometimes.

Ok, and so do you find sometimes you bring that cultural negativity and mindset back when you
come back to the main [org B] office?

Not really, cause it’s such a small fraction you see. There are enough times that you are proved wrong
that you just believe in the process and you start believing in the process but that again is a cultural
change. I mean, I see a lot of our superintendents and people when I bring them in new as we involve
new people into the CPMC teams because now we’re involved in three projects over there we are also
involved in the [org A – project 2] – so we have the [org A – project 2], the MBO & the main hospital
[org A – project 1] that we are all involved with so each time a new one starts up, I have to bring in
new people and get them up to speed. Each of the projects is at a different stage (do you find that
creates a cultural negative in anyway? – no), now I’m seeing the same type of growth patterns in
the individuals and its different individuals, when I was first able to change and identify individuals
and know that they would fit within a particular type of culture, I know that they have the right
attitude and as we get more and more projects I can’t just cherry pick much anymore of individuals I
want to bring in, now its people I know are going to be stubborn and more difficult to accept change
but so far again because of the existence of the team culture at [org B] have not really fought it. A
couple of guys that are old time superintendents that have been doing the work for a long time and do
not like additional paperwork are changing, they see the value, they see how its going to make their job easier as they go forward and it’s a little bit slower progression but they are progressing.

**Have you taken any of the strategies and philosophical principles they have used on lean projects with which you have a contractual relationship with and applied them to your own organisation?**

Well actually yes, CBA, several things, the SATs, you know that we learn and we started doing the book clubs and study action teams at the CPMC and it was successful enough that we finally tried it here and I was astonished at the success that it had here and the breadth that it took company wide. We are doing SATs company-wide now on safety, on all different types of lean things and different types of focuses on how we grow – we are doing mapping sessions on all of our different processes through out the company that started with the CPMC. CBAs we’re right now looking at a new office location and this lease is about up and leases are very cheap right now with today’s economy that we are starting to take a look see and we are using CBAs, choosing by advantages, even for something like looking for new office spaces and they are both in the CBAs for everybody to look at and evaluate the factors and the action items on them so company-wide they are grabbing hold of and using the knowledge that is there to help them inform and develop requirements to help them move on – so its been a great stimulus for everybody.

**Well they were all the questions I wanted to ask as part of the interview. However I would like to provide you with the opportunity to add any additional comments and/or thoughts regarding the lean implementation process, cultural maturity and [org B].**

I guess, I’ve always been interested in growth and I’m getting near the end of my term in construction, I’m 60 so I’ll be here another 6-7 years and then I’ll be done with it. But I’m just thankful that I got exposed to it on this project and have been able to start doing this because it’s just a continuous learning and stimulation and seeing and being able to bring that into a lot of the younger people and see their enthusiasm for it has just been wonderful. So I guess I’ve been thankful that I got exposed to it when I did. **And with your early exposure you would’ve in a way been able to witness the full spectrum of change associated with lean construction.** Yes, and actually that’s one of the things I don’t know that there’s anything new that lean offers, partnering – the whole partnering, so to speak when all the cambias sessions and all that kind of stuff were very good but it never tied money – so even though you were shaking hands on one-side you were still very much focused on how you’re going to make money not how the team in the project will make money. So and there were team incentives involved in the past that helped take care of that but they weren’t necessarily doing partnering. BIM has finally now come into affect where you can’t do BIM without a
collaboration type atmosphere cause you’ve all got to be involved in the development of that same model and no-one has the whole expertise to be able to build a single model – so you need the collaboration. [Org B] has a term that they wanted to be and used from the old renaissance master builder, the term ‘Master Builder’ and always one of our goals was always to be considered a ‘Master Builder’ but the true definition of ‘Master Builder’ is that was the person that built the model, physical model in those days, built the physical model and brought that on and was there to see the fruition of the completed project – but the thing is, is that cathedrals take over a hundred years to build this kind of thing and they were all considered master builders and I think, well we kind of also split apart architects in this way and designers and we all became such specialists because you just couldn’t have all that knowledge and now we are becoming as a group a master builder again – that whole concept so we return to the past. So that whole concept of a single entity wasn’t a person it can’t be a person now – as the depth of knowledge that is needed is to great but that entity now can become a master builder and we can all get back to the future. So I think its just a real and I think anybody with pride wants to be a master builder, you want to know it all and I’ve been lucky enough to go and be a labourer, a designer, be all aspects – so I’ve gotten to be able to see all of it from sweeping the floors up, so its kind of nice to be able to see everybody becoming more rounded and that’s mostly the struggles too. You’ve got to find designers that understand construction and construction people who understand design and that’s probably the biggest hurdle we have yet to get through. Construction guys now say I’m tired of all the re-iteration just give me the result and I’ll build it, I don’t want to hear all the iteration but once they start getting involved with and understand the iteration of why it’s being done that way and the benefits that they get from it – it starts getting better and its fun and it does make it back to being fun. You can have fun building projects.
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its affects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and when the company decided to implement lean.

Ok, well I have, well my position is as project sponsor which is similar to a project manager in other companies but with [org B] the title exists for an emphasis with design-build experience so I’ve been with the company for 19 years and I’ve worked my way up through the company, this has been the only company that I have worked for in that 19 years but I’ve been exposed to design-build so project sponsor is the role. So I manage the client relations and subcontractor contracts and basically the organisation and oversight of the construction team – that’s kind of the role there. So exposure to lean
is actually, well this is my first lean project on the cathedral hill project so I have been working on this for the last year and a half and that’s when we’ve really started with the validation study and learning the lean process. I’ve actually been working on the cathedral hill project for the last ten years or so and all the stages that have gone through but this is definitely the more collaborative approach and a very different way of doing it which is much better.

Ok you’ve mentioned this whole idea of collaboration and a different way of collaborating particularly on the cathedral hill project. How then would describe the working culture here at [org B] compared to the working culture on the [org A – project 1]? What are the major differences and similarities if any between the two approaches?

So I think as far as [org B], [org B] has a long history of design-build and that’s our culture so we are very service orientated and we are always basically looking out for the best of the owner, looking out to provide the best value and trying to create a relationship with those clients so that we can work together as a team and move onto multiple projects together and this merges very well with lean. You know lean is a very relationship based process with collaboration and teamwork which is really bringing everybody together as advocates for the project and the client as a team. And so our culture marries in well with that but it kind of takes it a little step further in design-build in our company we concentrate on providing the best value for the owner and the only contract that we’ve been allowed to do that – which is where we provide, we take the risk for the owner in design-build. In design-build we provide an owner an early price, guarantee an early scope guarantee and then we as [org B] take the risk for that. So that is a little bit different contracting and not an alignment of incentives as there are in lean – you know there's a lot of times where its us working, guarantying the risk for the owner but downstream to the subs, you know there's still a lot of them, there's as many as we can get with design-build they’re on the team and they are aligned properly with what we have guaranteed to the owner but there is a lot of them which aren’t and there is still lump sum, low bid – so there is a lot of that change order type mentality that exists down the stream. So the lean experience has been a good one, very good I mean it shows a lot of promise in design and construction where everybody, the contractors and contract is very well written and the message is very loud and clear that actually aligns everybody in the same direction, the risk sharing and taking the guaranteed prices and the caps off the number and really putting the team at risk for a portion of that alliance in aligning everybody in the same direction. Before working in design-build with designers, the designers were not aligned with us either we basically had to hire them and the only tool we had to use with them is really the contractual arrangements where if we are, you know we would do target value design in design-build and we would design for the target and if the architect did not design to that target or their design was creeping away from that target then they were obligated to go back and redesign for, you know on their own dime in order to meet that budget. So that really was the only alignment that we have in
design-build, you know here where they are actually putting a portion of their profits at risk and they are working with the team and committing to the team that we are all working towards this target price together. There is a lot more of an incentive for them, you know through the profit risk sharing and through you know just through a team commitment and a peer pressure to work as a team member and align themselves and you see that with all the trade partners, all the designers, really everybody that is apart of the team and everybody is really excited about the process and are excited about doing a good job and there is also an unwritten incentive which is really the team as I see it now – if we all work together and we do a good job and we drive this price down and we build the project to that driven down price and provide a good product at the end of the day, there is no reason the owner wouldn’t just take that one team and put them on another project to do the same thing because they know they are going to provide the best value for them. So I think everybody sees that unwritten message on the wall and are working towards that to develop that relationship and take it, you know, on down the road and continue on as a team and so, yeah.

Oh ok, that is a different and unique way of viewing the relationship. In your exposure to the relationship have you found and/or experienced any cultural negatives associated with the use of lean principles or the philosophy in general? Please explain.

The majority of it is positive I mean we definitely have challenges and I think some of those, well some of them are and its not really the lean being bad its bringing people on board and trying to get them educated into the lean process. You know we are having a lot of challenges with outside trade partners that we are bringing on board; they are not used to this process, they are not used to reliable promising, we are having a rough time trusting them – I mean we trust everybody on the team but we put that trust into them and we’re not getting a lot of the commitments meet that we should be and a lot of it is trade partners you aren’t there every week at the meetings every week you know they are outside like the window washing trade partner who doesn’t have to be there every week or somebody like that its not that person but its hard to get the reliable promising out of the some of these which trips up the whole team – when you’re not getting the information in an example of that is our consensus document which we are trying to put our consensus documents together we’ve distributed to all the trade partners and to different sections so they can go through a typical spec and try and convert it into a consensus document taking out all the unnecessary verbiage and information and trying to get down to what is needed in this type of lean/BIM culture for our consensus document and we are setting dates and we are not getting the information back when we should – so the challenge is really how do you work with all those different trade partners and get them up to speed. So we are trying to educate them and get them into reliable promising training and get them to be apart of the team – but we are finding that is one of the major hurdles that we are having to overcome. Some of the others are just the level of, I mean lean itself is a good premise, everything that we are working on
is good – its just really, its trying to get everybody on the same page and everybody up to speed, there are some people that are more advance and sophisticated with BIM then others we’re finding that to be a challenge with some of them. And I guess also, one of the struggles with the lean and the integrated form of agreement is that the cash flow happening very much earlier in the project and I think that’s something that looks like something Sutter is struggling with trying to make sure they’ve got that cash flow in place to keep things moving along – so lets see those are the major items that I see at this point.

That’s interesting. So you’ve spoken about some general lean contractual negatives. What types of cultural occurrences have occurred during the lean implementation process so far in [org B]?

There’s lots of positives. There’s a lot of people who are doing the study action groups and learning and making commitments and you know there are a lot of positives associated with and I’m trying to think if there are any, well negatives are really – well I don’t think there's any negatives associated with lean. It’s all about a lot of people trying to learn and get their heads around how this actually works and how it works in construction. And in our special projects group we’ve got a lot of people working on lean projects now in construction and I think that’s where they are finding some challenges with getting people to accept pull scheduling and the last planner and putting their trust into pull scheduling – I mean pull scheduling basically takes up all the flow out of your project so if you have an item that comes in late or you have a trade partner that doesn’t meet his commitments you know it really puts everybody at risk of the project being late and I think a lot of the superintendents, you know, with a normal project they are nervous enough and not sleeping at nights and trying to make sure they are staying on schedule but now you take all the flow out of the project and you pull everything at the end to that last responsible moment and it’s a lot more stressful for them to put their trust in that system until they really see it work and until they see and get that experience its definitely a big learning curve there.

Have you found through the use of the study action approach to understanding the philosophy of lean have assisted in minimising the potential for resistances to emerge?

Yes. No they are very good, we’ve gone through Toyota Way, and Understanding Lean Thinking, and getting the right things done with our group at the hospital or on the MOB and we’ve gotten a lot out of it. I mean, I think that’s one of the best ways to learn lean principles is to really read the books and discuss them as a team and then come up with potential action plans of what we can do to make ourselves better and to improve the process. So a lot of good ideas have come out of that and a lot we’ve put into place a lot of new protocols and out reach programmes and things like that to make sure we are working as a team and trying to be more lean.
Ok, you’ve mentioned some of the educational tools [org B] have utilised to assist in the communication of lean philosophy. Have you found then that there has been one person in particular (identifiable as a change leader) driving the process of lean particularly in using SATs as a facilitator to learn? Or has the process been driven by a collective group/s of individuals within the company?

No, I think its more, well I see it as, its definitely not one person but I think it is more kind of the core, its not the core group but it’s the core team members. Its been the general contractor, the architect and the major MPCA subs who are there day-to-day and who are participating more in the study action groups and who are becoming more educated in lean and how it works. I see that. I mean we’ve seen interest from a lot of the other trade partners but a lot of times they don’t get involved in the study action groups as they should, some of them have but we’ve still got a long way to go to get them all up to speed.

**Are you yourself actively involved in facilitating the SATs within [org B]?**

Yes.

**Have you found that your role as a facilitator in the SAT has increased and/or opened up your communication network within the company and in external contractual relationships such as those at [org A – project 1]? Please explain how.**

Well, within the company it is we did a, we did the majority of the books, the three books I listed off before were just the books we did with the MOB crew. I’ve also done a zero injury culture book within our company which helped with relationships throughout the company because we brought in a bunch of different offices and a bunch of different people so you really get to know people and know their viewpoints and where they stand on things within those groups which is good and it actually brings you all kind of onto the same platform and understanding you know of that commitment and everybody really bought into the book and there was some good conversations that came out of it and realistic conversations of what’s possible and what’s not. So I think it definitely strengthens relationships within the company and I’m going to be helping facilitate the Toyota way here in about a week or so – starting off another group which will be good but I have not done any study action groups outside of our MOB team or our company. But I have talked about it with other architects and they are definitely interested in and they would like to start study action groups with lean and some other topics with us so there is definitely a very, very quickly growing interest and a lot of people want to get involved from outside companies – so there is some potential for strengthening of relationships outside the company in that regard.
Ok, sounds like some new ventures might be in the works. How has the structure of the company changed within the last 5 years? And if there has been change has this been a result of the move towards lean by the company? Please explain.

There has been some change within [org B] in the last five years from the CEO down but it hasn’t entirely been linked to the implementation of lean. Within the company, I mean everybody is jumping on board this IPD and lean very, very quickly and they see the value in it and they are excited about it so we also have an internal group that is doing a study group on the integrated form of agreement and looking at that and trying to learn more about it and we are also studying in-house how we can apply lean in integrated project delivery to other clients and how that would work. You know [org A – the client] is very advanced and very progressive and very sophisticated and also has an owner who has assisted the team to put this in place and that doesn’t necessarily work for developers and others that are looking more at the bottom line and flipping buildings and have different goals in place. Our minds are trained to look outside the [org A – the client] of the world and see you know if there is an application for an integrated project delivery that we can work closely on and develop relationships that way with others. So its definitely, its quickly from the top down changing our company and culture and we’ve worked gosh 47 years or so on design-build trying to get design-build accepted in the cultures and in the workplace and the community and its funny because there is some developers that come to us that are finally after 20 years or so of accepting design-build and you know they say we’ve come all this way and now we finally accept design-build and now you want to go through something else – so well its better.

Have you found that attitude of developers outside your own company a challenge?

Yeah. I mean there is a big, you know [org A – the client] has put a lot of trust in our team and that’s what this really requires is an owner to put a lot of trust in us and the team and for a lot of developers and a lot of companies out there its hard to give up that control especially with some of these provisions on this, provision there is no dollar cap on the top there is a risk sharing pool and there is a super risk and that super risk is very, very scary to owners and developers so there maybe some modifications that have to happen to accept that or there may be baby steps as it always was a big step to go from a bid world to a design-build world and now it’s a step from a design-build to IPD which is a big step and you know maybe there is some interim baby steps that have to happen in order to get to that point.

That’s an interesting way of putting your perspective across. Has the company to your knowledge undergone change processes before the decision was made to go lean? If so please explain.
Yes. Yeah we did back in 2003-2004 we went through a big phase of TQM (Total Quality Management) and we were looking at that and implementing that throughout and we’ve always has an R&D to our company and they’re always looking for better ways to achieve quality, better safety so there has always been ongoing efforts to improve throughout the history.

**Was the approach towards TQM different to the current approach to lean implementation? Is it possible for you to explain the differences?**

TQM was implemented from the top down and lean has been more of a presence in middle management and filtered that way through the company. So I think it has been a little bit different and its more of what the upper management has seen in the marketplace and trying to assimilate that through the company.

**Have you found that way of implementing or at least understanding the philosophy behind the approach a more effective way to minimise rejection within the company?**

I think when you have the buy-in of the top management and the CEO it definitely creates a bit more of a catalyse to quickly disseminate through the company. You know if middle management is the one that has bought into a system or a process and there is a process of selling it to upper management before it can really be fully disseminated through the company – so I actually think that it is better if it comes from the top down. Fortunately for this process and for lean it has caught on very quickly and they see the value of it very quickly, because it aligns with – well when we first brought it up everybody said that ‘we’re already lean, we already do all that, we’re already lean’, you know and then they studied it more and they saw a lot of the differences and saw that there is more improvement and yes we do a lot of what is in there but we don’t do it to the extent that you’re changing a culture and that’s what lean is really about its adopting and changing a culture and it’s a long, long, long process – its not something that just happens. It’s about continuous improvement, eliminating waste and you know we hadn’t gone through and mapped out our accounting process and our project management process and change orders and subcontracts and you know looked for the waste and try to eliminate the waste before and now we’ve done all that and are continuing to do that.

I’m not sure if I’m repeating this question or not but how have your internal and external communication networks been changed as a result of lean? Of particular interest to this question is this idea of sharing all information between all parties on the cathedral hill project.
I’m not sure either, but on the [org A – project 1] hill project we definitely are. I mean there we are constantly looking for ways to reach out to the other projects that are working under Sutter so the St Luke’s, we are looking to review the [org A – project 2] and the [org A – project 3] and reach out to [org A – project 3] and [org A – project 2] and the [org A – project 1] and trying to figure out what they are doing and what we can do better and then also trying to share what we’re doing with them so then they can do things better. But not only that we are also trying to look at [other projects] and other facilities and see how we can help them improve or we can improve from them so we have put different protocols in place to facilitate that the sharing of all of our A3s and the binders are placed in a central location and setting up lessons learned, meetings to sit down with those other groups and just talk out loud about what they are doing and what we are doing and it always comes into a ‘ha, that’s a good idea’ and trying to learn from that.

**Have you found or experienced any type of resistance towards this way of sharing of information?**

No, not so far, not at all. Actually we’ve found kind of the opposite and [org A – the client] has set the stage for that and they’ve basically said you know ‘everybody needs to tell us if anybody is at all hesitant about sharing information’ so they have basically said everyone is going to share with everyone else to better the process and to better the project.

**Ok, have you then found that, that type of approach and leadership of [org A – the client] has assisted in maturing culture at all? Do you classify this approach as innovative and creating a new industry norm?**

Yes, absolutely. Yeah, I mean yeah. A couple of years ago if we were told we were going, we were supposed to send our estimate to [org A – primary contractors] or some other contractor and just them what we are doing we would have said ‘no way’ and they would have done the same to us. I mean that’s our competition and you’re not supposed to be sharing that information with them or they pick up on all your secrets and then they use them but here we have been doing that and we don’t even hesitate to do it but we are all improving and learning and using each other’s estimate forms, graph forms, cash flows and everything else and we’re all becoming better because of that. It’s hard to do but and it very counter-intuitive but, anyway it is the people that are within the [org A – the client] umbrella and working on these projects, I mean we’re not sending information to DPR or other competitors right now. But you know, I think its very difficult to do but we’ve gotten used to it quick and [org B – founder] was that way too he was very progressive and looking out at the big picture. You know he had developed, well he and the company had developed the pre-cast concrete frame which is a post-tensioned structure with tables made out of it – it’s a post tensioned structure and

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basically he purposely did not patented that process and that system because he wanted it to be shared with the engineering community and he wanted people to use it and improved upon it. And that kind of is where he comes from and that’s what he’s always promoted for us – so this is just an extension of that.

**So the company would classify itself as an innovator?**

Yes. That’s one of our core values which is innovation. So yes and the strengths and to build on the innovation of our company but the engineering and construction community as a whole.

**I would like to focus now a little bit more on culture. What are your feelings on the maturing of the company and your own culture as a result of lean?**

I think it’s great. I love the change. You know that’s one thing the company always, our company was always, well one of our downfalls was we were always control freaks. You know, we wanted control and we’ve had company presentations where you know we drive the bus, we are the design-build team and we have to take the lead and everybody else has to follow and that always, I always understood it but I always had trouble with that – you know because you really wanted, you want to get the whole team involved and you really want to build on their ideas and have they fully collaborate and I think in this process we’ve seen a lot more of that collaboration. When somebody sits at a table and they’re just following somebody’s lead and they’re just working as a, kind of a, well not as an equal to the other person they are not going to be as forth coming as they are if they are sitting shoulder-to-shoulder with somebody at the table and they are equal partners. You know, they’ve got a stake in the game, they are going to be giving it their all and really collaborating with those other people and throwing ideas and trying to build on everybody’s ideas and not being afraid to throughout those ideas. Whereas the other way we used to do it you would get a lot of those ideas out and we would collaborate but I don’t think you would get as much out of it as we do now that everybody is an equal.

**Have you yourself in your role within the company experience both positive and negative or conflicting culture? Or do you classify yourself as an acceptor based on your position and knowledge of lean?**

I see myself as an acceptor of this culture and I love it. No negatives, well none that I can think of. I mean its very nice to be able to come to a job, I mean before you would always have to go a job and you would have to deal with people complaining about change orders, there would be issues with you know people complaining about different things and arguing with the architect. The architect was
always working on their design solo and they would come out with a design that didn’t meet the budget and you would have to argue with them on what did you do that and they would argue well this is the way its got to be I’ve got to have this design. You know and there was a lot of animosity when you came to work a lot and there was just a lot of arguing and a lot of tension and now all of that is gone because everybody is working towards the same goal. So you know if the architect is checking with you saying ‘there’s my design, do I meet the budget and if not what can I do to make it meet the budget?’ and that’s not something you used to see and it great.

**Have you experienced over collaboration?**

I think its, well there is a lot more sharing and a lot more work sessions and a lot more meetings so that’s one item that is challenging and we had to internally sit down with our project team and say ‘is that ok?’ you know we need to divide and conquer cause there is so many meetings and we all go to these meetings we are not going to get anything done. So we have certain people go to certain meetings and then we come together once a week on Fridays and we share what we learned from those meetings in order to that. There is a different structure that has to take place cause you know you’re right if we have the same structure we has before and everybody else went to every meeting and everybody can learn things there is no way that we can handle it all and there is a different structure in the meeting schedules – you know setting up the cluster groups, and reviewing the different information and setting those agendas for the different cluster groups to handle that information that all feeds together works and that’s what has to happen and there’s got to be a different structure to handle all of this collaboration and sharing and details and everything else.

**So in a way it’s more about the adapting to the requirements of the project?**

Yes it is. But in the long run you save, in the short run you save a lot and in the long run you save a lot – by having the right people at the table during design makes everybody more efficient. You know you could have, well one of my examples I always use is the window washing, we didn’t have the window washer on board and the structural engineer and the architect were sitting down trying to figure out where the davits need to go and where the supports need to go and they could sit there for four hours and come up with a plan that’s ok but it’s not the best plan. You know whereas you can get a window washer and he comes in and sits down with them and within an hour or two you’ve got all the davits located, all the supports located, you’ve got all the information you need to put the plan together so you’ve just made everybody more efficient and more accurate. You’ve got a plan that’s going to work as you have the actual installer helping you put that together – so it’s the right information, when the architect and structural engineer sat down you know they could put the plan out and the window washer gets it and goes ‘why did they do that?, this doesn’t work’ plus the window
washer at that time can say well if you move this edge of the building in two feet you can eliminate this, this and this and make this more efficient and so you get them in early and you can build in efficiencies into the building that you probably would never have seen. So it really can make everybody’s time and design more efficient in design as well as in construction they are helping with that design and they are eliminating all of the potential questions and issues in the field well at least the ones design related – that you can be more efficient in construction as well. So it all just makes a whole lot of sense but it requires an owner to be open enough to shift some of that budget into the design process to get those people on board early to work together as a team.

**Final question, does management to your knowledge readily provides opportunities for individuals to increase training and education? If so, does this lead to the transferring of knowledge between organisational groups?**

Our company always promotes a lot of education and we have education sessions, calendars of events that are put on and we’ve got an education committee that actually develops different trainings for different people. So those will be held once every month and we do a lot of lunch and learns and they promote also seminars and other learning opportunities as they make sense for people – they want everybody to further their careers and grow as people for the company. It just makes the company more valuable.

**Is the type of training and education provided by the company directed more to individuals staying with the company short term or long term?**

Well it’s mostly directed towards supporting the company and being an integral part of the company. I mean [org B] has a lot of people who have been here many, many years and you know that’s really the goal to have people growth with the company and its also an employee owned company. So the success of the company is the success of the people, is the success of who we have relationships with – so its really trying to promote it within the better of the company, the better of the people, the better of the relationships, to better the clients.

**Are their opportunities for others outside the company to be employed later on in their careers? Or is more directed to individuals growing within the company?**

The majority of people grow within the company but there are people that come in from the outside, just depending on the needs and a lot of it can be market driven too. Right now the market is horrible so we have had to downsize a bit and when the market recovers we are going to have to bring people in. So it can be related to a lot of market cycles or where we are at with different market sectors.
Ok, have you found with the downturn in the market it has enabled the company to undertake the implementation of lean?

Yeah, I mean there are people, a lot more people in the office who now have more time on their hands so we have been able to implement a lot more study groups and try and position ourselves and learn while we can and try and get everyone up to speed and when projects come in its going to be easy to employ and implement those lean practices.

**In your opinion do you think that way of implementation is positive particularly in overcoming potential internal resistance?**

Yeah, I mean I think a lot of people are very open to change here and what we are doing and I haven’t heard a whole lot of people that are opposed to it. You know I think that sometimes its more of the superintendents and people who have been in the field a long time that usually have the most resistance to change but one of the things that [org B] has always encouraged is that those superintendents and others to be open to suggestions and innovation and change – I mean that’s really one of our core principles. So there hasn’t been too much resistance to the change but I think it doesn’t hurt having this type of market.

**Do you have any additional thoughts you would like to share?**

The process has worked for [org B] as [org B] is a relevantly small company with only 200 employees, we are kind of a middle sized company like that – you know where everybody knows each other and has relationships. On top of that employee is an owner, so everybody has the same goals and the same investments so I feel it’s a little bit easier to implement from that stand point as well.
Interview Transcript 4:

Transcribed by Brianna Chesworth in accordance with University of Newcastle policy 000873

Organisation B

Interview conducted on Friday April 25 2010

In attendance: Interviewer and 1 Interviewee

Start Time: 11:00am

Finish Time: 12:00pm

Phrases and words bolded are those of the interviewer

Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and when the company decided to implement lean.

Ok, I have been with [org B] for 4½ years closer to 5 years now and I’ve only worked for [org B] so I came out of school and started working with them. My current role within the organisation as a project engineer which is my day-to-day job duties on a job site managing field engineers who directly manage all our work and the subcontractors work as well as dealing with billing, RFIs, a lot of the paperwork. And in the office I’m doing by-out, currently I’ve been on two projects with [org B] I did the building next door which was a nine storey class A office building and I was on that job for
about 2 years and then I did a 7 storey pre-cast concrete parking garage [...] and now I am on the [org A – project 1] which is the lean project for [org A – the client] and I’ve been on that project for a year since I’ve been back in the office after the parking garage. So both of the two previous projects didn’t implement lean at all, this project next door the nine storey office building started out as design-build but didn’t go completely that way the contract type changed right before they signed the contract and the parking structure was a design-build parking structure – so similar concepts but nearly as integrated as what we are doing at the hospital.

Other than the current implementation of lean now, has the company undergone any other forms of change during your employment? What type of cultural impact did this change have compared to the current implementation of lean?

No, lean implementation is the only change I’ve exposed to. Ok then, so what has been your knowledge about the implementation process and the resulting cultural environment? They have definitely started to begin implementing lean and the lean concepts. I’ve been exposed to it the last year; part of that reasoning may be because I’m usually in the field so I don’t see a lot of what goes on in the office. When I was at [the car park project] they did have someone come out who was a lean specialist and walk the job with us and just look at how we did our work on daily basis, how efficient it was, where we could cut out waste and he walked the job for about three days and then did a presentation to us on his findings in areas where we could actually lean up our day-to-day activities. That probably was the first time I was exposed to it.

Ok, did you find that the employment and use of a lean specialist was a hindrance or motivation to change and challenge the current way of thinking?

I thought it was helpful, it came across differently to different people I guess. I wasn’t as involved with it as the project superintendent was at the time and he has done a lot of parking garages so it was definitely one of those things where he thought he had it down and knew exactly how to do it the most sufficient way as he had just finished two other ones that were very similar. The person doing the analysis said it, said we were pretty lean in how we did it just because of the experience, but they did offer some areas where we could improve and we took that back and looked at it, I know they did here internally in the office – I wasn’t involved once they took it form the field and he kind of gave us his findings.

Ok, so that was an interesting way of addressing minor concerns and improvements. I would like to ask you now about your working relationships, particularly how are your working
relationships different from those on-site and those within the office? Further more have these changed due to current lean implementation processes?

They are similar, but very different. On a job site you are very close to the people you are in the trailer with, you spend years 8-10 hours maybe 12 hours a day with the same people in a trailer there is not very much privacy and everybody knows everything about everyone and you become very close and especially on my two projects we pretty much had the same team which is kind of unusual within the company but the same team moved from one job to next. It just so happened that the timeframe that we had it just rolled that way and we were all available for the next project so we became even closer it was about 4 years of being with the same people, the same 5 people. But in the office the people are, the relationships I guess aren’t as strong just because there are more people and you obviously don’t interface with them as much as you do when it’s a small group of 5 or 6 people but the, I guess the type of relationship – well it feels the same everybody feels very open, friendly, shares their information, shares their personal lives – which is one of the reasons I actually choose Pankow because of the size and that personally feeling of knowing people and knowing the CEO’s and vice president and they all know who you are and you know who they are and that’s nice, you know about their family lives.

Oh ok, so the culture of the company revolves around family, very interesting. Do you find that a different culture environment in operation at [org A – project 1]? Can you explain the differences in culture as well as the working relationships?

Yes, it’s very different. And I know we as a company are trying to move that way but even just the relationships between the design members or the design team and subcontractors and trade partners is very different. A lot of the animosity is gone, my job at [the car park] was to deal a lot with the billings and change orders and people submitting change orders they thought they’d deserve and trying to work through those issues and it just seems like the structure at the [org A – project 1] is going to be completely different, when we’re actually on the job site. And the relationship with the designers I didn’t get to be upfront on the pre-construction end as much as on the parking garage because I was still working on the other building so I was still in the field on another project. I did do some preconstruction on the 9 storey office building before I actually started and I witnessed a lot more interaction between the designers and ourselves and the designers and even the trade partners and it’s amazing hearing the trade partners getting excited about being involved so early and getting to be apart of choosing other team members – that’s something that they never get to do and you know they just loved the fact that they were on the interview panel for who else in coming on board and they get to have a lot of say in how the team is structured.
Have you found that kind of involvement assists in creating and building a positive working environment from the pre-construction phases of the project for all parties?

It’s much better definitely. And I’m just very excited to see that actually in the construction process and how it changes just the way the field runs and whether or not the trade partner union employees are going to take to it. Because when you call up BNS for somebody you’re just getting whoever is next on the bench you don’t really have a lot of say in how they are going to interpret it and how well it’s going to go over with them. But on the preconstruction phase it is amazing and it’s a great environment to work in, you know much nicely and you look forward to everyday, much better than not knowing who you’re going to fit with today over.

Have you found that those types of improvements have also similarly filtered down through to the company here?

Definitely, our exposure at [org A – project 1] has just opened up the company to it and its great that we have a few key people, myself being one of them, actually involved over there and we can kind of spread the word here and we’ve started doing study action teams, we are looking at a new office space, we are supposed to move at the end of the year and its going to be much more open floor plan and kind of orientated to the groups of people who are working together or sitting together now and not so many private offices much more efficient so every member of a project team is sitting in one group together instead of all the field engineers in one group, and all the project managers in another group and so it will be a lot more intermingled – which I am looking forward to.

With the current working relationship between [org B] and [org A – project 1] are is/there a/or change leader/s emerging who are assisting in making the process of implementation in [org B] a better experience?

I think it’s a group perspective, I think there are a lot of people who are starting to look at lean and see the benefits of it and I mean I guess within [org B], we are the ones who are kind of educating everybody else just because we have the knowledge and we are being exposed to it so its kind of upon that small group of people but I think all of the designers and trade partners who are involved in the cathedral hill project are also spreading the word. I know that there’s one of the mechanical or the mechanical trade partner on the hospital was doing presentations to the sheet metal unions about it just too kind of get them involved. The drywall trade partner there that we bought on board is educating their field crews and bringing them in and teaching them about it before they even see it happening in the field. So there is definitely a large group of people who are starting to kind of spread the word and I think everyone over there is thrilled with it.
So there are a number of different trade partners making the move. Have you found then with your role and exposure to lean at the [org A – project 1] project and you have in some way become a lean facilitator?

Yeah, yes definitely. And I attend the LCI dinners and I actually just did a lean educator training session with [LCI – co-founder] on teaching just the intro into teaching the lean course. So its been great for me to as it has allowed me to take that step in my career, you know to be at the forefront of something and help distribute throughout the company and working with [interviewee 3] putting together presentations on introduction to lean. We’ve gone, [interviewee 3] and I have gone down to [a college] – which is one of the major colleges where people, our company recruits from when we’re hiring and have done presentations on just what is going on at our project and lean construction and trying to introduce them to the topic as well. They’ve been really exposed to design-build probably in the last 5 years and the strength that, that has taken on in the construction industry, but we are trying to get down there and teach them about lean too so when they come out they have a little bit of an edge on some of the other students.

I would like to now ask you a few questions regarding culture, these questions still link in with your role as a facilitator. Would you say through your exposure to lean your cultural environment has changed? How?

I think I’ve always been an accepting person of change I think that, I’ve only been with the company for 5 years so I kind of only know what I’ve heard before that, that we were a very conservative company the founder of the company was pretty conservative and that he past about 5 years ago now, which was right before I came on. And since then there has been a lot of change within the company and I think for some of the people that have been around longer, obviously it has been harder because they were used to it being one way. But I have always been more open to it.

Through your exposure to lean and in particular the lean implementation process [the company has undertaken] have you faced or experienced any cultural challenges? You can also address positive experiences and exposures.

Positives, I think positives are pretty clear just the open communication, the collaborativeness, the bringing of key people on board early on in the process – cause that’s really who you need to make a project successful.
Negatives, I can’t really say that I’ve seen any yet. Like I said once we actually get into the field I’m just interested to see how it all works, to how it all works out once there is actually, once it has actually been built and see how much of a change there is between the old way and lean.

In addition, the [org A – project 1] project is unique because you definitely have to an owner who can do that financially and who is willing to do it and put up all of the risk. I mean I guess that’s one of the negatives is that we are still waiting for the city to approve the project and get the entitlements through before we can actually break ground at the end of this year, beginning of next year – so there is a little bit of risk involved in that they are spending a lot of money upfront and I think that everyone is waiting too see how everything works out in the end and they’ve had previous projects where they have done lean construction but maybe not to the extent of this project but they have implemented some of the concepts and they’ve seen the benefits they’ve had from that but it is definitely a process where the people have to be open to it and open to spending the money and have the vision to see the benefits that they will get out of it in the long run instead of just seeing the dollars that they are spending upfront and putting at risk.

**Have you yourself in your role at the [org A – project 1] any cultural frustrations associated with the current processes associated with design or just day-to-day duties?**

Yes, I mean there is always frustrations but I feel like that is with any project and not necessarily the lean process. I think it’s just the city of San Francisco, whatever city or jurisdiction that you are working in, there are a lot of projects that come through this office that take years and years to actually start. I remember when I interviewed for [org B] at the beginning in 2005 and I interviewed in like January and they were saying they were going to be starting this project any-day now, and day now and the project still didn’t start until I had been with the company for like 6 months. So therefore, we have other projects now that are doing the same thing that were supposed to start or we are expecting to start any day and we are just waiting for them to give us the go and waiting on the city’s in the pre-construction effort. So I think that’s just typical of how construction works in these major cities that it’s a lot of hoops to jump through before you can actually get an approval and a care and value what the community thinks especially in San Francisco and so there is a lot of time and effort put into making sure that the neighbourhood is happy with what's being built.

**Have you found in your role and relationship with [org A – project 1] there has been any form of resistance in terms of sharing company information and processes?**

I think there is an initial, well I don’t think its resistance, its more hesitation because you’ve done it one way for so long and you kind of have to constantly remind yourself and other people that they are
paying us all to be there and share information, you know its all the same owner, so by sharing the information we are all only improving the project for the owner and there is a lot, well I’ve only encountered maybe in all of our interviews whenever we interview for a trade partner we also ask them about that ‘how do they feel about the open book policy and sharing all their costs’. We’ve encountered one person, one company that really had a problem with it and its something that we weigh heavily on when choosing a trade partner, its almost like a fatal flaw cause you do have to be so open. Sharing information between the projects I think has been great, the walls up there just show all of our information, everywhere we are at and at any time when we are looking at something since the hospital has been going since, well for quite sometime before the medical office building whenever we are considering a change or consider bringing someone on board we’ve always been able to go to the hospital and kind of ask what have you guys done, what did you find and can we see what information you have – so that’s great. And yeah I don’t know if its resistance or a hesitancy in the beginning to get used to the idea of ‘it’s ok to share that information’. So it’s mainly then about the establishment of relationships and trust amongst the parties? Yes, establishing relationships and trust.

**Have you found with the relationships formed with other partners on the [org A – project 1] project that there is potential for growth in their companies? Or do you find the working culture of [org B] enables you experience the same level of growth?**

I haven’t found one that I guess I would prefer to be employed by I really like [org B], it definitely opens your eyes to what else is out there, you know if you, which is good. I mean what happens you work in the industry anyway that you do get exposed to many more companies, there are probably other companies over there who have been doing lean and then who a little bit more on the forefront of the changing, of the changes in the industry. I consider [org B] an innovative company we’ve designed moment frame latches for example. We definitely think outside the box type company, but I do think we tend to maybe lag a little bit in picking up on the changes in the industry and the way the industry is heading so I am glad to see us on the forefront of lean, sometimes I question whether or not we would be if we weren’t so involved with [org A – project 1] so its been good for both me and the company. But there hasn’t been a company that I prefer to be employed by.

**We’ve discussed in some detail about the culture and working relationships of the company particularly in regards to lean, however we haven’t discussed much about the process associated with implementation. How would you describe the process of lean implementation [org B] has taken?**
I think that’s hard to answer because we are just starting and so we started with, we’ve been doing some process mapping of our current states, we’re doing the study action teams, we had the person come out and look at the job site and I know they did that in LA too on a project that they did, they had someone come out and look at how they are. So when they first came out to [car park project] I remember thinking ‘oh why are they doing this?’ I mean I hadn’t been exposed to lean at all, so I was like what we’re they thinking, you know or why did they decide to do this and now that I’ve exposed to everything that is going on at [org A – project 1] and looking back I see what they were doing and in that way its kind of staged but we also have taken on a lot and are doing a lot with lean. I think also a lot of that has to do with the economy though, you know if were a different economy and everybody was out in the field doing stuff then I think it would be a lot more staged and a lot slower going but since unfortunately we are all sitting in the office instead of on a job site it seems like a good time to start introducing people to it and educating them about it cause once everyone is gone and out of the office it’s a lot harder to get people in the office to learn or even time when they are out in the field, even if someone out there were to do it.

Have you then found that the contractual relationship between [org B] and [org A – the client] has been the main pre-cursor/influencing party for the company’s decision to implement lean?

Yes I definitely think it has had a large influence, I know that [interviewee 1] has been involved with lean for multiple years probably before the [agreement of org A] got really large. I don’t think there would have been such a large push though if we hadn’t been so exposed to it somewhere and seen the benefits of it and knew that was the direction we should be going.

Other than lean have you been exposed to any other management philosophies during your time within the company?

No. But quality wise we definitely have a quality management programme implemented prior to lean. That was also developing, its always been there within the company its just maybe not been a standard or there was no standard to how it was done and prior to lean they were working on getting a standardise document to be used on every job site.

Although not directly linked to process, I wanted to move onto something known as knowledge transferability it’s linked in a way to management. Have you found that [or B] values the ideal of knowledge transferability, education and training?

Yes, definitely they encourage all of us to grow as much as we can within the industry even from just coming out of college they really allow you to grow as much as you would like to and experience as
many different approaches or facets within industry or organisations you can be associated with. Its one of the goal they actually make for all of the engineers up through senior management is you get involved with some kind of industry organisation and outside of lean there is a local, well its actually a national, a US national group that volunteers with high school students who want to go into architect or engineering or construction management and you are required every Wednesday to leave work early to go meet with the students at 4 o’clock and I’ve been doing it for 4 of the 5 years that I’ve been with [org B] and they encourage all of us – and there’s probably 5 of us, 6 of us that do that every week. So they definitely encourage your growth and that just you know exposes you to other people in the industry, not only are you helping the high school students locally but you are being exposed to other people and are also learning.

Do you find that those types of activities also influence the working culture of the company as well as your own culture?

Yes, yes I do. I think that we all kind of influence, there is definitely a certainly a type of person who works for [org B] or at least the type of person who is successful within [org B] and you can see a lot of that in the people that are here and the individual cultures that they bring and you know obviously your culture gets changes or improved by being involved in these outside organisations and the fact you can bring that back to [org B] as an overall organisation.

Do you like the type of working environment which encompasses what is known as a learning environment?

Yes, definitely. I think that you just continually improve yourself as you learn and educate yourself and know more and that kind of goes back to that answer about wondering if we would have been so involved in lean if it weren’t for that project – that I feel maybe sometimes as a company we are a little bit behind on whats going on in the industry. I don’t know I guess design-build we’ve been kind of doing that, that’s the approach the company has taken for what I hear, for as long as the company has been around for even before it was a huge thing within the industry and we’ve been kind of on that forefront and a lot of the senior management were the people who helped being very involved in DBIA and getting those organisations up and running but there has been some others like LEED we’ve been a little bit behind on when everyone else was going green when it was the new thing and how that is kind of evolved within the industry. So it just kind of depends on what the company chooses – maybe something that they want to invest a lot of time and effort into – but I do enjoy being in a company that does encourage you to be educated and they bring in people all the time to give us, like what they are doing today a lunch-and-learn on a new concrete product and really open to just kind of getting you exposed to a bunch of different products and avenues.
Do you find that the use of education and training programmes by the company is designed to lead to internal promotions? Or do you find that it’s more about the growth of the individual?

I think it’s both; I think it’s all to do with the individual basis. But I think that everyone has a little bit of, you know the more you are involved with the more knowledge you can obviously bring to your position, the more likelihood you will be promoted. But I also think on an individual basis it kind of goes back to a certain type of person who flourishes inside of [org B], is the person who wants to learn more and is never satisfied with where they’re at but is always striving to be better usually those are the type of people who do well and stick around during these harder times. So I think it’s a little bit of both.

That was the final question for the interview. However I want to give you the opportunity to provide any additional thoughts you may have on lean, the process of implementation and cultural maturity.

Going back to the, well I guess I just thought of this, the education portion of it was that [org B] is a company that has started to put together in the last couple of years training sessions that are specific to the company that they require people to take on. And they’re rolling out that out in the next few months here and then I think they’re starting with maybe 7 courses this year they’re going to roll out up to 30 courses I think they hope to have in the next few years that people can take to continue to educate themselves and I think that also is done to strengthen each of their individual capabilities so then they can be promoted to the next position – that was just something that I thought of but other than that I don’t think I have any other comments.
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and your exposure to lean.

My name is [interviewee 5], I’ve been with [org B] 19 years, most of my time with [org B] has been spent in Hawaii and a few years here in the [Northern California] area. I have a bachelors and masters in civil engineering like a lot of the people in the company with an engineering background. I was in the military in the coast guard for 10 years, so I didn’t start with [org B] right out of college like a lot of people but I started out a quality control engineer on a large project in Hawaii and I progressed up through the positions of project engineer and I’ve been a project superintendent on job sites. A lot of
the projects I’ve done have been renovations, some new construction but split between Hawaii and the [Northern California] Area – that kind of summarises my background with the company at least. My exposure to lean has been limited to I would say the last year probably. I was on a two and a half year renovation and seismic upgrade project in [California] which is just a few miles from here that project finished in the field in June of 2009 and so as that job was finishing we moved into the office here and I’ve become involved in the [org A – project 1] in [Northern California] which you’ve probably heard about from some other people and in our case, well out role there is not general contractor but a trade partner to perform the structural concrete work. So I’m going to be the superintendent on that project eventually when it moves to the field which is still almost two years away for us, but I’m involved now in the preconstruction role as a trade partner with the whole [org A – primary contractor] integrated project delivery team a couple of days a week over in [Northern California]. So my exposure to lean has been mainly in regard to that project, you know before that project we’ve done some study groups here in the office so with [interviewee 2] and a few other people you may have meet, we did like a study action team of reading the Toyota way that was probably my introduction to the whole thing with lean that was within the last year. We’ve basically read that book and discussed it as a group and how it might apply to our industry and to out company and then my involvement in the cathedral hill hospital project has given me a little bit more exposure to the lean process, you know whether its just meetings within the organisation or there’s been a few training sessions with you know [LCI – co-founder] and some other people you know the lean construction institute you know as far as some half day seminars on what the lean concepts are about and the lean construction institute has monthly meetings here in the bay area that usually include a presentation on some ongoing or recently completed projects that try to use you know some of the lean concepts in their design and construction. So my exposure to it is limited to that timeframe.

Ok. Have you found that the use of study action teams by the company as well as other lean orientated and facilitated events has assisted in expanding your knowledge into the concepts, philosophy and principles of lean and its benefits?

Yeah, I mean before the Toyota way sort of introduction that we’ve used to the whole concept, before reading that book I didn’t know much at all. I’d heard through [interviewee 2] or other people that the [org A – project 1] and [other projects] were going to be utilising the lean construction methods the lean concepts. I really didn’t know what that was all about. So that study action team was a good way of getting a bunch of people from the company and maybe with a number of different backgrounds to read through the book and every week together and discuss you know what the process means and how it might apply to construction and where we might see it going in our company. So that was a good introduction to what it is all about especially for those of us who had not been involved with it before. The cathedral hill hospital we have exposure to people like Glenn Ballard and some of the
lean people in the field that have been studying and applying the concepts for quite a while so it seems like a good opportunity here in the bay area and with this particular project to get exposure to the process. [External contractor] is one of the general contractor partners in that project based in the mid-west but they apparently have a pretty strong history in lean and there’s a few people there within their organisation who have then been trying to apply this to construction for a few years so they bring a little bit more experience. So there is some exposure there with people that have been through it a while and know how to it can be applied to construction.

You’ve hinted at a few cultural ideas in your discussion so far, so I would like to address these first before we continue the discussion. Have you found with your experience as well as knowledge a shift in the cultural environment since the decision to implement lean strategies was made?

I’d say there is a little bit of that. But we are still at the very beginning, I’d say. I think like the regional managers, we have operations in northern and southern California and we have what we call our base building group and we have the special projects group and I think the regional managers, the upper management has been exposed to it enough there they’re trying to implement, you know some of the steps, some of the lean concepts but its still kind of new to a lot of people, project managers, superintendents – so I think the whole shift, the whole company’s culture to that is going to be a slow process and I think we are just at the very beginning of it and to try and look at a few lean tools, methods and concepts and apply them in the field we’re trying that in a few areas, maybe the smaller projects first where maybe its easier to adopt and I can see where just because it is something new, something different there is a little bit of resistance to change in some cases and in others I think its certainly the new wave of the future for some of the bigger projects we are seeing. Its something company wide I think the intent is to try to have it become more part of our culture but we are just really starting that I would say.

Have you found with your even though limited exposure to lean, your working relationships have changed and shifted in dynamics? If so, please explain and if not, also please explain.

Yeah, I’d say certainly from my exposure on the hospital project I mean its part of the integrated project delivery but its also the lean concepts of getting the whole team there I think our company has always tried to involve our subcontractors. We do a lot of design-build work you know before integrated project delivery and before lean was even talked about so compared to a typical public hard bid contractor where you just get the lowest number and you bring them in and maybe you fight over things over the course of the project we’ve tried to develop in all the markets we work in partnerships and have very good relationships with most of our subcontractors. But what I’m seeing here at the
hospital is certainly taking it another step where you’ve got a lot of those people involved way before construction starts working together, and we also because we do a lot of design-build we typically work with architects and engineers during the preconstruction stage but here you’ve got all those people working together with a lot of the major subcontractors – so I see the real benefits of getting those partners involved early in the project and it helps us as a general contractor better understand how they do their work, or what makes their work more efficient and I think I’m learning quite a bit about some of the intrinsic values of the trades, and seeing the benefits of the design team getting feedback from the drywall subcontractor, mechanical, electrical, plumbing, window subcontractor – we’ve got major trades there that are having a direct input on how the design can make the project more cost-effective and cost-efficient and easier and better to build in the field.

**Do you find that the lean approach is a good direction for industry to take? Or you think lean is only applicable to certain project types?**

It seems to lend itself right now to larger projects. We haven’t gone out to build this one yet but I certainly have a good deal of confidence that everything we are doing now is going to make the construction go a lot smoother, the owner recognises that they’ve realised some significant cost savings from when they started but I think its going to be, well to overcome what’s been the traditional means of project delivery for a lot of owners that the lowest price in competitive bidding is the way to get the best value where we’ve always if we’ve had the opportunity to evolve in design and build early on we felt we could deliver more value by helping steer the design into a more efficient construction this method takes it a whole lot farther but it involves kind of a leap of faith for owners to get away from the competitive pricing mindset and it also requires a lot of trust that you’ve got the subcontractors involved early on, they have a motivation and incentive to try and drive the cost down as opposed to not having to bid the work and just get handed the works. So the owners on this hospital project certainly seem to recognise the value in what they are doing, they’ve got a almost billion dollar project, that’s got a huge budget, there is a lot of time and money being spent now with all the people that are involved but they’ve seen some real cost benefits to it already so there may be a dollar threshold and a size of a project where it becomes difficult for the owner to take that leap of faith to spend a lot more in the early stages not really knowing for sure whether they would save that in construction or not. But I certainly feel confident in what I’ve seen in this project that there are some huge benefits and you know especially for medical projects in the state of California has a regulatory agency which oversees all medical projects in both design review and construction that there are some huge inefficiencies if you have incomplete design and things that can come up in the field so solving those now in a medical project is going to reap huge benefits for the owner later, I think.
Have you experienced any challenges towards the lean implementation process? In your answer can you address challenges at both [org B] and [org A – project 1]?

I guess some of the things I would question about it, a hospital project like that is so complex that what they’ve done to break the preconstruction group up into teams that each have their areas of responsibility and there is a lot of collaboration and communication amongst them – which is what you need by breaking up chunks of work that can be dealt with a reasonable sized group of people. I would say that sometimes you sit back and wonder why there is too much time being spent studying and restudying too many different alternatives you have to make some sort of comparisons, you want to look at alternatives but also if you look at the total timeframe we have and I’ve only been involved in it for less than a year and a lot of people were there two years before I got there so you really do have to question the amount of time being spent prior to construction and could that be a little more focused as opposed to studying an alternative to death because the time set aside there, that maybe the process is allowing a lot more studying of options and opposed to having a little bit more incentive to make decisions and move forward – that’s probably the only drawback I would say that sometimes comes up. That I think the process we are going through is good but maybe part of it may be driven by the fact entitlements in the project have delayed the start so that kind of has stretched out the preconstruction sometimes you look back and say ‘well its great we had this extra time as we are still trying to figure things out’ but are you still figuring things out because you have so much time that you’re taking longer than may be what you need too.

That’s a very interesting thought and perspective. I would like to move the interview back towards the process and also management. In your role both at [org B] and on the [org A – project 1] project is there a lean champion who is driving the process within [org B]? Or is the process being driven by a collective group of individuals?

I think there is a couple of key people with the [org A – primary contractor] general contractor partnership that I think had a reputation and a history of implementing lean and certainly being a champion of it as a process. So yeah I think there is a couple of people very top of the organisation at the general contractor level and at the same time from [org a – client] the owner they believe in the process and they encourage the team and they provide positive feedback on what we are doing and what we are accomplishing, that they see the benefits of it. So yeah I think that its got from top leadership people who are very much champions of the process and the programme and they have a few staff people beneath them they try to work with the nuts and bolts of providing the resources, the training, organising specific meetings of how you actually try to implement lean. You know don’t think about the way you’ve been doing things for the last 15 to 20 years but here’s how the lean thinking apply to the day-to-day processes in preconstruction. What about [org B]? I say it’s more of
a collective group that the people and most of them you’ve talked to today who are involved in either
the hospital or the MOB (medical office building) are totally embedded in it and we’re getting hands
on experience with it. I think Lonnie Andrews is probably the key person within the company who’s
been involved with that project for many years when lean was just being implemented so I would say
he is probably recognised as sort of the lean expert or leader in the company and then the regional
managers of each of the offices I think are trying to implement some of the lean concepts and I think
they’re sort of that group of 5 or 6 vice presidents are the ones who I think can see the potential value
of it and the future of the industry and are trying to look at how to implement it, not just all of a
sudden change everything, instead do it project by project and into the different areas to try and adopt
some of the concepts and methods.

**Ok. The next question is concerned with process and management. Have you found the process
of implementation [for lean] has been undertaken different to other times upper management
have decided to implement change?**

I would say with what I’ve seen with lean its grown out of our involvement with the CPMC medical
projects is where it really started for us. And I think like a lot of new methods or philosophies I think
there is some idea that you don’t necessarily want to roll it out to the whole company like ‘we’re
changing this is it’ but to try it out and sort of learn maybe on a project-by-project basis, I think that’s
what we are doing is having learned and been exposed to it on these two projects we’re trying to roll it
out to the rest of the company. You know we are not like all of a sudden change everything, but take a
look at it as we – you know whether its in preconstruction or as we start to look at how we staff
projects and part of it goes hand in hand with some technology changes with the use of BIM (Building
Information Modelling) and that is not necessarily a part of lean but it is part of where the industry is
going – so I think the company is looking at the technology side of things as well as lean concepts and
trying to implement them to varying degrees on a project-to-project basis. And as a comparison I
would say in 2004 [org B – founder] passed away in his early eighties after leading the company for
some 47 years and leading up to that point there was knowledge there that at some point the company
would have to deal with that issue and there was a group of 5-6 top vice presidents within the
company that prior to that event had taken place had started to look at how the company would start to
go forward in the future and at that point there was a more definite kind of developed a strategic plan,
a business plan and that’s something we kind of rolled out where each region of the company, the
company CEO and president travelled around and kind of delivered the results of a couple of days of
off-site workshops and sessions they had with facilitators to develop our strategic plan and company
mission and things like that. So that was where there had clearly been a change to people at the top
with the passing of [org B – founder] and the company wanted to take definitive steps of how we are
going to keep the company going ahead in the future and kind of tried to deliver that message to
everyone within a very short time, in the course of a month or two of here’s what happened, here’s how we are going to try and go forward and keep the company financially strong and if we are going to diversify our markets and things like that.

Have you found that type of education and communication has minimised the potential resistance towards change within the company?

Yeah, that’s true. I think people certainly appreciated in that instance where the gentlemen’s name who was on the company had been the president, in his last few year he had become less involved in the day-to-day things, so those people relatively new to the company didn’t really see [org B – founder] and his involvement as much, his business philosophy and his way of doing business was still very much on the company as far as how we conducted ourselves daily and the type of work we pursued and the clients that we did work for. So there was a bit of a change after that we recognised that the industry is changing and to be better prepared for the cyclical up and downs of the economic that drive our private work I think some changes in the type of work we were pursuing and were better received when the group of vice presidents made a conscious effort to go out and explain it wasn’t just a rash decision but there was a thoughtful process that we went through to recognise where the industry is and where our markets are and under [org B – founder’s] guidance we’ve been doing this but we think we need to start to do something a little bit different to survive and remain healthy in the next few years.

Did that process change the working culture of the organisation at all?

I don’t think it changed the culture that much I think to some people who had been around for a long time we always had a history of private negotiation work, repeat clients and that was always important and always will be but the need to, well we’ve never been and still aren’t doing a lot of hard bid, lump sum type work but we were trying to purposely trying to diversify into some public markets that were acceptable to other means of delivery and that helped us even in very recent years as the private work and the economy has tumbled we’ve managed to have some work keep us going there where we might not have had enough of had we been following more the older model. I mean we still aren’t going to head into the public hard bid battle but we are finding more and more owners are considering other project deliveries then just lump sum bidding as well. So I think that’s probably where we’ve seen some different project types and ability to do some different types of projects that will help us through the economic ups and downs of the industry.

That’s an interesting way of describing other processes and their impacts. Have you found then the current economic downturn has assisted in the company’s decision to implement lean?
Probably a little bit, I mean I guess the one thing in our business when things are booming everybody is competing for people and your trying to hire the talent you need to staff the projects when things slow down the company is faced with the decision of how many people do we keep knowing we need resources to pursue work and then when we get work and when the economy picks up we don’t want to go out and higher all new people but at the sometime you can’t keep everybody. So the company went through some very difficult decisions about needing to lay off some people as projects finished up and sort of retain a core group and even with some people who would normally be on a job site, are now in the office awaiting their next term. So we are trying to take advantage of this slow time by actually planning for it pretty well with trying to do things like the study action teams, and looking at the processes of how we have done things and are there ways to improve those so we have tried to use some of the lean tools of looking at the current state of what we have done for years and is there a better way to do that process as part of building. So during the slow time we’re trying to get more training available to people across the company at junior level and mid-management and up with the knowledge that at some point we will get busy again and we will be back in the field but during this with what will be a couple of years of relatively slow market especially for northern California I think we are kind of taking advantage for that. And it does include some training that is relevant to lean and lean concepts.

**You’ve mentioned the use of study action teams by the company to educate and train employees; do you see this as the company valuing knowledge transferability? Please explain.**

Yes, I think probably that was something that occurred during the 2004 strategic shifting of the company and its plan, there was a little bit more focus on the organisation of our training. The company grew for quite a while and things were booming but things have shrunk in terms of the number of people but we’ve added a few positions and there was a number conscious and organised effort both for in-house training and for using outside resources. So we’ve tried to get a lot of input from people who have been in the different positions throughout the course of their career to determine what training is appropriate, for when and for what people and we’ve tried to set up a bit of a collection of courses that people will take at certain points in their career and I would say like right now we are just probably getting ready to roll out some those that are related to the lean concepts. There really hasn’t been any in-house training that is specific to lean only then the study action team with some of the basic books but we are developing some courses in-house or identifying sources outside for some of the choosing by advantages and some other things like that – so I know there are some specific lean concepts that we’re adopting in our training programmes that people waiting for their next assignment will have an opportunity to get a little background on.
Have you found that this system of educating assists in people generally becoming accepting of change?

I think so, well I think before when people go onto their next job site assignment you know we’ve decided to change the way we do some things or implement some lean construction concepts and methods to get some training before you actually go out in the field especially when things get busy and people are stretched in on a job site taking advantage of this slow time in the office and giving people some training especially if we develop some in-house training where we find we have really tailored it to our company, to our culture and how we’ve done things in the past and how we might do things in the future – I think that will be received by the younger engineers who have been employed with the company for 3-5 years, if all of a sudden we decide to do things differently to how we did things on their last project to provide some very specific training on how and why will make it better received and better understood and more easily implemented.

That was the last question I was going to ask you, but I will give you the opportunity now and allow you to share any additional thoughts you have on lean, the implementation process and cultural maturity.

I guess just sort of general comments from being involved in the hospital project for at this point about 8 months or so, there is a wide range of people there that have been in the industry a long time and some not so long and some that have even come from other industries – so it’s good to get some different perspectives there and we often talk about the construction industry as centuries old and how much can we really do differently and a lot of the Toyota way and the lean concepts seem to be initially coming out of more of a production, assembly line type of thing you know where you are making repetitive and similar products and you know construction is quite different, in that every building is different and we aren’t typically building the same thing over and over again. So part of what we have to overcome is how do we apply these things that we don’t see examples of that aren’t assembly line, automotive or manufacturing type repetitive work and applying it to what we do. But a lot of what we do even though the buildings are unique there is a lot of repetitive processes and repetitive materials so I think it has opened our eyes up to looking closer at trying to find more ways of being efficient and establish a workflow. So I think it has been good exposure to see what’s been done in an assembly factory type of application and think more about how we can pre-fabricate and we see people that have 20-25 years in the field doing things as an electrician or a plumber and they are actually grasping this and coming up with some good ideas in how to implement it. So my experience with the hospital project has been good in that regard in that I am able to see how people have been doing things you know the old way, the same way for years and it actually stimulates some creative thinking of how can you make things more efficient in the work we do and so I think we, I
am in a good position to be able to see this applied to a whole number of trades and for our concrete work we are trying to come up with some ideas now which we’ll implement in a year or so.
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and you exposure to lean?

My position is regional estimator for the northern California division of the base building group of [org B] builders; it’s also more about preconstruction and managing the preconstruction process then actually estimating. I will get in and help with architects and our own people on projects and how we envision them to be laid out and designed and into the structural design aspects of figuring out what form of resistance do you what to do, what structural system would want to be implemented into each project. My exposure to lean is probably like everybody else here is through the [org A – projects] and
I was involved in the very beginning with doing initial estimates with that and took it through probably, lets see if I can get it right and get the correct words to, the concept phase of design and then handed it off to [org B – representative] once it was established and that way I could continue in finding new work instead of staying with something we already had. I’ve been with the company for around 26 years and came to [org B] right out of school.

**What are your links to the [org A – project 1]?**

I have been linked to [org A – project 1], but I haven’t been involved the last 4 or 5 months.

**In your role within the company have you shift in the working culture as a result of the company’s contractual relationships with [org A] and the company’s decision to implement lean?**

Yeah, I think the biggest thing; well I wouldn’t call it a shift. There's two things, doing a lot more you know what we call SATs, you know doing the book classes or, you know study action groups and doing a lot more of that lately with the company so we can learn more about lean and other thing within the industry. Right now I’m on a BIM management book club. So, the other part of it is becoming open with pricing and clients. So that’s I would say the study action groups and finding you know, being able to with ownership and all that and the you know like on the MOB project with the designers that we are working with its like heres the estimate, heres the you know and its actually, and usually when we’ve done things like that its glossed over with the designers but now they are really interested in the cost which is very good.

**Ok, so has this movement by the company towards the use of study action teams have been influenced by outside contractual relationships? Or was the decision influence more an internal strategic evaluation by [org B]?**

Probably internal, well no because we learn, because I think with the hospital project over there the cathedral hill hospital project we are seeing on that project they were doing a lot of these study action groups. And so we saw the need or that we needed to do the same thing. So actually its kind of both, we saw it happening and said hey we need to do that too, from what I understand.

**Has the use of these study action teams by the company been a positive experience? Particularly with employees more inclined to want to learn through those mechanisms?**
Yeah, from what I have been told, they’ve done a safety study action group and they’ve done one or two others and it sounds like people do get stuff out of it. They’re opening their minds to it and yeah I think they are getting things out of it.

I would like to move now to focus on your working relationships within and external to the company. Have you found since the start of the lean implementation process by the company and your exposure to other lean projects, you direct and indirect working relationships have changed? If so how and why do you think they’ve change and if not, why not?

I would say within the company probably not too much because we feel like we talk and that we are collaborating and are collaborative within our offices and all that. Outside other than mainly the medical office building project there is a lot more collaboration going on there. I think, our well the other part of it is we are talking to the owners and other clients and we’re trying to teach them about the lean culture and from that the actual integrated project delivery, you know IFOA agreement we have at CPMC. So interaction to others outside is more about teaching, and teaching the clients about the process and trying to get them to understand that this is a learning curve and a better process than what they are used too.

Ok then. Have you seen then with the whole collaborative environment, teaching and educational side associated with the lean implementation process lean champions emerge within the company? Or do you find it’s been a collective group of individuals that have driven the process?

Probably within this office it’s been [interviewee 2], actually [interviewee 2] and [interviewee 3] have been and are the champions of it. Then as we are going along more and more people are becoming champions of it. I mean I would say [interviewee 2], well, you know, he was probably the initial one and he was the only who started reading the IFOA he became a champion of the two. So its top down I mean [individual] is our president and he’s definitely seeing how the process helps or will help.

I might move towards some questions regarding the process of implementation as that last answer hinted towards that. So how then would you describe the lean implementation process [org B] has undertaken?

I would say it was, well I don’t know. Upper management it was a bit top down, [the president]. Well I would say middle management cause when we first got involved with cathedral hill and with Sutter and then on their processes it was, well if you want to count that IFOA agreement as a lean process than [the president] was our general manager in the office and he had blessed us in being able to
follow that agreement and say yeah we’re willing to follow this but then upper management is you want to go another level up down would be [interviewee 2] who was going to the meetings and so most of the cathedral hill meetings and he was championing it from that point. Once [the president] said yes we’re going to do this, then [interviewee 2] said, well I’m sure [interviewee 2] had a lot to influence for [the president] and so once [the president] said yeah we are going to follow this, then [interviewee 2] became a champion and then [interviewee 3] who works for [interviewee 2] and then from [interviewee 3] to the superintendents and its kind of a well….So basically instead of going top down, it was a bit of both? Yeah it was part top and then implemented across? Yeah and yeah its gone down to the field engineers and yeah.

Have you found that through the process of lean implementation that the structure of the company has changed in any way?

No I would say the structure is roughly the same. But I know as we do our business plans we are trying to think more and more about how do we become more of a lean organisation, for instance our office, we are going to move out of this office and into a new space that is going to allowing more collaboration among everybody. I mean now we have enclosed offices, they are not open offices and so we are trying to get people over that paradigm shift of you know the cubicle is a bad thing. So we are trying to get people to realise that cubicles can be good too because now you can collaborate a little bit better, so I would say that’s a big shift of us thinking about how do we create a much more leaner and more collaborative office space.

So has there been any form of cultural resistance by employees in general over that decision?

Yeah, to point. I mean I think people, you know there are a few that want their closed offices right but they are starting, it takes a little bit of a paradigm shift. I mean myself I like my closed office space but the thing is we leave our doors open anyway so a voice like mine carries, Steve’s obviously carries but it’s the, you know we leave our office doors open anyway – so its not like its going to be this big noisy space, it just won’t bounce off the walls as much before it finds it way out the doors. So I would say that’s one shift that we’re experiencing is trying to make our office, well the space more lean and then with that we’re looking to do a lot more electronic. Instead of you taking a piece of paper and taking out a pdf copy and printing it and then just storing it somewhere we’re trying to think of ways of how do we leave it electronic instead of having to have a file or drawer full of paper – so that’s a little bit of a shift that even in over estimating group trying to, because in estimating I like drawing or having something on my table but I’m trying figure out and learn how to do it without it and do it all onscreen and we are figuring that out. And our new engineers coming into our office.
they don’t have much paperwork, they do everything off the screen, off pdfs or off the model – so it’s trying to learn from them.

**Will the change in office locations for this division [base building and special projects] of the company merge both company sectors in a way? Or will they still be separated as they are now?**

Yeah, we, well from what I understand we will still keep our [Northern California] group in [Northern California] and we are going to keep our group here but right now, I don’t know if we because we are starting a new fit plans right now and I would assume right now PSPL is in that one building and we’re base buildings over here. I would assume once we do a fit plan that we will be bit closer together but we do want to have if you are working in a project team in one cluster and another project team in another cluster – instead of doing too much mixing.

**When [org B] has undergone change in the past has the experience been any different to the current lean process? For example, something like Total Quality Management?**

There’s been a lot of buzz words out there and it takes some time to get things implemented.

**Ok then, I’ll restructure the question. Has then been that lean is more successful because the concepts fit within the culture of [org B] better, than other management approaches have in the past?**

I think part of it has been the type of work we’ve been trying to do it on has helped people see some things and understand, and see what’s going on in those meetings. So I would say from that standpoint it’s a mind shift, not necessarily. Well when I think of TQM and all that I think of something written down in a process well lean is more about a mindset and changing how you think, it’s not necessarily well I’m doing A, then B, then C.

**Have you then seen any form of employee resistance towards the mindset of what lean is?**

No other than, the only resistance I’ve seen is people going ‘oh well another thing we’ve got to learn’, ‘so its another thing that is going to complicate my life’, or you know cause there are so many things that right now we are doing a safety is changing and codes change and there’s a lot of things you’ve got to learn in construction that you have to keep up on and now heres another thing you’ve got to learn – that’s where a lot of people kind of roll their eyes sometimes that its well ‘how am I going to handle this too?’ It’s not about change but its about filling that brain with more stuff, but the brain can only take so much stuff.
Some interesting comments, to me it seems that the use of study action teams by the company is assisting in minimising any resistance by employees as they are designed specifically as an educational tool.

Yeah I think so, I mean people, well its interesting you know because people who you don’t think, I think back to when I was in the field and as a field engineer and I was totally intimidated to come into the office and talk and express views and we’ve got guys in here younger engineers who totally knows, it helps level the playing field when you have [interviewee 8] and the area manager in the same room with a superintendent or a field superintendent and it levels the playing field. So I think people feel that there is more ability to talk and to express their views.

I want to move the discussion now to highlight a little more in-depth the role of study action teams within the company. Are you a facilitator and/or involved in the study action team courses for [org B]?

Yes I am on the BIM one. I forget the official name. So I am a facilitator on that.

Have you found in your role as a facilitator has helped established more communicational and working networks with employees who you may not have had a working relationship with before?

Yeah. Yeah well I’ve just started; we had out first one just the other day. So I’m learning to be a facilitator and I’ve never done it before so I’m learning something myself on how to get things out of people. In terms of relationships it’s the same people I mean, well our BIM action team, yeah I mean yeah because we have a subcontractor in the southern California group involved so there is a couple of guys or people that I haven’t or that I know very well because we haven’t talked about this topic a lot amongst each other.

With the presence of employees from other [org B] office locations, have you noticed that they have a culture environment to the one here in [Northern California]?

Not necessarily, no. I mean there is two things they do a little different down there but we all kind of think the same. Once they you know with the BIM stuff, when we start it up here, Louis being our BIM specialist and him going down there and trying to train some people down there and it was kind of difficult for him to try and get them to see the light of how model can and doing the process helps, but once they saw the light things started, well we started seeing the same thing.
It seems that [org B] has a strong interest in the continual education and training of its employees. Do you think that the company is similarly concerned about knowledge transferability between employees and groups? How?

Oh yeah, oh yeah, even more so then before. I would say that, well when the company started out there was a lot of antonym, you know each job site had its own way to do things and now we’re trying to make it more streamlined so when a field engineer goes from this job to this job we are using the same programmes, we are using the same processes so yeah there is definitely a shift there. Now that you said that, yeah.

Do you find that the shift to a more streamlined approach by the company has been a result of education and training?

No I think, well part of that was from going from an antonym, an antonymous job site to more streamline is more of a reaction to the guys in the field. You know when I was in the field, it was the same way I would go from one job to the next, like this project engineer would do something a little bit different the this guy – so you would just kind of adapt and so didn’t think about it but now there is a lot lately a lot of push from the field engineers, from people in the field saying ‘hey we need to do the same thing from one job to the next so we know what’s going on, so we know what to expect from one job to the next, it would make my life a little bit easier’.

Do you also believe that external contractual relationships between [org B] and other companies [particularly org A] have also pushed the company to streamline project duties?

Yeah, yeah. Well I think we started trying to streamlining before that, well maybe not – we’ve not taken a group you know some people [within the organisation] we’re investigating the EARP system where everything is run though a single database. So I think maybe from the [org A – project 1] we saw that hey there are some other things people are doing that we need to do the same thing, we need to have a centralised database so we can have access to that all the time and not have everybody have their own spreadsheet on their own computer – in that, that information goes away when they leave or go to the next job. So I think there might be some learning from the cathedral hill project on how and there are definitely some things that we’re implementing and we’re learning into the EARP system and all that. But there might be some, but I think it might have, or we might have gone after this database, this central database before we even got into the cathedral hill but there are definitely some things that we are learning from cathedral hill and putting it to the processes.
I'm heading back to the whole concept of study action teams, but I did forget to answer this question. Do you feel valued that [org B] provides opportunities for growth through education and do you find that this education and training leads to internal promotions for employees?

I feel it’s more of an informational gathering and learning and not as a ‘hey if you do these three SAT groups you’ll get promoted’. It’s more part of your growing and your continued growth and improvement within the company. It’s not like hey, there are stepping stones right you don’t just take one class and become boom an expert in everything and oh therefore I got a raise. But it’s a stepping stone to learning more and improving yourself. So, well I’m looking at bonus goals and are the way we are doing our, well using success factors in doing our evaluations of our employees – I don’t even think we have SATs listed as something we need to do in our goals.

Ok, so then does management use any form of incentive/s?

No other than to than doing this. People are assigned to groups, so the incentive then becomes if you can’t make a group session let the facilitator know but you still need to read the chapter and then you need to write your own notes and then give them to the facilitator before the meeting. So a lot of it is peer pressure, and yeah, but to make sure people are coming and you know are involved in the session, and its ok if you can’t make but just make sure you read the chapter and write the notes and that’s the major element and somebody actually did the reading.

Finally, have you found that those types of sessions have assisted in changing the culture of [org B] in any way?

No, because we have just started and I haven’t seen anything yet.

So how long have the study actions teams been in placed within [org B]?

Oh, less than a year. I know from just listening to the guys talk about the safety sat that they did and I think they did another one people got a lot out of it. So there are definitely some things, there is a lot of take-a-ways at the end of it, that is you take something away and if there is something that we need to do that came out of it, then it needs to be done. Another issue is how do we can it done and how it is done, everybody is always like ‘oh we got this great idea’ and its always like well ‘how are going to implement it’ – it would be easier just to say ‘oh do it’. That’s one of the hardest things to actually implementing those ideas and getting people to buy into it and then actually doing them.
Well that was the last question; I wanted to now open up the floor to allow you to express any additional comments and thoughts on lean, the implementation process and cultural maturity.

I think it’s interesting, well within our company cause we have done a lot of design-build work, when I first went to my first lean event which was through UC Berkeley with [LCI – co-founder] and it was funny because it was a re-bar task group and we were trying to figure out how to lean up the reinforcing steel industry and they were doing this on another thing and they were trying to take notes and try to see if there was, well we did some process mapping and things like that and at first I, my first reaction was ‘well [org B] does a lot design-build work we already do this, we already collaborate’, well the [org A – agreement] is collaborate but **REALLY** collaborate and that’s kind of after when I went through the taskforce I was like ‘oh ok’ and when I went into some of the meetings at MOB I went oh ok this is what they mean by really collaborating and its not just doing design-build and having our own team and the team work together there is more to it than that. So I think we as [org B] at least are 75% of the way there cause of the way we think and who we are and because a lot of the work we do is design-build we are part of the way there, if you were a pure bid contractor it would take a lot of work to get there and I don’t know it would be interesting if you interview the bid-contracting groups to see where they fit in this whole acceptance of it.
Interview Transcript 7:

Transcribed by Brianna Chesworth in accordance with University of Newcastle policy 000873

Organisation B

Interview conducted on Friday April 25 2010

In attendance: Interviewer and 2 Interviewees

Start Time: 3:00pm

Finish Time: 4:00pm

Phrases and words bolded are those of the interviewer

Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and your exposure to lean.

Interviewee 1: I’m vice president of [org B] special projects which is a group which principally does smaller projects, remodelling, renovation and some from ground up

Interviewee 2: Most are existing facilities

Interviewee 1: Yes existing facilities
Interviewee 2: Sorry operational facilities, so challenging work

Interviewee 1: Yeah, yeah so renovation of existing and in existing. Our offices are 90% medical related projects and mostly on the whole market place is basically institutional, community college and medical.

Interviewee 2: And how long have you been with [org B] for [interviewee 7 [2]]?

Interviewee 1: Just shy of 10 years.

So you came into the organisation?

Interviewee 1: Yes, I came into the organisation, I wasn’t one of those who came out of school and have been here ever since, no I came here. No actually I transferred in; I came in 10 years ago from another major contractor operating in the US. What was the other question?

What is your exposure to lean?

Interviewee 1: Well a lot of our work that we’ve done this medical work has been for CPMC a [org A] affiliate. We have then operated on the sidelines of the lean implementation by Sutter; it isn’t as deeply rolled out amongst the affiliates as a lot of people might think certainly within the Sutter organisation itself and the major projects they manage lean is pretty prevalent. So like I say we’ve been on the sidelines and we see a particular benefit from it, in terms of maintaining a client relationship and we have worked over the last 3 years to implement some of the principles ourselves within our group we haven’t been successful in that we haven’t had the initiative from the owner to support that its very difficult for one element of the team to be lean when the other elements aren’t. We’re also now able to learn from CPMC, cathedral hill projects we have people who are well embedded in that culture and in those projects that we are sharing information and opportunities for participating in the lean LCI (Lean Construction Institute) local chapter, P2PSL as well here locally we have attended their events and so we are working at the implementation within our group. In the last year and a half the company as a whole has recognised the benefit of lean construction and the tools and processes that are in place. What makes it simple for us to move into lean is our culture is a very good fit, we have been for 47 years a collaborative contractor, our design-build heritage and culture is pulling together teams of experts and getting them to work together to deliver a project of higher quality and lower cost, satisfying the clients’ needs and never ending the project in any sort of litigation. So if you want to say we’re collaborative then I think that’s the way to prove it, we don’t end in dispute. So that’s enough for me right now.
Interviewer Note: All questions now are directed to and answered by Interviewee 1

You mentioned briefly about there being some resistance to the lean implementation process within the company, particularly in the up-taking of principles and tools at different times by different groups. Have the different adoption rates of lean within [org B] creating any type of cultural challenges or negatives?

I wouldn’t say its negative; it’s a little bit of resistance to change, because the last planner for example, we’ve been implementing that as part of lean and it’s a very structured process. It requires you to obtain reliable promises from your trade partners, but also the pure state of it measures peoples’ performance so our superintendents who live in the fields with the trades and rely on those commitments are resistant to measuring that performance and to putting people on the spot and say ‘well you made this commitment, you didn’t make it and this is the impact of it’. It happens anyway just in order to keep the project moving and not having to stand people up and having them accountable for their movements, but this is much more structured and you know its documented, its printed and it shows you didn’t do this, so our whole score of our team is not as high as it could be and it appears to the superintendent to be a duplication of effort that is there’s multiple levels of documentation that is going into that process. They prefer to do something very simple, a little simple Gantt chart of a schedule and modify it as they need to as work progresses – so the resistance has been towards the documentation and the confrontation part of it, not so much the benefits that come from it but the fear that there is going to be some initial kick back and resistance to it – they have enough to deal with let alone, have to deal with that.

Oh ok that’s very interesting to know. I would like to now get your viewpoint on SATs [Study Action Teams]. Some of the other people I have spoken with today have mentioned the use by [org B] of Study Action Teams as part of educational and training tools. Have you found that such mechanisms assist in overcoming potential resistance of lean, its tools and also principles?

Well certainly within my group we’ve completed one study action team with the Toyota way and we had one superintendent from our group who participated in it, who was one I targeted early on to roll out last planner and I think having read the Toyota way and having understood more of the principles into what has got to be accomplished and how to go about accomplishing it. And I think that’s reduced the resistance we also, well I also mandated that on a [org A] project we will follow lean principles, we will do what we can to be a leader if it isn’t the entire team that’s participating just so that one we continue our relationship with [org A – client] because like everyone [org A – client] is trying to figure out how to implement it as well. As I said earlier they don’t have it dispersed along all the affiliates equally so it is, well the answer the question very simply it has been beneficial to do that.
and also having done that always us to look at our culture and realise having done that we have always operated the same and it hasn’t significantly differer from the true culture that’s within the Toyota way and TPS [Toyota Production System] its more the tools and principles that are described there that differentiate.

Very interesting. Have you found then with [org B’s] existing culture and the move towards lean implementation that the working relationships of the company employees have remained fairly constant? Or have they changed, even in the slightest of ways?

I would say there has been more open communication. There certainly is less scepticism by those who are being asked to participate and they don’t have a formal education, and a study action team helps them understand what is trying to be done and they can begin to see the benefits of the process and they also recognise how important their component truly is and making sure that projects move efficiently and we are not delayed, they can rely on the fact that they can bring guys to the job site and they can be efficient and effective. So it takes a while but ultimately they begin to see it and how well it can work and how much of a benefit it cane be to them personally.

Have you found then the approach by [org B] in adopting lean had been different to the adoption of other management strategies in the past?

Well I would say in the 10 years that I’ve been here lean is really the first initiative that I can say I’ve experienced where we’ve attempted to formalise a different approach and to standardise an approach. The company has been very entrepreneurial and in that regard it is, it was organised as such that there were key people as project executives or sponsors or group managers or whatever, were given tasks to go out and make things happen and make project be successful. Exactly how that happened wasn’t as important as the fact that they were successful and we had a repeat client that would come back to us again, we are trying to grow to expand and in order to expand and grow we have to standardise so we can train people on the way that we want to do business and get them out there. We can’t take 10-12 years to develop somebody in order for us to grow so standardisation is a way for us to give them a very strong foundation on our core principles.

Have you found that the contractual relationships [org B] has with companies such as [org A – project 1] have influenced the company’s decision behind the implementation of lean?

I would say that relationship we see them as a very important client, potential client that cultural we are aligned to very well. And yes it is, it has been a significant factor at least from my perspective to incorporate lean which is part of our client’s satisfaction that’s what they want to see and that’s how
they want their projects to be delivered. And again what’s important it’s not really a cultural shift, its not like we are going to end up with two groups, one pursuing lean and delivery of projects in lean and the other sort of a more conventional or a less lean way – that’s not the way we work.

**So in a way you’re talking about the streamlining of culture to the individual employees within the company/organisation?**

Right, yeah.

**Alright, have you found again with the external contractual relationship you have with [org A – the client] that there has been a lean champion/s emerges who is influencing the lean implementation process and lean education at [org B]?**

No. No I can’t think of a person who would be a champion, certainly there is a person who has the most experience and has spent the most time with lean. But in terms of there being a champion and to say the company needs to do it this way, then no I wouldn’t. It’s been more like a collective decision and yeah there’s good things’ going on and we’re hearing good things going on and we’re seeing other results – we want to be better. There is not a champion I have asked a couple of people in our office to be our champions within our office too, since they are working on [org A – projects]. But it’s to help us and be certain that we do have a couple of folks who are assigned the task of growing our commitment and helping us learn more and streamline that – be the influence of the rest of us.

**As we don’t have much time left, I wanted to open the floor to allow you to express any additional comments you may have regarding lean construction, the implementation process and the ideal of cultural maturity.**

I can’t say that anything comes to mind. Well I guess, its not much really [org B] but its just to share. Implementation of lean on a project can be very difficult if its not 100% commitment and leadership and it needs to happen on the front end. You can, but you can’t effectively do it if you implement it half way through, it is, well at least in what we are seeing in the marketplace as far as subcontractors and design professionals – for a lot of them it is a significant shift in the way they are used to operating. This whole concept of silos versus solo, contractors have always considered themselves silos and subcontractors as well, getting them to work together and break down those barriers is difficult without the day-in and day-out reinforcement and its specifically, well its real easy to see on a small scale project when people aren’t 100% committed. I mean in terms of their full-time equivalency it’s a part time commitment to them to be doing a small project they are not there 8 hours a day, five days a week, 365 days a year – its just 2 hours here or 4 hours there a couple of days a
week. So if they don’t normally work collaboratively then that little experience in lean exposure on a small project isn’t going to convert them overnight, so you’re struggling a little bit, fighting that uphill battle to get them to think more openly as a team member and not just as a participant.

Interviewee 1 left, so responses from here on in are those of the second interviewee in this grouping.

Ok, so we might as well go back to the beginning. Could you provide a small background on the company, your role and your exposure to lean.

I am the regional manager, vice president for the base building group. I’ve been with [org B] straight out of school, so the perspective is a little bit different. I came here because of a vision of the past president, that we had, was a visionary, a big booming voice, but with the presence and the ideas of a better way of building. So when I joined [org B] it was with the notion that I was coming at it with a structural background but didn’t feel right about building something inside told me how am I going to work for a design engineer who designed builders and I just didn’t understand how they were put together and I didn’t understand the process. So inherently I felt like the opportunity had been forwarded to me by [org B] to work in a collaborative environment cause that is what was sold was an option to the design-bid-build world, an option to the status quo with no limits. You know [the president] was selling that this wasn’t just an option you know you can go this path or this path and the two roads will never converge. He was sounding on this is a better way to build and the market is going to go there. So right from day one I came to this company with the notion that the only reason that I was here was to find a way to work on collaborative teams and eliminate waste, ultimately adding value to a client. You know maybe that’s a little bit soap boxy or preachy, but you see it in the papers, you see that case studies where things go wrong, you see the law suits and inherently the more you think about it from a business person standpoint and how people run their businesses, I just can’t understand how the industry lead itself to get so commoditised and broken where you are providing a service where every project has its own special needs and constraints and yet, you know design engineers that is the one I draw back on because that’s the profession I was almost in, you know, they’ve allowed themselves to be basically be told you’re a half a percent, that’s what you are to me, you’re half a percent of the construction cost to me and now go and give me the same old design, for the same old system as fast as you can. And so at that point there is no more innovation, there is no more fresh ideas, there is no more finding a better way and certainly there is a chance that the door on valued-added just closers. So for me it wasn’t always called lean, but I came into the company with a belief that we were here to find a better way to build. So our culture has always been a learning culture, a learning organisation, you know [org B – founder] main focus was on innovating and finding a better way so he could be more cost-competitive, but then also pass that onto the client. So the lean exposure was more a function of staying in touch with the universities, we’ve found way, one
way or another I came out of [university] and we also have friends at Berkley and so we have tried to stay in touch with what they’re working on and through those connections we were put in touch with [LCI – cofounder] and what they are doing through P2SL, that and client, I’m sure you heard through [interviewee 7] our experience with [org A] and [org A’s] recent shift to lean. These were the main two driving forces the university side and the [org A] side, at that point the first time, the first chance we really had an opportunity to see it make a difference was with our precast company in 1998 we founded a precast company for a number of reasons that aren’t relevant to the conversation, but they weren’t, it wasn’t efficient as an operation. When we first were starting that company its almost like we were trying to do the same thing we always did with onsite pre-cast from job-to-job, remote. So we were trying to treat them like an extension of a jobsite resource, but they weren’t. They were a business that needed to function like a planted environment and at any rate the manager that they brought in wanted to implement lean tools and watching how quickly that group and yes they are in a product based environment, a manufacturing environment, which is somewhat accounts and is more easily directed and suited to the lean process – it was just amazing though how quickly from the time they had adopted the vision they were going to go this route, to when they has their first Kaizen event and started focusing in on driving the tools down and engaging the workers they were a different company within a year. I mean it just leaps and bounds within 12 months the difference they were able to make in their productivity, in there efficiency, in their safety, they were the worse business unit corporately before they had the transformation and within two years they certainly were showing us that we could take a leap from them. So those are the basic exposure points that I’ve had along the way with lean.

Ok, then it seems that your exposure has been very vast. I would be interested therefore to know whether your exposure to lean and the company’s decision to implement that there has been some form of shift in the organisational culture? If so, how would you describe this shift and if not vice versa?

Not in the culture. The culture has always been on continuous improvement in learning, the culture has always been on investing in our employees, the culture has always been in don’t take the short gain always look for the long haul, its what in the long haul is what is best and we’ve always been because we’re so engineer heavy even without saying the words I think there is some commonality between some engineers, you know they have these like balsawood bridge competitions – you’re taught early that the beauty of engineering is to get out of you as much as you can out of as little as possible or to at least understand your objectives and use as little effort and resource to achieve that end goal. So eliminating waste is just another way of saying that. So I don’t think is had changed our culture but certainly it has given us more focus, its given us a framework in which to operate, which I think engineers a lot of times don’t like, no external constraint, they don’t like feeling like they are
floating and or lost. So to have this concept philosophy well tested, well practiced its got names for the tools, I think it gave a lot of people here a framework to focus on.

**Ok then, has the implementation of lean then changed any of your working relationships? These working relationships can be both discussed from the internal perspective as well as an external perspective.**

Yes. Internally, well maybe I think I might be jumping the gun if there is a question later on. But culturally it has made us say to ourselves ‘is our orb chart set up appropriately for us to really be a lean organisation?’ So the internal relationships have changed in the sense that we have learned at this point its like a second ripple in the pond, initially it became a mission to find and eliminate waste, then the second ripple in the pond was to step back and go ‘ok, well what's our biggest value message, what are we really doing and where's the client?’ We were looking everywhere for external and internal clients and once which went on and its not just the client/s, its the end user and user process. Then it rippled out to just stepping back and going ‘well what a second there are certain fundamental flaws in how our company is set up that if all we are doing is running around and taking the low hanging fruit, that’s not going to be a real transformation’, you know we are going to get to a certain level and we are going to get stuck and the real meaningful benefit to being a more efficient company that can then grow is in the heavy lifting. So now we are at the point, that yes how our different units work together, how our different internal service providers interact, absolutely all of that has dramatically changed for the better. Well, changing, we’re not there yet.

**You mentioned in your previous answer about the company units now working together, have you found this has been influenced by the company commitment to knowledge transferability, education and training?**

Yeah, I mean we’ve changed in how we structure the training. 10 years ago we would give training on a job by job or as needed basis, so its not that anybody, we’ve always been a company that hires for a career and so its easy to say we’re always interested in the long term benefit and well-being of each employee but there is no strategic planning, there was no strategic vision for how do you invest for those people along the way it was very job by job as needed or one-off approach. Now we have a professional development committee that has created with out side help and that’s part of our reality in knowing when to ask for help, getting outside people that specialise in setting up curriculum and leading classes to help teach us how to write curriculum for a class and how to set that curriculum up in a way so then you’re not relying on the speciality talents of one person but any person with a certain skills set can take this manual and know what they training, what they are teaching to a class. We now have a very formal process with something like 46 classes and every position in the company
along the orb chart is now matched for what skills it requires and how you build on those skills to move them along and these courses are set up really like a university environment to move those people along. So more than ever we have the same outcome or the same goal for what our people would be doing and given along the way, we just have a much better vehicle for consistently delivering and measuring how its working.

**Do you find then that the idea of employing for the long haul is in anyway challenging for the sustained growth of the company? Particularly in referring to the potential for employees to become lazy and complacent because of this attitude that their job is secured?**

I haven’t thought this one to death so I’m not sure exactly how I’m going to answer that only then to say its not a negative here. The first stereotype that comes to mind is the cushy government job where someone just gets lost and if they are going to get fired then they basically have to torch the building – you know there is so much job security that there is no challenge to do better. We’re not the government, raises, growth, opportunity are all earned I think there is a clear understanding that people are not going to be advanced just by being here that there will always be a talent based recognition where talent is rewarded, hard work is recognised, hard word is rewarded and so people that show themselves as complacent won’t be with the company. There is a fit period probably the first 5 years, well there is probably 2 systems, within the first year to 2 years we work hard, the construction industry is not glamorous and is therefore there are times especially before we I think improved our processes including hiring where we wouldn’t have matches. We would have people that would probably rather be in a consultancy office or quite frankly be a lawyer but not a contractor and in those cases those people rarely even make it 12months but if they do its not much beyond 12 or 24. Once you get past that year, years 1-3 then what we find is that certain people get our culture and get what we are all about and buy in and that’s when the company has programmes in which to bring them into first a senior associates programme and then they can become an employee-owner. So there is definitely check points along the way but if you get past your first 5 years at [org B] by then its almost 90-90+% maybe 95% that you are going to be here for a career. Very low departure after 5 years.

**Some of the others I have interviewed today have suggested that the use of SATs (Study Action Teams) have assisted in them to become more accepting of the process associated with lean implementation. Have you found in your capacity that the use of SATs also encourages employees to remain with the company and to grow?**

I don’t know we are only in our second cycle of using the study action teams here but I would say it’s a different way of training; it’s a different way of developing team bonding and comradity that I don’t
think people initially thought of that as a possible value outcome. So I guess what I’m saying is, well my gut is telling me yes because you’re not just learning a skill, but you are also getting that many subsets of our company, business units, positions, people from the first field, the most recently employed field engineer to a project executive are all coming together and sitting in the same room and the conversations and perspectives shared are bringing people closer together corporately and personally. So I think at the end of the day that benefit to teamwork and comradity can only help giving people a sense of place and feeling within the company, that maybe was already there but its certainly an added benefit that I don’t think people were thinking of when they asked can be bring this tool to the table, it is more about the lessons learned at the curriculum and the book as opposed to those other tangible benefits.

So you’ve found that they’ve been positive in the sense that they have facilitated the opening of communication networks that may under other circumstances may never have been opened?

Absolutely and we’ve, I’ve been a little bit of both sides I’ve helped plan who was going to attend one, but then I’ve just been a participant in 3 and we sat down and we intentionally said ‘ok, we’re going to wind up limiting the group to 10 so then everyone has meaningful input and so therefore we are going to set up 4 of these things over the next 6 months so now lets plan the guest list’. So we intentionally took field superintendents from one business unit and put them with project managers and estimators from another business unit just to make sure there really was a cross contamination or cross pollination of opinions. So that while it was done intentionally so different perspectives came to the table it also fostered corporate logs about what was going on in the business world, whats going on in your market. So from that standpoint well at least from my perspective it has performed, the outcome has been higher what was even intended.

Has there been any fostering of study action teams into lean principles, the lean implementation process or the philosophy itself?

Yes, our first set of study action teams the book was The Toyota Way. So the one that we have done the most we’ve probably reproduced study action teams across multiple regions by video conference and within different business units within the same region probably The Toyota Way has been 6 separate study action teams of 6-8 people. Since then we have also done safety and now we are doing IFOA and BIM as well. So its been a, its definitely helped getting people up to speed with the tools, the vocabulary, the history and the shared business perspectives of what each individuals concerns were about how lean would affect them, maybe what were some of their fears or barriers to embracing and moving forward but it raised the confidence and awareness within the company that this is out there and this is a transformation that we seek.
Alright. Have you found that this way of advising what you intend to do is a good way of introducing the process of implementation? Has this approach been different to when other management strategies have been implemented?

Well I think the lean culture and the people we have meet like the [LCI – co-founder] and some of the people we have meet through Sutter they have given us different tools, different ideas but we, we’ve always had a value in continuous learning, we’ve always had a value in surrounding ourselves with people who want to take pride in the job they do but always know they can do better. So from that standpoint all I can say is with lean came a different set of tools, it was all, it just doesn’t seem in the lean spirit I don’t think anything we’ve done is ill convinced its just you’re always looking for a better way. So the tools we’ve been introduced to through the people we’ve meet at LCI and elsewhere while new they had the same intentions and the same intent was to bring a higher level of efficiency and that long range value to the company. And to that extent different but some, its just different, I hate to put a value on them as better or worse but its all within the same spirit. Well what we don’t want to do, because we’ve done this before, is like people start getting cynical and the non-believers will just sit back and say ‘well this is just another flavour of the month’, you know ‘last month you were using this buzz word and now you’re using this buzz word and there’s no real change’ – if anything with what we’ve been sensitive to is not having that fad feeling. So it’s a commitment that we are making and the use of study action team because its once a week for 8-10 weeks the benefit there as one tool I think is simply you’re not – its not about telling someone heres the buzz word of the day, you’re teaching them a little about history, your showing them performance updates of a company that’s really real and you’re giving them updates and case studies and I think it’s a more slow and deliberate approach. That we have, no overnight success, there is no overnight ‘thou shall do this, this way’ its simply opening peoples eyes to certain tools and skill sets and concepts and saying turn it on, flip that switch in your head we haven’t rolled out any memo that you’re going to be using last planner on every job or that you’re basically going to use any of the tools. We haven’t forced them on anybody what we are doing is we’re trying to top down from the company and say ‘this is important, there are certain jobs where's is been mandated by the client and everybody gets and that’s why you are doing it’, but then we are letting is disseminate. And we’re hoping and we correct if not but we watching it as we expand the amount of people in our company exposed to it then I think we are going to continue to set the next set of milestone goals without again making it seem like it’s a fad or a rushed judgement. And as long as everybody understands that we are going to continue to measure ourselves and see if we are improving and see if we are advancing the culture and taking those steps. Its not a rush to anything.

It seems that a more staged approach to the implementation of lean tools, principles etc is being undertaken by the company, testing to see what is working and not working.
I wouldn’t want to describe our process as testing as that assumes when something is not working then one would assume you would be abandoning ship. Because there is a cultural belief that we have always been lean, we have always had a value stream which has suggested we need to get better to succeed as a company and to satisfy our clients. This isn’t an experiment, it is at least at some point a human nature reality that we know its not an overnight hand people a book and say well now you’re lean. So I don’t know how to describe it other than to say I have no, well as the regional manager here, nobody on our jobs is going to get a ‘thou shall not’ your not going to be forced into anything but what we are going to do as we evaluate peoples performance because like any other company we have goal setting and we have performance matrix that everybody has to live up too and everybody gets measured against. People’s value stream and people’s goals will be in some manner tied to their ability to demonstrate continuous improvement and in doing so show efficiency in the lean tools we provide them, therefore one way or another people who want to continue to be with [org B] and wanting to exceed with [org B] are going to be able to demonstrate that their personal goals are aligned with our corporate goals and that’s no different to how its ever been. But now the lean is working into that process.

How would you then describe the process of implementation within the company? For example, has the decision to go lean been influenced by an individual or has the decision been influenced by existing contractual relations or has the decision been to implement been a strategic decision by the company?

It would be easy to characterise people like [interviewee 2] and [interviewee 3] and [interviewee 4] as our champions and they’ve earned that kind of respect but it wasn’t our intent. We have other strategies in our business plan where we say you are the champion and its tied to a very specific goal now do. I have specifically not wanted to place that burden on somebody’s’ head when they are out there trying to enforce lean or sell lean. You know, lean is truly aligned with our culture, therefore its going to be natural, as we make the tools assessable and we make and reinforce the training to support the use of those tools it will become so fully integrated and intertwined into our daily performance that you don’t need a champion. This isn’t about taking the bull by the horns and making it work – we are already a lean organisation what we need to do is continue to provide regular access, support and training for people to fully embrace and understand, how to use the tools that are out there. So no I don’t think we really have a champion but [interviewees 2, 3 and 4] are absolutely believers and first adopters within our organisation as far as many of the tools because of their presence at [org A].

Ok very interesting. How you found then that the contractual relationship with [org A – the client] and its affiliates has also assisted in adopting lean principles and tools?
Its given us a platform to regularly practice many of the tools in a project setting, well at least in a pre-construction setting – that’s the benefit. We may not have gotten to the point where we recognise how much benefit we as an organisation stood to gain by adopting that framework – so there’s the magic. I mean I think the magic is that it opened our eyes to a world which was already out there but made it more real in the context of our business plan because its such an important client. So for that we can be eternally grateful but we where already culturally of that mindset but were just lacking the framework.

That was the final question I had and you’ve given me some interesting information and thoughts on lean construction and this ideal of cultural maturity which I am investigating. I now wanted to give you an opportunity to revisit and/or express any additional comments you may have regarding lean construction, the implementation process and the ideal of cultural maturity.

I think one of the things that when [interviewee 7] was speaking that sparked in my mind was that when we are dealing with the outside world I don’t necessarily actually I guess I do agree with his assessment of when you look at the Toyota Way examples they were a company with many different units and many different skill sets. So I still see that as analogist to our building environment where you are dealing with different skill sets but they are actually working for different employers – I think we continue because our culture was already that of a collaborative learning environment. I think we sometimes forget how difficult this concept is to many of our peers within the industry when we walk into an environment where we are supposed to work with them and we just expect the light bulb is going to go off for them the way it did for us because they don’t have that culture and I think we forget what a big deal that is. There are going to be a lot of people that hear about lean and see clients that value lean and they are going to want to just say ‘well I’m going to do that’ and that’s, well you don’t do that – you either are or you aren’t and yes you can practice and reinforce and there’s many things you can do to try and head down that path but you can’t do lean. You can’t just decide well I’m going to do lean. So there are a lot of our partners, there are a lot of our sub contractors that we’ve worked with for 20 years in one level of collaborative environment or another, however what has become apparent to us as we try and bring them into projects such as CMPC for some people is just doesn’t fit. They can’t turn the switch on and its not there for them and therefore they are not going to get it, its just not part of their culture, its not part cultural environment and therefore it’s a world which is not going to be available to them.

Do you find that to be a challenge?
I do, I do because once you get so far down the road that your eyes are opened and embracing and appreciating the opportunities that are available with the right mind set, its almost, well from an engineers perspective its hard to turn off the fact that you just look at them and see waste. You look at them and see inefficiency, you look at them and see a lost opportunity and you just can’t bring yourself to enter, to allow that to enter into your team. If the right partner is out there you got to pick the right partner that’s going to add to that positive environment, that positive experience, knowing that focus is going to be there – it doesn’t matter how good of a relationship you have personally and how many successful projects you have completed – once you see in that group that its not there, that the spirit and willingness and the understanding isn’t there, you just see waste. So from an engineers perspective is hard to see waste and say well that’s a good idea and let that into my team. And I’m sure we are going to continue to bump into obstacles, there hasn’t been a lot of resistance because again I really believe people understand when they come to work with [org B] that we are always at that engineering mindset of finding a better way to do more with less, efficiency of effort – so I think we have it easy by all accounts of what other companies go through without that cultural alignment and 43 year old, actually at this point 48 years, 47 years of history.
Interview Analysis

Each interview will be analysis separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organisational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analysed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes will be boldly green highlighted with underlined.

Where features of diffusion groupings are not present a description of ‘not discussed’ be placed.

A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue.

The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 5 Results: Descriptive and Cross Case Analysis.
Interviewee 1: Senior Executive 1

<table>
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<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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| Overview | When describing the implementation process and the decision forming the lean strategic direction the interviewee highlighted a number of contributing factors. The nature of the contributing factors was both internal and external influenced and included:  
- The organisation’s external contractual relations with organisation A (as a trade partner); and  
- The recent death of the owner and CEO of the organisation.  

According to the interviewee the organisation in a good position to implement lean as the organisation apart of its external trade partner contractual agreement is forced to implement lean.  

The interviewee noted that this approach and need for the organisation to implement lean as part of contractual obligations puts the organisation in a unique position to learn about the lean process and principles by viewing how the process has been undertaken through an external party.  

The impact of the death of the founder, owner and CEO will be discussed in relation to the formal social system, more specifically management directions.                                                                                                                                                                                                                                                                                                                                                       | “The company outside of lean right now, the company had changed dramatically in the last 4 or 5 years largely because [the founder, owner and CEO] passed away and”                                                                                                                                                                                                                                                                                                                                 | The interviewee highlighted an understanding and awareness of the nature of lean and their own understanding of its application within the organisational environment.                                                                                                                                                                                                 |

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<tr>
<th>Organisation &amp; Management Environment</th>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tr>
<td>Formal Social System</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks.</td>
<td>“The company outside of lean right now, the company had changed dramatically in the last 4 or 5 years largely because [the founder, owner and CEO] passed away and”</td>
<td>The interviewee was very open about the nature of the organisational environment the structure has created for the organisation. The</td>
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In particular the interviewee was asked to describe the nature of the formal social system, as well as the success and failings of the relationships and networks. When answering the question the interviewee spoke about how the formal social structure of the organisation reflects the presence of both innovation-decision interpretations, presenting the structured and patterned arrangements of the system units. Questions directed to the interviewee revealed that the formal social structure of the organisation has undergone significant change over the last five years after the death of the company owner and CEO. This change has seen the organisational environment change from a traditional design and build organisation to an organisation underpinned by collaborative work practices. Still present within the organisation is general governance and support by a CEO and board with changes to the organisation to be in the form of organisational specific work committees with the latter having emerged.

The interviewee discussed in depth the presence of change within the formal social structure of the organisation in line with the changes that have occurred within the organisation, including:

- Managerial directions; and
- Education.

when he passed away instead of, well we had a board of directors when he was alive and we had upper management of course but it was always [the founder, owner and CEO] making most of the critical decisions. When he passed away that went to a board which is much more active now that looks at business a little bit different, the culture is still largely intact but the approach is certainly different I certainly support the direction we have gone because it focuses on facts that are very important to me and my role in operations”. – management directions

“...we have a professional development committee that has created with out side help and that’s part of our reality in knowing when to ask for help, getting outside people that specialise in setting up curriculum and leading classes to help teach us how to write curriculum for a class and how to set that curriculum up in a way so then you’re not relying on the speciality talents of one person but any person with a certain skills set can take this manual and know what they training, what they are teaching to a class. We now have a very formal process with something like 46 classes and every position in the company along the orb chart is now matched for what skills it requires and how you build on those skills to move them along and these courses are set up really like a university environment to move those people along. So more than ever we have the same outcome or the same goal for what our people would be doing and given along the way, we just have a much better vehicle for consistently delivering and measuring how its working”. – management directions and education

interviewee did highlight that the organisation experience high levels of creativity and interaction across working groups. This has occurred through the direct changes in directional management and a focal shift towards education.

Informal Social Structure

The interviewee was also asked to describe the informal social system of the organisation. Again questions were directed towards communicative relationships and networks that form as a result of lean implementation. The interviewee was asked to describe the nature and context of the relationships and networks.
When describing communicative networks and relationships within the organisational environment the interviewee highlighted that these have been influenced by the contractual partnership with organisation A. The interviewee in particular highlight how through the organisations relationship with organisation A there has been a trend to utilise contractual relations as a form to manage the interaction and exposure of individuals to the lean innovation. These contractual relations have been experienced from both an external and internal viewpoint.

The nature of such relationships was described in a homophily context. The nature suggests contractual based communicative networks and relationships are between like-minded people. This was highlighted by eternal contractual relations within the organisational environment to be guided by the client and the alignment of the organisational environment to client satisfaction. This has ultimately emerged within the organisation in conjunction with the organisations trade partner contractual agreement with organisation A and its move towards the acceptance and implementation of the lean innovation.

The interviewee noted that the movement towards the lean innovation is guided and governed by the organisation’s commitment to client satisfaction in the delivery of construction projects.

**Homophily** relations was similarly identified and discussed by CI1, CI2 and CI3.

manner, we’ve got a very good one now but it’s the expectation by all parties is different, so I like the direction the culture is going I think there is a lot of value in the whole ineptness of having so much energy expended to design and develop the project before any work is done. But the real trick is going to be how many times and with regular private developers your going to have that ability – I may be wrong and hopefully I am wrong, I think its going to be hard to replicate this very often because it is a real commitment to an owner or by an owner and it’s a real financial investment by that owner way upfront and most owners especially on the private side but increasingly on the public side just don’t have that luxury of capital ahead of building construction.
The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the informal social system in relation to the presence of lean within the organisational and project environments.

In their discussion of the informal social system, the interviewee also described the presence of heterophilic networks and relationships within the organisational environment.

For the interviewee the presence of heterophilic communicative networks to culturally enhance relations between non-like minded individuals and teams.

**Heterophily** communicative networks was also identified and discussed by SE2, C1, C2 and C3.

That's very much a cultural positive but then again Pankow has had a lot of that, its just that this is just a much bigger slice of it. I am very surprised because we haven’t had success a lot of the time with non-design/build contractors on design/build projects getting them to participate in any other way except you know a command and control response perspective. We the general contractor say it and they do it. But the very same sub, the very same guy is now at cathedral hill and offering all kinds of opinion because its being asked and its valuable opinion, its valuable information that he is giving and that’s been the biggest surprise the cultural change from subservience – well that’s the wrong word, but my experiences has been most subs look to the general contractor to provide the leadership and the direction. That still occurs at cathedral hill but there’s much more discussion by a greater number of participants then is typical and that very much is a positive.

When describing communicative networks and relationships within the organisational environment the interviewee highlighted that these have been influenced by the contractual partnership with organisation A. The interviewee in particular highlight how through the organisations relationship with organisation A there has been a trend to utilise contractual relations as a form to manage the interaction and exposure of individuals to the lean innovation. These contractual relations have been experienced from both an external and internal viewpoint.

The nature of such relationships was described in a heterophilic context. The nature suggests contractual based communicative networks and

“With [organisation A] we have had a good working relationship over the years, again, well PSL was the one that brought the [organisation] to[organisation A] by doing some of the smaller jobs for them in existing hospitals. Their work occurs much quicker, on a smaller scale, its easier to budget with existing budgets that they have in house, so it occurs much quicker – we’ve had, we’ve probably have had a 15 year relationship with Sutter that I think has always been very positive, I think that positive relationship is one of the reasons we’ve been involved in two teams there”.
relationships are between like-minded people. This was highlighted by eternal contractual relations within the organisational environment to be guided by the client and the alignment of the organisational environment to client satisfaction. This has ultimately emerged within the organisation in conjunction with the organisations trade partner contractual agreement with organisation A and its move towards the acceptance and implementation of the lean innovation.

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The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the informal social system in relation to the presence of lean within the organisational and project environments.

When answering the question the interviewee highlighted how the informal social system of the organisation and on-site project teams are governed by **hetrophic communicative networks** throughout the lifecycle of the project and within the organisational environment. The nature of such **hetrophic relations** were described as **study action teams** within the business and organisational environment as all the requirement when we sit down for an SAT is this isn’t a pass or no pass participation folks but you are expected to participate. In fact I’ve got a list here, my job as a facilitator is for you guys on the quite side I’m going to remind you we want your contribution – you guys that talk a lot which I tend to do a lot, I’m going to shut you up a little bit. And what happens you complete the SAT there’s been a great exchange of ideas, that continues after the session is over and the folks, they are people that are one or two years out of school now you’ve also given them an expectation – if there are some action items that come out of it which they do and there has been quite a few on the safety book, what are you going to do about it management? Are you going to track down some of these ideas we discussed? And one of my jobs, well goals is for this year is to come up with a better way to give them the follow through and follow up with these
parties are formally committing to the advocating of heterophilic communicative networks as part of the organisational and project environments.

The nature and context of the discussion highlighted the presence of deeper strengthening, bonding and integration of individuals and teams, particularly through:

- The introduction of educational specific study action team agendas and expectations;
- Encouraging of contribution and collaboration on an informal level;
- Encourages underlying integration through the cultural environment and social norm behaviours;
- Assists in developing a thought process.

The introduction of educational specific study action team agendas and expectations;

Encouraging of contribution and collaboration on an informal level;

Encourages underlying integration through the cultural environment and social norm behaviours;

Assists in developing a thought process.

Social Norms

The interviewee was also asked to describe the social environment of the organisation with reference to ‘changes’ that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of integration and stability of all organisational levels. In particular the interviewee highlighted the nature of stability and integration within the organisation and the offering through the development of better programmes and knowledge transferability within the organisation.

The interviewee discussed and viewed stability as a management mechanism used as a means to want to keep growing and keep learning so as a result of those two things we have what we call a PDC (Professional Development Committee) of which I am a member we’re trying to improve the old way we would do things is have big group meetings, big company meetings that were very important they would certainly build up a lot of relationships and a lot of stories were told and in a lot of ways, there was a lot of means and method in how we do business kinds of knowledge transferred but it was not formalised. We are doing, we are pretty early in the process but we have created courses now, we’ve created 22 this year, there is about another 120 on our list to do and including several that are lean orientated of courses to make it simpler to transfer that knowledge. And it was a knowledge transfer that was exactly the reason why we use the study action team concept for that safety book I mentioned because that is a great way of communicating, of well providing information by a comparison and contrast perspective – we did that with the Toyota Way”.

running ideas. So it is stimulated quite a bit of discussion that just keeps going. And I think if there was ever, [the organisation] has never been too with the exception of [founder, owner & CEO] being [founder, owner & CEO] I don’t think people have ever been too overwhelmed by job descriptions to not voice their opinions when they wanted to or its just never been a rigged culture that way but we are much looser now just because, if nothing else using the SAT – I think they are just a great, easy, easy way to free some of that thought up and communication up.
ensure the culture and education to remain relatively constant. According to the interviewee, stability and integration is important as there are individuals within the organisation who are members of different tertiary working groups and further to this stability of developing better programmes and knowledge transferability within the organisation.

When discussing organisational social norms the interviewee described how the cultural environment of the existing organisation has assisted in the lean journey for the organisation. The interviewee in particular highlighted how the organisational culture is underpinned by a design/build philosophy that encourages open collaboration and communication between project parties.

For the interviewee the existing design/build cultural environment has assisted in enabling the use of exiting communicative networks as a means to implement and discuss lean. The nature of the collaborative environment has also enabled the organisation to develop ‘buzz’ as well as a want and desire to implement lean through the cultural environment.

“So our culture has been very strongly influenced by a design/build philosophy even a non-design/build projects and that philosophy well a big component of that has always been collaboration and we always have been a design/build project orientated or as we do them we are always contractor let because we are a contractor and so you know there is lots of collaboration and there is lots of mutual respect between the team members and lots of expectation based on what their responsible to deliver that’s exactly what’s happening at cathedral hill but cathedral hill is probably on steroids compared to where we’ve been you know on our design/build history”.

“To a degree some of our upper managers right now there is a real excitement about it, about lean techniques and the knowledge of what those techniques are, what the philosophy that holds the techniques together and its not understood to the degree that it needs to be by upper management, I think a lot of the pushing for our lean growth right now is middle management and job site driven and I don’t know if that’s a problem but sometimes our highest company leaders don’t have the clearest vision of what we are talking about yet. So they are being educated just like everyone else – so that’s the negative its too easy well in my view as a middle manager its too easy for upper management sometime to get very excited about an article they read and the lights go on and everything but you they don’t pay the power bill or something”.

Opinion The interviewee was asked a number of questions “What we’re learning here [in this office], right here is a
Leaders & Change Agents

concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the organisational environment advocates that everyone in the organisation is lean leaders (or opinion leaders). The discussion of opinion leaders within the organisation was done in context to organisational social norms.

According to the interviewee the organisational structure management approach utilised within this organisation has created a unique working environment with specific social norms centred on four primary behaviours. Two behaviours in particular link themselves to the presence of lean opinion leaders and leadership ideals within the organisation, those of advocacy and integration.

The social norms present in the organisation centre on the belief and attitude that to learn is to communicate with knowledgeable individuals and be exposed to working examples of lean implementation. For the organisation according to the interviewee this is achieved through the contractual relationship with organisation A.

Of particular importance to the interviewee when discussing organisational specific opinion leaders was their ability to:

- Encourage individuals to take control of their learning and knowledge; and
- Encourage and advocate individual desires about the need to learn and sharing knowledge.
The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However, the nature of the organisational environment advocates that everyone in the organisation is lean leaders (or opinion leaders). The discussion of opinion leaders within the organisation was done in context to organisational social norms.

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The social norms present in the organisation centre on the belief and attitude that to learn is to communicate with knowledgeable individuals and be exposed to working examples of lean implementation (or the innovation). For the organisation according to the interviewee, this is achieved through the contractual relationship with organisation A.

This favourable belief and attitude about lean is evident in the interviewee’s statement about individual leadership.

one of the big improvements is, especially with the two groups here and to a lesser extent the group in San Francisco is they have been the ones who have taken the lead in the evaluation of our existing work processes to get to the current state – because they understand the basic concept of what you are trying to do better and the argument has already been won in that it makes sense to review what you are doing, to see what you can improve in the future and it's largely been this group that has taken that lead.
The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the organisational environment advocates that everyone in the organisation as change agents.

According to the interviewee the organisation has always identified themselves as industry specific (external to the organisational environment) change agents. The interviewee discussed how the founder and owner of the organisation advocated an innovative environment that assisted in enhancing the construction industry. This is present in the organisation always being innovative and open to sharing and collaborating when new patents were introduced for construction processes and structures.

C12 similarly identified and discussed the organisation as an external change agent.

Historically we have but that’s been more along the lines of we’ve had several that knew structural framing systems, you know [the company] has held a lot of patents in either a framing construct concept for structure or a means or method on how to do a framing structure and we’ve usually had champions supporting those because they involved getting building code approvals and those types of things. – SE1 – the organisation in the past has been an agent in other facets.

Cultural aspects present are the attitude and belief that the project affiliate is a world leader in the lean form of project delivery.

“The group that is involved in cathedral hill especially the MOB, where we’re the general contractor cause there is now currently three different parts of cathedral hill that we’re involved in, the MOB being the one, that got the most, the one project of the three – that we’ve got the most general contractor control one that group of folks that you will be talking to later this morning have certainly spear headed exposing the company to CBA techniques, to A3 techniques which different folks have picked on or have picked that up to different rates”.

“For lean right now its new enough to the company that, that a leader has not emerged, I think we are right on the cusp of that and we’ve had some, we’ve probably had a
individuals are used as they have the most direct contact and interaction with lean implementation through the contractual relationship with organisation A.

A committee of change makers emerge already and those will be the folks that you talk too the rest of the day. [Three of them in particular] as they’ve been working on, they are really doing the heavy lifting on using the concepts that Sutter is requiring, the lean concepts, the contractual concepts and adjusting those to be more in alignment with how [the organisation] typically does our work. So slowly but surely that committee is leading the change but there has not been a champion emerge from that yet”.

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<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has lead to their current senior management role within the organisation. The interviewee described their current role as an operations manager. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework. The exposure of the interviewee to lean is considered low-moderate. This occurs as the interviewee has exposure to lean within their daily role however there is no direct correlation between the exposure to lean and the contractual relationship with organisation A.</td>
<td>Exposure largely through the contractual relationship with [project 1] of [Organisation A] over the last four years Not officially assigned to [the project] like some of the others [interviewees]…. I’ve been in kind of a nice position of being able to see what they are doing at some distance and reflect upon what that means to [the organisation] incorporating some of these techniques into our culture and the way that we do business.</td>
<td>Not Applicable</td>
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<td>Persuasion</td>
<td>The interviewee was asked to describe the lean implementation process for the organisation. For this organisation lean implementation is relatively new with the process going no longer than 9 months. The organisation according to the interviewee is currently in the early stages of forming a strategic direction, trailing lean tools.</td>
<td>We are starting to see value from some of these techniques and what is the least obtrusive way to incorporate those into our culture, because when you change a culture even just a little bit there is a big bang and I’m trying to look at ways to minimise that or make it ducktail a little bit easier than just jumping in with both feet. We have the luxury of time right now with the</td>
<td>Although the interviewee described favourably the use of study action teams, they also felt some frustration towards the persuasive process and techniques.</td>
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and forming persuasive techniques/approaches to inform and make the organisation aware of lean.

As a clear strategic direction for the organisation is still in development the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation. The first of these techniques is study team agendas through education programmes and training initiatives.

The interviewee discussed the presence of study action teams as part of a wider education programmes and training initiatives framework. The nature of study action teams and education according to the interviewee assists in not only informing the workforce of decisions but also to educate and discuss lean both formally and informally.

Study action teams for the organisation advocate hetrophilic style communications and advocates non-judgemental knowledge development.

down market and being able to participate in the laboratory that is [organisation A].

To me that is one recurring theme of lean is its very common-sensical most of these techniques are not difficult to understand, yes there’s a little nuance to what you are doing – it’s a little bit and if you don’t understand that little bit of change then you miss the whole point – i.e. your really doing it the way its always been done or you’ve done it.

Decision/ Implementation

The interviewee during the interview was also asked to describe the process behind the decision and implementation of lean within the organisation.

The interviewee identified and described the current implementation approach the organisation is undertaking. The nature of the implementation currently is on tool selection and implementing specific tools for specific targets. For the interviewee this approach is quite slow but allows individuals and teams to adapt more rationally towards lean within the organisational environment.

“We’ve implemented some things and we are still looking at some things and other things and how they would work – I would say we’re furthest down the road right now in the last year, year and a half we’ve looked at the majority of both our administrative processing capabilities and in a couple of cases job site work processes for you know, we do a lot of structural concrete work so some of those work activities from benefit of using lean observation techniques, work flow structuring, flow charting and those activities and those types of things. It’s gone a long ways administratively because we are forced now because of a technology that we’ve used for accounting software not being supported much longer, that we have to make a change – so those reviews of our processes have helped us decide which
The approach also allows for a gradual development of lean knowledge and awareness and a cultural acceptance of lean implementation. A new vendor to go with and has given us a better understanding of how we do our work day in and day out in a number of areas that the programme writing for the new technology that we will be using in about a year is probably going to be a much better fit then it would have otherwise been looking at work flows, work processes we’ve done a lot of work on”.

“I think, you know actually, why I criticised our upper managers for not being as educated in some of the philosophy and some of the concepts of lean as the three people you’re going to talk to later in the day that’s actually kind of a good thing because they are certainly interested in the concept because as owner is driving this right, somebody who is paying us to work for them and that’s why we are in existence so if, I think, I think that as things on [organisation A] changes made following some lean philosophies succeed then upper management is going to accept changes. We are going to drag them into it but its going to be lead by people in the middle ranks up which I don’t have a problem with and I think once we have some successes that there won’t be resistance other than a positive resistance in trying to figure out how to do it better. So you know, again we’re in a good position because we are going to by contract were forced to do some of this – what a great thing”.

“We’re starting with implementation, it’s the philosophy as we have these minor victories along the way, and they start an aggregate quite a bit. So I think that’s how we are going to get there”.

**Confirmation**

As part of the interview process interviewees were asked to identify and discuss confirmation or ‘success’ stories associated with lean implementation within the organisational environment.

The interviewee highlighted the confirmation of lean through tool selection and personal cultural You know there’s the IPD concept what can we do contractually that maybe makes everybody sharpen their pencils because there is less risk to them that we assume some of that risk and as a team we are just more competitive going into a project – we are looking at ways to do that. Cause some of these tools certainly seem if they’re implemented correctly would lead you that direction but it’s a matter of how do you handle the

Interviewee although seeing some improvement still highlighted a number of challenges facing acceptance of lean within the organisation. Particularly the interviewee noted how contracts bind the implementation and approaches towards lean.
adjustment. The interviewee’s interpretation is underpinned by their own personal culture and a desire to become more aware of describing their interpretation the interviewee highlighted contractual obligations and being bounded by uncertainty of traditional contracting.

The interviewee’s reflection on tool selection within the organisation is derived from their own role/position and understanding of the process. As the interviewee highlighted the organisation is still in its early phases of the journey and there has not been many ‘victories’ of lean yet.

business relationship when the owner is not taking a large chunk of the risk right now. Two years from now they could decide that they don’t want to build it and we’ve all been paid and been able to go through this glorious education and yet there is still no project.

“So I mean its just, its very minor things I think are going to adjust very quickly but it’s a recurring theme that, well to me anyway, that the changes with lean that we will run into are going to be very modest tweaks on how we do it but they’re critical tweaks and if you don’t quite get them then you’re going to waste a lot of time and that’s what I’m trying to decipher in a number of areas”.

“…we’re pretty new as a company on our journey with lean. So we are not there yet but I guess that’s kind of the philosophy of lean is that your never there yet, you know, you’re always growing, you’re always improving, you’re always looking to anyway and there is no ends to the means. It’s kind of like life, well there is an ultimate end to life”.

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<td>Verbal Communication</td>
<td>When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified communication to be guided by engaging the workforce through integrated learning. In the description and discussion of communicative tools the engaging of the workforce through integrated learning was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and</td>
<td>“...we’ve got the most general contractor control one that group of folks that you will be talking to later this morning have certainly spear headed exposing the company to CBA techniques, to A3 techniques which different folks have picked on or have picked that up to different rates”.</td>
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heterophilic communication within and across the organisational and project environments.

The presence of such informal **communicative tools and methods** also enables the transferring of central ‘shift specific’ knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: **Visual Communication**

When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of **verbal communicative tools and methods**. The interviewee identified communication to be guided by engaging the workforce through **integrated learning**.

In the description and discussion of **communicative tools** the engaging of the workforce through **integrated learning** was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophlic and heterophilic communication within and across the organisational and project environments.

The presence of such informal **communicative tools and methods** also enables the transferring of central ‘shift specific’ knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: **Visual Communication**

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| Written Communication | Not Discussed | Not Discussed | Not Applicable |
## Challenges

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<td>Direct versus Indirect</td>
<td>During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.</td>
<td>“The groups in southern California the LCI [lean institute] is much newer and just getting off the ground – they haven’t had a job and they haven’t had an owner that supports this education that we are getting up here – so we are, we’re quite a bit ahead of where our other groups are at but its all three of our offices in northern California, even the two offices that don’t have the most direct involvement with [organisation A]”.</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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<td>The interviewee discussed and highlighted an opinion linked directly to location specific implementation which can lead to inner change and conflict. According to the interviewee location specific implementation is cause for concern as some individuals can perceive implementation as favouritism amongst a select or small group of individuals or implementation specific close to a project.</td>
<td>“I have no preference I mean there is some frustration right now up here (the office) because we are seeing lots of benefit and people being the way people are temperamentally you want that immediate change, but our other two regions are not nearly as far along so have of that change would be alien because they would not have had the time to assemble the framework in their own minds to see how this is going to fit and so we would just be pushing something on them and you know we are in a luxurious position being paid to participate in the laboratory that is [organisation A – project]”.</td>
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<td>This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for individual resistance of the lean innovation and indirect or second-order aspects for others. The type of impact was moderate to the organisational environments.</td>
<td>“Where I think the negative have been its very easy to put lean – I’ve been involved with the industry long enough to have seen two or three waves of buzz words come through, 15 years ago total quality management was a big thing and everybody in the company was talking about it our upper managers were very excited about it and nobody had a clue as to what it was”.</td>
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<td>The interviewee discussed and highlighted an opinion linked directly to nature of the industry to implement rapidly management philosophies that aren’t understood.</td>
<td>“We’ve had some dictation; we’ve had some miss communications with folks that thought we weren’t doing something lean enough. And there has been an upper manager within the company that directed a superintendent to start doing last planner and then went ‘see you’. And so there is all kinds of resistance to that,</td>
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<td>This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for individual resistance of the lean innovation and indirect or second-order aspects for others.</td>
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innovation and indirect or second-order aspects for others. The type of impact was moderate to the organisational environments.

During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.

The interviewee discussed and highlighted an opinion linked directly to communication between organisational groups due to working on lean and non-lean projects.

This perspective highlights both direct and indirect aspects. Direct aspects are present in the immediate for individual resistance of the lean innovation and indirect or second-order aspects for others. The type of impact was moderate to the organisational environments.

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“Well I think the relationships that we have with the team at cathedral hill I think are working very well. You know the only confusion is sometimes one organisation because the general contractor for the hospital is a joint venture so am I talking to a [organisation A senior manager] person or a [organisation B] person, do I need to talk to two people – you know sometimes that’s a little unclear and that’s probably more true for me because I’m not immediately involved every week, the other folks you talk to probably have a much clearer, you know understand the patterns that much better than I do”. 
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<td><strong>Organisation &amp; Management Environment</strong></td>
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<td>Formal Social System</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks. When answering the question the interviewee reflected on the design/build philosophy that governs project works. The interviewee highlighted how the formal social system of the organisation and on-site project teams are governed by <strong>heterophilic communicative networks</strong> as governed by design/build obligations. The nature of such heterophilic relations were described as <strong>enhancing relations</strong> within the business and organisational environment as all parties are formally committing to the advocating of <strong>heterophilic communicative networks</strong>. This is evident in the supporting of and enabling of lean implementation within the organisation and across project environments.</td>
<td>“I’ve noticed that, we are typically a design-build which brings in a lot of the architect for early discussion and a lot of team type discussion I’ve noticed that on the lean on those teams the communication has improved and the structure has improved that communication, the culture has improved that communication and the [the organisation] team members have gotten a lot better at sharing and getting closer even within our own group, that are project specific, because of that success”.</td>
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“I think, that because [the company] and the culture of from growing from within everybody knows each other from the time that they were in college on so there is a, there is a set communication thing that is very informal and we are small enough to make that work. But we are
relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks.

When answering the question the interviewee reflected on the working environment of the organisation. The interviewee highlighted how the formal social system of the organisation and on-site project teams are governed by homophilic communicative networks as governed by design/build obligations. The nature of such hetrophilic relations were described as enhancing relations within the business and organisational environment as all parties are formally committing to the advocating of homophilic communicative networks.

This is evident in the supporting of and enabling of lean implementation within the organisation and across project environments.

getting bigger but we are small enough to make that really work but from the outside because I’m not part of that chain and there are quite a few of us that aren’t part of that communication chain I think I can see that helping us and formalising the communication better and bringing us more into the [company] family then what we would have been under just you’ve got to be here long enough to be apart of that chain”.

Informal Social Structure

The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks.

When describing the informal social system and influences towards the informal social system the interviewee reflected on the contractual relationship between the organisation and organisation A. Particularly the trend to utilise contractual relations as a form to manage the interaction and exposure of individuals to the lean innovation. These contractual relations have
been experienced from both an external and internal viewpoint.

Although not contractual in its approach the interviewee discussed the wanting of individuals and groups within the organisation to embrace the lean innovation. The interviewee expanded on this by discussing the approach undertaken by the organisation’s management sees the establishment of improved communicational streams and access to the project site at organisation A. The interviewee also noted that approach is only in its developmental stages, however there level of exposure to the lean innovation has enabled them to begin to see and feel the movement towards change occurring within the organisation.

SE2 also discussed the presence of internal contractual relations within the organisation environment however this interviewee focus and explained the presence as more of a mission to eliminate waste which turned into something more meaningful and philosophical for the organisation and its employees.

The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the informal social system in relation to the presence of lean within the organisational and project environments.

When answering the question the interviewee highlighted how the informal social system of the organisation and on-site project teams are governed by **heterophilic communicative networks** throughout the lifecycle of the project and within the organisational environment. The

“So I think they are seeing that and they can see that they can make a difference, that I guess the shop floor we can make a change and that type of atmosphere and they can be more involved and its helping. In fact we’ve had some of our labourers and our union guys wanting to know if they can also do an SAT because they felt that they were missing out on knowledge and wanting to do it also – particularly asking ‘well why can’t I do it?’”. So we are starting to try and implement a little bit of that especially on the safety culture and getting them involved in that per their request because they had seen the changes it had been making”.

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nature of such **heterophilic relations** were described as **study action teams** within the business and organisational environment as all parties are formally committing to the advocating of heterophilic communicative networks as part of the organisational and project environments.

**SE1, SE2 & CI2** also identified and discussed **heterophilia Study Action Teams** as part of the informal social system of the organisation.

**Social Norms**

The interviewee was also asked to describe the social environment of the organisation with reference to 'changes' that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

The interviewee highlighted that within the organisational environment lean is viewed as a collaborative and relations based management philosophy. How the organisation approaches lean is through **advocacy** and embracing lean not only as an individual but also within the organisation and on projects. The interviewee in describing **advocacy** and lean highlighted that the existing cultural of the organisation has enabled **advocacy** and to become a greater part of the organisational environment.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of **advocacy** at all organisational levels.

**Advocacy** is representative of management, teams and the organisation becoming “…lean is a very relationship based process with collaboration and team work which is really bringing everybody together as advocates for the project and the client as a team. And so our culture marries in well with that but it kind of takes it a little step further in design-build in our company we concentrate on providing the best value for the owner and the only contract that we’ve been allowed to do that – which is where we provide, we take the risk for the owner in design-build.”
spokespersons of lean and the application of lean not only within the organisation but also the project and day-to-day life.

CI2 and CI3 also identified and described advocacy similarly.

The interviewee when discussing organisational social norms also identified education as a core norm within the organisational environment. For the interviewee education is central to the organisation in advocating heterophilic and homophilic communication and promoting an integrated collaborative environment.

The nature of the educational environment within the organisation according to the interviewee encourages reflective, integrated and team learning.

CI2 also identified and described advocacy similarly.

“With this group it’s a lot of individuals just wanting to get better and to learn, improve themselves and just a desire across the board. Very little people just fill out the hours in [the organisation]. Everybody is a company person and even if they are not growing statue wise they are growing as a person and what duties they can do and very much already we are a learning culture. I think this is helped and people are getting more and feel more involved as part of the team and they are seeing corporate decisions being based on what they are learning so it is helping I think the whole team building as a company and when you are team building as a company that’s a lot about finding your culture a little bit”.

“I’m not sure whether this is another true lean technique but the study action team concept we have used quite a bit for probably areas that might not have been intended to do we’ve started – we’ve had four or five groups up here now so probably forty-fifty people looking at the Toyota Way book, you know the basic starting book. But where we’ve really used it, probably having 70% per most of the salary folks have gone through its called the pathway to through zero injury culture – it’s a book based upon the construction industry institute surveys on how to get to a zero industry culture and been using the SAT as a format to compare and contrast what the book is saying compared to where we [the organisation] are at with our safety programme”.

“...the SATs, you know that we learn and we started doing the book clubs and study action teams at the
CPMC and it was successful enough that we finally tried it here and I was astonished at the success that it had here and the breadth that it took company wide. We are doing SATs company-wide now on safety, on all different types of lean things and different types of focuses on how we grow – we are doing mapping sessions on all of our different processes throughout the company that started with the CPMC”.

| Opinion Leaders & Change Agents | The interviewee was asked a series of questions concerning opinion leaders and change agents and their presence or role (if any) within the organisational environment. When describing opinion leaders and change agents the interviewee reflected and discussed that there is no specific opinion leaders or change agents within the organisation. | “We’ve had visits from a lot of people to go over there and walk the floor and to understand the visual workplace that we’ve created. We do report outs for the entire company and let them know what’s going on, we are actually right now the people that are actually at CPMC are being asked to develop additional SATs like choosing by advantages (CBAs), we have teams that have taken 3-4 day courses on that to learn how to do it, they are becoming teachers and we are going to do |
The interviewee was then asked if through the contractual partnership with organisation A whether opinion leaders or change agents are emerging. The interviewee did highlight how the contractual relationship with organisation A is used as a best case example of lean implementation. Such is the example is how organisation A openly allows access for employees of organisation B to experience a high intensive lean environment.

The nature of this contractual relationship between organisation A and organisation B according to the interviewee identifies organisation A as a secondary aide change agent for the informing of lean within the organisational environment.

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considered high. This occurs as the interviewee has exposure to lean within their daily role, involvement in the Lean Construction Institute and the contractual relationship with organisation A.

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| Decision/Implementation | The interviewee during the interview was also asked to describe the process behind the decision and implementation of lean within the organisation.

The interviewee identified and described the current implementation approach the organisation is undertaking, the approaches implementation approaches included:

- The nature of the implementation currently is on tool selection and implementing specific tools for specific targets;
- Driven by the successes of organisation A;
- Cultural; and
- Educational specific.

For the interviewee this approach is quite slow but allows individuals and teams to adapt more rationally towards lean within the organisational environment.

The approach also allows for a gradual development of lean knowledge and awareness and a cultural acceptance of lean implementation.

“We have moved on from those things that are successful. Where we tried to say especially in special projects, where we tried to say ‘you’re going to accept lean, you’re going to do mapping, you’re going to last planner, you’re going to do all this stuff and you’re going to start it’ and without really the slow training that it requires and adequate growth and the culture to accept that kind of thing, there is more resistance that way. And [the organisation] in general has not really said well you’re going to do it and people have gone in, we did that on a couple of jobs and started a job because it was a contractual requirement – so everybody understands it’s a contractual requirement we’ve been able to pick the right people to move into that environment and so, its been more of a get it specific into processes and get it specific into a few projects, show that it is successful there and then it will start going out and getting accepted”.

“…right now it’s probably filtered into and being driven by the success. Its kind of segment of the company from the top all the way down to some field engineers that are being successful because they are using it and other field engineers are seeing that and what these guys are doing and liking it so, and now they are wanting to get involved. So we’ve got a kind of a slice of the pie cut all the way from the project people to the top and it’s kind of growing outward”.

“…as a culture we are implementing slow and so once you accept that you know that they’re going to implement slow but they are going to implement fast

The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of the organisation.
once they decide it is successful they are going to do that very quickly then it’s ok. It doesn’t really bother you that bad”.

“…one of the lean attributes, well looking at it in a lean way, you know study slowly and try and see what’s going to work for you and then implement quickly – kind of fits the way we’ve been doing it. 5 years ago when I started to get involved it was mostly just me, then I would say 4 years ago our special projects which turns over projects and you’re going to talk to [interviewee 7] later today is in-charge of that group. We started implementing there because they were doing more [organisation A] work and because of the quick nature of the projects it seemed to be that we could get a feel for the flow of from pre-construction to construction and so on. Lean takes more time and more prep time then what special projects would allow so it kind of had a shaky start there is just wasn’t as successful as we hoped it to be. We also, [the organisation] also has a manufacturing company that manufactures pre-cast, it stays pre-cast, now they started doing a 5S type operation in their plant, they started doing that and it kind of evolved into, you know, more of mapping processes and using some of the lean tools I don’t necessarily want to say they were becoming lean but they were starting to implement some of the lean tools and they actually brought in some lean facilitators, I can’t think of the gentleman’s name right now, to help them. That was very successful and [the organisation] again at that point in time started implementing, became interested in the lean tools – the mapping processes, the elimination of waste and that kind of thing so at that point in time, we started doing, well it moved into our accounting, they started mapping our accounting processes – again low hanging fruit, a lot of waste and a lot of things within accounting the way that the process worked and works, again success with that within our corporate accounting which flowed down to our job site accounting and different processes. Over the next couple
of years and then when I think about it a year, a year and a half ago maybe two years ago because of that slow process and that development they started to get more traction for a cultural lean change. We had been incorporating the tools, at that point in time and really surprising to me we started doing some study action teams, some SATs on the lean way. We had brought in a lot of our field staff and inter-mixed it with office staff and started reading the book and talking about how we could implement that with [the organisation] and it really truly took off – you wouldn’t think a lot of salty old construction workers are going to like a book club cause that’s basically what it is, read a book and discuss it – but really a lot of people like the improvement portion of it, a lot of people liked the way it could help improve them, they could see it as a tool for growth and improvement, the elimination of waste and it really started getting traction I want to say about 1.5-2 years ago. The SATs have actually started moving into our safety department, we are taking safety books and bringing that learning environment into our safety environment and it’s just really starting to spread”.

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<td>Verbal</td>
<td>Communication</td>
<td>“…the SATs, you know that we learn and we started doing the book clubs and study action teams at the CPMC and it was successful enough that we finally tried it here and I was astonished at the success that it had here and the breadth that it took company wide. We are doing SATs company-wide now on safety, on all different types of lean things and different types of focuses on how we grow – we are doing mapping sessions on all of our different processes throughout the company that started with the CPMC”.”</td>
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the nature of the communicative tool is more informal and allows more open homophilic and heterophilic communication within and across the organisational and project environments.

The presence of such informal communicative tools and methods also enables the transferring of central ‘shift specific’ knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: **Verbal Communication**

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**Challenges**

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<td>Direct versus Indirect</td>
<td>During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation. The interviewee discussed and highlighted an opinion linked directly to economic growth and lean implementation which can affect organisational culture. According to the interviewee economic specific implementation is cause for concern as individuals can view lean implementation differently dependent on their cultural environment and understanding of lean. The cultural environment influences how individuals accept or reject the implementation of lean. This perspective highlights both direct and indirect aspects. <strong>Direct</strong> aspects are present in the</td>
<td>“…that’s why the slow growth in [the organisation] over the last five years some of the things that I tried to force very quickly found out that I couldn’t force them – but things once we had the project going and people could see the success and could understand how it’s going and started doing the SATs and understanding the culture its going rather quickly and it is”</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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“…quite frankly lean is a lot and a little difficult as a lot of the tools is, a lot of the tools don’t replace existing tools – it’s one more thing that they’ve got to do. So if the process is a more structured accept this and get rid of these two things then it’s probably better, in fact I used to have a division and my boss he was a divisional manager and they used to say ‘no new full form can be implemented unless it takes the place of two existing forms’. All the information that we need is already taken care of in all the of the forms we already use – so if you
organisational environment and the cultural environment of the individual. **Indirect** or second-order aspects are present in the operations or management areas of the organisation. The type of impact was **minimal** to the organisational environments.

During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.

The interviewee discussed and highlighted an opinion linked directly to information sharing and the management of information sharing. According to the interviewee information sharing becomes a problem as sometimes lean implementation can become quite intense through over communication.

This perspective highlights both direct and indirect aspects. **Direct** aspects are present in the communication of lean and how lean is approaches. **Indirect** or second-order aspects are present in the cultural environment, operations management and behaviours of individuals in accepting/rejecting lean. The type of impact was **minimal** to the organisational environments.

**Desirable versus Undesirable**

During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.

Communication was identified by the interviewee as an **undesirable** challenge and of **minimal** impact within the organisation. The interviewee want a new form, tell me what two forms is it going to replace – so that was the only way to implement a new form. And that kind of thing, lean doesn’t quite do that, lean doesn’t take the place of two existing forms it adds a additional paperwork to field staff in a lot of cases that aren’t willing to accept more paperwork”.

“…the information sharing across the whole thing is so broad and so sometimes over powering because one of the things I say is ‘the fantastic thing about these projects is the attention to detail, the communication that is allows, the openness it allows’. One of the worse things that it creates is all of the communication, all the attention to detail you know it’s a double edged sword – the best of it, is also very time consuming and sometimes frustrating because you churned so much sometimes you think let’s just move forward I’m tired of discussing, but that churn does create a more quality project, you get all of the things exposed very quickly – but gosh it’s a churns”.

“I sometimes get impatient and wish decisions could happen a little quicker because you know the answer and at there’s a point in time with 80% of information you know where the decision is going – let’s not talk about that other 20% that really is just rehashing and creating waste. And 99% of the time you are actually right, sometimes there is a 1% thing in there that you weren’t expecting that’s going to change that decision – so I can see the value of it but still it does get frustrating sometimes”.

Not Applicable
highlighted the presence of *undesirable* cultural attitudes concerning continual and constant discussions about elements of the project. The nature of communication can also affect the cultural environment as well and how individuals accept or reject the implementation of lean.

The interviewee’s own impatience highlights how varying degrees of knowledge concerning an organisation can impact the organisation’s innovation transformation.
When describing communicative networks and relationships within the organisational environment the interviewee highlighted and discussed tertiary working groups (or cluster groups). The nature of such relationships was described in a homophilic context.

According to the organisation utilises a fourth tier management group of project teams that undertake project specific works and phases of construction. Organisational cluster groups are underpinned by a collaborative environment and governed by two higher tiers of management. It was noted by interviewees that the presence of clusters groups within the organisation has been stable. Since the organisation has started to undergo the lean innovation process existing cluster groups have strengthened while also creating new cluster groups between each organisational location.

The interviewee noted that the success of homophily perspective cluster groupings as part of the informal social structure has worked as the company is relatively small and also because the employee is also the owner “so everybody has the same goals and the same investments”.

CI3 also discussed the presence of homophily cluster groups within the organisation, this
The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the informal social system in relation to the presence of lean within the organisational and project environments.

When answering the question the interviewee highlighted how the informal social system of the organisation and on-site project teams are governed by [heterophilic communicative networks](https://example.com) throughout the lifecycle of the project and within the organisational environment. The nature of such [heterophilic relations](https://example.com) were described as [study action teams](https://example.com) within the business and organisational environment as all parties are formally committing to the advocating of heterophilic communicative networks as part of the organisational and project environments.

SE1, SE2 & CI1 also identified and discussed [heterophily](https://example.com) study Action Teams as part of the informal social system of the organisation.

Social Norms The interviewee was also asked to describe the social environment of the organisational with reference to ‘changes’ that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

The interviewee highlighted that within the organisational environment lean is viewed as a

“...to be as forth coming as they are if they are sitting shoulder-to-shoulder with somebody at the table and they are equal partners. You know, they’ve got a stake in the game, they are going to be giving it their all and really collaborating with those other people and throwing ideas and trying to build on everybody’s ideas and not being

“...That’s one of our core values which is innovation. So yes and the strengths and to build on the innovation of our company but the engineering and construction community as a whole”.

“I’ve also done a zero injury culture book within our company which helped with relationships throughout the company because we brought in a bunch of different offices and a bunch of different people so you really get to know people and know their viewpoints and where they stand on things within those groups which is good and it actually brings you all kind of onto the same platform and understanding you know of that commitment and everybody really bought into the book and there was some good conversations that came out of it and realistic conversations of what’s possible and what’s not. So I think it definitely strengthens relationships within the company and I’m going to be helping facilitate the Toyota way here in about a week or so – starting off another group which will be good but I have not done any study action groups outside of our MOB team or our company”.
collaborative and relations based management philosophy. How the organisation approaches lean is through advocacy and embracing lean not only as an individual but also within the organisation and on projects. The interviewee in describing advocacy and lean highlighted that the existing cultural of the organisation has enabled advocacy and to become a greater part of the organisational environment.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of advocacy at all organisational levels.

Advocacy is representative of management, teams and the organisation becoming spokespersons of lean and the application of lean not only within the organisation but also the project and day-to-day life.

CI1 and CI3 also identified and described advocacy similarly.

The interviewee when discussing organisational social norms also identified education as a core norm within the organisational environment. For the interviewee education is central to the organisation in advocating hetrophilic and homophilic communication and promoting an integrated collaborative environment.

The nature of the educational environment within the organisation according to the interviewee encourages reflective, integrated and team learning.

CI1 also identified and described advocacy similarly.

afraid to throughout those ideas. Whereas the other way we used to do it you would get a lot of those ideas out and we would collaborate but I don’t think you would get as much out of it as we do now that everybody is an equal”.

“So the success of the company is the success of the people, is the success of who we have relationships with – so it’s really trying to promote it within the better of the company, the better of the people, the better of the relationships, to better the clients”.

well I see it as, its definitely not one person but I think it is more kind of the core, its not the core group but it’s the core team members. Its been the general contractor, the architect and the major MPCA subs who are there day-to-day and who are participating more in the study action groups and who are becoming more educated in lean and how it works. I see that. I mean we’ve seen interest from a lot of the other trade partners but a lot of times they don’t get involved in the study action groups as they should, some of them have but we’ve still got a long way to go to get them all up to speed.
When discussing organisational social norms the interviewee described how the cultural environment of the existing organisation has assisted in the lean journey for the organisation. The interviewee in particular highlighted how the organisational culture is underpinned by a design/build philosophy that encourages open collaboration and communication between project parties.

For the interviewee the existing design/build cultural environment has assisted in enabling the use of exiting communicative networks as a means to implement and discuss lean. The nature of the collaborative environment has also enabled the organisation to develop ‘buzz’ as well as a want and desire to implement lean through the cultural environment.

SE1 and SE2 also identified and described culture similarly.

“...[the company] has a long history of design-build and that’s our culture so we are very service orientated and we are always basically looking out for the best of the owner, looking out to provide the best value and trying to create a relationship with those clients so that we can work together as a team and move onto multiple projects together and this merges very well with lean”.

Opinion Leaders & Change Agents

The interviewee was asked a series of questions concerning opinion leaders and change agents and their presence or role (if any) within the organisational environment. When describing opinion leaders and change agents the interviewee reflected and discussed that within the organisation change agents are present and identifiable.

The interviewee identified themselves as an internal change agent for the organisation through their role working within organisation A.

According to the interviewee the organisation has always identified themselves accepting of change. The interviewee discussed how the organisational environment is guided by a want and desire to educate. The nature of education

“I have talked about it with other architects and they are definitely interested in and they would like to start study action groups with lean and some other topics with us so there is definitely a very, very quickly growing interest and a lot of people want to get involved from outside companies – so there is some potential for strengthening of relationships outside the company in that regard”.
within the organisational environment is directed towards the individual, teams and organisational groups.

The interviewee highlighted how with lean organisational management is approaching implementation in a way that is centred on education and knowledge development. Management is focused on the use of study action teams lead by internal change agents to assist in encouraging and enhancing the development of knowledge.

The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the organisational environment advocates that everyone in the organisation become a change agent of lean.

According to the interviewee the organisation has always identified themselves as industry specific (external to the organisational environment) change agents. The interviewee discussed how they are using their position within the industry to assist in enhancing the construction industry. This is present in the organisation always being innovative and open to sharing and collaborating with other organisation.

SE1 similarly identified and discussed the organisation as an external change agent.

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<td>Cultural aspects present are the attitude and belief that the project affiliate is a world leader in the lean form of project delivery.</td>
<td>“…we are also trying to look at Eden and other facilities and see how we can help them improve or we can improve from them so we have put different protocols in place to facilitate that the sharing of all of our A3s and the binders are placed in a central location and setting up lessons learned, meetings to sit down with those other groups and just talk out loud about what they are doing and what we are doing and it always comes into a 'ha, that’s a good idea' and trying to learn from that”</td>
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**Knowledge**

The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has led to their current middle management role within the organisation.

The interviewee described their current role as a senior-middle manager both within their organisation and organisation A (as per the contractual partnership and agreement). The interviewee is also involved in the Lean Construction Institute. The role description indicates that the interviewee is categorised as a champion and innovator for the purpose of the research and as set out in the theoretical framework.

The exposure of the interviewee to lean is considered moderate. This occurs as the interviewee has exposure to lean within their daily role, involvement in as an internal change agent (education facilitator) and the contractual relationship with organisation A.

"First exposure to lean through [Organisation A] project site, exposed over the 18 months".

"I manage the client relations and subcontractor contracts and basically the organisation and oversight of the construction team".

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**Decision/Implementation**

The interviewee during the interview was also asked to describe the process behind the decision and implementation of lean within the organisation.

The interviewee identified and described the current implementation approach the organisation is undertaking, the approaches implementation approaches included:

- Reflection on past change management approaches;
- Cultural;
- Research; and
- Cultural;

"…its quickly from the top down changing our company and culture and we’ve worked gosh 47 years or so on design-build trying to get design-build accepted in the cultures and in the workplace and the community and its funny because there is some developers that come to us that are finally after 20 years or so of accepting design-build and you know they say we’ve come all this way and now we finally accept design-build and we’ve come and trusted you enough to do design-build and now you want to go through something else – so well its better”.

"Yeah we did back in 2003-2004 we went through a big phase of TQM (Total Quality Management) and we were..."
Middle management focus with filtering through the organisation. For the interviewee this approach is quite slow but allows individuals and teams to adapt more rationally towards lean within the organisational environment.

The approach also allows for a gradual development of lean knowledge and awareness and a cultural acceptance of lean implementation.

For the interviewee this approach is quite slow but allows individuals and teams to adapt more rationally towards lean within the organisational environment.

The approach also allows for a gradual development of lean knowledge and awareness and a cultural acceptance of lean implementation.

| Confirmation |
| As part of the interview process interviewees were asked to identify and discuss various confirmations or ‘success’ stories associated with lean implementation within the organisational environment. The interviewee highlighted the confirmation of the lean implementation journey. The interviewee viewed the confirmation of the lean journey both internally and externally. The interviewee’s reflection on the internal and external lean implementation journey is derived from the individual’s role and exposure to lean. |

“...the lean experience has been a good one, very good I mean it shows a lot of promise in design and construction where everybody, the contractors and contract is very well written and the message is very loud and clear that actually aligns everybody in the same direction, the risk sharing and taking the guaranteed prices and the caps off the number and really putting the team at risk for a portion of that alliance in aligning...”

“I mean everybody is jumping on board this IPD and lean very, very quickly and they see the value in it and they are excited about it so we also have an internal group that is doing a study group on the integrated form of agreement and looking at that and trying to learn more about it and we are also studying in-house how we can apply lean in integrated project delivery to other clients and how that would work. You know [organisation A] is very advanced and very progressive and very sophisticated and also has an owner who has assisted the team to put this in place and that doesn’t necessarily work for developers and others that are looking more at the bottom line and flipping buildings and have different goals in place. Our minds are trained to look outside the [organisation A’s] of the world and see you know if there is an application for an integrated project delivery that we can work closely on and develop relationships that way with others”.

Interviewee was open in discussing the lean implementation journey. However as the implementation is in the early stages the interviewee is yet to establish a full understanding of lean implementation within the organisation.
everybody in the same direction. Before working in design-build with designers, the designers were not aligned with us either we basically had to hire them and the only tool we had to use with them is really the contractual arrangements where if we are, you know we would do target value design in design-build and we would design for the target and if the architect did not design to that target or their design was creeping away from that target then they were obligated to go back and redesign for, you know on their own dime in order to meet that budget. So that really was the only alignment that we have in design-build, you know here where they are actually putting a portion of their profits at risk and they are working with the team and committing to the team that we are all working towards this target price together”.

As part of the interview process interviewees were asked to identify and discuss various confirmations or 'success' stories associated with lean implementation within the organisational environment.

The interviewee highlighted a personal confirmation of the lean implementation journey. For the interviewee the confirmation of the lean innovation for all individuals within the organisation is about reflection. Reflection in the sense of the individual and their role, duties and exposure to lean.

“‘It’s about continuous improvement, eliminating waste and you know we hadn’t gone through and mapped out our accounting process and our project management process and change orders and subcontracts and you know looked for the waste and try to eliminate the waste before and now we’ve done all that and are continuing to do that’.

Interviewee was open in discussing the lean implementation journey. However as the implementation is in the early stages the interviewee is yet to establish a full understanding of lean implementation within the organisation.

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| Verbal Communication | When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified communication to be guided by engaging the workforce through “…they are very good, we’ve gone through Toyota Way, and Understanding Lean Thinking, and getting the right things done with our group at the hospital or on the MOB and we’ve gotten a lot out of it. I mean, I think that’s one of the best ways to learn lean principles is to really read the books and discuss them as a team and then come up with potential action plans of what we can
In the description and discussion of communicative tools the engaging of the workforce through educational study action teams was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and heterophilic communication within and across the organisational and project environments.

The presence of such informal communicative tools and methods also enables the transferring of central ‘shift specific’ knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: Verbal Communication

| Visual Communication | Not Discussed | Not Discussed | Not Applicable |
| Written Communication | Not Discussed | Not Discussed | Not Applicable |

Challenges

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<td>Direct versus Indirect</td>
<td>During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation. The interviewee identified one indirect perspective emerged regarding the participant discussion concerning the education of the lean innovation in the organisation. The consequence is identified as minimal in its impact.</td>
<td>“…we definitely have challenges and I think some of those, well some of them are and it’s not really the lean being bad its bringing people on board and trying to get them educated into the lean process. You know we are having a lot of challenges with outside trade partners that we are bringing on board; they are not used to this process, they are not used to reliable promising, we are having a rough time trusting them – I mean we trust everybody on the team but we put that trust into them and we’re not getting a lot of the commitments meet that we should be and a lot of it is trade partners you aren’t there every week at the meetings every week you know they are outside like the window washing trade partner who</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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This **direct** perspective was discussed by the interviewee and highlighted the impact of educating outside trade partners in the process of the lean innovation.

The interviewee did discuss how the organisation is making attempts to educate these ‘other’ organisations and making them apart of the team. According to the interviewee “that is one of the major hurdles that we are having to overcome”.

During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.

The interviewee identified one **indirect** perspective emerged regarding the participant discussion concerning the project planning and financial management of the project once the lean innovation has been implemented.

The consequence is identified as **minimal** in its impact.

This **direct** perspective was discussed by the interviewee and highlighted the financial and planning impacts on the organisation through the use of the lean innovation.

| doesn’t have to be there every week or somebody like that it’s not that person but it’s hard to get the reliable promising out of the some of these which trips up the whole team – when you’re not getting the information in. an example of that is our consensus document which we are trying to put our consensus documents together we’ve distributed to all the trade partners and to different sections so they can go through a typical spec and try and convert it into a consensus document taking out all the unnecessary verbiage and information and trying to get down to what is needed in this type of lean/BIM culture for our consensus document and we are setting dates and we are not getting the information back when we should – so the challenge is really how do you work with all those different trade partners and get them up to speed. So we are trying to educate them and get them into reliable promising training and get them to be a part of the team – but we are finding that is one of the major hurdles that we are having to overcome.” |

| “I guess also, one of the struggles with the lean and the integrated form of agreement is that the cash flow happening very much earlier in the project and I think that’s something that looks like something Sutter is struggling with trying to make sure they’ve got that cash flow in place to keep things moving along – so let’s see those are the major items that I see at this point” |

| 621 |
During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.

The interviewee discussed and highlighted an opinion linked directly to information sharing and the management of information sharing. According to the interviewee information sharing becomes a problem as sometimes lean implementation can become quite intense through over communication.

This perspective highlights both direct and indirect aspects. Direct aspects are present in the communication of lean and how lean is approached. Indirect or second-order aspects are present in the cultural environment, operations management and behaviours of individuals in accepting/rejecting lean. The type of impact was minimal to the organisational environments.

“...in our special projects group we’ve got a lot of people working on lean projects now in construction and I think that’s where they are finding some challenges with getting people to accept pull scheduling and the last planner and putting their trust into pull scheduling – I mean pull scheduling basically takes up all the flow out of your project so if you have an item that comes in late or you have a trade partner that doesn’t meet his commitments you know it really puts everybody at risk of the project being late and I think a lot of the superintendents, you know, with a normal project they are nervous enough and not sleeping at nights and trying to make sure they are staying on schedule but now you take all the flow out of the project and you pull everything at the end to that last responsible moment and it’s a lot more stressful for them to put their trust in that system until they really see it work and until they see and get that experience it’s definitely a big learning curve there”.

“...well there is a lot more sharing and a lot more work sessions and a lot more meetings so that’s one item that is challenging and we had to internally sit down with our project team and say ‘is that ok?’ you know we need to divide and conquer cause there is so many meetings and we all go to these meetings we are not going to get anything done. So we have certain people go to certain meetings and then we come together once a week on Fridays and we share what we learned from those meetings in order to that”.

| Desirable versus Undesirable | Not Discussed | Not Discussed | Not Applicable |
**Interviewee 4: Champion & Innovator 3**

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### Organisation & Management Environment

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<tr>
<td>Formal Social System</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Informal Social Structure</td>
<td>The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks. The interviewee discussed how the current enhancement of relations between members of the organisation is strengthened through the establishment of stronger bonds between individuals within particular project and office environments (homophilic communicative networks). Underpinning this interpretation is the need for the cultural environment of to be representative of the organisation and its commitment to its employees. The occurrence of different interpretations and perspective between interviewees can be a result of the role and position of each interviewee.</td>
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"But in the office the people are, the relationships I guess aren’t as strong just because there are more people and you obviously don’t interface with them as much as you"
networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks.

When answering the question the interviewee reflected on the design/build philosophy that governs project works. The interviewee highlighted how the formal social system of the organisation and on-site project teams are governed by **heterophilic communicative networks** as governed by design/build obligations. The nature of such heterophilic relations were described as **enhancing relations** within the business and organisational environment as all parties are formally committing to the advocating of **heterophilic communicative networks**.

This is evident in the supporting of and enabling of lean implementation within the organisation and across project environments.

When describing communicative networks and relationships within the organisational environment the interviewee highlighted and discussed **tertiary working groups** (or cluster groups). The nature of such relationships was described in a **homophilic** context.

According to the organisation utilises a fourth tier management group of project teams that undertake project specific works and phases of construction. Organisational cluster groups are underpinned by a collaborative environment and governed by two higher tiers of management. It was noted by interviewees that the presence of clusters groups within the organisation has been
stable. Since the organisation has started to undergo the lean innovation process existing cluster groups have strengthened while also creating new cluster groups between each organisational location.

CI2 also discussed the presence of homophily cluster groups within the organisation, this discussion highlighted how the organisation is divided into in-office teams and on-site project teams.

Social Norms
The interviewee was also asked to describe the social environment of the organisational with reference to 'changes' that have occurred within the organisation as a result of lean implementation. The interviewee discussed social norms in terms of the organisational and project environments as social norms transcend business environments.

The interviewee highlighted that within the organisational environment lean is viewed as a collaborative and relations based management philosophy. How the organisation approaches lean is through advocacy and embracing lean not only as an individual but also within the organisation and on projects. The interviewee in describing advocacy and lean highlighted that the existing cultural of the organisation has enabled advocacy and to become a greater part of the organisational environment.

Lean has been implemented increasingly on projects within their own organisation, suggesting that the level of transformation success is dependent on the embracing of advocacy at all organisational levels.

Advocacy is representative of management, definitely they encourage all of us to grow as much as we can within the industry even from just coming out of college they really allow you to grow as much as you would like to and experience as many different approaches or facets within industry or organisations you can be associated with. Its one of the goal they actually make for all of the engineers up through senior management is you get involved with some kind of industry organisation and outside of lean there is a local, well its actually a national, a US national group that volunteers with high school students who want to go into architect or engineering or construction management and you are required every Wednesday to leave work early to go meet with the students at 4 o'clock and I've been doing it for 4 of the 5 years that I've been with Pankow and they encourage all of us. So they definitely encourage your growth and that just you know exposes you to other people in the industry, not only are you helping the high school students locally but you are being exposed to other people and are also learning.
teams and the organisation becoming spokes persons of lean and the application of lean not only within the organisation but also the project and day-to-day life.

CI1 and CI2 also identified and described advocacy similarly.

<table>
<thead>
<tr>
<th>Opinion Leaders &amp; Change Agents</th>
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<tr>
<td>The interviewee was asked a series of questions concerning opinion leaders and change agents and their presence or role (if any) within the organisational environment. When describing opinion leaders and change agents the interviewee reflected and discussed that within the organisation opinion leaders are present and identifiable. When discussing opinion leaders the interviewee highlighted leaders to be guided by the core cultural competencies (organisational social norms). The core cultural competencies guiding opinion leaders are focused toward advocacy and integration emerge as influencing innovation specific opinion leaders, particularly in becoming a leader of the organisation and the innovation.</td>
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| “…our exposure at [organisation A] has just opened up the company to it and it’s great that we have a few key people, myself being one of them, actually involved over there and we can kind of spread the word here”.

| “I attend the LCI dinners and I actually just did a lean educator training session with [GH] on teaching just the intro into teaching the lean course. So it’s been great for me to as it has allowed me to take that step in my career, you know to be at the forefront of something and help distribute throughout the company and working with [interviewee 3] putting together presentations on introduction to lean”. |

| Interviewee was open and happy to discuss their role within the organisation as an opinion leader. The interviewee feels advocated to take control of their own lean journey. |

| The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the organisational environment advocates that everyone in the organisation as opinion leaders.

The interviewee highlighted how as an opinion leader they are able to take control of their own exposure and development of knowledge. |
associated with lean. For this interviewee being an opinion leader is essential to their own success and reflection.

### Implementation Process

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<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a short-term employment within the industry at varying management levels which has led to their current middle management role within the organisation. The interviewee described their current role as a senior-middle manager both within their organisation and organisation A (as per the contractual partnership and agreement). The interviewee is also involved in the Lean Construction Institute. The role description indicates that the interviewee is categorised as a <strong>champion and innovator</strong> for the purpose of the research and as set out in the theoretical framework. The exposure of the interviewee to lean is considered <strong>moderate</strong>. This occurs as the interviewee has exposure to lean within their daily role, involvement in as an internal change agent (education facilitator) and the contractual relationship with organisation A. “First exposure to lean through [Organisation A] project site in the last 9 months”. “Day-to-day job duties are on-site managing field engineers, who directly manage all the work and the subcontractor work as well as dealing with billing – it’s a lot of paperwork”.</td>
<td>Not Applicable</td>
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<tr>
<td>Persuasion</td>
<td>The interviewee was asked about the persuasive techniques employed or used by senior management to assist in the persuasion of the workforce towards lean. The interviewee identified the use of <strong>opinion leaders</strong> and <strong>change agents</strong> as a persuasive technique used by senior management. The nature and context of this persuasive technique links in with education and team learning through study action teams. “…we are the ones who are kind of educating everybody else just because we have the knowledge and we are being exposed to it so it’s kind of upon that small group of people but I think all of the designers and trade partners who are involved in the cathedral hill project are also spreading the word”.</td>
<td>Not Applicable</td>
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According to the interviewee, change agent presence within the organisation is underpinned by the notion of individuals within the organisation working with organisation A. Becoming educators and change agents and assisting the persuasion of other individuals to accept rather than reject the innovation.

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<tr>
<th>Decision/Implementation</th>
<th>Not Discussed</th>
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<tr>
<td>Confirmation</td>
<td>As part of the interview process interviewees were asked to identify and discuss various confirmations or 'success' stories associated with lean implementation within the organisational environment. The interviewee highlighted a personal confirmation of the lean implementation journey. For the interviewee the confirmation of the lean innovation for all individuals within the organisation is about reflection. Reflection in the sense of the individual and their role, duties and exposure to lean.</td>
<td>“I think it’s a group perspective, I think there are a lot of people who are starting to look at lean and see the benefits of it and I mean I guess within [the organisation] we are the ones who are kind of educating everybody else just because we have the knowledge and we are being exposed to it so it’s kind of upon that small group of people but I think all of the designers and trade partners who are involved in the cathedral hill project are also spreading the word”.</td>
<td>Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.</td>
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<table>
<thead>
<tr>
<th>Communication</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Verbal Communication</td>
<td>Not Discussed</td>
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<td>Visual Communication</td>
<td>Not Discussed</td>
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<tr>
<td>Written Communication</td>
<td>Not Discussed</td>
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<tr>
<th>Challenges</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tr>
<td>Direct versus Indirect</td>
<td>During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.</td>
<td>“I think there is an initial, well I don’t think its resistance, its more hesitation because you’ve done it one way for so long and you kind of have to constantly remind yourself and other people that they are paying us all to be there and share information, you know it’s all</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the</td>
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The interviewee discussed and highlighted an opinion linked directly to information sharing and the management of information sharing. According to the interviewee, information sharing becomes a problem as sometimes lean implementation can become quite intense through over communication.

This perspective highlights both direct and indirect aspects. **Direct** aspects are present in the communication of lean and how lean is approaches. **Indirect** or second-order aspects are present in the cultural environment, operations management, and behaviours of individuals in accepting/rejecting lean. The type of impact was **minimal** to the organisational environments.

<table>
<thead>
<tr>
<th>Desirable versus Undesirable</th>
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the same owner, so by sharing the information we are all only improving the project for the owner and there is a lot, well I’ve only encountered maybe in all of our interviews whenever we interview for a trade partner we also ask them about that ‘how do they feel about the open book policy and sharing all their costs’.

presence of waste within the organisation.
Interviewee 5: Project Manager 1

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<tr>
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<tbody>
<tr>
<td>Overview</td>
<td>When describing the lean decision and lean implementation process the interviewee also discussed to some degree the presence of an authority-innovation decision underpinning lean within the organisation. However this discussion focused on the decision approaches by individuals in higher management roles at each office location of the organisation. The interviewee noted that through their exposure to different office locations they have been able to see how each of the 5-6 vice-presidents of the company are using their authority and knowledge of lean to change the future of the organisation’s presence within the industry. Further to this, the interviewee also discussed how differently each of the vice-presidents at each office location are communicating, informing and implementing the innovation as a means to lower potential conflicts to arise. The interviewee also noted that the organisation is benefiting from the exposure to lean within organisation A and how this external contractual relationship has assisted in the decision to implement the lean innovation.</td>
<td>“…there was a bit of a change after that we recognised that the industry is changing and to be better prepared for the cyclical up and downs of the economic that drive our private work I think some changes in the type of work we were pursuing and were better received when the group of vice presidents made a conscious effort to go out and explain it wasn’t just a rash decision but there was a thoughtful process that we went through to recognise where the industry is and where our markets are and under [the ex-CEO] guidance we’ve been doing this but we think we need to start to do something a little bit different to survive and remain healthy in the next few years”.</td>
<td>The interviewee highlighted an understanding and awareness of the nature of lean and their own understanding of its application within the organisational environment. The interviewee showed understanding and acceptance concerning the need to transition towards lean.</td>
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<thead>
<tr>
<th>Organisation &amp; Management Environment</th>
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<tbody>
<tr>
<td>Formal Social System</td>
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<td>Informal Social Structure</td>
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<td>Not Discussed</td>
<td>Not Applicable</td>
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<tr>
<td>Social Norms</td>
<td>The interviewee was also asked to describe the</td>
<td>“I’m learning quite a bit about some of the intrinsic</td>
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social environment of the organisational with reference to ‘changes’ that have occurred within the organisation as a result of lean implementation.

The interviewee highlighted the presence of social norms (integration) in terms of the organisational and project environments as social norms transcend business environments.

The interviewee discussed integration as a social norm within the organisation. In particular the interviewee highlighted how integration brings value through the lean transformation for those employed in trade.

For the interviewee integration is viewed as more of a learning process for trades and all organisational groups values of the trades, and seeing the benefits of the design team getting feedback from the drywall subcontractor, mechanical, electrical, plumbing, window subcontractor – we’ve got major trades there that are having a direct input on how the design can make the project more cost-effective and cost-efficient and easier and better to build in the field”.

<table>
<thead>
<tr>
<th>Opinion Leaders &amp; Change Agents</th>
<th>The interviewee was asked a series of questions concerning opinion leaders and change agents and their presence or role (if any) within the organisational environment. When describing opinion leaders and change agents the interviewee reflected and discussed that within the organisation change agents are present and identifiable. The interviewee identified themselves as an internal change agent for the organisation through a collective group of individuals driving the change. The interviewee highlighted how with lean organisational management is approaching implementation in a way that is centred on collective group of individuals driving the change.</th>
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|                                 | “…it’s more of a collective group that the people and most of them you’ve talked to today who are involved in either the hospital or the MOB (medical office building) are totally embedded in it and we’re getting hands on experience with it. I think Lonnie Andrews is probably the key person within the company who’s been involved with that project for many years when lean was just being implemented so I would say he is probably recognised as sort of the lean expert or leader in the company”.

| Values of the trades | values of the trades, and seeing the benefits of the design team getting feedback from the drywall subcontractor, mechanical, electrical, plumbing, window subcontractor – we’ve got major trades there that are having a direct input on how the design can make the project more cost-effective and cost-efficient and easier and better to build in the field”.

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### Implementation Process

<table>
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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has led to their current project management role within the organisation. &lt;br&gt; &lt;br&gt; The interviewee described their current role as an operations manager. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework. &lt;br&gt; &lt;br&gt; The exposure of the interviewee to lean is considered low-moderate. This occurs as the interviewee has exposure to lean within their daily role however there is no direct correlation between the exposure to lean and the contractual relationship with organisation A.</td>
<td>“Limited experience to lean, exposure to lean in the last year through [Organisation A] project”.</td>
<td>Not Applicable</td>
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<tr>
<td>Persuasion</td>
<td>The interviewee was asked about the persuasive techniques employed or used by senior management to assist in the persuasion of the workforce towards lean. The interviewee discussed persuasive techniques in context to the informal social system, particularly study action teams. &lt;br&gt; &lt;br&gt; The interviewee discussed how the organisation uses education to bring together individuals who may/may not hold different values, morals and beliefs and persuade these individuals to adopt lean. The structure of such study action teams within the organisation are focused towards the introduction of the innovation through the use of a common book or reading materials.</td>
<td>“Study action teams have been undertaken with [interviewee B] with the reading of the Toyota Way. Those study action teams discussed the book and the application of principles to the industry and the company”.</td>
<td>The interviewee was not committal over with the success/experience so far with the new training/education framework.</td>
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</table>
Each study action team is made up of individuals from different positions and roles within the organisation, this is done according to PMI the interviewee to provide a broad spectrum of understanding and allow members of the organisation to communicate with other members who they may not communicate with in day-to-day duties. From this point the book or reading materials is introduced to the study team, read and then discussed at length in terms of the “application of principles to the industry and company”.

The interviewee did highlight that exposing individuals to the innovation through the study action team environment allows individuals within the organisation to learn and understand the strengths and weaknesses as well as other’s opinions associated with the innovation before making a decision to accept or reject the innovation.

The interviewee was asked about the persuasive techniques employed or used by senior management to assist in the persuasion of the workforce towards lean. The interviewee discussed persuasive techniques in context to the formal social system, particularly tertiary working groups and lean awareness.

The interviewee addressed the persuasion approach utilised by organisational management in the trialling of the innovation on a project-by-project basis and learning about the innovation through this exposure method.

Exposing individuals and teams on a project-by-project basis allows individuals and teams within the organisation to learn and understand the benefits associated with the innovation before

“I would say with what I’ve seen with lean its grown out of our involvement with the CPMC medical projects is where it really started for us. And I think like a lot of new methods or philosophies I think there is some idea that you don’t necessarily want to roll it out to the whole company like ‘we’re changing this is it’ but to try it out and sort of learn maybe on a project-by-project basis, I think that’s what we are doing is having learned and been exposed to it on these two projects we’re trying to roll it out to the rest of the company”. 
making a decision to accept or reject the innovation.

| Decision/Implementation | “…in 2004 [the founder, owner and CEO] passed away in his early eighties after leading the company for some 47 years and leading up to that point there was knowledge there that at some point the company would have to deal with that issue and there was a group of 5-6 top vice presidents within the company that prior to that event had taken place had started to look at how the company would start to go forward in the future and at that point there was a more definite kind of developed a strategic plan, a business plan and that’s something we kind of rolled out where each region of the company, the company CEO and president travelled around and kind of delivered the results of a couple of days of off-site workshops and sessions they had with facilitators to develop our strategic plan and company mission and things like that. So that was where there had clearly been a change to people at the top with the passing of [the founder, owner and CEO] and the company wanted to take definitive steps of how we are going to keep the company going ahead in the future and kind of tried to deliver that message to everyone within a very short time, in the course of a month or two of here’s what happened, here’s how we are going to try and go forward and keep the company financially strong and if we are going to diversify our markets and things like that”.

The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of the organisation. |
| The interviewee was asked to describe the decision and implementation process of lean within the organisation. In particular the interviewee was asked to describe the process. When answering the question the interviewee spoke about how change within the organisation has occurred in the last 6 years after the death of the founder, owner and CEO of the company. The interviewee in particular discussed changes mainly to the formal social structure of the organisation reflecting the presence of both innovation-decision interpretations, presenting the structured and patterned arrangements of the system units. Questions directed to the interviewee revealed that the formal social structure of the organisation has undergone significant change over the last five years after the death of the company owner and CEO. This change has seen the organisational environment change from a traditional design and build organisation to an organisation underpinned by collaborative work practices. Still present within the organisation is general governance and support by a CEO and board with changes to the organisation to be in the form of organisational specific work committees with the latter having emerged. |
| The interviewee was asked to describe the decision and implementation process of lean within the organisation. In particular the interviewee was asked to describe the process. The interviewee highlighted that the direction of lean implementation is significantly different to… |
previous innovation implementations; due to the nature of exposure. Currently the organisation is experiencing a more natural and organic exposure towards lean through exposure of individuals at differing levels of the organisation.

The interviewee also highlighted how the culture of the organisation is also assisting the overall acceptance of lean within the organisation.

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<tr>
<th>Confirmation</th>
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Communication

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| Verbal Communication | When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified communication to be guided by engaging the workforce through educational study action teams. In the description and discussion of communicative tools the engaging of the workforce through educational study action teams was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and heterophilic communication within and across the organisational and project environments.

The presence of such informal communicative tools and methods also enables the transferring of central ‘shift specific’ knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: Verbal Communication

beginning of it and to try and look at a few lean tools, methods and concepts and apply them in the field we’re trying that in a few areas, maybe the smaller projects first where maybe it’s easier to adopt and I can see where just because it is something new, something different there is a little bit of resistance to change in some cases and in others I think it’s certainly the new wave of the future for some of the bigger projects we are seeing”:

“So we are trying to take advantage of this slow time by actually planning for it pretty well with trying to do things like the study action teams, and looking at the processes of how we have done things and are there ways to improve those so we have tried to use some of the lean tools of looking at the current state of what we have done for years and is there a better way to do that process as part of building. So during the slow time we’re trying to get more training available to people across the company at junior level and mid-management and up with the knowledge that at some point we will get busy again and we will be back in the field but during this with what will be a couple of years of relatively slow market especially for northern California I think we are kind of taking advantage for that”.

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During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation.

The interviewee identified one *indirect* perspective emerged regarding the participant discussion concerning the project planning and financial management of the project once the lean innovation has been implemented.

The consequence is identified as *minimal* in its impact.

This *direct* perspective was discussed by the interviewee and highlighted the financial and planning impacts on the organisation through the use of the lean innovation.

"...some of the things I would question about it, a hospital project like that is so complex that what they’ve done to break the preconstruction group up into teams that each have their areas of responsibility and there is a lot of collaboration and communication amongst them – which is what you need by breaking up chunks of work that can be dealt with a reasonable sized group of people. I would say that sometimes you sit back and wonder why there is too much time being spent studying and restudying too many different alternatives you have to make some sort of comparisons, you want to look at alternatives but also if you look at the total timeframe we have and I’ve only been involved in it for less than a year and a lot of people were there two years before I got there so you really do have to question the amount of time being spent prior to construction and could that be a little more focused as opposed to studying an alternative to death because the time set aside there, that maybe the process is allowing a lot more studying of options and opposed to having a little bit more incentive to make decisions and move forward – that’s probably the only drawback I would say that sometimes comes up”.

Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.
### Interviewee 6: Project Manager 2

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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
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<tbody>
<tr>
<td>Overview</td>
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<td>Not Discussed</td>
<td>Not Applicable</td>
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<tr>
<td>Organisation &amp; Management Environment</td>
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<tr>
<td>Social Norms</td>
<td>Not Discussed</td>
<td>&quot;I would say within the company probably not too much because we feel like we talk and that we are collaborating and are collaborative within our offices and all that. Outside other than mainly the medical office building project there is a lot more collaboration going on there. I think, our well the other part of it is we are talking to the owners and other clients and we’re trying to teach them about the lean culture and from that the actual integrated project delivery, you know IFOA agreement we have at CPMC. So interaction to others outside is more about teaching, and teaching the clients about the process and trying to get them to understand that this is a learning curve and a better process than what they are used too”.</td>
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<tr>
<td>Formal Social System</td>
<td>Not Discussed</td>
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<td>Not Applicable</td>
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<td>Informal Social Structure</td>
<td>Not Discussed</td>
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The interviewee was also asked to describe the social environment of the organisational with reference to 'changes' that have occurred within the organisation as a result of lean implementation.

The interviewee highlighted the presence of social norms (integration) in terms of the organisational and project environments as social norms transcend business environments.

The interviewee discussed integration as a social norm within the organisation. In particular the interviewee highlighted how integration brings value through the lean transformation for those employed in trade.

For the interviewee integration is viewed as more of a learning process for trades and all organisational groups

"Probably within this office it’s been [interviewee 2], actually [interviewee 2] and [interviewee 3] have been and are the champions of it. Then as we are going along more and more people are becoming champions of it. I mean I would say [interviewee 2], well, you know, he was probably the initial one and he was the only who started..."
the organisation **change agents** are present and identifiable.

The interviewee identified themselves as an **internal change agent** for the organisation through a collective group of individuals driving the change.

The interviewee highlighted how with lean organisational management is approaching implementation in a way that is centred on collective group of individuals driving the change.

**Implementation Process**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has led to their current project management role within the organisation. The interviewee described their current role as an operations manager. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework. The exposure of the interviewee to lean is considered low-moderate. This occurs as the interviewee has exposure to lean within their daily role however there is no direct correlation between the exposure to lean and the contractual relationship with organisation A.</td>
<td>“First exposure to lean through [Organisation A] project”. “Position is more about preconstruction and managing the preconstruction process than actual estimating”.</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Persuasion</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Decision/Implementation</td>
<td>The interviewee was asked to describe the decision and implementation process of lean within the organisation. In particular the “...it was a bit top down [current CEO]. Well I would say middle management cause when we first got involved with cathedral hill and with [organisation A] and then...”</td>
<td>The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of...</td>
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</table>
The interviewee highlighted that the direction of lean implementation is significantly different to previous innovation implementations; due to the nature of exposure. Currently the organisation is experiencing a more natural and organic exposure towards lean through exposure of individuals at differing levels of the organisation. This approach is enhanced through middle management essentially driving the lean transition; with support from senior management.

The interviewee also highlighted how the culture of the organisation is also assisting the overall acceptance of lean within the organisation.

As part of the interview process interviewees were asked to identify and discuss various confirmation or 'success' stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of their own personal understanding of lean and the lean implementation process. The perspective reflects how individuals at particular levels within the organisation have perceived the outcome of the implementation process.

"...as we do our business plans we are trying to think more and more about how do we become more of a lean organisation, for instance our office, we are going to move out of this office and into a new space that is going to allowing more collaboration among everybody."

Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforce the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.

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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Verbal Communication</td>
<td>When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of <strong>verbal communicative tools and methods</strong>. The interviewee identified communication to be guided by engaging the workforce through</td>
<td>“...doing a lot more you know what we call SATs, you know doing the book classes or, you know study action groups and doing a lot more of that lately with the company so we can learn more about lean and other thing within the industry. Right now I’m on a BIM management book club. So, the other part of it is becoming open with pricing and clients. So that’s I</td>
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</table>

**Communication**
In the description and discussion of communicative tools the engaging of the workforce through educational study action teams was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and heterophilic communication within and across the organisational and project environments.

The presence of such informal communicative tools and methods also enables the transferring of central 'shift specific' knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: Verbal Communication

<table>
<thead>
<tr>
<th>Visual Communication</th>
<th>Written Communication</th>
<th>Challenges</th>
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<tbody>
<tr>
<td>Not Discussed</td>
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</table>

**Feature** | **Analysis** | **Quote** | **Interviewee Attitude**
---|---|---|---
Direct versus Indirect | Not Discussed | Not Discussed | Not Applicable
Desirable versus Undesirable | Not Discussed | Not Discussed | Not Applicable
### Interviewee 7: Senior Executive 2

#### Overview

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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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</thead>
<tbody>
<tr>
<td>Overview</td>
<td>When describing the presence of opinion leaders and change agents the interviewee highlighted the collaborative environment underpinning the organisational and management environments. The interviewee discussed that there is no one champion within the organisation who is leading the lean transformation rather it’s guided by a collective decision by all within the organisation. Further to this, it was mentioned that individuals have been approached regarding their knowledge however this is directed towards more using particular individuals to assist in the process and grow the commitment of the organisation in implementing the lean innovation.</td>
<td>The interviewee highlighted an understanding and awareness of the nature of lean and their own understanding of its application within the organisational environment.</td>
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#### Organisation & Management Environment

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<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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</thead>
<tbody>
<tr>
<td>Formal Social System</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Informal Social Structure</td>
<td>The interviewee was asked to describe the informal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the informal social system in relation to the presence of lean within the organisational and project environments. When answering the question the interviewee highlighted how the informal social system of the organisation and on-site project teams are governed by heterophilic communicative networks throughout the lifecycle of the project and within the organisational environment. The nature of such heterophilic relations were</td>
<td>“I’ve seen a little bit of both sides I’ve helped plan who was going to attend one, but then I’ve just been a participant in 3 and we sat down and we intentionally said ‘ok, we’re going to wind up limiting the group to 10 so then everyone has meaningful input and so therefore we are going to set up 4 of these things over the next 6 months so now let’s plan the guest list’. So we intentionally took field superintendents from one business unit and put them with project managers and estimators from another business unit just to make sure there really was a cross contamination or cross pollination of opinions. So that while it was done intentionally so different perspectives came to the table it also fostered corporate logs about what was going on in the business world, what’s going on in your market? So from that</td>
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</table>
described as **study action teams** within the business and organisational environment as all parties are formally committing to the advocating of hetrophilic communicative networks as part of the organisational and project environments.

**SE1, CI1 & CI2** also identified and discussed hetrophily study Action Teams as part of the informal social system of the organisation.

**Social Norms**

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation.

In answering the interviewee described the emergence of and committal to a range of significant attributes discussing the attributes in relation to organisational contexts. The first emerging social norm identified by the interviewee was **education**.

The interviewee highlighted how education is integrated within the organisation through culture, more specifically **cultural change**. The interviewee also noted how management has developed a specific education programme for the organisation and the success of this programme has led individuals to become more committal to the culture and nature of the organisation.

“There is a fit period probably the first 5 years, well there is probably 2 systems, within the first year to 2 years we work hard, the construction industry is not glamorous and is therefore there are times especially before we I think improved our processes including hiring where we wouldn’t have matches…. Once you get past that year, years 1-3 then what we find is that certain people get our culture and get what we are all about and buy in and that’s when the company has programmes in which to bring them into first a senior associates programme and then they can become an employee-owner. So there is definitely check points along the way but if you get past your first 5 years at [the organisation] by then its almost 90-90+% maybe 95% that you are going to be here for a career. Very low departure after 5 years”.

When discussing organisational social norms the interviewee described how the cultural environment of the existing organisation has assisted in the lean journey for the organisation. The interviewee in particular highlighted how the organisational culture is underpinned by a design/build philosophy that encourages open collaboration and communication between

“What makes it simple for us to move into lean is our culture is a very good fit, we have been for 47 years a collaborative contractor, our design-build heritage and culture is pulling together teams of experts and getting them to work together to deliver a project of higher quality and lower cost, satisfying the clients' needs and never ending the project in any sort of litigation. So if you want to say we’re collaborative then I think that’s the
project parties.

For the interviewee the existing design/build cultural environment has assisted in enabling the use of exiting communicative networks as a means to implement and discuss lean. The nature of the collaborative environment has also enabled the organisation to develop ‘buzz’ as well as a want and desire to implement lean through the cultural environment.

CI2 and SE2 also identified and described culture similarly.

way to prove it, we don’t end in dispute. So that’s enough for me right now”.

“The company has been very entrepreneurial and in that regard it is, it was organised as such that there were key people as project executives or sponsors or group managers or whatever, were given tasks to go out and make things happen and make project be successful. Exactly how that happened wasn’t as important as the fact that they were successful and we had a repeat client that would come back to us again, we are trying to grow to expand and in order to expand and grow we have to standardise so we can train people on the way that we want to do business and get them out there. We can’t take 10-12 years to develop somebody in order for us to grow so standardisation is a way for us to give them a very strong foundation on our core principles”.

| Opinion Leaders & Change Agents | Not Discussed | Not Discussed | Not Applicable |

| Implement Process |
| Feature | Analysis | Quote | Interviewee Attitude |
| Knowledge | The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has led to their current senior management role within the organisation. However the interviewee has only been with the organisation for a short period of time. The interviewee described their current role as an operations manager. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework. | “3 years working with [Organisation A]” “Special groups which principally do smaller projects, remodelling and renovations - office are 90% medical related projects”. | Not Applicable |
The exposure of the interviewee to lean is considered low-moderate. This occurs as the interviewee has exposure to lean within their daily role however there is no direct correlation between the exposure to lean and the contractual relationship with organisation A.

<table>
<thead>
<tr>
<th>Persuasion</th>
<th>Not Discussed</th>
<th>Not Discussed</th>
<th>Not Applicable</th>
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<tbody>
<tr>
<td>Decision/ Implementation</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
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</table>

**Confirmation**

As part of the interview process interviewees were asked to identified and discuss various confirmation or 'success' stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of their own personal understanding of lean and the lean implementation process. The perspective reflects how individuals at particular levels within the organisation have perceived the outcome of the implementation process.

"…we see a particular benefit from it, in terms of maintaining a client relationship and we have worked over the last 3 years to implement some of the principles ourselves within our group we haven’t been successful in that we haven’t had the initiative from the owner to support that it’s very difficult for one element of the team to be lean when the other elements aren’t. We’re also now able to learn from CPMC, cathedral hill projects we have people who are well embedded in that culture and in those projects that we are sharing information and opportunities for participating in the lean LCI (Lean Construction Institute) local chapter, P2PSL as well here locally we have attended their events and so we are working at the implementation within our group”.

**Interviewee**

Although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.

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<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Verbal Communication</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Visual Communication</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Written Communication</td>
<td>Not Discussed</td>
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<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Direct versus Indirect</td>
<td>During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean</td>
<td>“I wouldn’t say its negative; it’s a little bit of resistance to change, because the last planner for example, we’ve been implementing that as part of lean and it’s a very structured process. It requires you to obtain reliable</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the</td>
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</table>
The interviewee identified one *indirect* perspective emerged regarding the participant discussion concerning the project planning and document control and reporting associated with the project once the lean innovation has been implemented.

The consequence is identified as *minimal* in its impact.

This *direct* perspective was discussed by the interviewee and highlighted the financial and planning impacts on the organisation through the use of the lean innovation.

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<th>Desirable versus Undesirable</th>
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</table>

promises from your trade partners, but also the pure state of it measures peoples’ performance so our superintendents who live in the fields with the trades and rely on those commitments are resistant to measuring that performance and to putting people on the spot and say ‘well you made this commitment, you didn’t make it and this is the impact of it’. It happens anyway just in order to keep the project moving and not having to stand people up and having them accountable for their movements, but this is much more structured and you know its documented, its printed and it shows you didn’t do this, so our whole score of our team is not as high as it could be and it appears to the superintendent to be a duplication of effort that is there’s multiple levels of documentation that is going into that process. They prefer to do something very simple, a little simple Gantt chart of a schedule and modify it as they need to as work progresses – so the resistance has been towards the documentation and the confrontation part of it, not so much the benefits that come from it but the fear that there is going to be some initial kick back and resistance to it – they have enough to deal with let alone, have to deal with that”.

operations and how they have led to the presence of waste within the organisation.
### Interviewee 8: Senior Executive 3

#### Organisation & Management Environment

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<th>Feature</th>
<th>Analysis</th>
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<th>Interviewee Attitude</th>
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</thead>
<tbody>
<tr>
<td>Overview</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
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</table>

**Social Norms**

When discussing organisational social norms the interviewee described how the cultural environment of the existing organisation has assisted in the lean journey for the organisation. The interviewee in particular highlighted how the organisational culture is underpinned by a design/build philosophy that encourages open collaboration and communication between project parties.

For the interviewee the existing design/build **cultural environment** has assisted in enabling the use of exiting communicative networks as a means to implement and discuss lean. The nature of the collaborative environment has also enabled the organisation to develop ‘buzz’ as well as a want and desire to implement lean through the cultural environment.

CI2 and SE2 also identified and described culture similarly.

“*The culture has always been on continuous improvement in learning, the culture has always been on investing in our employees, the culture has always been in don’t take the short gain always look for the long haul, it’s what in the long haul is what is best and we’ve always been because we’re so engineer heavy even without saying the words I think there is some commonality between some engineers, you know they have these like balsa wood bridge competitions – you’re taught early that the beauty of engineering is to get out of you as much as you can out of as little as possible or to at least understand your objectives and use as little effort and resource to achieve that end goal. So eliminating waste is just another way of saying that. So I don’t think is had changed our culture but certainly it has given us more focus, it’s given us a framework in which to operate, which I think engineers a lot of times don’t like, no external constraint, they don’t like feeling like they are floating and or lost. So to have this concept philosophy well tested, well-practiced it’s got names for the tools, I think it gave a lot of people here a framework to focus on*."

“You know, lean is truly aligned with our culture, therefore it’s going to be natural, as we make the tools assessable and we make and reinforce the training to support the use of those tools it will become so fully
integrated and intertwined into our daily performance that you don’t need a champion. This isn’t about taking the bull by the horns and making it work – we are already a lean organisation what we need to do is continue to provide regular access, support and training for people to fully embrace and understand, how to use the tools that are out there”.

| Opinion Leaders & Change Agents | Not Discussed | Not Discussed | Not Applicable |

| Knowledge | The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry at varying management levels which has led to their current senior management role within the organisation.

The interviewee described their current role as an operations manager. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework.

The exposure of the interviewee to lean is considered low-moderate. This occurs as the interviewee has exposure to lean within their daily role however there is no direct correlation between the exposure to lean and the contractual relationship with organisation A.

| Persuasion | Not Discussed | Not Discussed | Not Applicable |
| Decision/ Implementation | Not Discussed | Not Discussed | Not Applicable |
| Confirmation | Not Discussed | Not Discussed | Not Applicable |

“*I joined [the organisation] with the notion of coming at it with a structural background. Inherently I felt like the opportunity had been forwarded by [the organisation] to work in a collaborative environment because that is what was sold was an option to the design-bid-build world, an option to the status quo with no limits*”.

| Communication | Not Applicable | Not Applicable | Not Applicable |
When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of **verbal communicative tools and methods**. The interviewee identified communication to be guided by engaging the workforce through **educational study action teams**.

In the description and discussion of **communicative tools** the engaging of the workforce through **educational study action teams** was discussed in a positive manner. This emerged as the nature of the communicative tool is more informal and allows more open homophilic and heterophilic communication within and across the organisational and project environments.

The presence of such informal **communicative tools and methods** also enables the transferring of central 'shift specific' knowledge in an informal environment.

Communicative mechanism underpinning secondary theme: **Verbal Communication**

<table>
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<tr>
<th>Challenge</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<tbody>
<tr>
<td>Direct versus Indirect</td>
<td>During the interviewee the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational environment as a result of lean implementation. The interviewee identified and discussed the cultural and collaborative</td>
<td>“I still see that as analogist to our building environment where you are dealing with different skill sets but they are actually working for different employers – I think we continue because our culture was already that of a collaborative learning environment. I think we sometimes forget how difficult this concept is to many of our peers”</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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</table>
environment of the organisation as a challenge influencing lean implementation. Particularly the interviewee described the challenge from an internal and external perspective.

According to the interviewee the cultural and collaborative challenge with the organisation is identified as a *moderate* implication for the organisation and *minimal-moderate* for employees.

The *direct perspective* highlights the need for management to be patient throughout the implementation process and to reiterate the reasoning behind the decision:

The *direct consequence* also has a number of *indirect flow-on consequences* to individuals in middle and higher management levels within the organisation:

within the industry when we walk into an environment where we are supposed to work with them and we just expect the light bulb is going to go off for them the way it did for us because they don’t have that culture and I think we forget what a big deal that is…. once you get so far down the road that your eyes are opened and embracing and appreciating the opportunities that are available with the right mind set, it’s almost, well from an engineer’s perspective it’s hard to turn off the fact that you just look at them and see waste. You look at them and see inefficiency, you look at them and see a lost opportunity and you just can’t bring yourself to enter, to allow that to enter into your team. If the right partner is out there your got to pick the right partner that’s going to add to that positive environment, that positive experience, knowing that focus is going to be there – it doesn’t matter how good of a relationship you have personally and how many successful projects you have completed – once you see in that group that it’s not there, that the spirit and willingness and the understanding isn’t there, you just see waste”.

| Desirable versus Undesirable | Not Discussed | Not Discussed | Not Applicable |
Appendix 4: Organisation C – Interview Transcripts, Interview Notes & Analysis
Interview Transcripts

Interview Transcript 1:

Transcribed by Brianna Chesworth in accordance with University of Newcastle policy 000873

Organisation C

Interview conducted on Tuesday April 29 2010

In attendance: Interviewer and 1 Interviewee

Start Time: 10:30

End Time: 12:30

Overview: The purpose of this interview was to allow the lean leader of [org C] to talk about the general implementation of lean within the organisation and how the process and implementation of lean matured culture.

Bolded words/phases are the interviewer

Interviewee:

Today I would like to discuss the journey [org C] Contractors have taken in implementing lean strategies within the organisation and the cultural implications emerging from this decision. First off, I would like to discuss the development of some of the associated lean programmes of [org C] Contractors. One of the things we are developing is doing the Gamba wall with the project executives so you should be able to go to the project and assess what your team is doing. So we have all the training but we are using job instructions, you know, but always focusing first (gives the interviewer an example of the documentation and training package the company uses – note. Try to get a copy of this is I can). There is a difference between management and leadership, ok, leadership focuses on culture and management works on processes within the culture, ok. So one of the biggest challenges here that we had at [org C] a long time ago was to differentiate leadership and management, ok, and when should I be a leader, when should I be a manager and we said ok when we focus on the culture and we were dealing with cultural issues you are a leader, when you are dealing with processes, we think culture that you are a manager – and for you to be respected you need to be working on both. So at the same time we are performing something you are performing in a way that reflects the cultures
so it will be a leader observing if you are applying the culture and also be a manager understanding how you are managing flow, how you are being efficient and how you are removing waste working on the processes itself. And so we show them what it is – we call it the lean approach, the way we see things (maybe try and get a copy of this to assist me in the analysis of the data) and its much more based on the five elements of lean thinking – correct – (yes) – and everybody knows the definition of lean within the company – you know here – lean in a very simple way is to be effective and efficient. Effective means do the right thing and efficient means do the thing right in a continuous improvement loop – ok – (yes) – and it means delivering customer value through a stream line process with no waste practising continuous improvement – ok – ok they say then that’s the definition, how are we going to do this?? Ok, we are going to do that, we are going to make this happen by implementing the five elements of lean thinking – they are, do you remember the one – (yes, value, value stream, pull, flow, perfection) – but do remember there is an order for that – (yes, yes, I know) – and each five customer value and each five chain of value get flow, pull and then pursue perfection, and we make that happen by developing systematic thinking, scientific thinking and constant self purpose – ok. So lean is the delivery of customer value through a stream line process practising continuous improvement we are going to make that happen by implementing the five elements of lean thinking they are customer value, chain of value, flow, pull and perfection and then we will develop scientific thinking, systematic thinking and constant self purpose and we will achieve excellence. Excellence when you have good business results, when everybody is empowered in your organisation to drive efficiency through processes that the customers want. Ok – everybody is empowered. So then we use this as part of the culture we say ok that the way you are going to approach this, that is the culture, that is the way you are going to behave – ok – and these are the things I want you to develop I always want you to practice and say reflection, think, think – and I will show you how we did this – I want you to go to gamba you can not make an assessment in this company if you do not go to the place where action occurs. And its much more than that – its not just going to the place and looking, I need to talk to you, I need to work with you for a while, I need to understand your challenges because here we say if you make an assessment about a situation without going to the gamba, people will take that as blame but if you go to gamba and you spend some time with these people and we work with them and we understand their challenges and you help them improve their lean approach the assessment that you make will be taken as an opportunity for improvement because it is very easy for me to go there and assess your job but if I don’t practice with you for a while they will take everything as criticism. People get self defensive – ok – so then once you go to gamba you practice and you go and see for yourself and a lot of people say ok draw a circle on the floor and stay inside the circle – correct – yes but if you are talking about management if you stay inside the circle you don’t see anything because you don’t have a product there you just have a series of decisions that you don’t know – ok – so that’s the difference when we are in construction we have a product line but you always have a lot of management things that we need to do a lot of the decisions we need to make and if you stay inside
the circle it does not give us the answers unless I go start talking to you and asking you – you know in order to understand – (yes) – the situation. And now we practice scientific thinking that means understanding the current situation and gathering data to formulate a hypothesis, understanding the root cause for the problem by asking why five times – put in counter measures, test the counter measures if they work they will become part of the improvement if they don’t work go back again, check again – ok – that’s scientific thinking – you can not say anything until you understand the current situation normally people don’t do that so at [org C] we encourage that, it also develops systematic thinking – you know – systematic thinking is divided into three parts that we say holistic thinking – I need to view the system as a whole, I need to have the big picture always. Dynamic thinking – you know I need to have this constant thing going on that is identifying the present situation, problem solving and continuous improvement – I need to be on that. Ok – and then I have the third one that is called [closed] loop thinking (double check at 7 minute mark) where I need to know the implications of my decision throughout the system once I make an improvement – that’s the reason I talked to [LCI – co-founder] when I said improvements have consequences and if we don’t understand these consequences by having, by not having the big picture maybe an improvement that I’m making here I will be overwhelming someone else down the stream. (Yes). So I always need to have this big picture and understand the consequences and make sure that everybody understands the changes that we are making – ok – so and of course constance of purpose – ok – you need to have a strategic direction that we call through north indicators and I will show you one example where we went through this (example is not available as it contained confidential information about employees in the company) – right, the two north indicators because if I have a direction and if I have current situation I know what I need to know – ok – if I don’t have a direction and a current situation I don’t know how to lead, I can not lead these guys (interruption from one of the office employees) so I will give you some examples on how to define a true north indicator and by assessing the current situation you can see the gaps – normally people do not understand the direction they need go and they also do not evaluate their current situation so they become reactive to others to whatever happens – correct – (yes) – so at [org C] when, when we are leaders we’re focusing on something like this. Ok, that’s the approach. And when we become managers, just let me show you one example (example is not available as it contained confidential information about employees in the company – see if they have a basic outline) for last planner system these are the steps, these are the things I need to look at, the key points and that’s my leadership thinking – ok – for example for me to develop (interruption) – so one of the things we are doing here, when you are doing planning – ok – you need to practice lets say reflection – ok – before you go through a pull session you need to do some preparation and it means you need to understand the current situation to say you need to identify the current conditions outside satisfaction, you need to take a look at the drawings, take a look at the specifications, prepare a first planner schedule – that’s the schedule I’m doing for myself just to understand because I’m going to be the leader, I’m going to be the facilitator of this pull session I need to know the current situation – its
not a collaborative thing its just something I need to do myself but it helps me do some research and at least understand the biggest challenges – ok – I will prepare a procurement schedule, will identify challenges and I will identify assumptions adopted – time to answer a change order and everything so by having that I will develop my current situation, I will develop scientific thinking I will also develop systematic thinking, I will also develop constance of purpose, I will help develop my leadership, and it will help me become more effective to allow everybody here to make decisions based on a general consensus and get more collaboration and they are the key points – you know identify customer satisfaction, what is the completion date, what are the implications if we delay, take a look at the drawings and understand coordination level and sign off process, take a look at the specs, identify core items and non-core items – so it is just key points, so at this point here I’m being a manager – ok – and then I observe how this idea reflects about the things that they are doing, are they capable in understanding the current situation, are they practicing problem solving – ok – so its being manager and in future put two colours here – you know like green manager, yellow leader. So at [org C] we figure out that this is something that we need to do, how to be a leader and how to be a manager. When I talk about leadership I’ll be talking about that thing that I showed to you the five elements of lean thinking and constance of purpose and also achieving excellence. When I’m talking about management, I’m talking about the processes. But I need to combine both (yes) because the way we approach makes a difference in the results we get. And we choose to take the lean approach – ok – right. So that’s a brief idea for what lean is – ok – and to uh help people understand what we are trying to do, we have something that we call lean training at [org C]. Ok where we use the book The Toyota Way and we use this book, in fact we use this book for helping people gain a little bit of vocabulary but out training combines different books. Combines like uh, Lean Thinking: The Machine which changed the World, The Toyota Culture, Toyota Talent, it’s a combination and also other things like Edward Emmings, Henry Ford, so it’s a combination. I have a masters in business and I have a MBA, so I know, so I put all these things together because the Toyota Way doesn’t answer all the things but it’s a good book to help people gain some knowledge and vocabulary and at the beginning we are doing it this way – ok – this is the one that we did I don’t even know when (the interviewee is talking about one of the early lean training sessions) but it was about four years ago, 3 years ago where we just talk about the chapters culture, attention, applying what we learned and have people talking about the book just briefly talking about the book. Ok – so chapter 3 - you know one of the things is the seven ways of waste, seven types of no value action, uh chapter four is improve communication structures through resolution – you know things that will get peoples attention – ok – and we start giving this training over and over again. Now this training became to this right now – it is completely different we have a syllabus today, that we explain to people everything they are going to get, and we give them 18 classes, one hour each one, where we go through that 5 elements of lean thinking and we combine with the 14 principles, but at the same time we practice exercises with them – so we are in a point right now that I don’t need the book anymore, I can do that without the book –
because we are having exercises and we are having for example one of the last things we did, we gave about, I don’t know 15 or 20 of these trainings already – so we capture all the bullet points, what is common for everybody in all the chapters – so I know all the bullet points, what calls peoples attention in average, we also teach them what they need to pay attention to when they are reading – so for me I just need to refer to the book a little bit and ask for the comments very briefly and give them exercises because the way to change your culture is helping change what we call basic underlying assumptions – ok – and these are the things that are hidden, people do not say but its there – ok – and the only way for me to change that is by making you practice exercises. You change your basic underlying assumptions, if and only if you practice exercises and you show why you need to change and right now we have training that takes, uh, people through these exercises in a way to change their basic underlying assumptions and one of the first things we do in the training is – you know – what is the first thing you do when you are implementing lean, what is the first question that you ask, for example we are going to see a process or something what is the first question you ask? - (why) – you can also say the best way is customer value identified because if you don’t know what your customer wants – don’t even ask the second question, what are the process that you have in place that help understand your chain of value – so we teach them that the first question that you should ask when you are a lean leader, when you are working on the culture is whats customer value and then you get to a serious problem because who is your customer, how customers you have, do you understand that of course you have the owner that is one customer but you have internal customers that you need to deal with and all of them are connected, in something we call a network of commitments that will be delivering what the final customer wants but for example you are a framing or dry wall company and if I am a electrical and the owner wants I need to understand what your value is and you need to understand what my value is in order to produce what the customer wants – so we start having these conversations about who is the customer and so we then start talking about customer value, people say ok and some people say the customer is the one that signs my cheque – here in the united states you listen to that all over the place – but its not he is one of your customers but you have another one the guy downstream that you are providing something is your customer if I’m framing then the electrical – the electrician is my customer because he will be roughly touching my framing alright – so then I need to understand whats value for him and then I need to put my framing in a way that adds value to him because if we do that we will both be satisfying our final customer and we start having these conversations – oh my gosh – so its much bigger than we thought. So then we just ask them a question whats value for you from this frame – ok – so my first session we put down something we call matrix of values that we use this for the development of KPIs (Key Performance Indicators) – whats value for you, this is the lean training at [org C] and this guy said a better understanding of lean thinking from start to finish and how to apply in the IT realm – the other guys says how to apply lean in the design portion of the project – so now I know how to customise my training to their values. And from time to time we stop and ask are we adding value to you because then I can put my processes in place.
and of course before each session you know when I’m talking about chain of value I start thinking about what am I going to do and what are the actions which have value and what are the actions which do not add value which I can get rid that I’m not going to use in my training – alright. If he stops talking about how to apply lean design I see it as a way to stop talking about design, I’m not going to talk about something that is not related to design. But can I connect design and IT together than yes I can – using through VEC, through new things by having the proper software in place by having the right hardware in place, I can connect things – so by understanding what’s value for them we can practice and say and reflect how we are going to prepare the sessions.

Do you find in your sessions you have people from all over the company and at different organisational and educational levels? Is this a large group of people or do you have more focused sessions?

So we have, we always have a mix at the beginning we just had people from [org C] but now we have trade partners, we have architects, we have owners together but for example I’m going to give this training to, ah, an architects office its 100 years old but I’m going to bring owners, I’m going to bring trade partners – its always good to make a mix but what we’re focusing on right now is to give training to a project team because if I have people from different places I can put a case that will be something that I have in my mind that people suggest but if I have a team then we can use a real case and say alright tell me what your problem is – they say oh our problem is – now lets apply lean to solve this problem and they can relate to their projects right away. So lately we are applying this training to project teams but we need to have everybody there, the owner, the architect, the trade partners, the general contractor, consultants – we have all of them in the room. Sometimes we don’t have all of them but we have people representing them at least. And then we go through that and we help them understand what lean is. Ok, and by doing that and using cases and making them practice I help them change their basic underlying assumptions. Ok, let me show you one example (as this example contained confidential information it can not be included in the reporting). So one of the things that is required to understand customer value is how do I measure the defining of value or not – this is what I call true north indicators, alright, so then what we did, we taught them the lean approach, how to identify customer value and from customer value I identify my KPIs that will be the ones together at the same time with the processes that I need to put in place that will be the ones that help me understand my current situation – every time I assess my current situation I have a process and I have a KPI that both came from value – you can not assess current situations without having a process in place that is attached to a KPI that came from customer value. For example, I can not assess a process to make hamburgers even with all the indicators if my customer wants pizza – I know it’s a simple example but its meaningful. So what we did whats my project capable criteria, my KPI, we create a matrix of value we create a diagram for values we agree on an infinity diagram on KPIs on
the process and how to get there. And we said to our major customers saying ok we are creating the matrix of value. The Infinity diagram is made up of headings that is unique to the needs of the client – as are the KPIs in use for the diagram. The background contexts and drivers of the diagram are qualitative and quantitative based. Elements such as low impact, medium impact and high impact drivers are incorporated into the infinity diagram, drivers are then summarised and ranked according to the outcomes of the diagram.

First, off we are not perfect, we still have a lot to improve, like a lot. But a lot of people focus on tools, for example to organise the company, to organise everything at [org C] we are focusing on thinking because thinking drives everything, behaviour drives everything so we are going to see – we are doing 5S but we’re not crazy about things but we are crazy about making people understand about customer value, chain of value, flow, pull and pursue perfection because we believe that if we help them go through this everything will be better at the end.

It is interesting to note in your previous discussion that you look specifically at behaviours and individuals understanding of the concepts behind the decision, however the representation of this is unclear within literature. It is my belief, that this ideal of culture is the underlying element with which research has misinterpreted when discussing processes of lean implementation – when the underlying need for adoption or implementation is usually based around these ideas of behaviours, relationships etc.

Absolutely, and you can use a tool to help you observe a new culture but the tool by itself doesn’t help you transform the culture – I don’t like saying change because the implications of the transformation are beyond the tool domains. They go beyond that. When you use a tool like 5S or Last Planner System you can see you the culture that you want to have but to get there you don’t get that through the tool you get that through a huge, a constant education process. You need to be whispering in peoples ears all the time – you know – like a pay attention this is customer value identified and you don’t have a tool – we created a matrix. It’s a, this matrix is a – you don’t need to be a genius – ok, just put the name and whats value for him – its simple. And it’s what works best for the organisation. Yes, but the purpose for me is not to have that nice tool but the purpose for me is to teach the company to engage in conversations with the customers in order to identify what they want.

It seems that the [org C] way to lean implementation uses the individuals themselves or the collective of individuals to push the movement of lean implementation forward.

Yes, yes – I can give you an example of something we were doing today involving the last planner system. Alright, so, in fact we were talking about planning, we were talking. In fact we use the last
planner system, if I need to choose, the last planner system helps you have certain types of conversations that you know – it makes you aware of the conversations that you need to have. But we say why didn’t we improve on these things we were just talking about right now, why didn’t we talk about improvements before and I said you know, if you don’t have good and accurate information on your schedule that is a result of the conversations we have with trade partners – ok – why should I improve this point or that point because I’m, what I was aiming in the past, was ok, lets create a collaborative plan – ok – people are saying oh you need to focus on having weekly work plans with tasks that deliver clear deliverables – if I don’t know what my customer wants than I don’t care. Ok – I need to teach the company on how to create a complete collaborative schedule that everybody buys in and is committed to it. And I need to develop a way to manage that network of commitments in a way that I will be respectful to everybody – once I get to that point then I have a good plan so now it add value to the plan – ok – its layer by layer. People are so anxious to jump to the weekly work plan, of course, there are weekly work plans but I was focusing first on the pull session. And then the six week look-a-head and the weekly work plan come naturally because they are inside the pull session – there is just another level of generality people don’t talk so much. So we focus much more on people – so these are the things we have – so just for the new session we have, let me show you (confidential document not allowed to include with the research). So once we put all that in we can define the KPIs and everything, ok, but look we know the drivers but look what happens, ok, this is important, if I say to you what are the main KPIs of a job – everybody would say we know all the KPIs its cost, quality, etc, etc, but when these people are in action – look – Number 1: Just think about schedule, budget – he didn’t talk about quality or safety – he talked about customer satisfaction and behaviour. You know in 12 guys, 10 guys talk about schedule, 9 guys talk about budget, 2 guys talk about quality, 4 guys talk about safety, 7 guys talk about behaviour and 7 talk about customer satisfaction, 10 about behaviour, 4 lean, 2 IFOA.

**What is IFOA?**

Integrated Form of Agreement, that’s the contract that includes behaviour and lean – that is one of the best for me

So even with people saying we done that, like that, or they we say we know all the KPIs, they are blind – so, behaviour has three dysfunctions. One we call blindness – when its something you don’t see, the other we call frownness (double check this at 7:50 mark), for example when your riding a bike you just make a mistake when you fall because its an automatic thing that makes you forget about the details of the process and so if you’re a carpenter you won’t remember your finger when your hammer hits the finger – ok – and then we have misrepresentation when we think something is a but in fact its b – see – so you see a lot of blindness here. Ok, so if you just take main the KPIs of schedule, budget,
quality and safety not even talking about customer satisfaction just 1 guy out of 12 considered all of them so we prove that lean is good because when you put a collaborative process, if this guy is not thinking about quality the other guy participating is thinking about quality this guy would call his attention and say think about quality. That’s what proves the point for me about collaboration is the best way to go in projects because it reduces your blindness and frowness about things that you don’t see in a moment alright. So in our measuring of this we put for example, meanings, we put the KPIs posted, and then we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times, we go through the counter measures and we test the counter measures and they become part of the process so its something that we are applying to the current project right now and its about tracking costs. That’s one of the examples of what we are doing with me, so this team is managing that so and we also guide them through this training, we have everybody there and at the end of the training they get a certificate and they have everything and its good to increase the collaboration while we are also implementing 5S. That’s another thing that we did.

Do you find that the training, the actual approach to the training is more like Study Action Teams? Is this a positive are people more accepting and enjoy the whole training experience?

Yes, and uh because you give them exercises, if its just about talking about the book people get angry at it, they get bored, but one of the pluses they have let me see if I have any pluses (goes to supporting training documentation which was brought to the interview this is confidential and can not be used as part of the research analysis) here I have pluses and deltas here, she didn’t put all the pluses and deltas here but we usually have pluses and deltas for everything. So if you take all the pluses and deltas, interaction, timing (pluses) – deltas contractor and general contractor. If we take another session, the pluses are road map about lean helps to see the entire process better, participation and one of the deltas is more days between each session. So we have people really enjoy participating on this because its uh hands on type training. We talk about the book normally, I leave two or three sessions at the end we talk about 4 or 5 chapters of the book per session and during, in the sessions at the beginning I make comments and I ask them to make comments about one or two chapters but we focus on exercises. But I always relate it to the chapters. Ok, chapters 1-4 they talk about customer, customer satisfaction and value and then 4-6 they talk about 14 principles, then 6-21 they talk about the 14 principles, and the last two chapters are about implementation and how to become a lean organisation. So we know the structure of the book we focus the exercise to go along with what they are reading but we always ask them to give us comments, bullet points because it is the only way for us to make sure they are reading. Ok, if we don’t request then nobody is going to read the book. So that’s one of the things we did there alright. Just identifying customer value and how to create KPIs (and this is the 5S process we have here) we put using 5S, organisational chart
with roles and responsibilities you know people assessing each other, the first assessment they had we put an assessment tool, they gave because we made one foreman assess the other foreman so we made – so I am going to assess and I’m giving you 100 points because I just want to be nice to you that’s the buddy system – the first assessment we got everybody was perfect and we needed to go back and say no, if you do this you are not helping these other guys but what if I say something then he is going to be mad at me – so you need to re-educate people about telling them the assessment tool is not about blame but rather there to help them improve but if they are buddies its hard for them you know and I need to be patience because if I push then they become defensive – so we need to go it’s a risk approach and go back and forth. So that is you hammer and hammer and hammer until you break the rock. It takes time. So sometimes people say or why don’t you implement 5S – people say oh I implemented 5S pretty fast, I don’t believe that because you can have it working for one week but you don’t have it working forever because it takes time and you need to be patient and that’s what we have been trying to do and its challenging because sometimes you know – we have here a joke called golden gate shuttle because we want to jump from the bridge and commit suicide, the shuttle comes here twice a day so sometimes I just want to kill myself but the pressure just gets so high, but by the end of the day it seems to calm down and things get better, so you just need to be patient.

**So when did [org C] make the decision to go lean?**

2004

**Was it an in company based decision or was it requested elsewhere?**

It was a request from [org A – the client], they really understood the concept and said we are going for it, no matter what the owner says.

**How are your lean sessions structured and what do you cover in your sessions?**

Lean sessions have participation controls, people who gave the work, who didn’t give the work – ok – we had 15 sessions. So we control everybody’s participation, what we learned, session notes. So through the training we help people improve their performance by implementing lean. So we have our summary, session log, we control the trainings that everybody goes through, we also have the progress reports – showing things that he did and things that he didn’t do and things that we needs to do, [org C] production unit is another element. So we can control all the employees, all, all of them – alright. We have training for last planner system, we have training for kaizen, the other things that we are doing is applying that and let me show you something *(another confidential document is shown – can not use this for the analysis and reporting)* we have insurance mapping, we have additional
occurrence events which assist in overcoming problems, the collaborative teams address each question of the problem and then at the end we came up with a process in how to deal with any future insurance issues. Once you implement you need to test and modify. It took around 5-6 months about 14 meetings of around 1.5 each session to overcome the problem of insurance and insurance requirements on site – it took this long because not all team members could participate in all the meetings. Problems emerge because of the culture with people mindsets using it to deal with problems; I need them to anticipate problems. You need to anticipate and plan.

We also have developed an assessment tool for the last planner system; I’ll pick the ones at the beginning because they are the better ones. So anyway we have an assessment for planning, an assessment for the 6 week look-a-head and we have another assessment for the weekly work plan. In a way that is you can answer certain questions here you get a red and automatically you get a red on the other ones. The assessment has been around since about October 2008, we are also adding additional elements to the tools and adding other assessment tools such as behaviour and processes to help implement into the culture. So this is one of the things that we are doing, we are also putting to the entire company to define missions, vision, and values, something that we call the [org C] way – it too us one year but it was a collaborative process we took a cross functional team of the company and we had the president there but they were not allowed to say anything – let us define what out purpose is, where we want to go and the values we think are important that will drive behaviour. It was a one year and two months process, a lot of fights, aligning all the values for behaviours with lean – like being process focused, being relationship orientated a lot of things in a way that align with the lean culture and now we are measuring this, measuring how we are being successful in this journey. And uh, trainings, candidates for training – it’s a lot of things. But is there any specific questions you wanted to ask, challenges for example.

Well first off, I would like to know about some of the challenges [org C] faced when implementing lean?

You know the biggest challenge there is, is to engage everybody in the process. Even having the commitment from the top, we want the top managers to enforce the process because it makes our lives easier. But in fact people don’t buy in, so it required a huge negotiation process in order to engage everybody because some guys were already doing something that we call lean and they said we are already doing this why should we change. First, it is not a change, we are just transforming and taking things to another level and second let me have a look at what you are doing and can I make an assessment and talk to you, its not blame. So you need to have all those negotiations and the entire company went through these negotiations and some people took two for us to reach but they were valuable people and we didn’t think it was fair for us to say if you are not lean then you don’t work
here. You know we need to give everybody a chance and we need to wait because a lot of guys are successful and they say why should we apply lean if we are already successful and instead of saying ok, we say but we want you to be more successful then you are. But we need to do that with respect because they have their own time, their own dynamic and we need to adapt everything to their own dynamic so for us it was kind of frustrating because you need to wait. Waiting is one of the most frustrating things you have in lean implementation and you need to be patience and it’s a risky approach as it trial and error at the same time and its interesting because a lot of things/team progress – but sometimes things happen and they confess to the business that the approach is useful and then you need to go there instead of blaming the team – you need to understand what’s going on, what are their frustrations, so you need to be very, very patient. This is one of the biggest challenges we have in implementing lean is people going back to business as usual – sometimes you don’t have the same levels of implementation throughout the company, it’s different and you need to use the process to that. Because you are not achieving perfection. We were just talking today about, can we use the same language when you are relating to last planner system about some issues in our projects – one of the guys said no we can’t, we just can’t because there are some things that the contract requires, that the owner requires – that I need to use that language. But can you keep the thinking at least, no, no, the thinking and the approach we will keep we are just using another word. So they start negotiating that so sometimes you get frustrated because sometimes you have one person saying one thing and its directly the same as what another is saying only its different words – throughout the company and sometimes you just can not have it. They can explain what lean is, everybody can explain the same thing, but sometimes some owners say, if I have a problem, I want a RFI (Request for Information) and we were trying to get rid of them but he says I don’t know how to function without a RFI, so ok we would normally cater to his request – but for this project no we will not. So of course he would change and of course we would help him change but it takes time. Even with subcontractors when we started using lean, using last planner system, the subcontractors called us and asked are we using last planner system, we said yes, so now I need to charge you guys more because this is a pure waste of time – but the problem is they didn’t understand what last planner system was – today they come here they are so happy because first a pull session that took 6 or 8 hours to do now it takes 1.5 hours. We do the same pull session over an hour and a half with similar results because we learn how to do that. Pull session occur all the time (the total number that have been conducted are unknown) so once you do them over and over again you start learning. So waiting is the biggest frustration and sometimes some people in the company want to go faster, you as an individual can go faster but will the company cross the bridge at the same time as the individual no. As a lean leader I need to stay with them and go not to fast but in a way where I can take everybody to other side. The frustrations rely on people and sometimes a lot of people do not understand how to make that happen and they start making assessments that do not represent reality and then you need to deal with those assessments and start back at square one and repeating the process until everybody learns, understands and can cross
the bridge together. Focusing on why, why we are doing this, why the company has decided to do this and why we need to be patience. That’s one of the biggest challenges we have. But the company is transforming, it’s low but it is transforming – now we are at a point were we need to get together and give an extra effort again just to overcome this hill because you are almost there, in fact if you have a s curve (draw on a board – no record of the placing interviewee is discussing is available in the accompanying notes taken during the interview) we are currently here in the implementation of lean we are at a certain stage in the process where we need to start moving again and now we require more leadership. So what we require of our project executives is to get closer to the project and that’s the reason why we are increasing the number of meetings associated with the project and really use leadership to coach and not push them, be closer to them and make sure they are not being complacent in the assessment of themselves.

So was the implementation process for the company undertaken in stages? Or was the process undertaken filtered throughout the company?

So what I can tell you is that is a little bit chaotic at the beginning because you don’t know where to go. Would you say that’s a challenge? Oh yes, at the beginning because you need to, we have so many things to do, but then after certain point we start organising more and we start to after a while start to realise if we don’t have our mission, vision and values aligned we aren’t getting there. You can implement a tool but the transformation is beyond the tool domain, its about behaviour, its about the way we perceive things, the way we want to be. So how and where is the place we can to go to make that happen, we need to revisit the mission, vision and values of the company and that need to be put in place. So we put everybody together, but some people said oh we can’t do that, just give me a piece of paper and I will write everything – no, no, no, you stop – you’re not writing anything the company will do that by itself. How? Just by bringing everybody here, we do a cross functional team and talk and it’s a fight, it is crazy. I think [org C] is brave enough to go for this, I think it was one of our best things we did, you know we could overcome selfishness and allow everybody to talk, we didn’t control anything – the process as controlled for sure, but only certain things but what you want to say is not controlled and you can say whatever you want people need to listen and be respectful. So it took us a long time about 1 year and 2 months just to go over this process because putting all these people together the agendas didn’t fit and you go back and forth, then you have the frustration and then things didn’t go well and then you need to fix the problem again and then understand and put in other processes in place, create a new agenda so it took us a lot of time but now we see value in this because every time we have a problem we say pick the [org C] way – we have a booklet, so read it if you have a problem see the behaviour and assess the problem, looking at elements as what did you miss, oh I wasn’t being relationship focused, I was not treating people with respect etc. What do I need to do to overcome this, this ok now I can move forward etc. So during our mapping sessions we
always assess the values, whether they are solution orientated or not. So we have a lot of things, so it is still fragmented but it’s a kind of mosaic, but now we can see the picture. In the past it was a green colour, a red, a purple, why all these pieces – the pieces are slowly coming together. Its slow, that’s a frustration, the change is slow, you don’t change a company in one or two years it takes a lot of years because you need to transform behaviour and when you transform behaviour you transform your metabolism, when you change you change yourself. You change you pet types, that’s things that connect your cells – you change that. So its painful and it takes time. The process allows other problems to be addressed and solved liked trust – particularly when people talk about lean they don’t talk about that in detail. They don’t say in our company nobody trusts each other – its hard for you to accept the fact that people are pretending to trust each other when in fact they don’t. You need to build that trust and building trust takes time – because whenever you do something that harms the trust you go back to square one again. You need to start all over again and that’s frustrating when someone says something you just disrupt everything – its very delicate process.

Can you tell me a little about the working culture of the company? Particularly, how has it changed as a result of lean implementation? For example, how lean has and its processes changed working relationships.

One of major differences we have seen is collaboration with the working environment to be much more collaborative and the awareness of the current situation changes. You have people more prepared when they talk and make an assessment they rely on information that is very accurate. So when someone starts talking to me about planning, I need to prepare myself because this guy comes up with good comments. So for me it’s the way we see the world, this may seem philosophical, but it has changed by making us more aware of the world and current situations from the past and because of that we start seeing things in a different way we start thinking about more variables. You also start having different conversations and its different in a way because people start becoming more sceptical, you think its not that I don’t trust, its more give me the information – I trust your knowledge, but if you give information that doesn’t seem correct of course I’m going to become sceptical, and its this that takes transformation to another level because you think its going to be easy but it really gets worse. Because they require more from you, so it means they are stronger, this is something that I’m observing now.

You’ve talked about some of the challenges the company has faced during lean implementation but what have some of the successes of lean implementation with the organisation?

Leadership, it’s a huge success in leadership not only within the company but outside the company as well. We have other companies to us saying can you help us, so they are building trust with us based
on our knowledge and its putting us into a position, we are happy to be in this position but its also a huge responsibility, because people start looking at you and your organisation. For example now we are creating a lean community at [org C] so all these guys that went through the training with us, were going to meet every two months to talk about lean and we are going to create a two way road training programme. So we are going to have architecture firms/practices coming here to learn lean, we are going to have one guy do a session on set based design and of course lean, another guy from another architecture practice is going to do a presentation – but I’m not sure if its about 5S in an architects office and we are going to make a presentation about out processes here. We are going to start exchanging this information openly and what we are going to start now is to go to other offices to give training but what we are saying is that they come to our office to give training. We plan to create this thing that we call met-organisation – its organisations working together but with decentralised management – not just one guy managing everything, so it all about how we can work together in order to deliver customer value. How can we be more effective and efficient and its this that lean is allowing us to do, its like how Toyota works with suppliers we are starting to work with our partners now because we have something in common which is our training. So this training has become very strategic for us to develop leadership, to increase knowledge and also to modify the construction business because you can not be lean by yourself. So these are the things for me that are huge advantages that we have because right now people are looking to us and we tell everybody we are not perfect, you will find a lot of defects at [org C] but one thing you can deny we are really trying to be complete and that’s the reason why I brought you here. If you want to go deeper I can start bringing in documents because its one thing talking but its another thing to document everything that you are doing and how the processes, for example for lean sessions mapping we plan to have several sessions – we had 14 which is double.

**Do you find that a frustration associated with lean that there is so many sessions and so much discussion?**

Yes, yes it is a frustration at the beginning but unless you understand it is a process you need to go through if we spend 14 sessions, the next mapping we do, which we are doing right now we are going to spend 10. And then we are going to spend 6, but that’s the learning curve and people don’t want to go through that. So it is frustrating but we are explaining because people complain its too much time, or its this, its expensive but wait a minute look what we did and the next time we are going to get together we are going to learn more in order to save more time. Because let me show you something (confidential document can not be used in the research). **So it’s more a negative that becomes a positive.** Yes, it’s the frustration of the learning process. **When we discuss breakdowns on the job, the solution is not always in your domain, but occurs somewhere upstream of the problem.** We bring in the entire company to solve problems in order to reduce the calling of blame particularly
if someone does not attend all session meetings. You also need to be cautious how you approach the problem and the people involved in the problem.

We started assessment and self assessment in 2008 and we have found when it comes to the self assessment tool, people tend to over assess themselves. When I see a lot of green, I don’t like that as it shows that there are underlying problems. Assessment tool asks a variety of questions associated with the project and individuals are assessed based on their performance of the tasks.

**Do you utilise the use of integrated team environments in the day-to-day working of the organisation as well as on site?**

Not all the time, sometimes we do move some people around – I think the company tends to keep the same project team if possible. And every time we bring in a new guy, they have to fit in with team dynamics and again it’s a learning process. If a team is wholly integrated, this does not occur, yes the dynamics are there but a team is never fully integrated. There is a lot to do, it’s a progress, compared to other companies yes we are integrated but in terms of lean no, it is impossible to be fully integrated and achieve perfection – but I think we are getting there. I like to pursue perfection and it’s a challenge, but in my view we are always going to be striving for perfection. That’s what makes it interesting and challenging about the pursuit of perfection, you lead by example and show the community that you are trying to improve. If you are perfect you are not tolerant. Doubt becomes a challenge if you don’t find knowledge and research – for me its about philosophy.

**End of Interview**
Interview Analysis

Each interview will be analysis separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organisational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analysed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes will be boldly green highlighted with underlined. Where features of diffusion groupings are not present a description of ‘not discussed’ be placed. A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue. The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 5 Results: Descriptive Analysis.
### Interviewee 1: Champion and Innovator

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<thead>
<tr>
<th>Feature</th>
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<tr>
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<tr>
<td><strong>Organisation &amp; Management Environment</strong></td>
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<tr>
<td>Formal Social System</td>
<td>Not Discussed</td>
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<td>Informal Social Structure</td>
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<tr>
<td>Social Norms</td>
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The interviewee was very open about the nature of the organisational environment the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of creativity and interaction across working groups.

The first emerging social norm identified was **advocacy**.

The interviewee highlighted **advocacy** to be evident firstly in personal leadership and management. The interviewee described the process to involve such stages as reflection, questioning, reasoning, acceptance and rejection without questioning. The presence of leadership and personal management within advocacy the interviewee distinguishes the difference to be influenced by contextual means.

The second highlighted **advocacy** perspective...
was concerned with performance. The performance of both advocacy styles according to the interviewee is guided by individual performance.

The interviewee also discussed a number of processes or approaches the organisation uses to promote advocacy, particularly the use of something known as the Gamba Wall. The purpose of the Gamba Wall within the organisation is concerned with the making and management of project and individual assessments.

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The second emerging social norm identified was integration.

The interviewee discussed integration in terms of collaborative working environments. The nature of the description and discussion highlighted a link between relationships, awareness and communicative learning.

Core to this perception is the philosophical nature of lean making employees more aware of “seeing things in a different way” and “thinking about more variables”.

The interviewee also noted that through integration you as an individual you “start having different conversations.”
The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The third emerging social norm identified was education.

The interviewee discussed education in terms of cultural change through integration. The interviewee highlighted and advocated how education is integrated within the organisation through culture, more specifically cultural change.

The interviewee discussed how education particularly of the innovation is assisting in maturing the cultural environment of the organisation, particularly in terms of organisational integration, awareness of lean strategies and understanding lean.

The interviewee also noted that senior management has developed a specific education programme for the organisation and the success of this programme has lead the organisation to be approached to do external educational training.

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"….we practice scientific thinking that means understanding the current; situation and gathering data to formulate a hypothesis, understanding the root cause for the problem by asking why five times – put in counter; measures, test the counter measures if they work they will become part of; the improvement if they don’t work go back again, check again, that’s; scientific thinking….systematic thinking is divided into three parts
The second emerging social norm identified was **stability**. 3 stability contexts were identified within the organisation. Firstly stability was identified and discussed as a lean innovation approach.

The interviewee highlighted how the approach taken by the organisation’s management and the influence of individuals within the organisation:

The direct focus is centred on the five elements of lean thinking and the use of these elements to be become more effective i.e. “*doing the right thing*” and efficient i.e. “*doing the right thing in a continuous improvement loop*”.

The second stability context described by the interviewee was the entrustment of thinking of organisational management.

According to the interviewee the purpose behind imposing a particular approach to thinking according to the interviewee is the provision to individuals of a stability base to address concerns and reflections about the innovation.

The third stability context involved the use and advocation of self-assessment management tools as a part of the social environment.

According to the interviewee the self-assessment tool was brought into the organisation by management as a means to identify, assess and overcome underlying problems associated with the lean innovation. However the tool has been varied in the success and measurement of **stability** within the organisation.

The interviewee was asked a series of questions that we; say holistic thinking [which is the] need to view the system as a whole, I; need to have the big picture always. Dynamic thinking [is the] need to have; this constant thing going on that is identifying the present situation, problem; solving and continuous improvement, I need to be on that. And then I have; the third one that is called [closed] loop thinking where I need to know the; implications of my decision throughout the system once I make an; improvement”
concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The second emerging social norm identified was culture. The interviewee described culture in correlation with the greater organisational environment.

For the interviewee culture is about strategic direction and the management of strategic direction through the utilisation of indicators, referred to a north indicator. The purpose of such indicators is supposed to provide the individual with a responsive framework which guides their work practices.

The presence of cultural indicators is also present for the organisational environment which assists in frame working the strategic direction and management of the innovation.

Opinion Leaders & Change Agents

The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the organisational environment advocates that everyone in the organisation is lean leaders (or opinion leaders). The discussion of opinion leaders within the organisation was done in context to the innovation (or lean).
The interviewee discussed the presence of opinion leaders to be in the form of educators of which the interviewee identified themselves as. The interviewee described their (opinion leader) educational role to include preparation of exercises that challenge and develop individual and collective ‘scientific thinking’, ‘systematic thinking’, ‘leadership’ and ‘lean awareness’.

According to the interviewee change agents play an essential and significant role within the organisation when lean implementation occurs. Questions concerning opinion leaders and change agents were important as the interviewee is identifiable as a champion and innovator as defined by Rogers’ diffusion theory framework.

The interviewee was asked to describe their role within the organisational environment. The interviewee highlighted and discussed how rather than an individual or group of individuals the culture of the organisation has assisted in acting as a change agent of lean implementation.

According the interviewee the nature of the cultural environment of the organisation assists in providing a platform for other organisations to utilise as a framework of lean implementation. Particularly the interviewee described how management through the provision of a unique work environment where the organisation becomes an external change agent to organisational specific trade partners wanting to undergo a lean transformation or learn more about the lean innovation:

“We plan to create this thing that we call met-organisation – its organisations working together but with decentralised management…. How can we be more effective and efficient and it’s this that lean is allowing us to do, it’s like how Toyota works with suppliers we are starting to work with our partners now because we have something in common which is our training. So this training has become very strategic for us to develop leadership, to increase knowledge and also to modify the construction business because you cannot be lean by yourself”.

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<td>Knowledge</td>
<td>The interviewee when asked about their role</td>
<td>“We plan to create this thing that we call met-organisation – its organisations working together but with decentralised management…. How can we be more effective and efficient and it’s this that lean is allowing us to do, it’s like how Toyota works with suppliers we are starting to work with our partners now because we have something in common which is our training. So this training has become very strategic for us to develop leadership, to increase knowledge and also to modify the construction business because you cannot be lean by yourself”.</td>
<td>Not Applicable</td>
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within the organisation and exposure to lean described a long-term employment within the industry and their own organisation. This experience has lead them to their current position within the senior management team of the organisation.

The interviewee described their current role as a **champion and innovator**. The role description indicates that the interviewee is categorised as a **champion and innovator** for the purpose of the research and as set out in the theoretical framework.

This individual has had a **high level of exposure** to lean innovation and lean transformation in organisational environments through their role as lean educator and facilitator within the organisation and through the organisation’s external educational programmes.

**Persuasion**

The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.

The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of the **formal social system**. The interviewee discussed the use the formal social system through formal awareness of adoption and process of the lean innovation

The interviewee was not committal over with the success/experience so far with the new training/education framework.
The interviewee discussed and identified the organisation as a core management group party in the formal social structure of organisation A. The organisation is also identified as a trade partner in other lean projects across the USA.

The organisation according to the interviewee has been in contractual relations with organisation A for a number of years. In 2004 this relationship became more developed at the request from organisation A for the organisation to begin implementing lean. This contractual relationship between the organisation and organisation A has enabled according to the interviewee the exposure individuals and teams on a project-by-project basis allows individuals and teams within the organisation to learn and understand the benefits associated with the innovation before making a decision to accept or reject the innovation.

Further to this persuasion approach used by the organisation, organisational management enabled all employees to participate in the re-writing of the formal missions, visions, goals and objectives underpinning the organisation.

According to the interviewee, this approach was long and tough, particularly in gaining a mutual level of respect towards and understanding of the lean innovation across the whole organisation.

The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.  

"So lean is the delivery of customer value through a streamlined process practising continuous improvement we are going to make that happen by implementing the five elements of lean thinking they are customer value; chain of value, flow, pull and perfection and then we will develop scientific thinking, systematic thinking and constant self-purpose and we will achieve; excellence. Excellence when you have good business results, when
The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of **social norms**. The interviewee discussed **advocacy** in two contexts. The first **advocacy** perspective is the education of employees.

The interviewee focused their description on the education of employees in the basic ideas of lean principles and their application within the construction and organisational environments.

The second **advocacy** perspective is organisational change.

The interviewee was concerned the need for individuals within the organisational environment to change their basic underlying assumptions of the lean innovation by embracing and leading the lean transformation through education.

"we then start talking about customer value...."

This approach according to the interviewee creates this sense that the individual is questioning and trying to understand the lean innovation and are themselves becoming leaders in the innovation.

"....to organise everything at [the organisation] we are focusing on thinking because thinking drives everything, behaviour drives everything so we are going to see....we are doing 5S but we’re not crazy about things but we are crazy about making people understand about customer value, chain of value flow, pull and pursue perfection because we believe that if we help them go through this everybody is empowered in your organisation to drive efficiency through processes that the customers want....So then we use this as part of the culture we say ok that the way you are going to approach this, that is the; culture, that is the way you are going to behave and these are the things I want you to develop I always want you to practice and say reflection and think...."

"You change your basic underlying assumptions, if and only if you practice exercises and you show why you need to change....the first thing you do when you are implementing lean [ask yourself these questions]....first question that you ask....are [we] going to see a process or something?....the second question, what are the processes that you have in place that help understand your chain of value....so we teach them that the first question that you should ask when you are a lean leader, when you are working on the culture is what’s customer value...... so we start having these conversations about who is the customer and so”:

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the lean implementation process for the organisation.

The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of **social norms**. The interviewee discussed **culture** through cultural ideals and organisational specific cultural thinking.

The interviewee discussed this idea that in the past organisations have tended to focus on the implementation of the lean innovation in terms of ‘tools’ and ‘principles’ rather than something on a deeper philosophical level.

Culturally the organisation is attempting to persuade individuals through the organising of the organisation.

<table>
<thead>
<tr>
<th>Decision/Implementation</th>
<th>The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation.</th>
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<tbody>
<tr>
<td></td>
<td>The interviewee first discussed the informing of the lean <strong>decision</strong> within the organisational, more specifically education. The interviewee discussed the communication of the lean <strong>decision</strong> in terms of <strong>reading resources</strong>.</td>
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<td>According to the interviewee as part of their organisation specific education and training programme referred to as <em>Lean Training at [the organisation]</em>.</td>
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<td>The purpose of this organisational specific training programme is to provide reading resources to assist employees to understand the</td>
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<td><em>everything will be better at the end</em>.</td>
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<td>The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of the organisation.</td>
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innovation, the process of implementation and the organisation’s decision. Such as “The Toyota Way”, “Lean Thinking: The Machine which changed the World”, “The Toyota Culture” and “Toyota Talent”.

According to the interviewee, the reasoning behind this approach to using a combination of reading resources is linked to providing the organisation’s want to provide a larger knowledge base for its employees.

The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation.

The interviewee first discussed the informing of the lean decision within the organisational, more specifically education. The interviewee discussed the communication of the lean decision in terms of study action teams.

According to the interviewee study action teams are utilised by management as part of a larger educational programme framework to educate the organisation concerning innovations and organisational specific objectives.

Underpinning the study action team approach within the organisation is the decision of ‘change’ through readings and training. The presence and content of the study action team agenda as part of a larger educational programme for the organisation is supported according to the interviewee through plus/delta learning.

The purpose behind the organisation utilising plus/delta learning as part of its education programme framework according to the

“....we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times we go through the counter measures and we test the counter measures and they become part of the process – so it’s something that we are applying to the current project right now and it’s about tracking costs…. so – and we also guide them through this training, we have everybody there and at the end of the training they get a certificate and they have everything and it’s good to increase the collaboration while we are also implementing....”
The interviewee generally described elements of implementation rather than an overall strategic process. This occurred as the organisation has been implementing for a number of years.

**Elements of implementation** for the lean innovation are the second aspect to be discussed. The implementation of the innovation refers to the putting to use of lean within the organisational and management environments. The interviewee did not openly discuss the implementation of the lean innovation into the organisation in detail rather the interviewee discussed specific elements and approaches management have utilised.

The first element described by the interviewee was the early phasing of implementation and the forming of the strategic direction of the organisation by senior management. Specifically for this organisation the strategic direction involved a restructure of the organisational norms, goals, agendas, missions and values.

“....we put everybody together....Just by bringing everybody here, we do a cross functional team and talk and it’s a fight, it is crazy. I think [the; organisation] is brave enough to go for this, I think it was one of our best things we did, you know we could overcome selfishness and allow everybody to talk, we didn’t control anything – the process as controlled for sure, but only certain things but what you want to say is not controlled and you can; say whatever you want people need to listen and be respectful. So it took us a long time about 1 year and 2 months just to go over this process because putting all these people together the agendas didn’t fit and you go back and forth, then you have the frustration and then things didn’t go well and then you need to fix the problem again and then understand and put in other processes in place, create a new agenda so it took us a lot of time but now we see value in this because every time we have a problem we say pick the [organisation] way....we have a booklet, so read it if you have a problem see the behaviour and assess the problem”.

The interviewee generally described elements of implementation rather than an overall strategic process. This occurred as the organisation has been implementing for a number of years.

**Elements of implementation** for the lean innovation are the second aspect to be discussed. The implementation of the innovation refers to the putting to use of lean within the organisational and management environments. The interviewee did not openly discuss the

“You can implement a tool but the transformation is beyond the tool domain it’s about behaviour, it’s about the way we perceive things, the way we want to be. So how and where is the place we can to go to make that happen, we need to revisit the mission, vision and values of the company and that need to be put in place”
The implementation of the lean innovation into the organisation in detail rather than the interviewee discussed specific elements and approaches management have utilised. The second element described by the interviewee was the early phasing of implementation and the selection of lean tools.

**Confirmation**

As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through *education programmes and training initiatives* and the extension of the underlying educational agenda for the organisation.

According to the interviewee management acknowledges that the lean innovation does not lead to the full achievement of perfection rather perfection is seen as a continuing improving and challenging one’s self. This underlying philosophical understanding of lean is represented in the organisation’s educational agenda.

The interviewee discussed how as the organisation’s lean facilitator it is their role to develop and manage the educational agenda, addressing in particular their role in terms of the last planner system sub-educational agenda.

The interviewee reflected heavily on their role as the organisation’s lean facilitator. The strength of the educational agenda within the organisation is

| Confirmation | “...for [the] last planner system these are the steps, these are the things I need to look at, the key points and that’s my leadership thinking, for example for me to develop an educational plan. So one of the things we are doing here when you are doing planning, you need to practice let’s say reflection,...you need to do some preparation and it means you need to understand the current situation,...you need to identify the current conditions outside satisfaction, you need to take a look at the drawings, take a look at the specifications, prepare a first planner schedule....to know the current situation” | Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation. |
frame-worked by elements of individual reflection, questioning and reasoning behind the purpose, approach to and understanding of the lean innovation.

As part of the interview process interviewees were asked to identify and discuss various confirmation of 'success' stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through the assessment of organisational challenges and improving personal and project related performances.

The interviewee discussed through the development of a self-assessment tool the creation of lean knowledge and overcoming of challenges within the organisation associated with the lean innovation. At the first introduction of the self-assessment tool by management the interviewee noted that employees almost immediately rejected the tool as they saw it as a way to 'place and shift blame'.

The fault in the assessment tool for the interviewee was not so much the assessment tool but rather the attitudes of individuals in utilising and understanding the assessment tool. The interviewee discussed how the organisation’s management team went back to the drawing board to reassess and reflect on ways to overcome people’s natural inclinations to either shift the blame or disguise true feelings by not truly assessing performance based of fear potential backlash.

As discussed by the interviewee particularly addresses issues of cultural behaviours, attitudes

| “....so you need to re-educate people about telling them the assessment tool is not about blame but rather there to help them improve but if they are buddies it’s hard for them you know and I need to be patience because if I push then they become defensive – so we need to go it’s a risk approach and go back and forth. So that is you hammer and hammer and hammer until you break the rock. It takes time” |
and values, and how these cultural attributes influence acceptance and rejection of innovation. Although the rejection of the assessment tool occurred in the first instance, through the persistence of the organisation’s management and the lean facilitator and the educational agenda individuals are able to understand purposes behind the use of particular tools in the organisation’s transformation to lean.

As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through **leadership** more specifically internal and external leadership.

Of particular importance to the interviewee’s opinion was how the organisation’s approach and implementation processes has made the organisation a field leader.

This is particularly relevant to the interviewee with external companies approaching the organisation to assist in their own lean transformations.

“Leadership, it’s a huge success in leadership not only within the company but outside the company as well. We have other companies to us saying can you help us, so they are building trust with us based on our knowledge and it’s putting us into a position, we are happy to be in this position but it’s also a huge responsibility, because people start looking at you and your organisation. For example now we are creating a lean community at [the organisation] so all these guys that went through the training with us, were going to meet every two months to talk about lean and we are going to create a two way road training programme”.

As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through **the learning process** and frustrations associated with the lean learning process.

“When we discuss breakdowns on the job, the solution is not always in your domain, but occurs somewhere upstream of the problem. We bring in the entire company to solve problems in order to reduce the calling of blame particularly if someone does not attend all session meetings. You also need to be cautious how you approach the problem and the people involved in the problem”.
The interviewee discussed how such learning process problems to be present in discussions concerning project breakdowns.

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<td>Verbal Communication</td>
<td>When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of <strong>verbal communicative tools and methods</strong>. The interviewee identified communication to be guided by engaging the workforce through <strong>reflective learning</strong>. Reflective learning objectives encouraging <strong>visual and verbal communications</strong>.</td>
<td>“….we understand their challenges and you help them improve their lean approach the assessment that you make will be taken as an opportunity for improvement….”</td>
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<td>The first perspective highlighted the use of the <em>Gamba Wall</em> going above and beyond just the simple making of an assessment of an action or task. According to the interviewee the purpose of the <em>Gamba Wall</em> is actually being able to understand the place and how action occurs. <em>Gamba Wall</em> for the interviewee is about the need to talk to people involved in the task, the need to work with the people to provide a suitable action and understand the challenges associated with the task and the action as well as people involved in the task and action. According to the interviewee by spending time and working with people using the Gamba Wall can reduce the shifting of blame within the organisation:</td>
<td>“…we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times, we go through the counter measures and we test the counter measures and they become part of the process – so it’s something that we are applying to the current project right now and it’s about tracking costs…. so – and we also guide them through this training, we have everybody there and at the; end of the training they get a certificate and they have everything and it’s good to increase the collaboration while we are also implementing…..”</td>
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the utilisation of *plus/delta learning* in the form of exercise commonality between each training group. In particular the use of *plus/delta learning* highlights the calling of attention to specific areas of educational readings, revision of exercises and basic underlying assumptions.

The third reflective learning perspective is also linked to organisational education and training programmes through the encouragement of *written* and *verbal communications*. The process of reflective learning in education and training programmes as described by the interviewee.

When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of *verbal communicative tools and methods*. The interviewee identified communication to be guided by engaging the workforce through *study action teams*.

*Study action teams* as a tool of the larger communicative tooling framework within the organisation encouraging *verbal communication* was also discussed by the interviewee.

The use of study action teams as part of the communication tool framework according to the interviewee has been used as an informal way to educate and train both organisational employees and external organisational trade partners.

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<th>Visual Communication</th>
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“...we always have a mix at the beginning we just had people from [the organisation] but now we have trade partners, we have architects, we have owners together.... its always good to make a mix but what we're focusing; on right now is to give training to a project team because if I have people; from different places I can put a case that will be something that I have in; my mind that people suggest but if I have a team then we can use a real case; and say alright tell me what your problem is...”
**visual and written communicative tools and methods.** The interviewee identified communication to be guided by engaging the workforce through **project specific learning.**

Organisational management encourages **visual and written communication** within the organisation through **project specific learning** objectives.

**Project specific learning** objectives emerged as necessity within the organisation through the utilisation and development of the *Gamba Wall* which has enabled project executives within the organisation to “go to the project and assess what your team is doing”.

When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of **verbal communicative tools and methods.** The interviewee identified communication to be guided by engaging the workforce through **reflective learning. Reflective learning** objectives encouraging **visual and verbal communications.**

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“….we understand their challenges and you help them improve their lean approach the assessment that you make will be taken as an opportunity for improvement....”

“....we have a meeting to learn and understand the current situation, we understand the problem, practice problem solving, we ask why five times, we go through the counter measures and we test the counter measures and they become part of the process – so it’s something that we are applying to the current project right now and it’s about tracking costs…. so – and we also guide them through this training, we have everybody there and at the end of the training they get a certificate and they have everything and it’s good to increase the collaboration while we are also implementing....”
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### Challenges

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<td>Direct versus Indirect</td>
<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation. The interviewee discussed <em>communication and training</em> as a <em>direct</em> and <em>indirect</em> challenge currently impacting the organisation. The interviewee highlighted the <em>direct perspective</em> to the application of the organisation’s lean training programme to organisational trade partners and its <em>minimal</em> impact on communication. According to the interviewee providing training to organisational trade partners causes communication and training issues. The <em>direct consequence</em> in terms of communication and training affects the organisational trade partner more so than organisation C management. However, organisation C does experience <em>indirect consequences</em> through the provision of additional training programmes which can cause external communicational strain according to the interviewee.</td>
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<td>“….we need to have everybody there, the owner, the architect, the trade partners, the general contractor, consultants – we have all of them in the room. Sometimes we don’t have all of them but we have people representing them at least. And then we go through that and we help them understand what lean is”</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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<td>“Even having the commitment from the top, we want the top managers to enforce the process because it makes our lives easier. But in fact people don’t buy in, so it required...”</td>
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organisational and project environments as a result of lean implementation.

The interviewee discussed engagement with lean implementation as a direct challenge currently impacting the organisation.

The interviewee identified and discussed the engagement of the entire organisation as the biggest challenge in the process.

The interviewee noted that the direct engagement consequence emerged as a result of the cultural attitudes and perceptions that individuals held regarding the lean innovation. Particularly such attitudes were associated with self-assessments, the need to blame and questioning the reason behind the lean transformation.

The impact of such direct consequences affects both individual employees and the organisation, in terms of acceptance, attitude adjustments and time.

During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation.

The interviewee discussed time as a direct and indirect challenge currently impacting the organisation.

The interviewee discussed time issues associated with the implementation of the lean innovation within the organisation.

The interviewee highlighted the direct and "a huge negotiation process in order to engage everybody because some guys were already doing something that we call lean and they said we are already doing this why should we change”

"….we need to give everybody a chance and we need to wait because a lot of guys are successful and they say why should we apply lean if we are already successful and instead of saying ok, we say but we want you to be more successful then you are. But we need to do that with respect because they have their own time, their own dynamic and we need to adapt everything to their own dynamic so for us it was kind of frustrating because you need to wait. Waiting is one of the most frustrating things you have in lean implementation and you need to be patience and it’s a risky approach as it trial and error at the same time and its interesting because a lot of things/team progress – but sometimes things happen and they confess to the business that the approach is useful and then you need to go there instead of blaming the
**Moderate** frustrations associated with the implementation process of the lean innovation.

The **indirect consequences** which individual employees may experience over the course of the implementation process within the organisation. These personal frustrations emerge in particular as a result of different acceptance levels of the lean innovation within the organisation and the need for individuals to process that fact.

During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation.

The interviewee discussed *the organisation* as a **direct** and **indirect** challenge currently impacting the organisation.

According to the interviewee the challenge with the organisation is identified as a **moderate** implication for the organisation and **minimal-moderate** for employees.

The **direct perspective** highlights the need for management to be patient throughout the implementation process and to reiterate the reasoning behind the decision:

The **direct consequence** also has a number of **indirect flow-on consequences** to individuals in middle and higher management levels within the organisation.

### Desirable versus Undesirable

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<th>Desirable</th>
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<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a</td>
<td>“It’s slow, that’s a frustration, the change is slow, you don’t change a company in one or two years it takes a lot of years because you need to transform behaviour and when you transform behaviour you transform your</td>
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<td><strong>team</strong> – you need to understand what: going on, what are their frustrations, so you need to be very, very patient”</td>
<td><strong>organisation</strong> as a <strong>direct</strong> and <strong>indirect</strong> challenge currently impacting the organisation.</td>
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<td>“This is one of the biggest challenges we have in implementing lean is people going back to business as usual – sometimes you don’t have the same levels of implementation throughout the company, its different and you need to use the process to that – because you are not achieving perfection”</td>
<td>*Focusing on why, why we are doing this, why the company has decided to do this and why we need to be patience. That’s one of the biggest; challenges we have. But the company is transforming, it’s low but it is transforming – now we are at a point were we need to get together and give an extra effort again just to overcome this hill because you are almost there, in fact if you have a s curve we are currently here in the implementation of lean we are at a certain stage in the process where we need to start moving again and now we require more leadership”</td>
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<td>“So what we require of our project executives is to get closer to the project and that’s the reason why we are increasing the number of meetings associated with the project and really use leadership to coach and not push them, be closer to them and make sure they are not being complacent in the assessment of themselves”</td>
<td>*It’s slow, that’s a frustration, the change is slow, you don’t change a company in one or two years it takes a lot of years because you need to transform behaviour and when you transform behaviour you transform your</td>
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result of lean implementation.

The interviewee discussed the organisation as a desirable and undesirable challenge currently impacting the organisation.

The interviewee highlighted that although the implementation process itself for the organisation is a desirable decision, a number of undesirable or dysfunctional elements emerge associated with time and cultural behaviours and attitudes associated with the lean innovation.

The consequences are identified as moderately dysfunctional in its impact for the organisation and minimal-moderately dysfunctional for individual employees.

metabolism, when you change you change yourself... So it’s painful and it takes time. The process allows other problems to be addressed and solved liked trust – particularly when people talk about lean they don’t; talk about that in detail. They don’t say in our company nobody trusts each other – it’s hard for you to accept the fact that people are pretending; to trust each other when in fact they don’t. You need to build that trust and building trust takes time – because whenever you do something that harms the trust you go back to square one again. You need to start all over again and that’s frustrating when someone says something you just disrupt everything – it’s very delicate process”
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and when the company decided to implement lean.

We started the implementation process at [org D] in 2003. Its been about 7 to 8 years now. To begin with I’m the executive vice president of the corporation we are headquartered in Milwaukee and I’ve spent time in Wisconsin and also in Florida and other branches as well. Did I say I’ve been with the company for 33 years? (No) so I’ve been with the company a long time. I started working as a project
engineer on different sites throughout the country, the [org D] company built brewing facilities around the country and then I worked on some hospitals in Ohio, in Florida and a few other locations before going back to the headquarters. So that’s my background and I eventually worked as project manager and then labour relations, legal insurance and a variety of things within the company. So I probably more than anybody else now within the company has had a broader background as you can have starting in the field operations side all the way through the business side of the operations.

What about your exposure to lean? I do recall you said in the beginning that the company started the implementation process in 2003.

The first exposure to the lean process was when I was attending a trade association conference, I believe it was in Arizona and at that time I stumbled across a seminar that was being held entitled ‘Lean Construction’. I’d never heard the term and I believe it was in 2002 and [LCI – co-founder] was doing a presentation essentially on the last planner and he mentioned that there were other folks who were involved with it like [org A – primary contractor] Construction, and I knew [org A – primary contractor] Construction from Wisconsin because that’s were they are based, their headquarters. So I began to look into that and it was a very short period of time after that, that I attended several other sessions of the lean construction institute, one in Washington, one in Las Vegas and began to get a feel for the last planner. So probably 2003 we started using the last planner a version we had worked with [org A – primary contractor] Constructions on a project in Milwaukee, at [university project] that’s where we became more familiar in using it. As a mechanical contractor we do plumbing, heating, fire protection – we do excavations, controls so many of our projects we might have three or four different trades that we are directly responsible for and as a result we felt even though a general contractor or construction manager would not be using the last planner – we use last planner for our own workforce which was very beneficial. However, when I started looking at this lean construction I wanted to learn more about it other than the last planner or you know IPD. So I started looking around the country and I couldn’t find anybody who was teaching any type or form of courses on lean construction, I then started looking at lean manufacturing and of course read several books about lean thinking and they talked about using some of the principles associated with lean manufacturing trying to apply them to construction. So then we, we have a university of Engineering that was putting on a series of courses designed for an individual to become what they call a sensei or a master facilitator of lean manufacturing and so I went back to school for a year to the [university] and there were a series of courses held at different time periods during that year to become acquired with lean manufacturing and it was that time after those courses that we began to realise that we really had to make a change and so we began to look at this globally since we didn’t know too much about it we decided to hire someone who had the benefit of lean manufacturing to come in and assess our company – which we did. Basically there were two things that emerged and were a result of that assessment – number I was
if we wanted to go visit someone other company in the United States who were thinking about doing or who were doing what we were thinking about doing, none existed and I said well that’s the bad news what’s the good news – and the consultant at that time said well you can write the book and hence I’m in the process of finishing a book right now on our journey on Lean Construction for the last 7 years. So at that point I got together with the president of the company and explained to him what I thought this process was all about and basically in a nutshell it’s about eliminating waste – period. So he said well what’s your vision and in the next couple of weeks or months whatever it was we developed jointly a mission statement of what lean was all about and that was the beginning of our communication that we sent out to everyone with an outline from 2003 or schedule to 2007 and outlined all the areas we were going to try to implement the lean process and that was our first line of communication throughout the company.

You mentioned the last planner system tool as one of the company’s and your own first real exposure to lean and you also mentioned that it was implemented within the company early on. Was this implementation on a project-to-project basis or facilitated throughout all company projects?

It was implemented through all major projects of the company.

How successful was the implementation approach utilised by the company in terms of last planner use particularly with the lack of education, knowledge and understanding of lean?

Because primarily it is a scheduling programme, I guess the hardest thing about implementing that was changing the culture or mindset of the individuals particularly site foreman or if you will the last planner. Because whenever you ask them how long is it going to take to do something they will always inflate the number or they were concerned that if they gave us a certain number or answer we expected them to fulfil that no matter what and so they wanted some wriggle room (for the use of a better term) so their estimates for that week would be a little off but if you didn’t make it by the end of the week we weren’t going to berate them – but what we wanted to do was to find out what the constraints were or why couldn’t they finish that and we had a matrix of all the different things why they couldn’t finish the work including the lack of information, materials, area was not ready etc. Once they understood this was a tool to help them and not necessarily to monitor then the culture began to change.

So did the company use any specific tools or mechanisms or approaches to overcome limitations with the foreman?
It was just a matter of week by week saying if they couldn’t reach a certain goal then maybe not be complete for example, like we might not be sitting in this room right now, or why was it so we kept track of the reasons why and actually one of the number 1 things that came out of that was materials and not having the right materials at the right time. So it was that mechanism which enabled us to keep checking to see whether or not we were making progress.

Have you found with your own educational background in lean manufacturing, lean thinking and lean construction the bridging of the educational gap has occurred in some way – particularly in the relationships that you have and your own role within the company?

No question is has helped.

Was it yourself who facilitated the company’s move towards the adoption of lean principles?

Yes, I’m referred to as the lean champion for the corporation and then we took it one step further and we are part of a larger corporation about 1 and a half billion dollars annual volume of about 30 companies and I began to then last year we took it to the parent company and taught classes for all of those companies so now each of those companies are supposed to have a lean champion.

Have you found that your role as lean champion within the company and now corporation has changed your relationship with others? Oh absolutely. Has this created a more open relationship, actually how would you describe it? I’ll describe it through events which I have facilitated within the company. When we first began, I’ll say we started with our tool was one of our first 5S events where I would stand up and facilitate the group and there were about in that one about 10-12 possibly even more on this particular event, it was a large group as it was a large event which lasted about 5 days. When I would be addressing the group after some training I would say well what would you like to do – and we went through all the different things that they thought were wasteful and then I asked them what do you think would be the best way to handle it – it was immediately, well, you know as executive vice president what do you want us to do and I said well the steering committee have given us some objectives and here they are and we repeated them but how we accomplish those objectives – I’m the facilitator – you as a team, that’s what’s different about this process to other processes used in the past. Because typically we have a couple of executives, a manager or two and we are making all the decisions – this time we are giving you objectives, you have the responsibility to figure out how to accomplish those objectives – the team is, I’m just facilitating – and that was a big change for the group.
Did you find any cultural negativity emerge as a result of the new way of structuring training sessions and the training sessions themselves? Also, did this negativity also influence day-to-day attitudes of company individuals? Further more how would you describe this cultural negativity?

Oh lots, let me give you another example. We trained initially everyone in our workforce over 500 employees for about four hours each and we had our consultant who we felt better than, well rather than I go through that process, it was decided that someone with more knowledge and background in lean should lead that which he did. And we had over 250 ideas that came up as a result of those meetings and basically I had one gentleman said Ted you’ve been here for 25 years what’s different of all these things to eliminate waste is there anything new – and I said no – he said well what’s going to be different – and I said what’s going to be different is we are going to have teams to solved the problems not just someone like myself – so there were people that just felt you know what we’ve been doing construction a long time, we know how to do it, we don’t want any type of system – Toyota production system to help us do our job better – and to this day I’m sure there’s people in the organisation a certain percentage who still feel they know what they are doing and they don’t need any additional help to do it better. But let me tell you this, we have apprentices who we interview every 6 months and the younger people get it – they really understand how all we are trying to do is number 1 eliminate waste, bring value to the customer and be much more competitive.

Has the positive attitude of the apprentices within the company assisted in better educating and making other within the company aware of the positives associated with lean implementation? Particularly, in terms of those individuals who have worked in the industry for a number of year?

I would say yes, but I would say some of the older people who have embraced it they have been instrumental in helping people realise the benefits – we had one individual that was very staunch in their views in I want to do it my way, but he did have to admit that at least the company is trying to be better – they are not just, its not just status quo for the [org D] company. For a while, prior to the lean, we basically were doing very well a couple of years before to a point where we really felt there was some compliancy – well with the lean process, as you know its continuous improvement. So it just doesn’t seem people can be complacent under lean – just recently this office completely a project and I went up to the project manager and said wow what a great job, but and he stops me and says Ted, I know what can be done better next time – and I says yeah, did a great job, but there’s something else which can be done better next time. So yeah there are some stumbling blocks along the way but for the most part I think when they see things change, when they see the company is spending and
investing a lot of money to educate people on this process, also spending the time in these events they do understand that we are trying to be much better at what we do.

**With the shifting of individual attitudes within the company, have you also seen a shift in the culture, particularly in reference to prior lean implementation in 2003 and the current state of lean awareness in the company now?**

I would probably describe it best by the number of ideas that have been developed as a result. We have this thing called the lean line which is like a newsletter which comes out quite frequently and every time someone comes up with an idea we celebrate that idea and some of those ideas have been tremendous – that communication is another form of communication that we use in addition to people just talking about it. Wanting me for example, cause they know I’m the lean champion to come and take a look at their office or take a look at their truck as an indication that they get it and when you walk on different job sites that’s proof of lean working.

**With the different locations of the company, have you found that each location has a different culture? If so can you explain the differences?**

I would say the smaller locations, everyone understands it in the extent that they’ve applied what they know in the smaller remote areas. Although the principles of trying to do things better I think has caught on.

**Have you found, particularly in your position with the company, any negativity towards the implementation of lean, principally in the smaller and more remote locations of the company?**

I think its more they haven’t seen as much exposure like a Florida or Wisconsin and as a result they don’t understand and until you see it first hand, it is just hard to imagine what it can do for you. Because people love to be in their comfort zone and when they step out of their comfort zone it is not always easy.

**Have you found with the whole company implementing lean (although to different degrees) in has in some way broadened the relationships between each location of the company? Or have you seen evidence of the reverse occurring with working relationships and communication remaining within the confines of each location?**

Generally the way we operate, we operate as independent companies. So each branch is responsible for its own profit and loss and so we give them enough antimony to basically do what they want to do,
but with lean they have the opportunity to do more or less – with the exception of last year, we and I are currently going back through every branch and location and re-emphasis what we want to do they have to come up with their plan for 2011, stating what processes and projects are they going to be working on – we leave it up to them. For example in Wisconsin location they have 14 different teams that are going on within their company.

Ok then, so with the different locations of the company branches how would you generally describe the process of lean implementation undertaken?

In Wisconsin which has the majority of people, there is probably about 2/3 of our workforce in Wisconsin so the majority of what we have done with lean has been within Wisconsin but the Florida office being the second largest office was also very involved in the 5S events especially in the centre of production on job sites. I would say that for the most part I think the culture has changed in all the locations but I would say its more pronounce in Wisconsin and Florida. I don’t know if I answered that question or not?

You actually answered the question which was a flow on from the previous question. So did the actual process of implementation start within the Wisconsin office and then flow through the other office locations?

Right, yes it started there.

Was the implementation process infiltrated from the top and then through the company or was it implemented a different way?

Well it was started in Wisconsin but then all the branches got training on it as well. But if you actually want to go by numbers and use numbers of events there has been more events in Wisconsin and Florida then there has been in some of the other locations. But they all have been involved in some processes whether it be 5S, value stream mapping – they have all had some involvement.

With the team orientated environments within the company are they more likely to work together regularly or irregularly? In your response can you explain the how and why behind the approach.

There is always separate teams developed, usually you may have a couple of people on the same teams but for the most part all the teams are different. One of the things that we have stressed over and over again there’s always a lady on the team, usually, and that’s because we want a different
perspective and there’s always somebody from the area that is involved and there is always someone outside the area as well.

Have you found with the structure of the teams to be influenced by the type of project works to be undertaken or more directed towards team and communicational bonding within the company?

Well, we try to make sure that all the people are involved in the teams. The way that teams are developed usually is people who might be equated with some of the aspects or whatever it is we are going to do, but then other people that are not at all involved at all with it because we want that different perspective.

Do you find that the approach undertaken by the company works? And if so why, and if not why not?

Oh definitely – I’ll give you an example. We had a lady from accounting work with our metals group on a 5S event and we had one individual who was not really interested in participating. He was just going to do what he was told to do and that was it. By the third or forth day he had the lady working with him and he taught the lady how to weld. The second to last day he talked to some of the other ladies in the office and he had them prepare an 8 and a half by 11 certificate of a certified tack wielder (that’s what he called it) and he presented her with the certificate. The way that our events work everyone has to give a little brief review of what they learnt and where they were going to apply what they learnt from the event to their day-to-day lives and he was one that spoke about what he learned and the comradity of the team and it was just the as absolute opposite of what he thought about when he came in. Its amazing that some of these people never get the opportunity to work together and when they get to know some people and we have a little snack in the mornings, we have lunch together we have breaks together so in about 3-4 days you know the teams really bring, there’s no doubt the teams really bring a comaradity about their work.

So with 5S events you conduct with the company the majority of these are conducted over a period of a week? Or are the event durations dependent on the topical area of the event?

Sometimes, but sometimes things are not finished so team leaders have to follow up and get some of the things finished. But I would say we get about 85% completed during that day. So we don’t try to take on more than what we can try to finish.
What types of sub-topics are typically covered in company orientated 5S events? Are they more focused towards areas of lean or other initiatives as well?

Generally speaking and I’ll go back to the first one it was a tool room and it was a fairly large area, if you can imagine you have 300 people to whom you must supply tools to in the field that is a pretty large area and you have tools coming and going on different job sites. There we had this variety of people and we start out by training for about half a day and then we start to brainstorm throughout the day and develop what it is we are going to do and brainstorming, we vote on what they want to do and then for the next 3-4 days we then actually do what they want to do. So what it is, is everyone plays a part so they are skilled, non-skilled and sometimes an unskilled person with a skilled person and basically they are accomplishing whatever the objectives were. First they learn about what they are going to do – so they learn what the 5S is all about, then they figure out based on the objectives and the goals that they have – how they are going to accomplish that and then they vote on it, it’s a secret ballot vote and then we pick 5-10 depending on what we think we can accomplish.

With the structure of teams within the 5S events have you seen an increase in communication amongst all groups within the company? How has this communication influenced the lean implementation process? And has this renewed communication also filtered down to relationships within the office?

Oh yes, especially when we do value stream mapping events and the 5S for that matter – you have people as I said before that have never worked together and so maybe just in general communication with one and other. Knowing the different steps we use for these events making sure each member follows up in a certain period of time – lets say, if they say ‘ok I have a question and I need an answer – is it 48 hours or what is it?’ – so they know that there has to be some limit to when you can get back to the person, so I would say from that perspective communication has improved. And this lean line that we produce communicates what we are trying to accomplish.

Do you use or have you used any other form of mechanism or communication, similar to the lean line to assist and help motivate the workforce?

No we do not. We looked at this for a long time and we have a safety programme where we have an initiative programme with t-shirts and prizes and all that – the other thing that every person involved in an event for the most part gets a t-shirt – to day you know you were involved in an event. Other than that there is no monetary incentive of any kind. We found, at least this is our opinion, our perspective that most people enjoy before money is that they appreciate the recognition and we celebrate at our company meetings all the people involved in events – we celebrate it by the ideas they
bring forward and any idea that’s come forward that we have initiated we send that out to all 500 employees in their pay cheque – so that’s how we have increased our communication.

**Are the employees made to attend all training sessions or is it a choice of their own to select which training session they wish to attend?**

Everybody attends – we have company events twice a year. Spring and fall and there we give them a state of the company. So there we just give them an update on how we are doing from a sales perspective and then we discuss some lean ideas and issues and then we recognise the contributions of individuals within the company.

**Have you seen through increased communication and awareness of lean implementation and processes of lean a shift in the culture of the company? If so, how and why?**

One of the things that came from our discussions with the group and our consultant is that there wasn’t enough communication. And so his recommendation was once a month, well that’s good in a manufacturing sector, but for us when we have at any given time 300 jobs, even within one little location, its very hard to get that many people together. But we continue to make the investment, if you can appreciate that we spend an hour at these meetings twice a year and it gives everyone a chance to ask questions, we also have a Q&A session at the end of 15mins or longer and anybody can ask any question – whether from the floor or they can submit questions prior to the meeting.

**So that’s been an overwhelming cultural positive for the company?**

Yes.

**With the structure of the meetings would you like to have them more often? Or do you find that the current approach of two yearly meetings is efficient?**

Two a year I think is sufficient particularly with all the other communications that they get. I wouldn’t say not a month goes by that there hasn’t been some form of communication to all of the employees in the company. So 12 times a year, I think we’re doing ok. But certainly can be improved in some fashion.

**So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would like to and**
extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

I would like to say perhaps the greatest, well there are two events that took place within our office. Probably the majority of the conversations that you’ve had have been about job sites and we do a lot of things on job sites with material handling etc and applying lean principles of having things directing shipped and packaged in a way that they are easy to identify. Perhaps one of the biggest cultural changes in the company came about a couple of years ago – but prior to that we did a mini office event with our service group which consisted of about 10 people. We treated it, as a combination of 5S value stream event that took place over several months and the idea was to somehow streamline our operations but in the way we handled paper and our communication process within the office. And so that team was commissioned to come up with a new layout they had about 15% of our office space which is 22,000ft², this is in Milwaukee, Wisconsin and as a result they were supposed to come back a week later we new ideas of how to lay things out. And we always measure things before and after. And so we had both ladies and gentlemen involved in this group – actually all of the team participated and one or two outside people – that is the service team and it was kind of interesting because when they all came back with their ideas of how it should be rearranged it was the lady who came out with the best layout. And I said how did you do it? She said it was a Saturday morning on her kitchen table, she came up with how their portion of the office should be rearranged. And where they and the manager should be located etc – they reduced his steps by 50%, they eliminated a lot of different steps when they went through the value stream mapping. So that was 2 years before our major event in the office. Now none of those folks had offices – they were all in cubicles, but they just rearranged the cubicles so there could be better communication, we had higher partitions and we lowered some of them. So that was the first step. They were if you will the pilot programme for what was to emerge 2 years later. We set some objectives to this new team for the entire office 22,000ft² of office, we had basically, because we’d grown so much that we no longer had a training room which we originally had, we had more than one or two people in cubicles or offices so we were busting at the seams in a way. So the objective of this team was to, it was a large team and diversified, was to figure out, well here were the goals, the objectives were to ‘you must rearrange this office in such a way that we get out training room back for 40 people, we have 20% growth (in other words it would be 20% empty space) and everybody would have their own space that were presently employed and heres the big thing you can not touch the four walls. You can not expand the building, so for about 2 months there was this turmoil. The turmoil was between those who had private offices and those who had cubes. And they just couldn’t get untangled. And it really was our fault; I mean the president and myself, because we didn’t make the objectives very clear. And so one day he come before the group and he said I know your struggling, and then he says I hope what I’m about to say will help you – no one in the company including myself will have a private office. The big group got
together again and they were able to devise a plan and they did a very smart thing, they asked us to start taping off areas that we could work in and we ended up with a basic layout of a 9x9 area – everyone could live with a 9x9 working area. And so, after about 6 months they came up with a plan and we implemented it and now we have a beautiful training room which can be sub-divided for 40 people, nobody has an office, everyone is in a cube, we have 8 quiet combination conference rooms in the front of the building so if you need to have quiet time you can go into those offices, we have much better communication because I don’t have an office anymore and my assistant is right behind me and all I have to do is turn around and talk to her – nobody quit, that was a big, big cultural change. When I talk to other construction companies about what we did they said our management would never allow that – they would never give up their corner office. That changed more than anything else the communication - a sub-team prior to the action and move and the move took us three or four months as we had to knock down all the offices and we did it in quarters and I remember when we opened up the first quarter – somebody looked at it and said oh you added windows and I said no we didn’t touch the outside – what happened was everybody who had offices were taking all the light – because of their offices, so when you took down those walls the light came in. And I had one engineer who has worked for 30 years said first time I’ve ever seen the outside. So the point was this a cultural change to say you know it doesn’t matter what your position is within the company we are all going to be the same. And it was, that’s the one thing we stressed with all the teams – whenever I would be facilitating or some manager or vice president would be involved in a team he didn’t take any precedence over the rest of the team members – one vote and everybody is the same, equal. So this really opened up our communication – there was a sub-team, that prior to finishing the project started talking about office etiquette and how we had to have different types of voices when we speak because our office was open now. And I’ll be honest with you, it is quieter now then when we had the offices cause everyone had learned that we have to be aware about our voices and if you want to have a conversation with someone go to one of the quiet rooms. That was a big thing. Now that was in the year 2007 that we finished it, ten years after our move into the building we just moved again we wanted everyone, because different teams were being formed so we wanted everyone to move, it took us half a day to move the entire office because everything is on wheels, so all you had to do was move your two or three file cabinets and you’ve got your computer and your in the same area. So it was tremendous cultural change and shift. But that was a highlight, but then again this is related to the office itself. And so we have tried to apply all of the things that we learned in lean manufacturing to all of our office, our field, our trucks have basically been leaned out, we use the AD20 rule which means ‘if you use order in your office, if you it 80% if the time, it should be the closet to you’. So if you have a side door or rear door truck if you use whatever you are using 80% of the time you shouldn’t have to walk into the van – you should just be able to grab it. And we have many examples of that and the things that we have developed that we used in order for us to accomplish that. Same with our offices for example since lean is aniatrical part of what I do all of my lean materials, I don’t
have to move, its right there next to my table top because we don’t have desks – so its right there, so I
don’t have to get up and move to get it. That’s the idea - 80% of what you need should be closet to
you. And we have that rule anywhere, whether it’s a jobsite, an office, a truck, a shop – if I know
what it is I need to find it in 30 seconds or less. So if I’m looking for a nut or a bolt I should be able to
find it and as you walk around I’ll show you what makes it easier we called it visual arrangement – it
makes it easier to be able to find something in 30 seconds or less.

You’ve raised some interesting thoughts which have lead to whether there are any specific
strategies, particularly lean, which you use in the day-to-day running of the company? You have
mentioned a few like visual arrangements, but do you utilise more?

I guess the biggest one I would say is that we try to help our people understand and we’ve had this
happen where they take it upon themselves – our lean mission is to continually examine our processes
to provide greater value to our customers by eliminating waste. We want them to look at everything
they are do and to figure out what can I do differently in order for us to be more effective, eliminate
waste, even not changing the process if we can just eliminate steps. And as a result out waste, will be
less providing greater value. We’ve taken it to the level of everybody having when they’ve done a job
or at the jobsite or whether it be in the office and we’ve had some groups doing this as well – we ask
these questions every single morning and its becomes part of our structure that you know, we are we
going to do when we first started this about four years ago – I don’t have time for that, I got to get to
work – that takes 10 or 15mins maybe, but by asking those questions we can eliminate a lot of waste
during the course of the day. So the last planner is great, it takes 6 weeks, it takes 1 week and then by
the day – this is to me the ultimate – when I started last planner this is where I wanted to get to, I want
to go beyond the daily – when we do events and I’m leading them I have and I’ll give you an
example, when I start the event its always we start at 7, and we always have a break at 9:30, so I say
what are we going to accomplish between 7 and 9:30 for all participants at all of our events. So at
9:30 there might be a percentage or not, it just depends on the activity we are doing. Ok, so now we
are at 9:45 to noon – where do you think we are going to be, when you started somewhere up here
what about now. Ok, so then we talk about that and now I say, ok at 12:30 to 3:30 where are we going
to be at the end of the day. You know we talked about what we accomplished up here and now we are
talking about what we are going to accomplish for the rest of the afternoon. That is the process that I
eventually would like to get to but we do this on a regular basis – not because we have to but because
it is apart of our culture, this is becoming more of the culture at least on a daily basis but the idea is
you want to try to eliminate waste, the only way you can eliminate waste is by looking ahead and we
do it 6 weeks for long lead in items, we do it for a week for shop purposes – you do it everyday. So
that’s more than anything else, this daily planning whether its in the office, whether its in the shop,
whether its on the truck or our service guys we want them and I’ve seen some of their trucks and they
it on the dash we want them to just look at that and obviously we want them to think about it – we
don’t expect them to be calling in and say oh ok I’ve just gone through my daily huddle – the idea is
to eliminate. We have tracked that down to the point for our service – we know how long it takes
them because we have GPS in all of our vehicles, we know how long it takes them to go to pick up
some materials, how long they’re there, how many times they do that – we have been able to decrease
our gas consumption as a result of reducing the weight, as result of making less trips to the wholesale
house – I think its been a great instrument to change our culture. The daily huddle has been in use
about three years. So we are always trying something different, and this has been progressive and I’m
sure we’ll try something else.

End of Interview
Interview Analysis

Each interview will be analysis separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organisational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analysed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes will be boldly green highlighted with underlined. Where features of diffusion groupings are not present a description of ‘not discussed’ be placed. A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue. The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 5

Results: Descriptive Analysis.
### Organisation & Management Environment

<table>
<thead>
<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Social System</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks. According to the interviewee the philosophy underpinning the greater network or organisations is guided by organisational independence. Despite a larger organisational network.</td>
<td>“Generally the way we operate, we operate as independent companies. So each branch is responsible for its own profit and loss and so we give them enough antimony to basically do what they want to do, but with lean they have the opportunity to do more or less”</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Informal Social Structure</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the organisational independence agenda. The interviewee was also asked to about the nature, success and failings of these relationships and networks. When answering the question the interviewee highlighted how the formal social system of the organisation and on-site project teams are governed by <em>heterophilic communicative networks</em> as outlined in the overarching organisational independence agenda through <em>study action teams</em>.</td>
<td>“….we started with our tool was one of our first 5S events where I would stand up and facilitate the group and there were about in that one about 10-12 possibly even more on this particular event, it was a large group as it was a large event which lasted about 5 days. When I would be addressing the group after some training I would say well what would you like to do and we went through all the different things that they thought were wasteful and then I asked them what do you think would be the best way to handle it, it was immediately, well...’What do you want us to do’..”</td>
<td>“….that’s what’s different about this process to other processes used in the past. Because typically we have a couple of executives, a manger or two and we are making all the decisions – this time we are giving you objectives, you have the responsibility to figure out how to make those and then we need to be able to measure the outputs...”</td>
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In terms of study action teams the interviewee provided examples of how lean eventing has assisted in the creation of hetrophily style communicative networks between members of the organisation.

According to the interviewee study action teams are not utilised by management as a traditional forms of hetrophily communication, this occurs as each office location is viewed as an independent organisational entity of the larger company structure.

The interviewee did discuss how through lean eventing the study action team approach is embraced.

The interviewee also described how many individuals within the organisation did not understand the concept of and purpose behind the study action teams in the lean eventing environment. This was of significant importance to the interviewee in terms of lean eventing team dynamics and employees understanding the innovation without the direct knowledge of training and implementation purposes.

According to the interviewee management in the past has simply dictated ‘innovation’ process without encouraging open discussion and reflection. Changes in the approach for the adoption of lean for the interviewee is linked to the encouragement of more open discussion and reflection:

"There is always separate teams developed, usually you may have a couple of people on the same teams but for the most part all the teams are different. One of the things that we have stressed over and over again there’s always"
describe the nature of the formal social system in relation to the organisational independence agenda. The interviewee was also asked to about the nature, success and failings of these relationships and networks.

When answering the question the interviewee highlighted how the formal social system of the organisation and on-site project teams are governed by homophilic communicative networks as outlined in the overarching organisational independence agenda.

The interviewee did discuss how through lean education by homophilic communicative networks has enhanced relations within these groups. The interviewee highlighted it is the strategic objective of the organisation to develop separate work and lean eventing team environments.

According to the interviewee this enables the workforce to create new communicative networks with others of differing cultural and working backgrounds.

Social Norms

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The first emerging social norm identified was integration.

The interviewee discussed integration in terms of collaborative working environments through

a lady on the team, usually, and that’s because we want a; different perspective and there’s always somebody from the area that is involved and there is always someone outside the area as well…. Well we try to make sure that all the people are involved in the teams. The way that teams are developed usually is people who might be equated with some of the aspects or whatever it is we are going to do, but then other people that are not at all involved at all with it because we want that different perspective”

“Oh yes, especially when we do value stream mapping events and the 5S for that matter – you have people as I said before that have never worked; together and so maybe just in general communication with one and other. Knowing the different steps we use for these events making sure each member follows up in a certain period of time – let’s say, if they say ‘ok I have a question and I need an answer – is it 48 hours or what is it?’ – so they know that there has to be some limit to when you can get back to the person, so I would say from that perspective communication has improved. And this lean line that we produce communicates what we are trying to accomplish”
According to the interviewee the integration of individuals within the organisation at these types of events enables for integration to be carried onto and within the general day-to-day duties of the organisation.

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The second emerging social norm identified was **education** through the improving delivery processes and employee satisfaction.

When discussing **education** the interviewee again reflected on the changes in approaches the organisation has undertaken in making the lean innovation more prominent amongst employees. The focus of much of the education within the organisation according to the interviewee is based around the 5S principles of lean manufacturing and through the development of an organisational specific educational programme.

“….the first one it was a tool room and it was a fairly large area, if you can imagine you have 300 people to whom you must supply tools to in the field that is a pretty large area and you have tools coming and going on; different job sites. There we had this variety of people and we start out by training for about half a day and then we start to brain storm throughout the day and develop what it is we are going to do and brainstorming, we vote on what they want to do and then for the next 3-4 days we then actually do what they want to do. So what it is, is everyone plays a part so they are skilled, non-skilled and sometimes an unskilled person with a skilled person and basically they are accomplishing whatever the objectives were. First they learn about what they are going to do – so they learn what the 5S is all about, then they figure out based on the objectives and the goals that they have – how they are going to accomplish that and then they vote on it, it’s a secret ballot vote and then we pick 5-10 depending on what we think we can accomplish”

The interviewee was asked a number of questions concerning the presence and use of opinion leaders and change agents as part of the lean strategy and implementation process. The interviewee highlighted that within the organisational environment there are specific individuals that are identifiable as lean specialists and leaders. However the nature of the opinion leaders & change agents

“….I’m referred to as the lean champion for the corporation and then we took it one step further and we are part of a larger corporation about 1 and a half billion dollars annual volume of about 30 companies and I began to then last year we took it to the parent company and taught classes for all of those companies so now each of those companies are supposed to have a lean champion”
organisational environment advocates that everyone in the organisation is lean leaders (or opinion leaders). The discussion of opinion leaders within the organisation was done in context to the innovation (or lean).

The interviewee identified themself as the organisations opinion leader, describing their role and influence to be guided by the core cultural competencies of integration and education.

The integration core cultural competency is particularly important to the interviewee as the organisation has undertaken a new endeavour involving external trade partnerships:

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<th>Feature</th>
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<th>Interviewee Attitude</th>
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<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry and their own organisation. This experience has lead them to their current position within the senior management team of the organisation. The interviewee described their current role as a senior executive. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework. This individual has had a high level of exposure to lean innovation and lean transformation in organisational environments through their role as lean educator and facilitator within the organisation and through the organisation’s external educational programmes.</td>
<td>“The first exposure to the lean process was when I was attending a trade association conference, I believe it was in Arizona and at that time I stumbled across a seminar that was being held entitled ‘Lean Construction’. I’d never heard the term and I believe it was in 2002 and [individual] was doing a presentation essentially on the last planner and he mentioned that there were other folks who were involved with it….So I began to look into that and it was a very short period of time after that that I attended several other sessions of the lean construction institute one in Washington, one in Las Vegas and began to get a feel for the last planner”</td>
<td>Not Applicable</td>
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The interviewee further is opinion leader of lean, largely through self-education, lean manufacturing education and lean leadership.

### Persuasion

The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.

The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of social norms. The interviewee discussed the use the social norms through educational agendas.

According to the interviewee has not guided by any existing organisational or management rules or regulations. The interviewee noted that this occurs as each organisational location is treated as a separate entity of a larger corporation which forms the organisational and management environments, the presence of separate entities means that each office location is responsible for its own implementation of the lean innovation. These offices still participate in the main education and training events held throughout the financial year for the larger organisation. The interviewee also discussed the presence of organisational specific persuasion mechanisms in place across office locations, such as the daily hurdle.

According to the interviewee the approach

| Persuasion | “So that’s more than anything else, this daily planning whether it’s in the office, whether it’s in the shop, whether it’s on the track or our service guys we want them and I’ve seen some of their trucks and they it on the dash we want them to just look at that and obviously we want them to think about it – we don’t expect them to be calling in and say oh ok I’ve just gone through my daily huddle – the idea is to eliminate. We have tracked that down to the point for our service – we know how long it takes them because we have GPS in all of our vehicles, we know how long it takes them to go to pick up some materials, how long they’re there how many times they do that – we have been able to decrease our gas consumption as a result of reducing the weight, as result of making less trips to the wholesale house – I think it’s been a great instrument to change our culture. The daily huddle has been in use about three years. So we are always trying something different, and this has been progressive and I’m sure we’ll try something else”.

The interviewee was not committal over with the success/experience so far with the new training/education framework.
creates situation where it becomes the employee’s duty to question, reflect and make a consensus effort to understand lean. The nature of such an approach enables the development of individual and organisational cultural attitudes, behaviours, values and opinions concerning lean. Elements underpinning the implementation of the lean innovation into the organisation will also be discussed.

<table>
<thead>
<tr>
<th>Decision/Implementation</th>
<th>The interviewee during the interview was also asked to describe the process behind the decision and implementation of strategic decisions associated with the implementation. The interviewee first discussed the informing of the lean decision within the organisational, more specifically education. The interviewee discussed the communication of the lean decision in terms of authoritative needs associated with the business. The organisation according to the interviewee has been implementing the lean innovation since 2003 as per a decision made by the CEO through advice by the interviewee.</th>
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<td>“....when I started looking at this lean construction I wanted to learn; more about it other than the last planner or you know IPD. So I started; looking around the country and I couldn’t find anybody who was; teaching any type or form of courses on lean construction, I then started; looking at lean manufacturing and of course read several books about; lean thinking and they talked about using some of the principles; associated with lean manufacturing trying to apply them to construction”</td>
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<td>The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of the organisation.</td>
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<td>“We trained initially everyone in our workforce over 500 employees for about four hours each and we had our consultant who we felt better than well rather than I go through that process, it was decided that someone with more knowledge and background in lean should lead that which he did. And we had over 250 ideas that came up as a result of those meetings and basically I had one gentleman said ‘you’ve been here for 25 years what’s different of all these things to eliminate waste is there; anything new’, and I said ‘no’, he said ‘well what’s going to be different’ and I said ‘what’s going to be different is we are going to have teams to solved the problems not just someone like myself’”.</td>
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<td><strong>Big Room</strong> as a specific learning strategy to support education.</td>
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<td>According to the interviewee, <strong>lunch &amp; learns and The Big Room</strong> is an organisational specific education approach used as a means to undertake twice yearly education and training programmes for all employees of the greater organisation.</td>
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<td>In the discussion, the interviewee highlighted how the initial training lead to the use of a consultant to improve the training sessions.</td>
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<td>The interviewee discussed by the interviewee was the utilisation of lean eventing as a specific learning strategy to support education.</td>
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<tr>
<td>The interviewee highlighted the extent and access of organisational locations to the educational programmes, particular those held bi-yearly.</td>
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<th>Confirmation</th>
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<td>As part of the interview process, interviewees were asked to identify and discuss various confirmation of 'success' stories associated with lean implementation within the organisational or project environment.</td>
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<td>“….we have apprentices who we interview every 6 months and the younger people get it, they really understand how all we are trying to do is number 1 eliminate waste, bring value to the customer and be much more competitive….I would say yes, but I would say some of the older people who have embraced it they</td>
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<td>Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within.</td>
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| “…if you actually want to go by numbers and use numbers of events there has been more events in [the mid-east] and [south-east] then there has been in some of the other locations. But they all have been involved; in some processes whether it be 5S, value stream mapping – they have all had some involvement” |
The interviewee highlighted the confirmation of lean through acceptance of the educational programmes and training initiatives and the organisational acceptance of the lean innovation through education.

According to the interviewee greater organisational acceptance has been driven by the organisations educational agenda and high commitment levels between younger and older organisational generations towards the innovation.

The interviewee reflected heavily on the changing attitudes of particular employees when the lean innovation was first introduction into the organisation:

The strength of the educational agenda, knowledge of the lean facilitator and internal want for change within the organisation has allowed for a natural acceptance towards the lean innovation to emerge. The interviewee did highlight that the journey towards acceptance has been rocky however through persistence of management, open communication, questioning and reflection acceptance has been achieved.

Further to this the interviewee did stress that acceptance of the lean innovation has been greater in organisations that have been exposed to the innovation on a larger scale, however a mission of management is to further manage the exposure of the lean innovation and educational agendas for smaller organisational locations.

The interviewee highlighted this to be occurring over the next 1-2 years and reflects an internal management commitment to lean, this links in have been instrumental in helping people realise the benefits’’

“….we had one individual that was very staunch in their views in I want to do it my way, but he did have to admit that at least the company is trying to be better, they are not just, it’s not just status quo for the company” the organisation.
As part of the interview process interviewees were asked to identify and discuss various confirmation of 'success' stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through **altered organisational mindsets** through **cultural maturity**.

The interviewee discussed the purpose behind the lean innovation and how the general cultural attitudes of employees have changed throughout the lean process.

This second confirmation perspective as discussed by the interviewee highlights that when employees see management taking an active role in improving the process of project delivery then their own acceptance or rejection of the lean innovation and the maturing of cultural attitudes, behaviours and values.

### Quote

“....with the lean process, as you know, its continuous improvement. So it just doesn’t seem people can be complacent under lean, just recently this office completely a project and I went up to the project manager and said ‘wow what a great job’….he stops me and says ‘I know, [but] what can be done better next time’….there are some stumbling blocks along the way but for the most part I think when they see things change, when they see the company is spending and investing a lot of money to educate people on this process, also spending the time in these events they do understand that we are trying to be much better at what we do”.

As part of the interview process interviewees were asked to identify and discuss various confirmation of 'success' stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through **organisational achievement** through the acknowledgement of organisational achievement.

The interviewee highlighted specific tools the organisation’s management utilises to promote individual and group success concerning the lean transformation.

### Quote

“We have this thing called the lean line which is like a newsletter which comes out quite frequently and every time someone comes up with an idea we celebrate that idea and some of those ideas have been tremendous. That communication is another form of communication that we use in addition to people just talking about it”.

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The interviewee also discussed how through being the lean champion employees are more open to discuss their own personal achievements in understanding the lean innovation.

According to the interviewee these personal discussions although not represented in a tool form assists in employees to understand how the lean innovation works.

As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through communication through lean implementation. The interviewee highlighted that throughout the lean implementation process an external consultant has been employed as a means to address issues of communication.

“One of the things that came from our discussions with the group and our consultant is that there wasn’t enough communication. And so his recommendation was once a month, well that’s good in a manufacturing sector, but for us when we have at any given time 300 jobs, even within one little location, it’s very hard to get that many people together. But we continue to make the investment, if you can appreciate that we spend an hour at these meetings twice a year and it gives everyone a chance to ask questions, we also have a Q&A session at the end of 15mins or longer and anybody can ask any question, whether from the floor or they can submit questions prior to the meeting”.

As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted that throughout the lean implementation process an external consultant has been employed as a means to address issues of communication. The interviewee highlighted the confirmation of lean through managerial practice through culture. The interviewee when discussing this confirmation perspective reflected heavily on negative cultural attitudes and behaviours of some individuals over proposed changes and

“Perhaps one of the biggest cultural changes in the company came about a couple of years ago, [a major office layout change] we did a mini office event with our service group which consisted of about 10 people. We treated it, as a combination of 5S value stream event that took place over several months and the idea was to somehow streamline our operations but in the way we handled paper and our communication process within; the office. And so that team was commissioned to come up with a new layout...we always measure things before and after...we had both ladies and gentlemen involved in this group, actually all of the team participated and one or two outside people, that is the service team and it was kind of interesting because when they all came back with
how the changes in office layouts assisted in employees overwhelming accepting the lean innovation: 

their ideas of how it should be rearranged it was the lady who came out with the best layout... [Through this plan] they reduced his steps by 50% they eliminated a lot of different steps when they went through the value stream mapping...that was 2 years before our major event in the office. Now none of those folks had offices, they were all in cubicles, but they just rearranged the cubicles so there could be better communication, we had higher partitions and we lowered some of them. So that was the first step. They were if you will the pilot programme for what was to emerge 2 years later”

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| Verbal Communication | When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of **verbal communicative tools and methods**, The interviewee identified communication to be guided by engaging the workforce through **reflective learning**. **Reflective learning** objectives encouraging **visual and verbal communications**.  

The first **reflective learning** perspective discussed by the interviewee concerned the application of what is known or learnt into the working and field environments.  

“….we have tried to apply all of the things that we learned in lean manufacturing to all of our office, our field, our trucks have basically been leaned out, we use the AD20 rule which means ‘if you use order in your office, if you it 80% if the time, it should be the closet to you’. So if you have a side door or rear door truck if you use whatever you are using 80% of the time you shouldn’t have to walk into the van – you should just be able to grab it. And we have many examples of that and the things that we have developed that we used in order for us to accomplish that”

“….since lean is an important part of what I do all of my lean materials, I don’t have to move, it’s right there next to my table top because we don’t have desks – so it’s right there, so I don’t have to get up and move to get it. That’s the idea - 80% of what you need should be close to you. And we have that rule anywhere, whether it’s a jobsite, an office, a truck, a shop – if I know what it is I need to find it in 30 seconds or less. So if I’m looking for a nut or a bolt I should be able to find it and as you walk around I’ll show you what makes it easier we called it visual arrangement – it makes it easier to be able to find something in 30 seconds or less”
When asked further questions concerning the communication of lean implementation within the organisation to the workforce, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified communication to be guided by engaging the workforce through reflective learning. The interviewee discussed that organisational management encourage reflective learning through motivating written, verbal and visual communication objectives.

The first reflective learning perspective discussed by the interviewee concerned the embracing of reflective learning and recognition of this learning within the organisation.

The second perspective of reflective learning discussed by the interviewee links in with the organisation’s management approach, mission and goals associated with the lean innovation.

“We found, at least this is our opinion, our perspective that most people; enjoy before money is that they appreciate the recognition and we; celebrate at our company meetings all the people involved in events. We; celebrate it by the ideas they bring forward and any idea that’s come; forward that we have initiated we send that out to all 500 employees in; their pay cheque, so that’s how we have increased our communication”

The lean mission of the organisation is to…

“….continually examine our processes to provide greater value to our customers by eliminating waste”…

Achieved through continual reflective learning at all levels of the organisation…

“We want them to look at everything they are do and to figure out what can I do differently in order for us to be more effective, eliminate waste even not changing the process if we can just eliminate steps. And as a result out waste, will be less providing greater value. We’ve taken it to the level of everybody having when they’ve done a job or at the jobsite or whether it be in the office and we’ve had some groups doing this as well – we ask these questions every single morning and its becomes part of our; structure that you know, we are we going to do when we first started this about four years ago….by asking those questions we can eliminate a lot of waste during the course of the day”
reflective learning objectives encouraging visual and verbal communications.

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During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation.

The interviewee discussed *inner change and conflict* as a *direct* and *indirect* challenge currently impacting the organisation.

The interviewee highlighted how the introduction of the lean innovation has *moderately* impacted on employees and their cultural mindsets. More specifically the interviewee discussed how the innovation is primarily a scheduling programme this has indirectly impacted on the site foreman or according to the interviewee the *last planner*:

The *direct consequence* of this inner change and conflict is towards the site foreman or last planner as the introduction of the scheduling programme directly impacts their role and position.

However, the organisation does experience *indirect consequences* particularly in the introduction, training and management of the programme.

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<th>Challenges</th>
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<tr>
<td>Direct versus Indirect</td>
<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation.</td>
<td>“….whenever you ask them how long is it going to take to do something they will always inflate the number or they were concerned that if they gave us a certain number or answer we expected them to fulfill that no matter what and so they wanted some wriggle room (for the use of a better term) so their estimates for that week would be a little off but if you didn’t make it by the end of the week we weren’t going to berate them – but what we wanted to do was to find out what the constraints were or; why couldn’t they finish that and we had a matrix of all the different things why they couldn’t finish the work including the lack of information materials, area was not ready etc. Once they understood this was a tool to help them and not necessarily to monitor then the culture began to change”</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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<tr>
<td>Desirable versus Undesirable</td>
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<td>Not Discussed</td>
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Appendix 6: Organisation E – Interview Transcripts, Interview Notes & Analysis
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions? Ok, so to begin could you provide a small background on the company, your role and when the company decided to implement lean.

Interviewee 1: I’m involved in the electrical contractor side of the operations headed under the IPD. Lean has helped us complete the job, this may sound naïve but its virtually eliminated the risk on the mechanical and electrical side as far as the general contractor goes as we focus mainly on the architectural and structural trades and to have people out there, as an example looking at certain
aspects of the building process with us as a team mate and advising us on potential pitfalls that arose on previous projects that has helped us prevent any potential problems along the way. So its been a real teammate approach and I’ve got a superintendent that’s been in the trades for 30 years and has got literally tons of experience in different and multiple trades and he says that this has probably has been the best experience he has been through in terms of being involved in the managing of a project.

Interviewee 2: You know [interviewee 1] seemed sceptical at first as well and you may have felt the same way at first coming into IPD and not having any experience with it.

Interviewee 1: Yep, your right I was a little sceptical maybe at first and there’s maybe some sceptical issues first might have had to do with hows my insurance company, my liability provider going to look at this arrangement. From a legal standpoint I has concerns about how the contract was written from [the organisation] to [another IPD party] there was a little loose, you know, but it was really predicated and focused on trust and I’ve never seen a contract predicated on such a large amount of trust so I mean that certainly was a breath of fresh air

Interviewee 2: It is a huge deal, with everybody trusting everybody and you all know the work and you work for the benefit of each other

Interviewee 1: Absolutely, and it really rang through on the whole job in terms of us really being here for everybody

Interviewee 2: Its all about taking a leap of faith there that is involved

Interviewee 1: There is a leap of faith you know, with are the insurance issues going to work out, whats my attorney going to say about the contract, bonding wasn’t an issues because Westbrook pulled the bond – you know how does the event help profit or how will the job work out, we went in with X and I can tell you we hoped to make X plus 30% well we made X plus 100%. We doubled our profit on the last job we were doing well more than double. And you know that in a down economy it’s a true blessing, it really is I’m not kidding you it’s a true blessing to have a job like that and to be able to know you are going to make that money which we kind of just found out this morning [the person] their accountant came in and shared all their numbers with us, this morning so, to be able to have that kind of blessing in this economy is truly great experience and to know that we also saved the owner a million dollars on the front end of the bidding process. And the market conditions dictated that we were evidently because of Westbrook’s dealing with the contract and we were able to virtually double our profit but also be a million dollars low and I know OUC the client will not forget the fact that we saved them a million dollars that’s free money to them.
Interviewee 3: Plus every time we look at the place and see the improvements

Interviewee 1: Yes, absolutely it’s a win/win across the board and the client which is really what its all about, its all about the client who has truly seen it as a win/win across the whole project and its sort of like a miracle to keep all of the savings after sharing it – you know.

So you’ve spoken about some of the main monetary affects associated with the use of lean principles as a management tool with construction, however I was interested in going deeper into other areas such as communication and culture. How have you found the structure of communication and communication networks onsite and in office environments different to the traditional way of working?

Interviewee 1: I thought this was a much improved process over the traditional bid/build method we were able to talk on a much more casual, on the same level if you will with the architect and the engineers it wasn’t adversarial communication between us and the architect, us and the structural engineer/civil engineer

Interviewee 2: It was like no CYA type stuff

Interviewee 1: No CYA, no we did some casual documentation, it wasn’t hardline documentation – where truly people are worried their liability or their butts if you want to put it bluntly, it was more of a casual conversation and we could pick the phone up at any minute and the architect would actually return our phone calls within an hour and then [person 2] in terms of getting change orders that he wanted our subs to do on their behalf or the client’s behalf just super slick process which saved us a lot of time, paper work and headaches associated with paperwork. And its nice to have the design team on your side so your in the same group as them and your not and they’re not representing the owner and your not fighting with them over every little small detail – its very nice.

Interviewee 3: What is a change order? When you talk about these change orders what do they look like? What is it do they entail? Do they entail a price component?

Interviewee 1: Yeah, as an example, Georgetown our site works improvement contractor performed, they gave us an hourly ratio upfront for the hourly rates on a loader, bobcat you name it, all the heavy earth moving equipment and they gave us a price including the operator. So when [a local subcontractor] needed a chilled-water excavation which is fairly large they did it for the hourly rate and we just kept track of the hours they did to undertake the excavation.
Interviewee 3: So do you keep your change orders to your subs?

Interviewee 1: Yeah

Interviewee 3: What I mean is the team member subs

Interviewee 1: Yes, non team-member

Interviewee 4: On behalf of the team member

Interviewee 3: Yep

Interviewee 1: Correct

Interviewee 2: So we ask [interviewee 4] to check with [a local subcontractor rep] and see what his rate structure was and we you know looked at what we thought we could rent the equipment for and the options and there was no comparison – the way we ended up doing was economically as our site contractor

Interviewee 1: We had the operator on site

Interviewee 2: And [interviewee 4] informed me of what the costs were and you know I was of course, all for that and you know the change order takes place before the rest of the works can continue

Interviewee 3: So everyone is after savings where they can be found

Interviewee 1: Yeah and as we’re submitting our bills on a time and materials basis it cleans the whole process up – it sort of purifies it and the invoices are submitted and at the end of the day it is a cost to the group – not a cost really to me and its hard to shake that mind set – you know that’s really a cost to me and I got to amend this and really it’s a cost to the group – you know [IPD contractor] doesn’t have to provide that cost and its worked the opposite way so many times and a good example is I was with a group and we were sitting at breakfast and our steel fabricator delivered 375 anchor bolts in one day and all the nuts were supposed to be tack-welded to the bottom of the anchor bolts per the structural drawings. Well our steel fabricator missed that so they shipped all the nuts out loose and every one of them was loose – so we had to assemble one of them and screw the nuts and washers on the top and bottom and we were going for a footing inspection the very next morning on a Friday
morning because we wanted to pour the concrete foundations so we wouldn’t have to deal with the rain that was coming over the weekend and leave out excavations open. Well the nuts had to be tack welded, the bolts and the nuts had to be tack welded to each other – the steel contractor hey you know we missed it and they were trying to avoid any responsibility for it, so the boss (superintendent) of Westbrook said hey I’ve got a tack welding machine or a welding machine back at our office, I’ll go pick that up right now – this is at 3:30 in the afternoon on a Thursday afternoon and he said I will come back and I will tack weld those nuts – he worked for about 3 hours and tack welded everyone of those nuts so we could get our inspection the next morning and pour the concrete footings the next day. That cost from [IPD contractor] to the group 3 hours labour at whatever his rate is probably only cost the group what $180 you know if that and its irrelevant really but the steel fabricator I would have had to go back and I would have had to fight with them to get their erector out to the job site which he would have charged an enormous amount you know $75 minimum for one guy per hour and it would have ended up costing about $300-400 and it would’ve taken them three days to get it done. Only other option would have been to put them on notice and say we are going to back charge you because you haven’t done the job per plans and specs and we are going to hire our own welder but I’m required by contract to give them 48 hours notice so it still would have gone on until a Monday or Tuesday – so it was just a win-win across the board. And I never did back charge for it even though most general contractors should have with the steel fabricator because I just kind of use that as an ace in the hand for future dealings and negotiations with the fabricator.

Interviewee 2: And there was no paperwork extra paperwork involved

Interviewee 4: So really we ended up with a legitimate change order but was then able to be addressed throughout means and used to offset some other issues

Interviewee 1: Yes, absolutely worked out

Interviewee 2: If we would have delayed the project by 3 days it would have been multiples of what we spent

Interviewee 4: Well you would have risked the heavy rains coming in and washing in the excavations and then having to re-excavate all those footings and I mean you’re talking about a considerable amount of money and labour that was at risk

Interviewee 2: And things that you wouldn’t have charged like the steel that would have been difficult

Interviewee 1: Right, exactly
Interviewee 3: And it seems that the culture that’s out there on the site is what caused us, who had no responsibility for that at all but to say on a Thursday evening I’ll go get a machine and do this

Interviewee 1: Yeah its things like that lay the ground work for the culture on that job to develop and turn in to what its turned into – you know

You mentioned culture however you didn’t go into very detail about it. How would you actually describe the culture? Has it matured? Can you identify cultural positives and negatives associated in particular to the use of lean principles?

Interviewee 1: I would say culture you know, this might sound corny but culture is like selfless acts where everybody is trying to help each other out – you know I’ve got your back and you’ve got ours. Culture was very positive and there was a lot of positive momentum on the job site and I’ve seen that on other job sites but to this degree this was at a layer of positive energy if you will because of the, I think its all driven by the fact that we’re a team and we submit our invoices with the material on time. That changes everything. It really does, it’s a key component to this whole deal that I see it breaks down the silos of independence – independent silos that everybody is trying to protect. So the culture was extremely positive and a lot of positive momentum and quite honestly all of the jobsite foremen that have all worked together throughout this whole job they are all sad to leave the job – they really are these big, scruffy big guys out there they have developed a kinship around this job and comradity.

Interviewee 3: Nobody’s crying are they?

Interviewee 1: Well no-ones almost crying

Interviewee 4: Well where I see where it is really evident was at the weekly coordination meetings – you know I have said I don’t know how many of those meetings over the last 27 years that I’ve been in this business and you know its many of them and I’m talking about the weekly onsite meetings that you don’t have someone getting cross ways with somebody else I mean there’s usually some friction about something, somebody did not honour a commitment or somebody did something and its adversarial affected another trades work – there is always some kind of friction that is being dealt with and I didn’t miss too many of these meetings over the course of this job and I don’t recall a single time that we had an issue like that. I mean it just didn’t happen but it was all about planning where we were at and how we were going to get there – you know and it was just good discussion. And people were willing to work together and help each other out and I think that links directly to the culture that is on the job right there and now. I’m not saying that there wasn’t any issue, because that would be – but its dealt with in a different way
Interviewee 1: A lot of early stage planning that headed a lot of potential problems

Interviewee 4: Well that’s true, that has a lot to do with it – there’s no question that, that preplanning that goes into this type of work eliminates a lot of potential for that.

Interviewee 3: How do you think the superintendent – actually how do you think the superintendent will handle a traditional project? Do you think he in a way has been ruined with this project? Do you think he will be more relaxed? Do you think with his culture maybe he won’t be as good?

Interviewee 1: That is a great point. This project to a certain degree made certain aspects very easy for him (the superintendent) so did he run a 7.5 million dollar job – not really, we built a 2 million dollar job, architectural and structural and that’s where he was really responsible for it. We never really had to worry about the mechanical or electrical as I alluded before – I think how will be able to make the adjustments without a problem but it certainly leaves – we had very good subs on this job and that can make the superintendents lazy and they can get stuck in the mindset of hey we hired good subcontractors to perform their jobs on a daily basis, they need to do it and I don’t have to watch out for them – that is a good and dangerous mentality to have – I’ve seen that work both ways. I think he will be fine because he has been around so long and his been a consistent performer for us – but yeah I do have those concerns.

Interviewee 3: Well he for sure will not enjoy his next job.

Interviewee 1: Right, that’s very true. But then again it goes back to being part of a bigger group, we enjoy being a-part of a bigger group because as a small entrepreneurial company, I mean we are not a big company so we don’t have – you know, 50-100 employees and we just enjoyed the strength in numbers and we enjoyed the aspect of being a-part of this group.

Interviewee 2: It is enjoyable I mean, that’s a big difference from standard jobs – its always adversarial and your always looking out for that guy particularly wondering if he is going to stab you in the back or how he is going to treat you – but with this approach we know what the score is and we are comfortable in knowing what the relationship is.

Interviewee 3: Adversarial is kind of like a worker wanting to through me off a building one time. It was probably something I did to him and I don’t think he liked me very much. I forget what the job was over. But you had something going on with this guy who was so adversarial to you out on a job.

Interviewee 2: Yeah that experience was terrible.
You've spoken about some of the positive cultural experiences that have emerged with the use of lean principles on the job site. Have there been any negative experiences as well? If so can you provide some examples?

Interviewee 1: Yes, there is always some negativity on job sites that arises that may have been, actually there were some intense times between us and the steel fabricator.

Interviewee 4: But that was more of a traditional arrangement.

Interviewee 1: Yeah, it was – you know with our trades even though we all as a group took the design/build approach once the drawings are done – then we sort of bid out to architectural trades and the steel fabricator was one of those people who originally budgeted and they were the low bidder on the steel – actually they were not the low bidder they were probably the second low bidder and we wanted to use them because

Interviewee 4: Because they were involved with the project from the beginning

Interviewee 1: Yeah, they were involved from the beginning and they supposedly done another chiller project – so we thought they would bring a lot of previous knowledge and experience of chiller plants and previous layout that would help benefit us – but they brought none and that was a little bit – well it seemed like they started off with we’re a big sub and you’re not going to bully us around, you’re going to conform to the way we do business and I’d say they overall did ok, I’d probably give them a C+ or a B- maybe on the whole job – but there was just a series of things, the shop drawing process they used the latest, greatest shop drawing software that was very good for their manufacturing process but very non-friendly to the end-user – the contractor. It ending up being 800 pages of shop drawings – that’s super inefficient for us and super inefficient for all the designer professionals – but it super efficient for them on the manufacturing end and they outsource their shop drawings preparation on a small job like this. If you can believe outsourcing it to India and they had a separate drawing for each individual steel component of the job.

Interviewee 3: They did have some form of coordination didn’t they within the drawing with everything getting put together?

Interviewee 1: Yeah they did have some layout drawings, some erection drawings but to go back and figure out dimensions from the erection drawings to the centre of the tube to the centre of the column it was a nightmare. You needed to have a PhD to pull it off, it was a long string of numbers to figure out 11 and a half inches, you know it was really painful.

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Interviewee 2: You know I think IPD put together have an impact on solving their problems there is no doubt that together we would figure that out and we solved their issue – we had to hold their face to the fire – but in the end they performed and I think we got a pretty fair product.

Interviewee 1: They got the job done but they fought us, on the vent holes on the galvanised tubing above the roof, it was no-bodies fault but theirs – when they had tubes go to the galvanising plant, they are required to put holes in the end of them to release the galvanising material so it drains out and that galvanising plant hired a labourer to cut various oblong irregular holes into the tube, so, someone had to patch them all and they said they’ve never patched those before in their life, so, that’s a problem – they need to be patched. Especially since they sit flush to the roof of the building. So we worked through it.

Interviewee 2: We had some emails where we actually talked to them about that very problem beforehand and once we brought those emails back to life – they remembered that yeah we had talked to them about that and they finally agreed to patch them – there was no charge for patching them, was there?

Interviewee 1: They ending up wavering the cost when they realised that was the right thing to do.

Interviewee 3: So the IPD team, the primary team is the architect, the engineer, the general contractor, the mechanical and electrical contractors – and that’s it. Then each of those have subcontractors and by that time for the most part those are not people influencing the initial planning and coordinating services, so they are not primary team members. They are handled by normal contracts after the design is completed and the prices selected on the lowest responsible bid and then those have to managed in the traditional manner.

Interviewee 4: I think on a large job you know you may arguably look at like the structural steel contractor and say they might make sense on larger jobs to become part of the primary team as they would influence some of those decisions. But on this job here, we really didn’t think they were that significant – I mean it was more important to work with a structural engineer and work out all of the coordination of the mechanical systems that were being installed and supported by that structure more so than the fabricator.

Interviewee 3: I don’t know if any of us personally know of a fabricator that we feel like

Interviewee 4: Well no,
Interviewee 3: that fits the mould

Interviewee 4: well that would actually be an issue that if you ever got into a job were you want to bring them on board you have to make sure that it was somebody who was trust worthy

Interviewee 3: Psycho-analyse them to see if they would fit into the pre-existing team

Interviewee 4: well right minded and all that

Interviewee 3: So well in other words we have often talked about this it would be really hard to just put together a team for a job of un-associated parties, that you didn’t have a lot of personal experience with – like going into another city and saying or somebody else saying oh I like that IPD process, I think I’ll do that and then call up a general contractor, a mechanical and electrical and get these guys together to see if they can make it happen – they might, but all of this team has a lot of history together and we are kind of new to some individuals a part of the greater teams but other team members are not new to individuals. That’s important as to finding team members that you are comfortably with, that you have history with, that you know and you trust and that share your culture – that share the idea. So I’d say it would really hard to replicate, it wouldn’t be a real easy thing for an owner to say and read about IPD in a magazine and then go to his locally and has no place with somebody like that and I’d like you guys to do this, it would be such as alien idea – you know about how are we going to share this cost, you know I’ve got my own cost here and I’m protecting – it would be really hard to get that started. So you know, we thought about it – we started out wanting to, well really our first goal was to really try and develop something that could be used in the industry and not a selfish motive too. And try to add something for ourselves but it was all about can we find a better way to do this and share it? And we never had the intention prior to this, but we always knew that maybe what we are doing is so personality centric and stuff that maybe this can’t be replicated everywhere. And maybe for that reason this will always be something that we do here and nobody else does and the people who are doing IPD elsewhere in the country, as a lot of people are doing it now, but none of them are sharing costs – they all have elements and they all say they’re doing IPD but I haven’t heard of one yet that has a cost sharing arrangement and without that you don’t really have that.

Interviewee 4: Your right and that’s way that article in the ENR that you circulated the other day really is the first one that talks about that, it really identifies the real problem

Interviewee 1: I agree
Interviewee 4: about that real problem about putting the team together because it talks about the relationships about people not willing to share profit. I mean, there is just that greed factor, I guess,

Interviewee 3: Well you see to share profit is different to sharing cost because you can all have your own costs and we could finish the job and share the profit but still be fighting for our own cost area because you know, its probably tied somehow to your share of the profit – but we are sharing the cost, that’s a different concept

Interviewee 1: I think that’s really key to this whole thing

Interviewee 4: Oh it is,

Interviewee 1: because, I mean it truly does make that anchor mould retro fit washout and I mean we just did it for $180 which is impossible just submitting those costs are a really key part of this whole deal

Interviewee 3: And that, when Greg identified and prioritised the lean principles now he just said – but he said, well the first one that he put was 1. Don’t optimise one piece of the process at the expense of the whole process – well that’s it sharing costs is what allows us to do that uniquely, other systems can not do that;

Interviewee 4: And I think if you going to put lean down and this is something that the steering committee for the local lean chapter is trying to work on two things, trying to get a one page elevator talk (if you will) about lean – right that’s one thing. And the other thing is how to make it even smaller than that, you know, and that right there that one principle really kind of for me anyways, summarises what lean is all about – to mean that’s being lean and I’m trying to come up with something that will fit on the back of a business card

Interviewee 1: Optimising the cross collaboration

Interviewee 4: and how you go about doing that

Interviewee 1: and you go about selling that to the owner so that they can believe it and see it before you actually do it, they can see it upfront
Interviewee 3: And what about number 2, which Greg says collaborate – really collaborate – how does lean, well how does IPD facilitate that principle of lean – what's the difference in an IPD collaboration – between this job and other jobs?

Interviewee 1: Well I think, it starts in the early stages of design, early stage collaboration and it actually starts in the estimating period and the early collaboration we had projecting and budgeting number up front and discussing different ways we could do things. I mean really it helped save the owner that million dollars in the estimating phase. It really staged collaboration.

Interviewee 3: Don't you normally do something like that on all your jobs?

Interviewee 1: We do, yeah we try to get in as early as possible, when we try to sell preconstruction services to other owners so we can be involved with the architect in design/build but they don’t normally always buy off on us so its kind of touch and go.

Interviewee 3: Did you find, actually how would you characterise the relationship with the architect on this project opposed to normal projects?

Interviewee 1: I thought it was very good, very good

Interviewee 3: You said previously that you could get responses quickly

Interviewee 1: Yeah, if felt like he had his head in the game because he was a team member

You’ve mentioned a number of positive situations associated with the use of lean principles within the IPD approach particularly on the most recent job. Are there in your opinion any areas where improvements can be made? If so, what type of improvements would you like to see in the process? And if there were no improvements necessary why do you say this?

Interviewee 1: I’m sure there are areas for improvement

Interviewee 4: I would say that you know, I mean we have a very good relationship with our architect that’s on the team – but they are architects and that by nature, I mean there’s always a little bit of ego involved and in play with those guys and trying to and being so used to being the ones in control – you know some of that way of doing things sometimes has a tendency to creep into and you’ve got to step back and say wait a minute remember what we are trying to do here remember the process – you know, so. I mean how do you overcome that – its tough unless all your doing is meaningful type
work. I think that’s one of the challenges and I think all of us have that challenge to some extent and it goes back to the question interviewee 3 asked about the superintendent making that adjustment – I mean because we are operating in other market areas using more traditional project delivery methods and we are not doing these projects all the time and exclusively this way that’s where we have a little bit of breakdown sometimes – when we start one of these projects we have to kind of do a little retraining I guess within our own groups and our own teams sometimes – you know and the architects might be a little more challenging for them

Interviewee 3: To gurgle yourself up to the adversarial process

Interviewee 1: Right

Interviewee 4: Well you have to do that one – when you’re getting back in the swing of things

Interviewee 3: Right, that’s what I’m saying

Interviewee 4: Its like in the IPD world you’ve got to let the guard down a little bit

Interviewee 1: Well early on when the project first started – but we had project meetings for about 6-8 weeks on the early stages of the project – when we first broke ground, there were only some civil and structural issues to deal with and the architect was not invited to the weekly meetings because he didn’t bring added value and they took offense to that – I don’t know if they took offence to it but their feelings were hurt, well the individual’s feelings were hurt because they weren’t invited to the meetings – but you know the way we looked at it and the way the superintendent looked at it was hey unless they bring added value they don’t need to be here at this point and meeting because they’re billing us on an hourly rate and I’m totally on board for that, I mean there was no reason for them to sit there and not provide any added value to the meeting

Interviewee 2: If we needed something from them, we would call them and ask for their input

Interviewee 3: Well, there is an area that creates some friction and it probably needs some looking at because our approach to the architects and engineers is that we pay them per the hour, by the hour for whatever they do – I mean they don’t have a budget, they’ve given us an estimate but whatever they take – they will spend it. And our thinking is any money that you pay a good architect or a good engineer for work that they are really doing for the project is worth it. If they are working on a project but then they do share in a little bit of the profit at the end of the job, but its not as much as a team member because they have no risk and we set that hourly rate out at the very top end of what they
normally charge on any other job because we think they are better than most of the architects and engineers – they certainly perform well for us. But you are trying to minimise the cost on the job

Interviewee 4: And if you are having meetings basically that meeting is sitting down with a site contractor talking about dirt moving issues that really have nothing to do with design you don’t need to have an architect sitting there in on that meeting

Interviewee 3: I guess ideally we can call them and ask them if they thought, but they probably would have come

Interviewee 4: Yeah, kind of made the decision, because we looked at and we knew what the topics of the meeting was about and there was no design issues

Interviewee 3: Are they ok now?

Interviewee 1: Yeah

Interviewee 4: Oh, yeah we kissed and made up

Interviewee 1: Oh yeah, there’s been tons of positive momentum after that

Interviewee 4: Yeah that’s been good

Interviewee 1: Once we got into the architectural issues and got them on board it was smooth sailing and good team work

Interviewee 4: Well I think its just another example that transitioning from the more traditional way of doing things and business and a lean way of doing business – I mean there’s just, I mean that’s just not lean sitting there generating billable hours without any contribution or anything

Interviewee 3: Muda

Interviewee 4: Yeah,

Interviewee 2: It was the same with the engineer he didn’t come to many of the project meetings, I can’t think of any that he actually came to. He came to a lot of our upfront planning meetings
Interviewee 4: Yeah, planning meetings but during the weekly project meetings no unless there was an issue

**So in your own view do you think the project dictates the use of IPD?**

Interviewee 4: I don’t think it dictates it but I do think the type of project – I mean you know I think you can apply IPD to any type of project but I think it requires a type of owner, I think it requires a more sophisticated owner because one of the keys I think for an IPD process to really be successful is owner involvement for one thing. You want to make sure you have an owner that’s involved in the process which we do have through [local subcontractor] and very much so on this one, actually more so on this plant than any of the other projects that we’ve done. The owner, this was his second project – he was the project engineer for the owner on [another] job and it was the first one that we worked on with him on and he was very much involved and engaged on a regular basis and enthusiastically so. So I think it requires the right kind of owner to realise the full benefit.

Interviewee 3: Interviewee 1 if you were or had an opportunity to negotiate a job or some other type of job, like a little office building or something that was not so mechanically intensive or electrically intensive and you could swing it to the design-build type job would feel it would be advantageous to try and steer that as an IPD job?

Interviewee 1: Yes,

Interviewee 3: You do?

Interviewee 1: Yes,

Interviewee 3: Even though if you keep it as a traditional job you mark up all these people

Interviewee 1: Right

Interviewee 3: Because an IPD job there is no mark up, there’s no mark up on a team member – that cuts out a whole layer of cost out – you’d still feel okay with that?

Interviewee 1: Yes

Interviewee 3: Why?
Interviewee 1: Well,

Interviewee 3: You would have less of a job

Interviewee 1: Right, well part of it is I feel indebted to the group the other part would be the way the mark ups are done – you virtually make as much doing it the IPD formula way as you would and it also reduces my risk and I don’t have to worry about the mechanical and electrical package. There is virtually, well it sounds naïve, there is virtually no concern about the mechanical and electrical package from a performance standpoint – you know having to manage that aspect and quality control and all that, so those are the reasons

Interviewee 3: And there’s, now [LCI – co-founder] had done a paper on the transactional costs of doing a project that was really good and I think with IPD we certainly greatly reduced the transactional costs and you bore the brunt of that as the general contractor with all the change orders and all of that – you know, the scheduling issues and the fighting. So and those are real dollars, you know that you saved, you know you don’t have to have people that are back at the office wrestling with all these mountains of endless change orders and email fights and all that stuff that goes on they can be beaten over workers

Interviewee 4: I think that’s true and I think its also true on the actual execution on the job – so that’s where you want to spend your time

Interviewee 3: Good planning dollars

Interviewee 4: By moving paperwork and writing a lot of letters just to cover yourself and do all this stuff I mean that doesn’t do anything for the bottom line but if you can plan and collaborate, organise and make sure that job runs smoothly and fast and get it done ahead of schedule that translates into dollar savings

Interviewee 1: Dollars, absolutely

Interviewee 4: That’s where we want to be spending that time

Interviewee 1: Absolutely

Interviewee 4: So,
Interviewee 3: Yep, so there are some other important lean principles like reserve every decision until the last responsible moment – right so save every decision to the last responsible moment, is there any particular way IPD gives us an edge in exercising that principle? Or is that just a general one that we’re no different from anyone else?

Interviewee 4: Well I think it does, I think because of the collaborative process through the design audit job allows that to happen because we’re not often making equipment selection decisions for example, until after we have really thoroughly worked through the design process and often times we maybe even at a certain point on coordination you know to make sure a certain piece of equipment fits and those kind of things. You know, so, I just think that process itself kind of pushes you – I think that’s one of the reasons also that you, by the time you get to that certain point and you’ve had the engineers and you’ve had the installing contractor looking at the plan and working the plan, reworking it and then you decide on the best course of action for a particular piece of equipment – lets say, yeah you’ve done that – I think to a great extent you’re at that last responsible moment.

Interviewee 3: Maybe if the planning is well done, what we’ve done is moved the last responsible moment forward – you know backward toward the end of the job, we’ve pushed it back. So we can have the advantage of waiting a little longer to make some decisions so we don’t have to backtrack or waste something that we make or can’t use. So its probably, well not probably renounced.

Interviewee 4: Well I would say that another thing though that the IPD methodology does is because again going back to the owners involvement in the project that being one of the key principles I think of IPD is you have, the lines of communication are open between all the people that are really involved in the design process as well as from the owners standpoint – I mean they are the ones telling you what their needs are so because you have better communication – you know you have better information to make decisions on, you may know earlier because you maybe be, you may have a lot of communication you might not otherwise have that gives you insights on a pending change or something there's happening over here that may affect what we are building here – so you know then oh we need to hold off on this. And often times you don’t have those people communicating with each other then you’re not going to know that the owner may be – you know dealing with a situation which could have an impact on that project.

Interviewee 3: Yeah that’s right, the north plant comes to mind with the cooling towers change, right at the last moment – in that plant we changed from [one subcontractor to another]

Interviewee 4: You know, that’s what I mean.
Interviewee 3: No well before that we had one where it was a plant down here – it was a first plant down by the OEC office building

Interviewee 4: Yes,

Interviewee 3: Where they, designed the manufacturing

Interviewee 4: The one that went out of business

Interviewee 3: Yeah, well they stopped building this particular model tower - we got this job (IPD) we were going to put up this particular tower where the steel was all designed for that tower and then when we got there someone was making a different model tower – they weren’t building what it was supposed to look like, well not the way it was

Interviewee 4: Well there was actually a manufacture went out of business as well – they’ve since come back, but at that time they had gone out and we had to make a change

Interviewee 3: And redesign the steel and got it in on time with no change in price – I mean it would have been a huge change order – well there could have been big delay, big change in price – so that was a case where the response was at the last responsible moment to push back a lot of apparently, because that was a last minute change itself so that was made in time.

Interviewee 4: That’s true

Interviewee 3: Because everybody was working together and made it happen.

I was interested to learn throughout the interview that you don’t use the IPD system on every project. Do you find that going back and forward between the IPD approach and more traditional methods is difficult? Particularly if you fall back into ‘bad habits’, or do you through your knowledge of the IPD principles try and apply these to everyday work practices?

Interviewee 4: The honest answer is you do have the tendency of falling back into the old practices, there is a tendency to do that

Interviewee 3: But you have to, because we are not in an IPD project
But couldn’t you apply some of the IPD principles to general everyday working life, particularly in bringing added value to your job?

Interviewee 3: You certainly can

Interviewee 1: Sure

Interviewee 3: Yeah you can use those tools, the five lean principles but when we started talking about the five big ideas you take an ideal like don’t optimise one part at the expense of the whole – how do you do that? – unless you are within your own project, well your own part of the project – but that’s precluded across boundaries, contractor boundaries and it can’t happen

Interviewee 1: Right

Interviewee 4: Correct, it is dependent on the contractor

Interviewee 2: Our goal has to be about optimising our own little piece of the project – I mean that’s the only way we can make money, especially in today’s times. So we have to look for every possible advantage we can take on these jobs under normal plans and specs situation – I hate to say it even if its to the detriment of somebody else that might be on the project.

Interviewee 3: It’s the system, its just the way the system is designed – we didn’t design it we don’t like it, we would never design it the system like that but that’s the way is and somebody else choose it – so you’ve got to swim in that water or you’ve got to be in that water and know how to swim.

One more question if you had a choice between the traditional method and the IPD way of management, would you want to utilise the IPD approach every project?

Interviewee 4: Most definitely

Interviewee 1: Yea, I would say so

Interviewee 4: I would love to walk tomorrow and find out that the industry has awakening overnight and this is going to be the norm how we’ve been doing business for a long time – but its not likely now
Interviewee 3: But there are some people you know it may be even most people that could not do this – its just not in them to trust or to be trust worthy. There are people that even though they say we are going to do this they are still going to look for side angles we even had one on our team. We had a team member that we all loved and was a great guy played golf together and everything else but he, his company went out and brought in a subcontractor and they took advantage of the team by awarding this real lucrative contract to this guy who was the brother in law of the owner of the business, now and it was clearly a problem and that was the case where the person we were involved with at IPD turned out not to be the person pulling the strings and really in charge with the company who we thought he was equal partner and we finished that job, we settled everything and we had to not invite him to participate on other projects. The guy who was part of the team here was very embarrassed by the whole thing and it hurt him. But we had to do that and another issue where one of our team members hired a person from one of the other team members and he said that the other person he hired came to him and said he was going to leave this other company. And that caused such a problem for the group, the company that he left that we had to ask this person to, although we really liked this team member a lot, but you know we had to almost half a full court and say we’re sorry but we just can’t.

Interviewee 4: It was a breach of trust

Interviewee 3: It was a breach of trust, I mean even if the guy came to you first there is no way in the world you should have gone to the president of a company and talked to him about that. I mean it just had to happen.

Interviewee 4: And had he done that he may very well said hate to see him go but hire him if you wanted.

Interviewee 3: And maybe he couldn’t have done that because the other guy may have said well I’m going to fire you first for that – I don’t know, what might have happened. But we’ve had those two cases, those are two of the problems that we’ve had and the type of problems other people have had when your trying to have this trust relationship

Interviewee 4: But it has to be complete trust to work, it really does, you just can’t have that

Ok, so was the choice to use the IPD approach a collective decision or was it directed by one individual/company?
Interviewee 3: Well that wasn’t the way IPD started. IPD started I think I mentioned to you in the very beginning we were trying to see that theoretically in an ideal world – if you had a company and in your company and on your payroll, you had ten of the best architects in the world, a whole bunch of very good engineers and a whole functioning mechanical division – like a whole Westbrook in your company and a whole reo-electric within your company and then went out and bid a job and no matter how you got the job you would deliver it as an integrated project delivery – it would be perfect there would be no infighting, there would be a maximum efficiency, everybody is sharing costs – it would be beautiful. So we were trying to figure how can we take independent companies that want to retain their autonomy and come together and look before the owner as an individual integrated company and we did a lot of meeting and talking about that. You know [a local rep] was in charge, [another local rep], you know what that would look like, how it would happen and all kind of problems with it, you know we went through all the problems that people go through now and even coming up with a name we were thinking it would be integrated private, well in my thoughts I thought it would be integrated project development – cause we had already hit strategic facilities development as a company, so it was in my mind and [a local rep] said it ought to be integrated project delivery – cause that’s the real world. So [a local rep] was the one who strung those three words together and you know it’s like we wrestled with this for a couple of years. The general contractor we were working with wasn’t really interested, another company wasn’t really interested but then something happened and suddenly just like that, all of a sudden they both became very interested and we just got together and it just kind of took off. All the little problems evaporated, we had new solutions for them and decided we really don’t know how this is going to turn out but we are willing to risk a job – if you lose it won’t be the first time, but we didn’t and we didn’t bet more than what we could afford to lose. And we didn’t go ahead and take on a million dollar job and that’s the way it started. Maybe we should started up IPD inc again.

Interviewee 2: IPD you know just the general basics of IPD, we’re all on the same team – you know, reinforcing the ideas, whatever they need – right a problem or issue or a need they can’t fulfil that somebody else in the team could pick up and help out. And vice versa, we expect that to work both ways.

Interviewee 3: I’d say its indoctrination

Interviewee 2: More indoctrination

Interviewee 3: Its indoctrination what we are doing now more so than training.

Interviewer note: Break in audio as a new member of the interviewee party arrives.
Interviewee 3: Interviewee 5 is a mechanical engineer and is a partner in the engineering firm that does work with the IPD. We’ve covered about everything and the thing is, the thing I guess you could help with is how do you feel IPD works with you and do you think, I guess really she would like to is any of the lean principles that IPD uses as finding their way out into engineering.

Interviewee 5: As far as I know it works great for us. On the design side of things, one thing that I have found through an IPD project which is good is that we probably do spend a little bit more time upfront working with the contractor but you know, we would rather spend it upfront then on change orders and changing drawings, value engineering and all that. We created, well instead of creating shop drawings we actually came here and sat one of our guys here and sat down with their guys and did all the piping drawings and all that which they fabricated from and all that we even got support from interviewee 2.

Interviewee 3: That is an important thing that we didn’t talk about is we eliminated the shop drawing requirements

Interviewee 5: Yeah the drawing process, typically yeah

Interviewee 1: Now that’s a good thing

Interviewee 5: We eliminated having to go in and do shop drawings and fabrication drawings, we did all that at one time.

Interviewee 1: I never touched a mechanical, electrical or plumbing shop drawing as a general contractor in a traditional method we would have and these guys, this is was IPD is all about.

Interviewee 4: It really is a redundant effort in the traditional project delivery method, there's someone drawing it up and the contractor has to redraw it again (general consensus from all parties)

Interviewee 3: Muda, more muda

Interviewee 4: Yep

Interviewee 5: Yeah, when we are doing it in the typical fashion we just stamp, you know we don’t want to take any liability for the shop drawings so we just stamp reviewed on it and stuff and in IPD we all assume the risk and all that. So we try to do things once on the design side versus what its bid out there, its bid a project then looking back and wanting to [view] it and they don’t want to pay the
consultants to change their drawings for the [view] items the contractors have come up with. So it’s a big struggle and hassle.

Interviewee 4: Have you guys put any lean practices into place for the rest of the organisation?

Interviewee 5: We really haven’t, I mean we just really haven’t. One of the things maybe, I don’t know, I know I’ve heard of lean and read some of the lean stuff, some of that stuff is still new.

Interviewee 3: You’re busy designing drawings

Interviewee 2: You also have a lot of contractors out there too busy to look into such an approach as IPD

Interviewee 5: Well ironically, the other day I was at Florida hospital and there was this contractor there and I knew it was like [a local rep] and I had been told that they had gotten the design-build contract for fantasyland and I think I knew that because of MSI and I go oh how’s that design-build fantasyland project going – well the guy goes we’re doing that integrated project delivery, yeah that IPD method and all they are doing is using BIM. These people they have no concept of what true integrated project delivery is.

Interviewee 3: Exactly.

Interviewee 5: Yeah, they think using or doing a project with BIM is the same as integrated project delivery – its not. What I find, actually one other thing I’ve thought about is the LEED– USG that lends itself well to IPD because with LEED projects you have to have the commissioning, you have to the contractor should be on board at the get go when your developing all your commissioning plans and all that

Interviewee 1: Pre-commissioning plans, pre-construction plans

Interviewee 5: Pre-construction, all that. So to me IPD would lend itself really well to be integrated in with the LEED process

Interviewee 4: Are you familiar with what that is with our industry in the states?

No
Interviewee 4: LEED is basically a government (acronym)

Interviewee 1: Leadership and Environmental Engineering and Design/Development

Interviewee 4: There you go

Interviewee 1: It’s green

Interviewee 4: It’s the green method or building conditioning – that’s what it is and well the government actually gives awards right, isn’t it a government sanction body that determines the level, buildings can be, well there’s different levels

Interviewee 1: Yes, that’s the US green building council

Interviewee 5: Actually it’s a private organisation; yeah I thought it was government too.

Interviewee 1: It’s a private organisation the US green building council

Interviewee 4: There is a big push here to start building these building and I’m sure it’s the same around the world you know building more energy efficient, more earth friendly and all of that and its an organisation that is developing standards of how buildings should be constructed and they are developing specifications on how that is to take place and the certification process for certifying that building needs and they have different levels grade levels a building

Interviewee 1: Can be certified its silver, gold and platinum

Interviewee 4: And it just depends on a point system, right?

Interviewee 1: Yeah

Interviewee 4: Depending on, you know, you get so many points for using renewable materials, resources in the building – so many points for energy efficiency, mechanical systems and all that kind of stuff and depending on where you fall, what level of certification you’re at, so over the last couple of years

Interviewee 5: Its now government buildings here have to meet LEED certification whether its just certified
Interviewee 1: They have to on government buildings?

Interviewee 5: US, yep the GSA and all that, you start..

Interviewee 1: Like federal projects?

Interviewee 5: Yeah like, we were bidding on a job, we were brought in as a team on a design-bid for the GSA and in it, in the proposal – this is a building were the developers are going to develop a green building on a piece of land – and in that proposal it states that if building doesn’t meet the guaranteed platinum certification that the government would come in and do whatever it took to make it platinum and then

Interviewee 1: back charge the contractor

Interviewee 5: So that’s where the process of IPD you have the whole team in a building together

So would that be like a 5 star energy rating? Because in Australia we have a green star rating system for green buildings, for us a 5 star energy rating is the highest you can currently achieve.

Interviewee 5: Yes, well platinum is the top

Interviewee 1: 5 star I think is, I’m not sure what you are referring to

Interviewee 4: Well that would be the equivalent as there are not many platinum buildings for sure that I’ve heard of

Interviewee 1: I think there is only one in the state of Florida – if one, I think its only one

Interviewee 4: You know part of the issue of that thing is, is just the cost effectiveness of it, I mean right now it doesn’t really pay because the savings in energy doesn’t it doesn’t off-set the upfront cost of meeting those standards so that’s kind of stifled some of this from happening but as the government obviously gets more involved and starts mandating more and more of this it will become a bigger issue

You also mentioned that you don’t use the principles of the IPD system in your own day-to-day operations within your company. Can you justify this non-use of principles by your organisation?
Interviewee 5: I really couldn’t say because we don’t really have it employed within the company the lean principles

Interviewee 3: I’m not sure

Interviewee 1: Well, you may have them implemented but you just don’t know it

Interviewee 3: Yeah

Interviewee 5: That’s true too but

Interviewee 3: Yeah the five big ideas that Greg identified were number 1 was optimise the project but not the piece, not a piece of the project – so you are doing that on IPD projects – for sure because

Interviewee 5: Yeah

Interviewee 3: you’re not trying to optimise, you’re not trying to minimise your engineering costs you’ll do engineering that needs to be done on the project

Interviewee 5: Yeah, on IPD I would agree, yeah, yes that’s IPD

Interviewee 3: And then number 2 collaborate really collaborate – which we do a fairly large amount of collaborating and collaboration. Number 3 increase relatedness with the team members. Number 4 projects are networks of commitment – we certainly have that commitment and one that you guys probably do without identifying and I think we do it although we don’t formally think of it is tightly coupling learning with action – you know to, when something goes wrong to find a result why it went wrong and then look back and fix it and not letting it keep going on and on and on

Interviewee 5: That’s true we would use that and spread it throughout the organisation and don’t make this mistake again

Interviewee 3: and I’m trying to think of lean principles specifically apply to engineering and one of them that I’m thinking of is parallel design, you know, pursuing parallel design until the last responsible moment and then abandoning the one that’s not winning, you know, but to actually shorten the time frame of the design cycle to actually be pursuing parallel thought patterns and parallel designs so then when you get to one that’s not working you’re still at that same point as the other
Interviewee 4: Actually you would be doing that. I’ve worked on projects before that do that, that [org A – project 2] project for example was multiple systems that were at the same time were being developed and valuating to reach a point

Interviewee 5: That’s true, but we don’t

Interviewee 4: To stop over and over

Interviewee 1: It’s not calling it lean but you probably do adopt the approach

Interviewee 5: Yes I would agree with you there but that’s not the norm though but yes we have done that before – because to us time is money so the more we have to investigate on different, in the typical way of process

Interviewee 3: Interviewee 5 if you had your way would you do a lean project every time or do like the selecting of projects to be lean? Would you make more money?

Interviewee 5: IPD you mean?

Interviewee 3: Yes

Interviewee 5: Oh yeah, all day

Interviewee 3: You’d make enough money on IPD

Interviewee 5: Yes sir, if I haven’t mentioned there's no headaches, no finger pointing, no liability – its just more enjoyable

Interviewee 3: If there's something wrong, we have a job here where we give the owner a project for a million dollars less than the closest competitor, who we know, knows how to build the project and everybody at the table says you’re making more money than you would normally make. So where did the million dollars come from? There’s a million dollars somewhere here and a million plus because you’re all saying your making more than you thought you’d make coming into this project and we are a million savings upfront for the owner and then we made more money where did it all come from? Its only a $7 million project, $7.4 million.

Interviewee 4: I know what you mean I wouldn’t want to be the other team – saying where did it go
Interviewee 3: That’s a good way of putting it. Also could you really say under the traditional method that your net profit would be under 5% year in year out for the work you do.

Interviewee 1: It depends, cause 5% maybe yeah

Interviewee 3: Yeah that’s a good range because most small/large contractors make 5 or 4% and a lot of mechanical anyway. Well here’s a $7.4million job with $1 million as a percentage of 7.4 – we don’t have an accountant here (13.5%)

Interviewee 1: It’s about a 23% margin

Interviewee 3: 23% - I mean that’s a huge saving, that’s multiples and multiples of net profit and owners that want to save money and they want to save money by competitively bidding the project and they’re hammering you to get into your 10 or 5% and hammering us to get to a particular % and that’s nothing compared to what’s really there to be had – if they could see. Well sign me up I’m convinced.

Interviewee 2: Can we franchise this?

Interviewee 5: How bout the government, because I was approached a few weeks ago a guy called me about some government project over here design-bid which they are getting more into design-build you could use IPD in any design based project as an IPD project

Interviewee 1: Are they hard bidding on that one?

Interviewee 5: Well I was told this was a big project

Interviewee 1: There was a shortlist?

Interviewee 5: They were going to bid it against three other companies but that’s the question I had well look we get this team together and you’re going to go out and he said well I can’t really tell you yay or nay yet right now it was a short span fuse but is that something though because if something else comes up like that would we be interested in pursuing something like that in design-build with the government?

Audio stops because the conversation drifted to another topic. End of Interview
Interview Analysis

Each interview will be analyzed separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organizational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analyzed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes will be boldly green highlighted with underlined. Where features of diffusion groupings are not present a description of ‘not discussed’ be placed. A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue. The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 5 Results: Descriptive Analysis.
**Interviewee 1: Senior Executive 1**

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<th>Feature</th>
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<th>Interviewee Attitude</th>
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<tr>
<td>Overview</td>
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<tr>
<td><strong>Organisation &amp; Management Environment</strong></td>
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<tr>
<td>Formal Social System</td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks. The organisation is in a unique position in terms of project delivery as the delivery of lean projects is governed by client requirements and mutual contractual relationships, called IPD. According to the interviewee and SE2 this has occurred as a total lean transformation for the organisation is not viable for the services they provide and the current market economy impacting the United States of America.</td>
<td>“I think it requires a more sophisticated owner because one of the keys I think for an IPD process to really be successful is owner involvement for one thing. You want to make sure you have an owner that’s involved in the process which we do have through [partner] and very much so on this one, actually more so on this plant than any of the other projects that we’ve done. The owner, this was his second project – he was the project engineer for the owner on the [project] and it was the first one that we; worked on with him on and he was very much involved and engaged on a regular basis and enthusiastically so. So I think it requires the right kind of owner to realise the full benefit”. “….requires a more sophisticated owner because one of the keys…for an; IPD process to really be successful is owner involvement for one thing you; want to make sure you have an owner that’s involved in the process….”</td>
<td>The interviewee was very open about the nature of the organisational environment the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of creativity and interaction across working groups.</td>
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<tr>
<td>Informal Social Structure</td>
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<td>Social Norms</td>
<td>The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these</td>
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attributes in relation to organisational contexts.

The first emerging social norm identified was **advocacy**. The interviewee discussed advocacy in line with the undertaking of selfless acts.

The interviewee highlighted how the perspective concerned the presence of selfless acts being undertaken within the project as a means to maintain budget, time constraints and overall a positive cultural and working environment.

SE1 also identified and discussed **advocacy** through selfless acts.

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<th>Opinion</th>
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| Knowledge | The interviewee when asked about their role within the organisation and exposure to lean described a long-term employment within the industry and their own organisation. This experience has lead them to their current position within the senior management team of the organisation.  
The interviewee described their current role as a senior executive. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework.  
This individual has had a high level of exposure to lean innovation and lean transformation in organisational environments through their | | |
exposure through the IPD framework over 10 years.

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<th>Persuasion</th>
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<td>Decision/ Implementation</td>
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<td>Confirmation</td>
<td>As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment. The interviewee highlighted the confirmation of lean through job optimisation through the IPD team. According to the interviewee fundamental to job optimisation is the approach and structure of the IPD framework underpinning the lean objectives of the organisational and managerial environments. The interviewee’s perspective focused on the collaborative process and equipment management in terms of job optimisation. Also identified and discussed by Identified also by PM2 and PM3</td>
<td>“I think because of the collaborative process through the design audit job allows that to happen because we’re not often making equipment selection decisions for example, until after we have really thoroughly worked through the design process and often times we may even at a certain point on coordination you know to make sure a certain piece of equipment fits and those kind of things. You know, so, I just think that process itself kind of pushes you – I think that’s one of the reasons also that you, by the time you get to that certain point and you’ve had the engineers and you’ve had the installing contractor looking at the plan and working the plan, reworking it and then you decide on the best course of action for a particular piece of equipment, let’s say, yeah you’ve done that, I think to a great extent you’re at that last responsible moment”.</td>
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| As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment. The interviewee highlighted the confirmation of lean through open communication through networking of the IPD team. | “Well I would say that another thing though that the IPD methodology does is because again going back to the owners involvement in the project that being one of the key principles I think of IPD is you have, the lines of communication are open between all the people that are really involved in the design process as well as from the owners standpoint. I mean they are; the ones telling you what their needs are so because you have better communication, you know you have better information to make decisions on you may know earlier because you |
Fundamental to the interviewee’s perspective on confirmation is the alignment of all communication streams within the IPD framework.

maybe be, you may have a lot of; communication you might not otherwise have that gives you insights on a pending change or something there’s happening over here that may affect what we are building here. So you know then oh we need to hold off on this. And often times you don’t have those people communicating with each other then you’re not going to know that the owner may be you know dealing with a situation which could have an impact on that project”.

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<td>Verbal Communication</td>
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<td>Visual Communication</td>
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<td>Written Communication</td>
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Challenges

During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a result of lean implementation.

The interviewee discussed the organisational environment as a direct and indirect challenge currently impacting the organisation.

One moderately impacting direct and indirect perspective emerged regarding the participant discussion regarding the formal social structure of the IPD team (i.e. the organisation).

The interviewee discussed the presence of the architect as part of the framework to occasionally....

“I would say that you know, I mean we have a very good relationship with our architect that’s on the team. But they are architects and that by nature, I mean there’s always a little bit of ego involved and in play with those guys and trying to and being so used to being the ones in control, you know;. Some of that way of doing things sometimes has a tendency to creep into and you’ve got to step back and say wait a minute remember what we are trying to do here remember the process, you know. So I mean how do you overcome that, it’s tough unless all you’re doing is meaningful type work. I think that’s one of the challenges and I think all of us have that challenge to some extent and it goes back to the question interviewee 3 asked about the superintendent making that adjustment. I mean because we are operating in other market areas using more traditional project delivery methods and we are not doing these projects all the time

Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.
indirectly impact the structure in turn directly impacts other IPD parties. This occurs despite a pre-existing good relationship with the architecture party.

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<tr>
<th>Desirable versus Undesirable</th>
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*and exclusively this way that's where we have a little bit of breakdown sometimes – when we start one of these projects we have to kind of do a little retraining I guess within our own groups and our own teams sometimes, you know and the architects might be a little more challenging for them*.
### Interviewee 2: Senior Executive 2

#### Organisation & Management Environment

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<thead>
<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formal Social System</strong></td>
<td>The interviewee was asked to describe the formal social system in regards to relationships and organisational specific communication networks. In particular the interviewee was asked to describe the nature of the formal social system in relation to the mutual contractual relationship. The interviewee was also asked to about the nature, success and failings of these relationships and networks. The organisation is in a unique position in terms of project delivery as the delivery of lean projects is governed by client requirements and mutual contractual relationships, called IPD. According to the interviewee and SE1 this has occurred as a total lean transformation for the organisation is not viable for the services they provide and the current market economy impacting the United States of America.</td>
<td>&quot;….you see to share profit is different to sharing cost because you can all have your own costs and we could finish the job and share the profit but still be fighting for our own cost area because you know, it’s probably tied somehow to your share of the profit – but we are sharing the cost, that’s a different concept….&quot; &quot;…..requires a more sophisticated owner because one of the keys…for an IPD process to really be successful is owner involvement for one thing you want to make sure you have an owner that’s involved in the process….&quot;</td>
<td>The interviewee was very open about the nature of the organisational environment the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of creativity and interaction across working groups.</td>
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<tr>
<td><strong>Informal Social Structure</strong></td>
<td>Not Discussed</td>
<td>Not Discussed</td>
<td>Not Applicable</td>
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<tr>
<td><strong>Social Norms</strong></td>
<td>The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these</td>
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attributes in relation to organisational contexts.

The first emerging social norm identified was **advocacy**. The interviewee discussed advocacy in line with the undertaking of selfless acts.

The interviewee highlighted how the perspective concerned the presence of selfless acts being undertaken within the project as a means to maintain budget, time constraints and overall a positive cultural and working environment.

**SE1** also identified and discussed **advocacy** through selfless acts.

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The first emerging social norm identified was **integration**. The interviewee discussed **integration** in line with organisational relationships.

According to the interviewee the stabilising and integration of relationships within projects through the lean innovation.

The interviewee particularly described **integration within the project environment**. **PM1** also described **integration**.

| Opinion Leaders & | Not Discussed | Not Discussed | Not Applicable |
The interviewee described their current role as a **senior executive**. The role description indicates that the interviewee is categorised as a senior executive for the purpose of the research and as set out in the theoretical framework.

This individual has had a **high level of exposure** to lean innovation and lean transformation in organisational environments through their exposure through the IPD framework over 10 years.
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<tr>
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<th>Interviewee Attitude</th>
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<tr>
<td>Direct versus Indirect</td>
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<td>Not Discussed</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Desirable versus Undesirable</td>
<td>Not Discussed</td>
<td>Not Discussed</td>
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</table>
### Social Norms

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The first emerging social norm identified was **advocacy**.

The interviewee highlighted **advocacy** to be evident firstly in the client and owner roles that define construction. The interviewee highlighted how the client/owner throughout the project becomes advocates for the team and project delivery and in a way for the lean innovation.

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

"...absolutely it’s a win/win across the board and the client which is really what it’s all about, it’s all about the client who has truly seen it as a win/win across the whole project and its sort of like a miracle to keep all of the savings after sharing it. You know"
attributes in relation to organisational contexts.

The second emerging social norm identified was stability. The interviewee discussed stability in line with project delivery objectives.

PM2 also described stability.

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The third emerging social norm identified was integration. The interviewee discussed integration in line with organisational relationships.

According to the interviewee the stabiling and integration of relationships within projects through the lean innovation.

The interviewee particularly described integration within the project environment. SE2 also described integration.

"….a key component to this whole deal that I see it breaks down the silos of independence – independent silos that everybody is trying to protect. So the culture was extremely positive and a lot of positive momentum and, quite honestly all of the jobsite foremen that have all worked together throughout this whole job they are all sad to leave the job. They really are these big, scruffy big guys out there they have developed a kinship around this job and camaraderie”.

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<th>Opinion Leaders &amp; Change Agents</th>
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<tr>
<td>Implementation Process Feature Analysis Quote Interviewee Attitude</td>
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<tr>
<td>Knowledge</td>
<td>The interviewee when asked about their role within the organisation and exposure to lean described a mid-term employment within the</td>
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</table>

768
industry and organisation.

The interviewee described their current role as a project engineer within one of the senior management group organisations. The role description indicates that the interviewee is categorised as a project manager for the purpose of the research and as set out in the theoretical framework.

The exposure of the interviewee to lean is considered low; as this is the interviewees’ first exposure.

| Persuasion | The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.

The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of the **formal social system**. The interviewee discussed the use of the **formal social system** through the **IPD framework**.

The interviewee discussed how the utilisation of the lean innovation within a project environment and being dictated by the client/owner has assisted in the overall improved project completion. |
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<td>“Lean has helped us complete the job, this may sound naïve but it’s virtually eliminated the risk on the mechanical and electrical side [of the project works]”.</td>
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</table>
According to the interviewee the integration of all project parties throughout the planning and construction phases of the project, particularly through more fluid communication streams, equal participation and shared risks and costs.

This formal social structure persuasion perspective also links in with the next social norm focused perspective.

The interviewee was asked to describe the lean implementation process for the organisation. As an organisational partnership lean has been implemented over a number of years the exact process and approach of lean is not clear. However the interviewee did discuss a number of current and previously used strategies that form the lean implementation process for the organisation.

The interviewee in this discussion highlighted the use and presence of organisational social norms as part of informing persuasive techniques, particularly the use of **social norms** (integration). The interviewee discussed the use the **social norms (integration)** through the **IPD framework**.

The interviewee discussed in particular how through integration individuals and teams within the IPD framework have been persuaded that the lean innovation creates a holistic experience to project delivery.

"...it’s been a real teammate approach and I’ve got a superintendent; that’s been in the trades for 30 years and has got literally tons of; experience in different and multiple trades and he says that this has; probably has been the best experience he has been through in terms of; being involved in the managing of a project"

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<tr>
<td>Confirmation</td>
<td>As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with</td>
<td>&quot;...I was a little sceptical maybe at first and there’s maybe some sceptical issues first might have had to do with how’s my insurance company, my liability provider</td>
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lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through **the IPD framework** and the organisational structure.

The interviewee discussed the perspective as an extension to the current management structure and the scepticisms the interviewee held towards the framework.

Fundamental to the interviewee’s is the awareness by those individuals at a project management level are concerned about the potential impact the lean innovation has on existing project related concerns. The nature of the lean innovation and the structure of the IPD framework for this organisation is centred around the concept of trust as such opens up communicational networks, partner relationships, contractual obligations and construction processes.

This perspective also links in with the second confirmation perspective.

| As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment. The interviewee highlighted the confirmation of lean through **shared project cost and risk** and the organisational structure. Fundamental to the interviewee’s perspective on “There is a leap of faith you know, with are the insurance issues going to work out, what’s my attorney going to say about the contract, bonding wasn’t an issues because [the company] pulled the bond – you know how does the event help profit or how will the job work out, we went in with X and I can tell you we hoped to make X plus 30% well we made X plus 100%. We doubled our profit on the last job we were doing well more than double. And you know that in a down economy it’s a true blessing, it really is I’m not kidding you it’s a true blessing to have a job like that and to be |
| --- | --- |

Going to look at this arrangement. From a legal standpoint I had concerns about how the contract was written from [the organisation] to [another IPD party] there was a little loose, you know. But it was really predicated and focused on trust and I’ve never seen a contract predicated on such a large amount of trust so I mean that certainly was a breath of fresh air.”
this confirmation perspective is the alignment of all parties in gaining project funding and risk allotment.

The interviewee’s discussion on this confirmation perspective also had some reflections on how different the lean approach to project delivery compared to the traditional project delivery.

Further to this perspective the interviewee also reflected on the process and how shared project risk and cost has improved bill and material submission.

able to know you are going to make that money which we kind of just found out this morning [the person] their accountant came in and shared all their numbers with us, this morning so, to be able to have that kind of; blessing in this economy is truly great experience and to know that we also saved the owner a million dollars on the front end of the bidding process. And the market conditions dictated that we were evidently because of [the contractor’s] dealing with the contract and we were able; to virtually double our profit but also be a million dollars low and I know [the client] will not forget the fact that we saved them a million dollars that’s free money to them”.

“….we’re submitting our bills on a time and materials basis it cleans the whole process up – it sort of purifies it and the invoices are submitted and at the end of the day it is a cost to the group – not a cost really to me and it’s hard to shake that mindset, you know. That’s really a cost to me and I got to amend this and really it’s a cost to the group, you know. [The company] doesn’t have to provide that cost and its worked the opposite way so many times….”

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<tr>
<th>Communication</th>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
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<td>Written</td>
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<th>Challenges</th>
<th>Feature</th>
<th>Analysis</th>
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<th>Interviewee Attitude</th>
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<tr>
<td>Direct versus Indirect</td>
<td>During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the</td>
<td>“I was with a group and we were sitting at breakfast and our steel fabricator delivered 375 anchor bolts in one day and all the nuts were supposed to be tack-welded to the</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some</td>
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organisational and project environments as a result of lean implementation.

The interviewee discussed project planning as a direct and indirect challenge currently impacting the organisation.

The interviewee addressed the direct challenge of the IPD team and it's to overcome problems within the delivery of the project.

A number of cultural reflections are made by the interviewee regarding this moderately direct consequence.

The indirect perspective further emerged within the above discussion by the interviewee, who highlighted the consequence to be cost related:

Although a small cost was incurred by the project team over this incident, the overall cost for this incident was significantly cheaper than what the price could have been.

bottom of the anchor bolts per the structural drawings. Well our steel fabricator missed that so they shipped all the nuts out loose and every one of them was loose – so we had to assemble one of them and screw the nuts and washers on the top and bottom and we were going for a footing inspection the very next morning on a Friday morning because we wanted to pour the concrete foundations so we wouldn’t have to deal with the rain that was coming over the weekend and leave out excavations open. Well the nuts had to be tack welded, the bolts and the nuts had to be tack welded to each other – the steel contractor hey you know we missed it and they were trying to avoid any responsibility for it so the boss (superintendent) of [the organisation] said hey ‘I’ve got a tack; welding machine or a welding machine back at our office. I’ll go pick that up right now’. This is at 3:30 in the afternoon on a Thursday afternoon and he said I will come back and I will tack weld those nuts – he worked for about 3 hours and tack welded every one of those nuts so we could get our inspection the next morning and pour the concrete footings the next day”.

“That cost from [the organisation] to the group 3 hours labour at whatever his rate is probably only cost the group what $180 you know if that and its irrelevant really but the steel fabricator I would have had to go back and I would have had to fight with them to get their erector out to the job site which he would have charged an enormous amount you know $75 minimum for one guy per hour and it would have ended up costing about $300-400 and it would’ve taken them three days to get it done”.

During the interview the interviewee also addressed and discussed challenges that have been faced or are currently being faced within the organisational and project environments as a frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.
The interviewee discussed communication as a direct and indirect challenge currently impacting the organisation. One minimally impacting direct and indirect perspective emerged regarding the interviewee’s discussion into project specific communication and the adding of value throughout the project life-cycle.

The interviewee in this discussion highlighted changing cultural attitudes and behaviours in direct relation to communication and the project as a whole and its indirect consequence on other parties within the IPD team.

| Desirable versus Undesirable | “Well, there is an area that creates some friction and it probably needs some looking at because our approach to the architects and engineers is that we pay them per the hour, by the hour for whatever they do. I mean they don’t have a budget they’ve given us an estimate but whatever they take; they will spend it. And our thinking is any money that you pay a good architect or a good engineer for work that they are really doing for the project is worth it. If they are working on a project but then they do share in a little bit of the profit at the end of the job, but its not as much as a team member because they have no risk and we set that hourly rate out at the very top end of what they normally charge on any other job because we think; they are better than most of the architects and engineers. They certainly perform well for us. But you are trying to minimise the cost on the job”.
| Not Applicable |
### Interviewee 4: Project Manager 2

#### Overview

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#### Organisation & Management Environment

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<td>Formal Social System</td>
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<tr>
<td>Informal Social Structure</td>
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#### Social Norms

The interviewee was asked a series of questions concerning the social environment and cultural behaviours that have occurred, emerged or changed/matured within the organisation. In answering the questions the interviewee described the emergence of and committal to a range of significant attributes discussing these attributes in relation to organisational contexts.

The second emerging social norm identified was **stability**. The interviewee discussed **stability** in line with project delivery objectives.

The interviewee compared the different project delivery environments of a traditional project and a lean project. For the interviewee the processes linked to a lean project delivery has created a more stable, positive and friendlier working environment to what is typically experienced in more traditional project delivery methods:

PM1 also described **stability**.

“It is enjoyable I mean that’s a big difference from standard jobs. It’s always adversarial and you’re always looking out for that guy particularly wondering if he is going to stab you in the back or how he is going to treat you. But with this approach we know what the score is and we are comfortable in knowing what the relationship is.”

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<td>Opinion Leaders &amp;</td>
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<tr>
<td>Change Agents</td>
<td>Implementation Process</td>
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<tr>
<td><strong>Feature</strong></td>
<td><strong>Analysis</strong></td>
<td><strong>Quote</strong></td>
<td><strong>Interviewee Attitude</strong></td>
</tr>
</tbody>
</table>
| Knowledge     | The interviewee when asked about their role within the organisation and exposure to lean described a mid-term employment within the industry and organisation.  
The interviewee described their current role as a project engineer within one of the senior management group organisations. The role description indicates that the interviewee is categorised as a project manager for the purpose of the research and as set out in the theoretical framework.  
The exposure of the interviewee to lean is considered moderate as this the interviewee has had multiple exposures to lean projects. | Not Discussed | Not Applicable |
| Persuasion    | Not Discussed          | Not Discussed | Not Applicable |
| Decision/ Implementation | Not Discussed | Not Discussed | Not Applicable |
| Confirmation  | As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.  
The interviewee highlighted the confirmation of lean through **job optimisation** through the IPD team.  
According to the interviewee fundamental to job optimisation is the approach and structure of the IPD framework underpinning the lean objectives of the organisational and managerial | | |
environments.
For the interviewee this confirmation perspective is more about job optimisation at an individual level.
Identified also by SE1 and PM3

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<td>Visual Communication</td>
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<tr>
<td><strong>Challenges</strong></td>
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<tr>
<td>Direct versus Indirect</td>
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# Interviewee 5: Project Manager 3

## Overview

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## Organisation & Management Environment

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## Implementation Process

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<td>Not Discussed</td>
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<td>Persuasion</td>
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<td>Decision/</td>
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</table>
As part of the interview process interviewees were asked to identify and discuss various confirmation of ‘success’ stories associated with lean implementation within the organisational or project environment.

The interviewee highlighted the confirmation of lean through **job optimisation** through the IPD team.

According to the interviewee fundamental to job optimisation is the approach and structure of the IPD framework underpinning the lean objectives of the organisational and managerial environments.

For the interviewee this confirmation perspective is more about job optimisation through project design.

Identified also by **SE1 and PM2**

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Interview Transcripts

Interview Transcript 1:

Transcribed by Brianna Chesworth in accordance with University of Newcastle policy 000873

Organisation F

Interview conducted on Thursday February 7 2011

In attendance: Interviewer and 1 Interviewee

Start Time: 11:30am

Finish Time: 12:00pm

Phrases and words bolded are those of the interviewer

Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

No.
Ok, so to begin what type of project works does your company undertake and is this affected by the location, company strategies and culture? And if so is the organisation across different locations?

Okay. You're doing very well by the way.

Well we make various things... [the organisation]. In this particular organisation we make rail wheels and bar for, which I think might be used for, certainly used in the construction industry, for example in bridges and things. [the organisation] is across locations internationally and Australia. For the people you’re talking to today, they’re part of the manufacturing organisation which where there is a mine in [SA], umm, wire in [regional NSW], bar mill here, a rod mill in [regional NSW] and rail department here and in addition in [NSW] and [VIC] so it’s part of err Australia-wide organisation. We also have operations in Canada, and Mexico and Chile which was a part of the manufacturing organisation.

I actually forgot to ask, could you give a brief description of your role in the company?

Yep. My role is that, [local] region lean specialist. So my job is to work with businesses like wire and waratah and distribution and so forth to help them develop culture processes and management systems that sit behind the lean, really the Toyota production system. So, that’s my job.

Okay. Have you found then that the decision to implement lean has been based on other companies who are in similar areas?

I think...

Or has it been more of like an individual company decision?

I'm not sure, I'm not sure why [the organisation] originally decided to implement lean, umm... ... but the history is they had for a couple of years, they had a consulting organisation who worked primarily with [mining organisation] and then [the organisation] who help them implement some of the basic tools. The decision ahh, I'm not sure why, why, why the original decision... see I wasn’t here but for me, for this organisation, the decision to take the holistic approach, which is culture and people as well as the tools and the management systems was made here because I
proposed that they do that. And the General Manager liked the, liked the concept and said ‘yes, I'll let you try it in the bar mill’. So in the bar mill we’ve gone through, you know, quite a holistic process, and we’ve done the same here in rail and then wire and so forth... parts of wire. So that was, the decision was made on business needs from my point of view and I came and did a current assessment and said “oh my God, you desperately need this”... [laughter]... “Here’s what I think you should do...” so that’s how it was done.

Have you found that the approach you have taken, so one section, each section of the organisation implementing it has been a better way of going about the process?

I’ve done it, I’ve done it a number of ways historically and because waratah site was relatively new, umm it really does depend on the maturity of the business and how much, how much there is to do. Uhh, in wire, for example, they’ve probably been faster at spreading it across the business more holistic... more generally but I find that umm one has more effective deployments when one connects the deployment to a real business need and one sets clear results outcomes as well as, well we’ve done ‘5-S’ or whatever, so we, what we’re trying to achieve is specific business outcomes and in order to ahh, an organisation’s like... like a solar system where if you only change one part of it then it’s disaster, it all falls in to a heap so, my, my experience is you have to put in all the elements, you have to change, make a veritable change in all the elements of a system to really make it have some potential cause for lasting sustainability, so to do that, in a broad sense is very difficult, so my preference is to, to have a clear plan, to progress place by place when there is only one of me...So there is only one of me and I just can’t manage to do five at a time. There’s just too much to do.

So that’s why. So my, my, further down the track I train up people in each area and then lead people forward so I can spread out a bit more so umm, under the current circumstances with, with only one person for the whole of [regional NSW] who has a really good appreciation, you know, a really profound understanding of lean, it’s the only way to do it. I can’t do it any other way. I’m barely managing as it is. [laughter].

So, so under other circumstances where you have a leader of a business who really fundamentally understands that ‘yeah, you can do it more broadly’ but this is a way of the organisation learning from doing it once, making it better, doing it in the next place, do it better in the next place and so forth so that they start to spread but because it’s a bit slower but it’s probably more sustainable.
...and particularly with, the maturing and accepting...acceptance and rejection

Yeah, you do get that halo effect...

...of the tools and strategies you are actually learning from

... yeah, that’s right. So one area, doing it in one area softens up the next strategic ... ‘oh that worked pretty well for them, I might give it a go’. So, we do get, you do get an effect... a cultural effect just by, if you, if you are strategic about it, just by advertising the successes of it on one area and saying ‘well if you want this, this is what you’ve got to do for the next area ‘ and so forth.

Do you find when other change agents or lean people are employed after you’ve moved on to the next organisational business within the larger organisation, do you find that there’s any challenges that emerge from that?

Huge. Huge challenges. So for me, for this business, my, my, my process is ‘lend forward’ so I take someone from the area that’s going to be next and I have them with me by my hip and I let them see one phase, you know, one go around of the, of the process then I go with them and I watch them do it and coach them and then the next time they can pretty much go on their own. So the challenges with coaching, ahh, that I tend... it’s just logistics. I tend to have a couple going in that phase and it’s hard for me to get the time that, but as long as I can be with them the challenges are relatively minor, you know, it’s the normal change management challenges; challenge with once they start to go on their own, again it’s for me, logistics.. giving them enough time so that they don’t go too far wrong before they can get back on track. The process challenges are always the same, you know. It’s a completely new way of thinking and some people will take to it quickly and some won’t and, umm, inevitably stumble over sufficient involvement of people and ahh, the biggest, the biggest challenges, the mindset change so that they can make that click to thinking about people as, as important instead of as cogs in a machine.

That’s the biggest challenge.
With the presence of the challenging nature of lean what type of strategies do you use to try and overcome that, so any type of training, events; how do you get everyone to change their minds?

The way I structure it is I have a three or four month defined timeframe with defined outcomes. In that three to four months, umm, we say ‘well what, what bit of it, lean, are most important for you to do? For example TPM or 5S or standard of work for changing over machine or...’ and we get them to experience at least a part, at least one, one go of each tool, so one little area of 5S if that’s all they can manage, if it’s most important for them to have good role changes and standardised work becomes the strongest theme.

Okay, then.

If they don’t really need TPM I just give them a bit of a deep clean. If they, you know, if they, if they don’t really have issues with flow I don’t do any work on stores and just in time. So, depending on the business need I give them a taste of all the tools but during that four months, once a week, we do two hours of training for the leadership group. So an introduction to lean, an introduction to wire lean is a good thing; what lean is, umm, ahh, and, and depending on the group, the training is customised, what 5S is; what a leader’s... primarily what a leader’s role is in each of these is, you know, basically what it is but what’s your job?, how do you need to behave to coach people?, how do, you know, what is, what is tracking and this is what your role in it is, what is standardised work? this is what your role in it is. The actual experience of that, we do. So ahh, after the leaders are kind of, in the first four month period, is usually getting the leadership group just to think differently and experience some of the gains that they can get, in combination we try and umm, get them to, to, to lead the effort so to communicate to their people about what’s going on, usually it’s not that well done because they’ve just, not into the habit of doing that very well.

Ok, do you find that become fairly difficult with, the shift changes present within the organisation for example you’ve got maybe like management around during the day and then you’ve got constant shift changes where some operators only see management sporadically?

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Yeah, they usually have a very poor system of communication with their employees if they’ve never done lean before. So one of the first things we do is take their team leaders and put them through one week of training and we help them to construct a visual information centre and coach them on how they should be run so that’s one of the first things we do so you get some channel for communication. So what should happen is the supervisor... superintendent, should spend some time with the supervisors and talk about why we’re doing this, then the supervisor should be able to tell their people. Typically that’s pretty patchy.

With your external view of the situation do you find that it could be patchy because they may not understand the reason why lean is so important?

You’ve got to get, you’ve got to get the leaders to understand first, I think.

And that takes a little while. And then the leaders are going ‘oh God I should be telling my supervisor this’ and that takes a little while. And then the supervisors go ‘oh God I should tell my people this’ and that takes a little while. So trying to do a blanket communication strategy, although I do ask them to say ‘you need to tell your people there’s a take you got to do... you got to tell your people what we’re doing’, although we try to get them to do that, the training, ahh, takes some time for people to get through to a different way of behaving, you know, more inclusive or more engaging, ahh, less directive, more listening, more humble, you know, more focus on the operator and the process, those kinds of things takes quite a long time to evolve, typically, depending on the leaders, sometimes it’s not always, at some stage in the management chain there’s always someone who really just doesn’t get it.

Really, and it’s, you know, that blockage is your bottleneck for change. A manager might be fantastic, superintendent has a long way to go. Or superintendent is fantastic, supervisor has a long way to go. Or the manager has a long way to go, superintendent... somewhere there’s usually someone who needs understanding, more.

Ok, then.

…and therefore, therefore lack of acceptance, usually. So I, I try a lot of different ways. I do formal 2 hours a week; I do team leader one week, training to get them all off shift. I do at least three times a walk [week] an hour walk, week, an hour walk with the manager. I walk with the
superintendents on the shop floor as teaching, as a teaching mechanism and coach the information, the visual information, the team leaders in the visual information centre. So I spend a lot of time with them one-on-one but also some formal training.

**Have you found that, umm, your access on that type of level is helping to overcome those challenges in communication and trying to create that understanding around lean? For example your additional training that you do and your additional walk arounds**

I think it helps. Yeah, I think compared to deployments that I have seen before it’s much, you get a much, much better rate of acceptance more quickly than ones that I have seen before which didn’t have a structured training process like that.

**Do the other lean educators or leaders, do they also do something similar to you or are they just more for training purposes and you take up?**

Ahh, well, the structure for change agent is that, umm, I work for the corporate and each business has their own people who have a dotted line relationship to me so I coach them, they’re my ‘lend forwards’, so they’re the people that I want to be able to do themselves next time, the next wave of transformational...

**So they don’t have additional contact with people on the floor...**

Well, I bring them with me, so they see it. So for this one for example, the lean superintendent, umm, he participated in the bar mill and at 1 o’clock he is going to give the two hour training so I don’t need to be there, thankfully, ‘cause I’ve got you [laughter]. So, ahh, you know, he, he can do it on his own pretty much now... the training.

**Have you found also with your, with that communication that your own communication networks have strengthened and you’re able to try and move the lean, the implementation of lean a lot quicker?**

Yeah. Say for example, in wire, umm, the ‘lend forward’ person there, the change agent, in going through his first one and co-facilitating the second one the relationship with him is much stronger. And because we have regular governance, the relationship is... my relationship with the general
manager is much stronger than if it were not structured. So, I try and make a replicable structured process, umm, and therefore it just makes it simpler if you standardise that simpler, easier to develop relationship ’cause people know where they’re supposed to be and what they’re supposed to do. So, you know, the lean principle of standardisation works.

**Have you found that also transcends into when the actual employees undertake lean training?**

Oh yeah so in the first rounds one of the things we do have kinds of events where operators primarily involved to get their ideas to the surface and to implement some of the things that they’ve been asking for, for years, normally, and management not listening to them. So when I facilitate those I develop very strong relationships with those that participated through the kinds of events but in my role, my objective is to get other people to facilitate them so...In this deployment, for example, I’ve not had strong relationships with the operators as I did in the bar mill because I was much more heavily directly facilitating their events and helping them with ‘5S’ and stuff like that. Whereas, this one, I'm one removed from it because I've got someone in training to learn how to do that.

**Oh Okay. So I would like to discuss a bit about the culture and the changes in culture that you’ve actually seen from the beginning of when you actually came in into the organisation to approximately now and the changes with the events?**

Okay... remembering my role is a bit different because I'm relatively new...

**Ok I’ll restructure the question for you. Have you seen a maturing of the culture from when you actually entered and started the events within the organisation?**

I think I have. I mean, they might... Rail is still stumbling through the early stages, I would say. So, the superintendent you are going to talk to next, umm, he’s still just early, early stages of that. So, I’ve seen some indications that the culture starting to change in rail... not, I wouldn’t say ‘yes, there’d been a change’. In the bar mill, where you’ll go next, I’ve certainly seen dramatic shifts in the way people think, feel and behave. So, yeah, that’s my intent. I want them to do, but, in wire, I would say, ahh, I don’t, if I'm honest, I don’t know how successful I was in changing the culture.
How long has wire been implementing?

Well they’ve been doing the tools for quite a long time. So, I went in to the East Mill, that was their first one and, umm, that was about, I would say, six months ago. The thing is, culture is so much generated by the leader. And ahh, you can move leaders so far but I didn’t feel like I moved that leader sufficiently far enough to really make a, to change the organisation. So sometimes I’m more successful than others. [sub-organisation 1] was successful probably because we spent a lot more time on that there. But, you know, ‘you win some, you lose some’. You can’t... you can’t get them all. But the good thing about wire is that they are continuing to work on it. So, we’ll see... we’ll see.

So then would you describe for this organisation as it is more about this idea maintaining continuous improvement and challenging yourself and others.

Yeah. Yep. The major... in [the organisation], the major cultural change, I think that we need is the understanding from leaders that the most important thing is the people and the process... the people on the process. And instead of being someone who tells them what to do, being someone who coaches and supports, and teaches, that is very different. So the concept of continuous improvement, I don’t think I’ve scratched the surface of that because they, they are just so directive....You know. Anyway, very traditional... very traditional organisation. So the hardest work I do is on valuing their people. That’s the main cultural shift that I think that they need. Instead of being tellers being teachers. Coaches. Because it’s only by doing that that they will release all that... all that power. There’s so much power in people. Listen to them a little bit

I worked for […], which is an American company, for a number of years, 12 years. I thank God I did that because it let me see a decently run company. One which actually tried to work on its people and its processes and its technical ... and manage the business well. And then, [mining organisation], is an Australian company, it was terrible. Really bad. I was lucky enough to see a Canadian…[…], which was, at least their management system was good. Australia is unprofessional. It’s incredible. It’s really, really behind the times.

So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would
like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

For me it’s, umm, generally, it’s only become a dawning awareness in the lean community that you need to look at the mindset and behaviour of the business as well as put ‘5S’ in... you know. Umm, and one of the things about [the organisation] is that it has a really good frame around that. It understands that concept. So, it was relatively easy for me to say well you need to address lean deployment on all three dimensions of your system, not just your tools. And, uhh, umm, that is, that is good, you know. I think even, even, you know, if we can harness that it can be, even ahead of some of the really good lean companies. The real issue is that top management doesn’t understand. Top.. so I'm working at manager level...I'm not, I'm not convinced that [the organisation] leadership, even though they run a manufacturing organisation, really understand the power of what could be if they embraced lean. Just Toyota production system, you know....I’ve visited places in Canada and the difference between companies where the leader really... you never understand it all. There’s always learning to do. But where the leader was passionate about “Shit this thing’s fantastic and my organisation’s going to really try hard...” those companies are the ones where they delegated it. It’s just like night and day and the power of it’s, ahh, amazing. The best factory I ever saw was a craft factory... uhh coffee roasting factory in Toronto... in Canada. You know, there was a Toyota supplier. The leader, he had the Toyota way field book on his desk and he looked at it every day and studied it. And his... he had ‘hand-on’, ‘5S’, he had ‘just in time’ ‘Cambam’, he had all the elements of the lean production system. And it was an involvement, an engagement and really good approach to people but all I see in [the organisation] so far is the delegation and that’s not change. Most of all. Once you get that I don’t need to be here, really. ‘Cause... They can do it on their own. I just need to be a teacher. At the moment I'm a doer.

Thank you very much for your time.

You’re welcome.

End of Interview
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

No.

Okay. Let’s Begin. So I wanted to start off and learn a little about you and your role in the organisation and also when you first became aware of lean.
Okay, so my role in the organisation is shift supervisor in the hot section of rail. Rail is actually distributed into two sections, the cold and the hot sections. I’m one of two shift supervisors in the hot section. The cold section also has two shift leaders. I’ve been with the company for a period of 6 years and its only been in the last 12 months that we’ve been introduced to the lean part of management.

Okay. So as someone who is newly introduced to the innovation, what was your first reaction to the introduction and implementation of lean within the organisation? For example, did you prior to the introduction know what lean was?

No. Prior to that stage I did not know was lean was or have an understanding. I think there were a lot of other supervisors in the same boat. But as lean was introduced to us and to some stage implemented it started to make a lot of sense and then we could start seeing the benefits of it.

So what strategies and/or implementation approach was utilised by management in the introduction of lean into this section of the organisation?

First of all they sort of informed us of what lean was about and how we can actually make the organisation a better organisation by implementing lean. So it was as simple as letting all the supervisors and all the people, staff; just letting them know what lean is all about.

Did management utilised or encourage the use of reading resources or points of reference as a means to assist in the development of lean knowledge?

Yes. Well I have a couple of books, that we’re given to us. However that was only very recent. When I recent that was only 3 months ago. Yeah so just before Christmas, they gave us a couple of books regarding lean. Highlighting what lean was all about.

Have you found that this in a way has assisted in yourself gaining a better understanding of lean contexts and the application of lean principles within the organisation?

Yes, it has. Very much so.
As they have assisted in your knowledge development, has management provided opportunities for further discussion of the reading materials in group-based environments? Or is the reading designed more for the individual?

I think it was more for our own personal development. Lean, well even today, every Thursday we have a two hour training as far as lean is concerned. But those first books that were given to us has been more so for our own personal development with lean.

I’ll now ask a few questions relating to lean and communicational networks within the organisation. Have you, particularly in your role, seen any changes in the communicational networks of the organisation since the lean implementation process has begun? Or you haven’t been able to see any significant difference?

No. I think because its so fresh that we haven’t had a chance to really work with it. I guess another downfall that we have hear at [the organisation] is that in the past and I’m not saying that it happens now. But in the past we have sort of implemented a lot of things and never really followed with it. I think that new management has sort of changed that around and I think that lean is here to stay. So yeah its only at the very early stages. I haven’t seen a lot of benefits from it as yet.

So no benefits at all, not even any minor ones associated with work practice? For example, as I was walking around I noticed a number of visual communication centres and standardised work floor markings.

Yeah, we have seen some benefit through the use of those strategies, however those are new. We do have a standardised work that we carry with us, which allocates hourly trades and trade bagging and those types of things. The 5S was one of the first things that I could remember that was implemented here, just to minimise the, well because we do a lot of change-overs and a change-over from someone like yourself who’s not familiar with some of our practices. So an example of one, is we do a one wheel type and we need a change-over to do another wheel type because of different dimensions we need to do a change-over. Over change-overs were pretty primitive, I mean we didn’t have 5S where we had all the tools in the right place, at the right time; we didn’t have any of that. So where a change-over was taking for example an hour, now that we have implemented some and I use the some 5S we are actually seeing the benefits from that.
Have you seen that type of achievement has created a more positively empowering working environment?

Yes. At the start there was a feeling of you know “we’ve done things this way for 30 years, why do we need to change”. But like everything else once you start to implement it and see the benefits from it, then yeah, it was received a lot better. The culture and working environment did change a little bit. I guess really you just have to try things and see the benefits.

Has management within this section of the plant and organisation utilised any additional lean strategies? And if so what are the strategies?

Yeah. Something that is very different from a lean perspective is the information centres that we have now. We, well in the time that I’ve been here, we’ve never had information centres where we all sort of gather together and sort of discuss the events that happened on the previous shift. What’s coming up and what’s going forward. That to me is quite a good system; there is a lot of information that is transferred section to section that is quite useful. So the information centres is something that I have seen a great improvement in and a lot of benefits from it.

How has the presence of the information centres assisted in more efficient communication across shifts?

Yes. So when a shift comes in to take over another shift before they start the working shift we actually stop for about 15 minutes to do an information centre. So we discuss what happened on the previous shift, we discuss the targets for the next shift and what sort of hurdles we are going to come across on that shift. So we spend around 15-20 minutes at the start of the shift. The information centres have provided a positive working environment. We are also sort of given a little bit more rope to the leading hands [team leaders] so we want the leading hands to essentially run those information centres. At the moment we are sort of working it out with us staff will sort of run different information centres, but slowly we are training the leading hands to take that on; so we don’t have to attend what they can do themselves.

How many information centres are utilised within this section of the organisation?

With the hot section we have 3. 3 information centres.
Was there prior to the presence of the information centres any continuity between each of the shifts within this section of the organisation?

No. If anything there was a bit of a war between the two shifts. There was a little bit of conflict and sort of war like where one shift would leave things in an unsatisfactory condition for the following shift. But now knowing that the next shift is going to following through and it going to have that information centre, then all of those things are going to be brought out into the open. It has brought out a lot of unity between the crews.

Where the information centres well received when introduced?

Funny enough out of all the changes that we’ve implemented regarding lean, the information centre was majorly accepted by everybody. Everybody knew there was a need for communication between the crews. Like I was saying earlier your 5S and that weren’t taken so well, but the information centres were.

Why do think that 5S wasn’t as widely accepted?

I think it the guys don’t see the immediate benefit from it then they are very unlikely to take it on. But with the information centres they could see the benefits straight away. They could see that there was a gap, they knew that. With the 5S if it doesn’t make sense to them, then they don’t take it on as good as they should.

I’ll move away from some of the communicative strategies in place within the organisation and focus a little more on the organisational structure. You mentioned previously that the organisation partakes in shift work. How do the shift operations work within the organisation?

We have 12 hour shifts, day and night. One crew comes in during the day for 12 hours and one crew comes in during the night for 12 hours. The shifts are rotating.

How is the working environment different in this organisation previous to other organisations and management?
The environment is different because we include everyone in the process. Obviously everything starts at a higher level or our level, but we do trickle down to the guys on the floor quite quickly. You know it’s not a massive gap between us and them, from us finding out the information to them finding out the information. That used to done within a period of 6-12 months, but now we do that a lot quicker.

**How has that approach impacted on the employees on the shopfloor?**

They feel that they are apart of the organisation and are included in the decision process and the whole transformation.

**Have you found then that the inclusion of employees has made the working environment of the organisation more of a challenge? For example, do you feel that shopfloor employees know too much?**

No, I think it’s great. Personally I think its great. Going back [previous management] which is where I started here, it was very much us and them. The guys on the floor will tell you that, you know, it’s you guys against us guys. Its like this battle going on. Since [current management] has come in that gap has been narrowed quite a lot. You know the guys don’t quite feel the same way anymore. They feel like anything that some through, anything that is implemented is trickled down to them quite quickly, so they are always aware of it.

**Have you found that with such changes the operators are approaching yourself and other managers more with ideas? Or a want to learn more about lean? Or even the general working environment?**

They do. They’ve got a lot of communication backwards and forwards which is quite good at the moment. They feel part of the organisation.

**Do you feel overall that open communication and collaboration is making the working environment more empowering and positive?**

It is. Yes, its been a while since I last heard “us and them”. Its been a long time and that’s good.
That sounds extremely positive. I wanted to discuss a little bit and learn about whether you have experienced any personal challenges in terms of lean implementation?

Well I guess my challenge is, well it depends on how the guys take to it. If they, well with the information centres it was good and quite easy because they knew there was a need for it. With other staff and I keep going back to 5S, it was a challenge because like I said earlier and I keep repeating myself but if the guys don’t see the immediate benefit then they tend to sort of resist it and push it away. It’s only when you sort of get past that barrier and you tell them and show them how having the right equipment right next to them, instead of walking around for 5 minutes looking for a hammer or looking for a pitch bar or looking for whatever it is and how that benefits them. There was a lot of resistance, well a little story I can tell you, there was a lot of resistance because we actually taped them doing a change over and they resisted that quite a lot. They were calling that it was time in motion, they we were sort of on their backs to do things quicker and faster. So there was a lot of resistance there. It wasn’t until we actually told them and sat them down and told them exactly why we were doing this, just to make their job easier. You know instead of walking 20m to grab that tool, why don’t we just have the tool right there, just to make things easier. So my challenge has been to try to get through to them, how the benefits of 5S or lean as a whole is going to benefit them.

How would you describe the approach the organisation has taken for the implementation of lean?

Well a few people might challenge my answer.

You shouldn’t worry about that as the research is about how people perceive lean, so it shouldn’t matter.

Okay then, that’s good. I do believe we have approach the implementation as more of a trial and error system with the tools and strategies. We have tried something and if it doesn’t really work, it doesn’t mean that we throw it away but we sort of try something else. I think the reason behind that is because if they see things that are helping them they might sort of come back to the ones that they didn’t sort of take to on the first go-around. But to answer your question we sort of do implement something and if it doesn’t work as well as it should have worked then we move onto the strategy. Then try to implement that as well.
Has there's been any challenges emerge other than the general acceptance of some strategies that has influenced the implementation of lean?

No, I guess with all that the guys don’t understand it. If they don’t understand it then they don’t tend to question about it. The information centre that we have on the way through to these offices, is quite large and it takes up both walls as you come through. The guys make an effort to understand what’s going on, but they feel that it is overcrowded and just too much information. Once that happens they tend to switch off, they tend to not to worry about it. So when it comes to things like that the guys, they are a bit hesitant to say and approach it because it is just overwhelming, just too much information. Once they get to that stage then they go around with blinkers on and just don’t tend to accept that as much as they should.

Do you have any strategies to try and overcome those challenges?

No what we have been doing it inviting people to come to our information centres. It happens at 8:15 every morning and we’ve told our guys at our local information centres that they are quite welcome to come to our major information centre just to get an understanding on how everything works. If they are included in the information centre, over a period of time, they begin to understand why we have so much and how it is all sort of relevant. So we do invite them to come to the information centre. The information centres have also been in operation for roughly 6 months.

Within your section of the organisation this there any type of reward programme in place when new ideas are developed?

Not rewarded, but acknowledged. They get acknowledged and noticed and they get told about their great idea. As far as rewarded for that, then no. I know that some companies have a $50 voucher and movie tickets, but we don’t anything like that as such. But they do get acknowledged for that.

So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would
like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

I guess the only thing I really have to say is that we are slowly starting to see the benefits from it, from lean. Just like everything, well I spoke about the guys and having a little bit of hesitation in taking it on. I think we all did. At one stage we all thought well I’m not going to put that on them, well I know I did personally as well; thinking ‘oh no, here he comes with something that’s going to be better’. It is a big transformation. One of the real benefits I’ve seen when we do a Kaizen Blitz is because the guys have such a major input into the process, the culture changes within that group of people. I mean the last one we did was in the stream line, which probably doesn’t mean much to you, but it is one of our processes here and I noticed that with the guys being involved the way they were, they were taken off their job for a whole week to concentrate on improvement that section of the plant, their whole attitude changed quite dramatically. Because of their input and their ideas and we sort of took them on, because at the end of the day that work the machine, know the machine better than we do. But the transformation in culture and attitude it was great and I think the Kaizen Blitz are a great thing. They are something we really should keep up.

Thank you very much for your time.

You’re welcome.

End of Interview
Interview Transcript 3:

Transcribed by Brianna Chesworth in accordance with University of Newcastle policy 000873

Organisation F

Interview conducted on Thursday February 7 201

In attendance: Interviewer and 1 Interviewee

Start Time: 12:30pm

Finish Time: 1:00pm

Phrases and words bolded are those of the interviewer

Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

No. I think you’ve given me a good context of what we’re here for so... all good.

Okay. Excellent. So I wanted to start off and learn a little about you and your role in the organisation and also when you first became aware of lean.
Okay. So do you want me to start now and go backwards or start at the start and come forwards?

**You can do whatever you want.**

Okay. I'll take you on my journey. I did science at [university]. I did a double major in geology and geography. Left Uni and got a job straight away as a geologist and worked throughout the [organisational] region for the best part of 10 years, with a stint in Queensland for 6 months in amongst that with mainly [organisation] up there. I was with [organisation] for about 7 years - up the Valley - [organisation] as a geologist/mine planner. [I] sort of left geology and got to the mine planning strategy sort of side of it. [organisation] was a pilot area for Coal Australia for [organisation] to introduce lean. We used Lean Manufacturing Resources (LMR) for that. Quite a few consultants came in for that for probably about 12 months. During that time, because I was doing a lot of the planning and scheduling and running a few meetings that involved the information centre and visual factory side of things but they basically offered me a job in it. At the time I said ‘no, I'm not interested. I'm enjoying what I'm doing’. I spoke to a few people and they said ‘Luke, lean is all about the people. It’s not about the tools that you see. It’s about the people – you’re really good with people – you should really think about this before you brush it over.’ So I did an about-turn and took the job as a lean advisor. It’s been about 3 years at [organisation] doing lean. I'll probably add there – purely tools based... nitpicking the tools.

**Oh ok then, so this has been a very different lean approach?**

So you know where I'm going with it. Then the opportunity came up and I guess I was getting very frustrated with the focus on tools... and it was 90% tools and very little to do with people. We know lean is 90% about the people and the culture. So an opportunity came up to join [the organisation] and I live in Newcastle, 8 minutes from here, instead of driving an hour and a half to work. That was a big carrot, obviously. I really liked the way they told me what they wanted to create a culture, a lean culture and get the right people in the right roles. So I joined two and a half years ago – here – the [organisation] site. So here we are, 2.5 years later, I'm the lean superintendent for […] site – it’s been my role since I got here. That’s my journey, who I am and where I'm from.

**Okay.**
I guess the only other thing is when I first came here I brought the tools based approach with me. It’s been the way I’ve always been trained by consultants. It’s the way I knew. I knew there was more to it as far as the people and I felt it but I was still using exactly the same approach to deploy lean. It was written in my job description and everything: you’ll put up 5 information centres; you’ll do 3 QCO’s; all that sort of stuff. So it didn’t matter whether they were adding value to the company or we were working on the top issues – the most important things – or constraints/bottlenecks, as long as I was ticking all the boxes to show I was using the lean tools it was all hunky dory. Until we change the new approach now which is more of a systems-based approach: go in; do the diagnostic; identify the gaps; implement the tools as required.

**Did you find that your knowledge of the tool-based approach was a challenge?**

In what regard?

**Sort of like a challenge for yourself and the people around you trying to change your own and their mindset something like ‘I know it’s about people but I’m still about tools.’**

Oh definitely, because you get so bogged down in the ‘doing’. I think part of the biggest problem, especially people in my role and others is managers want tangible results, and they want to see them quick, and they’ve read the books and lean can deliver them quick, and improve flow and through-put and output and quality and all those sorts of things. So they’re the measures they want to see. Whereas, I knew it takes a long time to change people’s mindsets and turn them around and get them using the tools for the right reasons not because you are holding a gun at their head and telling them they have to use it. I guess that’s where my challenge has been, is trying to do my job to the best of my ability and justify my existence that I’m actually adding value to the company if results aren’t getting better because they want immediate results and they’re so focused on the outcomes and the metrics not the processes required to get the outcomes.

**Do you think that in itself is management not understanding the whole purpose of lean? Something like management having mindset of ‘we’ve read all these books and they’ve shown us all these tools so all we can do is implement these tools.’**
Yes. Don’t get me wrong because we’ve got a General Manager who is very supportive. He’s the one that brought it in so in that aspect we’ve been blessed to have him on board. But with respect to him and all the managers there is still... there are still targets. They still need to hit targets because that’s been told to them in their role descriptions. So they’re pushing for results rather to a 5 year vision of where we want to be, which is understandable. I think the thing that gets me is because we haven’t looked at it as a total package and everyone fundamentally changes the way we work, we delegate people to roll out the lean tools while management can go on with business as usual. I think lean is still seen as standardised workers for operators. Standardised workers would be General Managers, Managers, Superintendents, that sort of thing for the guys on the floor to use the tools and we need to audit them to see if they’re doing it. Finding that real clear link between Upper Management and the guys on the floor is the secret to what we truly haven’t exposed yet. Peel that onion back to get to the middle of it.

That seems to be an issue across a number of organisations. So it seems to be that common link that you have to understand – from my perspective – the employees first before you start moving through management and upper management because employees are at the core and the management is the outside of your organisation.

Yeah.

Well that’s just my opinion anyway.

And these are my opinions, too. I mean right, wrong or indifferent.

It just seems that people in management is more accepting, like they can understand the change because they’re more educated than the employees.

Absolutely.

They accept change quicker than people.

I’ll ask you this question: Are they going through any change?

I haven’t seen any change.
That’s why...middle management have change forced upon them. Upper management don’t actually have to change at all. They think they are but they’re fundamentally not changing at all. I’ll give you a really good example of that. We’re doing kaizen blitzes for example. God bless management, they’ve sponsored that we do one kaizen blitz per month, just continuously. We’ve got the authority to take 5 operators out of their roles each month for 5 days with the focus task of getting a step-change. What I can’t get commitment to is superintendents, managers coming out of their roles for 5 days to learn how to facilitate and run a activity. The kaizen blitzes are the biggest; and probably the only tool we have on site that actually allows us to turn the pyramid upside-down. Start supporting the people at the top rather than directing down. Yet our managers question what level of work that is. I’d be working at the wrong level if come out of my role to run a kaizen blitz with operators for 5 days. To me, the link they haven’t found is the thinking and the philosophies of the operations and kaizen blitz which is all about the PDCA cycle – the ultimate working together that a manager shouldn’t have the answers he should have the questions that lead the people to the answers. But we still have that direct-down ‘I’m smarter... couple of PhDs... I’m the manager ...I must maintain my status’ person on site. Whereas I know the true lean cultures, the operators always feel smarter than their bosses because they walk away from a conversation thinking they solved the problem themselves and the boss wasn’t able to solve it. The boss already had the answer but he helped guide them to the final destination – the solution of the problem by asking good open questions. So that person walked away feeling really engaged and enthusiastic and ready to run through a brick wall for their leader because they’ve solved a problem and the leader is walking away smiling felling very happy knowing he’s building capabilities into his people to problem solve.

So how would you describe the process of how lean has been implemented in this section of the organisation?

It’s a good process. It’s focused. It forces you to focus but, my honest opinion is we try to focus then repeatedly spread our wings and a lot of our people see it as ‘death by a thousand initiatives’. Because we are going through a rapid transformation in a short period of time all of a sudden our operators have got to do 5S, Visual Factory, TPM, QCO, Standardised Work, standardised work for leaders, hourly tracking, Judoka, Hijunka, flow; and that’s just in the first two months, then we go on to everything else after that. Often, we don’t glue them together or align them to one
common cause. They’re still seen as individual initiatives. ‘Are we really heading to a common
goal?’

That could be more of a challenge that... particularly in operators accepting this whole
“rapid transformation” because it seems in other organisations I have interviewed, when
they’ve done something too rapidly employees have been accepting at first but then it
becomes too overwhelming and they start to reject. Then management have to start
thinking of another strategy, maybe have to trial something, and then, if that doesn’t work,
try something else or go back to the drawing board – ‘Education seems to be...’

I think the thing is too, because they’ve tried lean here before but under a different heading... a
different basket. Every two years management turns over, as is the nature of the beast and with
that comes new initiatives, new directions, new ways to work. Each manager has the best way
and the only way. 5S, the most basic fundamental visual factory... the guys tell us they’ve already
done it. We’re walking through the plant, there’s no 5S out there but they tell us ‘we’ve already
done that 4-5 years ago when we did ‘Class A’ on site’. Then they’ve said it was called
something else two years before that and they’ll tell you ‘Back in 1994, October 23, they come in
here and they call it ‘Pit’ then’ and they’re memories are that good. But that makes our job so
much harder because they’ve tried it and failed and tried it and failed. It’s like a kid who tried
twice to ride a bike, fell off and took skin off his knees both times; he doesn’t want to get on the
bike a third time. But our job is not only to get them back on the bike and ride it but you’ve got
two months to do it. They’ve been trying for 2, 4, 6 years to do ‘5S’ and every 2 years they try it
fails but now we’re going to try it again. Hopefully it is different and we’ll get a different result
but you often wonder ‘are we doing the same thing hoping for a different result?’

Has lean at all been successful so far or is it too early to tell?

I guess I have this thing called a secret scoreboard. Where the managers are looking for metrics
and numbers and all that sort of thing, my secret scoreboard is when I walk through and one of
the operators grabs me and says ‘Can you explain a little bit more to me about that stuff we did
the other day?’ So I know it’s making sense to him, it’s in his head and he wants to have a go
whereas a lot of people discredit that and look for results. What I’m looking for is, when he comes
and says that to me and asks for additional training – discretionary effort – to explain something
further to him, we are starting to turn the pyramid upside-down because by him asking that open
question to me is him actually saying ‘can you come and help me support this 5S or TPM or QCO or Standardised Work, whatever it may be.’ I think we get bogged down looking at the scoreboard but that’s for the fans. I’m looking at the momentum. You’ve got to have that trained eye and know what you’re trying to achieve, I know we’re sticking to the game plan and I can see we’ve got the momentum but the try is about to come. Don’t get bogged down by the fact the scoreboard says ‘zero’ because it’s going to be ‘18-0’ in a very short space of time because I can feel and see and know there’s momentum there. But how do you measure momentum?

**Do you find the operators approaching you and wanting to discuss more is creating more open communication?**

Yeah.

**How? Is something like for example, one sees ‘another’ come up to you and they’re thinking ‘I don’t understand this... maybe if I go up to him as well...’ it creates that open communication and there’s world communication between the operators as well.**

Yeah, definitely. It’s a safety in numbers thing for them, as well. You’ve just got to start getting that critical mass of people to actually want to do ‘lean’. If you’ve only got a very small percentage of people engaged you know it’s going to fail because 95% of people will undo all the good work [the 5%] do through their resistance, sabotage etc. It’s about getting that critical mass of people to want to work to a common goal – not going out and telling them they have to ‘do this’ and we don’t even know what the end state is.

**Have you found the information centres have helped in changing the critical masses in trying to accept lean?**

Yeah, definitely. Again, I mention my secret scoreboard. I see one or two operators a day standing there and reading the information centre, which to me is like ‘Wow, they want to know stuff about the business; what are they reading it for?’

Admittedly, some of them are reading it to go and tell their mates this is a load of bullshit and they understand all about it but others I see read the information centre trying to [or actually being able to] understand some things that are on there and then come and say ‘You know we
missed the target last night? I was just down there and saw you miss the target. Did you know you could get an extra two tonnes per hour out of that machine if you used a left-handed screwdriver? ’ So they can start to see a couple of things. They get that sense of achievement but they can see how they can contribute to the success and the most important thing is know their contribution is valued by the organisation because there is now a mechanism for them to contribute to the success of the business whereas often, we don’t give our employees, which are our biggest asset, the opportunity to contribute to the business.

**Do they [the operators] get acknowledged if they come up with something that increases productivity through a simple measure?**

We’re getting better at that because often, what we’ll do, is reward people but all we’re doing is rewarding them for doing their job so we’re rewarding mediocrity with money and maintaining the status quo. What we’re learning and coaching our leaders in is that recognition is a lot more important than rewards. Saying ‘thank you’ or ‘thanks for that idea you gave me. We’re going to try it out next Thursday’ or ‘we’re not going to try it out because we spoke with safety guys and there’s a genuine concern that we could actually hurt someone further down the line.’ But the guys are genuinely grateful like ‘Thank you. I thought it had fallen on deaf ears or it was like a mirror... You were going to look into it and didn’t bother like you always tell us’.

**Does that have a flow on effect for communication?**

It starts momentum. It’s my secret scoreboard and how many people want to come up and contribute whereas before they didn’t feel they could before. But it definitely starts it because it starts a bit of healthy competition. It’s not so much competition, its more like ‘if you listen in you might listen to me too’.

**Have you found any cultural differences with changes in shifts and how they operate?**

Yeah. Massive.

**Do you think that’s a good or bad thing? For example would that be considered a cultural challenge or a challenge for yourself?**
It just tells us how much work we’ve got to do. There’s so much variability not just in our processes but in our people and in our people’s mindsets. We might get one group that’s just fantastic and they just go great guns. The next crew comes in and they just want the next crew to fail. They do poor setups or they don’t do setups at all for the next team because they don’t want them to succeed because we’re very much still stuck in a culture and it’s not [the organisation], it’s a Western Culture. The best way to look good is to make the other bloke look bad because then, you get left alone. While I can see he is getting ‘bashed’ they’re leaving me alone. And that’s because that pyramid is always up and we direct people what to do – when, how, why to do it – and do it my way, don’t talk back. They think ‘Oh good, he’s getting bashed... that’s not me.’ That variability in the crews... you can go from department to department and crew to crew, it will be like going to a whole different country. We say the biggest thing in lean is about standards but what we don’t have is standards for our people. We have standards for our operations; standards for our processes; standards of how we work; but then we don’t have standards for how we should communicate; how we should lead; how we should develop people. We get bogged down in wanting to see that green metric at the end of the day – ‘have we got the tonnes?’; ‘is everything lined up?’

**Do you find not having ‘people standards’ like ‘goals missions’ is a challenge? Is it something that needs to be rectified within the organisation?**

Without a doubt. The biggest thing we have got to have is that ‘common cause’. What are we here for to achieve? If you don’t know where you’re going any road will do and that’s what we’re seen to be doing. We have to align the business so everyone from the GM to the shop floor can tell you exactly why we come to work each day.

**Do you think you’re on the road to creating that at all or do you think you’re still quite a long way away in the transformation of the company into the lean...?**

It’s going to take a long time because our biggest age demographic on-site is 50-55 years old. In the next 10 years we are going to have to replace 50% of our workforce. When you are talking about people like that – using an analogy where you can’t teach an old dog new tricks – but we have a lot of work to do to change our biggest age demographic around. If you want to look around in 5 or 10 years, even that big demographic that we’ve turned around – we’ve got to do that for the next generation.
It might be a lot easier to transform someone coming in rather than someone who is still within their own culture and their own ideals.

And that’s why I bring it back to the critical mass. If they’re still around in 5 years and we’ve got a critical mass, when people come in the door there is a lot less resistance. They jump on the bus so to speak. As opposed to not jumping on the bus or being under it.

So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

I’d like to know how people actually work on their culture. We’ve actually got a process on site that is a very interesting and unique process not used anywhere else. People think that systems drive behaviours and hence if we go and implement all the lean systems we’ll change the behaviours but at the end of the day needs drive behaviours. How do we bring that common goal into the workplace to align us so we all have that common need to keep our jobs and work together and be the best in the world or whatever it may be? I would like to know other companies that are successful at lean – how do they change their culture? Implementing tools and systems is actually bloody easy. We think culture is soft stuff but culture is the hard stuff. How do people deal with the culture? It’s truly the hard stuff that gets left untouched.

Thank you very much for your time.

You’re welcome.

End of Interview
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

Interviewee 1: No

Interviewee 2: No
Okay, so let’s begin. Can you provide a small background on the organisation, your role and first introduction to lean?

Interviewee 1: Well my name is […] and I’m the coordinator and manager for bar. I became aware of lean when I was working for another company in the coal services. That was about 6 years ago, where we started looking at certain elements and visited other lean mine sites. So we went out and had a look at how they did it and started to implement it. Well some aspects of it, such as 5S components. Then I came over here to this site, where we had some lean consultants from the previous site owners and my department was the pilot department for this company to implement the foundation elements and principles of lean. We have had some level of success and it has certainly created some tension and got peoples attentions about a different management methodology. One associated with improvement of the business environment and we did that for a few years and then I came over here and I think we had a bit of a false start on this site and then [interviewee 1] came on board for the […] Bar Mill pilot lean diagnostic process. When was around….

Interviewee 2: 2009

Interviewee 1: …yeah at the end of 2009. And we’ve been progressively improving and implementing different elements of the lean toolkit since.

Thank you that was in-depth. Has anyone have a different introduction?

Interviewee 2: Yes, my name is […] and I’m a superintendent for the bar mill within the company. I first became aware of lean in 2009 when the organisation bought out the sites previous owner.

Thank you.

Interviewee 2: Not a problem
Interviewee 3: I’m [...] and I’m the cooperation superintendent for the bar mill. For me, I became aware of lean when I started with the company three years ago.

Okay. Thank you. I would like to move on and talk about the organisation’s implementation process when interviewee 1 highlighted. You discussed some of the strategies management have used to introduce lean into the organisation, are there any more specific strategies or approaches that were utilised? For example, how would describe the process?

Interviewee 1: Well first we did a diagnostic. Well actually I might just focus a bit on the pilot implementation experience first. We did a diagnostic of our current state and identified were we would like to be in a future state and identified the gaps or the barriers which were causing us issues at the moment and then worked out some action plans highlighting the process we were going to take to close the gap, well actually gaps. So that was centred around vulnerability and some of that was around customer product quality, also customer complaints and a fair bit around our culture; particularly in terms of how we engage our workforce differently to get some ownership into the business. We had a number of workshops with our operators and trades; one of the key elements that well I guess that got their attention was operator irritancy. Well we actually did a survey for operators as well and also for trades to find out what they thought about their leadership and the management of the site. And then we started a process that was focused on lean tools and utilising the lean tools on particular problem solving for some, 5S, quick change-over, standardised work and more recent interviewee 3 has implemented leaders standardised work for the front-end leaders of the team. So each with step we have got some lean improvements.

Have you then found through the type of implementation approach undertaken any challenges emerge? And in describing the challenges how have they impacted the organisational environment? For example is it operator based, managerial based, lack of communication between groups, lack of education etc?

Interviewee 2: All of the above

Interviewee 1: Well let’s put it this way. Not matter what change it was there is always some level of resistance.
Interviewee 2: But then the other challenge is we keep on butting up against the issues of maintenance and the maintaining of things at each stage of the implementation process. You know getting the traction and getting people to understand that is apart of the process and sustainability for the organisation. It is a huge challenge. Every time we have tried to implement a new stage, this remains an underlining element.

Why do you think then that this arises? Is it due to a lack of planning? Or understanding?

Interviewee 3: I do believe it’s because we then try to jump onto another part of lean and implementation. For example we implement one element of the process, we then go ‘well we’ve done that, so let’s move onto the stage’.

So you would describe it more as trying to speed up the implementation, maybe because you feel pressure to do so?

Interviewee 3: Yes, particularly without sustaining what we are doing and why we are doing it.

Oh okay, that’s a different way of viewing process challenges.

Interviewee 2: I think the other problem is, we have tried to fix the lean model across all areas rather than adapt the lean model to fit to suit our organisation and make ownership of it. We have rather taken the approach of religiously focusing on the structured formula of lean. I think where we have had some measures of success was where we had stepped back and said “well we actually own this system and we can tweak it to how we like”.

Okay. Have there been challenges in regards to the education of employees in the approach and reasoning behind the implementation decision?

Interviewee 3: Always.

Can you expand on your thoughts?
Interviewee 3: Sure. I mean anyone who gets used to undertaking tasks in a certain way will resist when change is introduced that affects the way they do something. Everyone is going to go through that resistance, they don’t want or they don’t want to see, that sometimes doing it in a different way is more efficient and beneficial to the process and work practices. Especially if you have to deal with people who have been doing the same job for 10 or 15 years and then you go “well we no want to do it this way”, their first reaction is “well what’s the problem, because we’ve been doing it this way for so long, why do we need to change”.

**So it more of the cultural mindset of employees, rather than a lack of understanding.**

Interviewee 3: Yes.

**Have you then got any strategies you use to overcome such resistance?**

Interviewee 3: We allow them to go through their own journey of resistance and then allow them to come back again. So its all about time and giving them time to process it and to think about it and then come back.

Interviewee 1: We are also engaging them more in particular activities. So instead of management telling…..

Interviewee 3: Yes, there is that as well….

Interviewee 1: them “well this is what we are going to do”. We are now getting them in workshop type activities or standardised work programmes or improvement workshops where we actually invite them and get people off each shift and invite them in a say “well this is the problem…..”

Interviewee 3: “…so you tell us the answer”….

Interviewee 2: …well its more “well how can we solve this problem”

**Does taking an approach such as that assist in operators being able to contemplate lean implementation in a more work specific environment?**

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Interviewee 3: Yes, definitely

Interviewee 1: Well we actually had some people over here involved in a Kai….

Interviewee 2: Kaizen Blitz

Interviewee 1: …yeah that’s it. Where the very first workshop we had some interesting operators come in with their arms folded, with the attitude that the workshop would be a waste of time and by the end of the workshop there was a completely different attitude about the whole process and they were so proud to be able to present to the general manager about their experience. That is something that is unique is that we have the operators within this style of workshop report and present to the general manager about what they had done during the week, what they had learnt and how they are going to apply that to their day-to-day duties. Those events have had amazing changes and something that is evident across the workshops, whether it is a Kaizen workshop or a activity based workshop or a standard team work building workshop for team leaders. It’s just really good to watch and see how it progresses.

**So despite the success of change attitudes why do think there are still challenges present in the resistance to accept lean? Do you feel it could be with the way in which lean is communicated or addressed?**

Interviewee 2: Well that’s part of the reason. But I think some of the other fundamental factors is what interviewee 3 touched on, you know about the guys been working the same jobs, that it becomes easier for them to do it that way. They then don’t see a need as far as they are concerned to want to change, they view lean as fad that is just going to past and all they have to do is wait it out.

Interviewee 3: I’ll give you example, for instance…..

Show me how you hangout clothes

[Interviewer and interviewee 2 both show clothes pegging method]

Interviewee 3: Thank you. Now the majority of people peg clothes pull their elbows up
Interviewee 3 shows the pegging method

Interviewee 3: But the way most people do it bad for you. Physically bad, especially for a task that is performed over a number of years. But if you watch basketball, they are trained to throw a ball with the elbows tucked into the sides.

Interviewee 3 shows the basketball method

Interviewee 3: So if you were trained by sport to do anything, you actually get trained the right way to do it. So your brain then knows well if I’m going to throw a basketball, you do it this way. You do it one way because you are used to it and if I said to you “go out and hang some clothes on the line and I want you to hang every piece of clothing with your elbows in because its better for you” what would your reaction be?

I may want to resist at first, but when I see the benefits I probably would end up changing the method.

Interviewee 3: So all of a sudden what you’re doing is better and you accept the change. And it’s not going to happen overnight but you are training your body to actually do it the more appropriate way.

Interviewee 2: I think for me something like lean involves more hard work and commitment. You know, instead of just throwing tools at people, you actually show them the process and yes it may mean more physical work then how the task used to be approached. And you know sometimes the majority of people readily accept that.

Do you utilise as part of your organisational workshops any of the traditional reading materials such as the Toyota Production System?

Interviewee 1: No, most people wouldn’t read them.

Oh okay.
Interviewee 1: We’ve done some lean workshops where we take people on a one or two day training course where we talk to our operators about what is lean and what’s its purpose and get them to build an opinion. But to give our trades and operators’ books, no, some would, with some it would probably make its way to the first garbage bin and some people don’t like reading too much and are very slow, unless of course it is a textbook. And sometime its seen ok we’re doing lean now so this is the latest flavour, a lot of the team members here have been through continuous improvement quality circles, QUC, TQM, all these and now we are going down the lean path. So they are a few people going well what’s the point. So its seen as something else they have to learn. They see it as an initiative rather than a way of doing business.

Interviewee 3: So yeah, the best way to get the operators involved and on board is to give them enough context and purpose. But get them involved in the process, so then it’s their idea and then they own it. And then try not to bite off too much at one time and get some runs on the board and then they start learning and start going “you know you’re right, this does work”. Where as if you went out and bombarded and said “well this is how we are going to do it”, then you don’t get them onboard.

Interviewee 2: As interviewee 1 has said the Kaizen blitzes and the workshops are very useful for them as it is a small group and very intense work for a week or so and 9 times out of 10 you do see that shift within individuals.

Interviewee 3: Probably one thing, if I look back. We have gone to the extent where we get the operators involved in the process and we have had some success. Ok so we get them involved and they like own it. But where we probably fell down a bit is not getting the team leader involved.

Alright.

Interviewee 3: Ok so we get the operator involved and they go out and they own it, but then they don’t have any authority around the mill. So they are trying to implement something and get behind it but they really don’t have the support of their team leader because the team leader wasn’t involved in that process and doesn’t understand how important it is for the operator and the rest of the team. So that’s probably we have failed and where we need to extend this leader standard workshop that has started to get them involved and supporting their guys who have done the Kaizen blitz and other workshops.
Interviewee 1: Interviewee 3 has actually done a lot of work to change that. He had a one week workshop for the team leaders and then he had a three week workshop for the team leaders. Where the team leaders were taken out of their role for three weeks and that’s made a heck of a difference.

That sounds like an interesting approach. Have you found that the training strategy has increased communication amongst team members and across team groups? Particularly in terms of what the training involved and the process behind the training?

Interviewee 3: Definitely and a good example of that when we had one individual who wasn’t really, well he was one of the operators who just sat there and thought that this was a waste of time and by the end of it could see that significant changes would be made and embraced the implementation. By the next workshop I was out on the floor and the individual was asking one of the other guys “so what are you involved in? I hear you’re going on one of these kaizen blitzes, so what are you going to do?” So the individual was actually wanting to know the other guys were involved in.

So each kaizen blitz event focuses on a different strategy and element?

Interviewee 3: Yes

Are the blitzes then tailored made for specific groupings of individuals?

Interviewee 3: Yes.

Interviewee 1: We actually use and collect data to see what the problem areas are, that’s how and where we decide to target the Kaizen Blitz. So for example, our operators might say “we’ll our biggest area or we’ve had an issue with locking heads over quick change overs or we couldn’t get a component apart etc”. These types of issues consume a lot of time and looking at the data we are able to identify the greatest loss. So we then design workshops around those problem areas and give operators a problem and ask them “well how are you going to fix this?” and the operators have come up with new methodologies. The last time we talked about having issues, the issue being discussed has just gone away.
Interviewee 3: The operators that we choose are the one’s that work within that area. And there might be a few but obviously we went through a list, myself and interviewee 2 and looked at who would be or who are very influential out there, people who will get in and behind and get some runs on the board.

Okay, that’s an interesting approach used. So then have the individuals/groups involved come up with a solution within the Kaizen Blitzes that has really shaped the organisation’s lean transformation? And if so, do those individuals receive any formal recognition of the achievement?

Interviewee 3: Yes

Interviewee 1: Absolutely

How would you describe the recognition of the achievement?

Interviewee 3: So it’s recognised across shifts. And the things that we’ve had successfully changed have been recognised across shifts.

Interviewee 2: Also, probably at the end of each week we invite all the managers on site as well as the GM and the guys present what they have done throughout the weekly Kaizen Blitz events. So that gives the managers the opportunity to see the groups positively reinforce what they have done and I think the managers can see how the groups are nervous about it but it allows a non-judgemental communication between management and worker groups.

You’ve mentioned that the organisation partakes in shiftwork. What do you mean by this? And how is this shiftwork structured?

Interviewee 3: We have 4 crews undertaking 12 hour shifts, 24/7.

Have you found that this type of shiftwork structure impacts on the type of communicational networks and working relationships present within the organisation? Is there any form of competition between shifts? Do some shifts out perform other shifts? Etc
Interviewee 3: No I haven’t really any intentional impacts. Because we would see 3 team leaders and crews a week well as we go through the week, we miss out on 1 team leader on a bi-weekly basis as they are on the weekend rotation. But then we catch up on them anyway.

Interviewee 1: Some of the managers do work differently to create contact opportunities with the teams and crews. For example interviewee 3 and myself make sure we spend some time on the operating floor, well interviewee 3 more than me. But we actually have now scripts for the day, where we allocate, well instead of doing meeting compelled, as there are a lot of other companies that just go to meetings, we allocate some time in the day for meetings and if it doesn’t fit into our time then we don’t have the meeting. But we have a lot of time out on the shop floor, talking, communicating, and monitoring the standards, auditing compliances and standard work. So we do spend a lot of time face-to-face with every operator and trades.

Have you found that your contact with the team leaders and crews has in a way created a more empowering and positive cultural environment?

Interviewee 1: Oh absolutely. When we started this I would go onto the shop floor and everybody would just go and scatter. Now we go onto the floor and if there is no-one there I would just stand there and they would just come up and ask “well what is happening? Where are at? What’s going to happen next?” and generally having a conversation. We also now have a morning information meeting where there were concerns about how the business was going and it was yesterday when the meeting started that the operators were just pouring into the door, just wanted to listen to the information. It was just wow; we’ve come a long way, in 18months; because it would never have occurred before.

Have you found that team leaders and team crews are more able to share ideas?
Particularly outside the Kaizen Blitz environment?

Interviewee 3: It definitely has increased where the guys will come up with a few initiatives and a few ideas about how to improve things then in the past. They also come up to us wanting to know more about the business.

So its conversation is more informal.

Interviewee 3: Yes
**Do you utilise any other communicational strategies as part of the lean transformation?**

Interviewee 1: We also use information centres, we have several centre locations, and there is one here, one in maintenance and a couple through the shop floor. The site centre one is managed by the general manager, the bar and grinding centre is managed by a number of us; there is also one for the network team.

Interviewee 3: Interviewee 1 also runs every couple of months a bit of an update on where the business is up to. This update is for everyone and is run across the site.

Interviewee 1: Yes I do. The meeting is about providing an update on the state of the nation and I usually tell them what is happening within the greater business environment. But more importantly what is happening on our own site and the business that we are in, covering our customers and costs.

**Have there been any significant improvements in communication between shifts since the lean transformation began? If so please explain.**

Interviewee 3: Oh yes. We did in the past have a few issues and we changed a few things when we started the 24 hour shift cycle. We used to record each shift’s tonnage performance, but since the 24 hour shift cycles, we record the tonnage per 24 hours. However the basis is there that each proceeding shift needs to set the next shift up for success. This involved the changing of mindsets essentially, that is one shift has bad or low tonnage productivity, could they set the next shift up and do some of their jobs for them so then they could catch up over the 24 hour period of tonnage. So that has seemed to work well. And also getting all the team leaders involved in one of the workshops and realising that when you have the four team leaders in one room, that one may have done it differently, to another and so on, they can all sort of brainstorm there and go “well hang on, that’s a pretty good idea there”. So we got the 4 team leaders inline.

**Have you found that there is more open communication and collaboration across the four shifts and team crews?**

Interviewee 3: Communication has improved but there are still some issues present.
Do you find that these communicative issues are more culturally influenced? Or have you found culture to be influenced by the overall working environment of the site?

Interviewee 1: It is an interesting site, this one because this site has had several owners. In more recent times it has gone through two organisational ownership changes. Because of another mill closed down within the current organisational ownership, some of those employees came across to work on this site. So there have been a few cultural issues there, there was the organisational ownership battle between employees, and then there was operators and trades versus management, operations versus maintenance and then the departmental and the shift. Most of that has gone away, I don’t see to much still going on, but occasionally you might see a little something anti-management. I don’t know for me its certainty improved.

Interviewee 2: It’s certainly hard to gage isn’t it. Yes definitely those issues you have mentioned there have gone. But I hadn’t heard about the organisational battle between employees.

Interviewee 3: The operation versus maintenance was a significant cultural issue…

Interviewee 2:…yes that has gotten better. But there is always a tension with the 10% factor. I think there is still present some tensions between groups, particularly between wages and staff, that still exists in the mindsets and pretty deeply ingrained in some. I mean in this case we have been operating for decades and to try and change a culture in a couple of years, is a big ask. So certainly there are positive signs.

Ok thank you. Have you found then that change in the organisational ownership is a central cultural challenge and issue for the organisation?

Interviewee 2: I think there is a lag in the culture. You know the culture prior to the current [organisational takeout] was very dictatorial, it was very ‘you must have hands on desks’, ‘do what you are told’ and that was the culture for many, many years and current management has been trying to change that. But it is tough going, as I was saying before because that culture is so deeply ingrained in people, and people are so suspicious and people are constantly expecting the current fad to go away and for us to revert back to what they have always known. So there is that element of mistrust still present within the environment.
Okay. Has the cultural environment been influenced by changes in the communicational environments present within the organisation? And if so, how?

Interviewee 1: Yes. Meetings and the changing significance of meetings, we have a lot less non value adding to the meetings. Well I know I certainly do. We seem to now only talk about what is actually important to the business and what we can control and we work on the things that are important to the business as opposed to working on things that would not have added any value. So we are very much more focused and I think the operators and trades get a lot more information now that what they had in the past through several means of communication, whether it is a newsletter from the GM, or a quarterly bulletin or a state of nation or the information that the team leaders provide on a daily basis or the enormous amount of time spent walking the shop floor. So it is entirely a different focus.

How has the impact of these changes been for you culturally?

Interviewee 2: Well speaking from my own responsibilities and counter abilities, it has been a huge positive thing. I can go out and speak with individuals about projects that we are working on and have a positive interaction with them and get feedback from them. I don’t feel overwhelmed from it, I feel encouraged by it, I feel useful. It gives me some more hope for the future of the organisation and getting that certain level of interest from the guys who I said before were culturally brought up not to have any interest and not have a want to learn.

Interviewee 1: For me we sometime focus on the wrong things. From my perspective we focus on dispatch performance going from 30% to the last 5 weeks in a row being 100%. And our average now is greater than 90% from 30% which is significant. Our customer complaints are at an all time low, our consistent ability to meet our schedule we haven’t missed any of our targets since February of last year so all the important measures and what we are working on are on the right things and clearing away all the clutter. It certainly has had some challenges along the way and I’m sure we’ve actually found a solution rather than just doing something for the sake of doing something.

Some interesting and differing perspectives. So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the
thesis and subsequent reports. But I also would like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

Interviewee 3: Lean for me is essentially about eliminating waste, which obviously helps us be more productive which gives us the dollars on the bottom line. To me that’s about it.

Interviewee 2: For me lean is about the visualisation and the solving of problems by everyone, all day every day. It’s about people being 100% engaged and working as a team. It’s all about being a learning organisation and challenging things and proving things and understanding things.

Interviewee 3: If you had asked the question has lean changed the way I manage? Then no. It hasn’t changed the person I am cause coming from [retail] am I still the same manager to what I was then, then yes. But has it changed the tools, then yes. So for me its more about the tools you use, whether it is the involving of operators cultural wise then I can’t say what it means.

Interviewee 1: For me it’s actually a way of life. It’s doing business differently. It’s a structured approach for continuous improvement through the use of a set of tools to be applied consistently to give us a much better outcome. I’m a little different to interviewee 3 about whether its changed me as a manager, I would say absolutely. It has changed the way I think.

Thank you very much for your time.

Interviewee 1: No thank you.

Interviewee 2: Thank you I look forward to seeing the results.

Interviewee 3: Thanks.

End of Interview
Interview Analysis

Each interview will be analysis separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organisational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analysed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes boldly green highlighted with underlined. Where features of diffusion groupings are not present a description of ‘not discussed’ be placed. A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue. The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 6 Australian Case Studies.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Quote</th>
<th>Interviewee Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formal Social Structure</strong></td>
<td>The interviewee provided a general introduction to the type and nature of works and products the organisation provides to the construction industry. Although primarily manufacturing in the nature of project works, the provision of services to the construction industry is significant. Each organisational location is treated separate organisations with sub-organisational environments – dependent on the nature of products.</td>
<td>Well we make various things [the organisation]. In this particular organisation we make rail wheels and bar for, which I think might be used for, certainly used in the construction industry, for example in bridges and things. [The organisation] is across locations internationally and Australia...We also have operations in Canada, and Mexico and Chile which was a part of the manufacturing organisation.</td>
<td>Interviewee was open about sharing general details of the nature of work the organisation provides.</td>
</tr>
<tr>
<td><strong>Informal Social Structure</strong></td>
<td>The interviewee discussed to some degree the presence of mass homophily and heterophily communication through study action team methods. The context of the discussion focused on team leader training in the lean innovation. Homophily communication is present in the forming of study action teams of like minded individuals at a team leader organisational level. Two differing heterophily communication networks were discussed, highlighting:</td>
<td>“…one of the first things we do is take their team leaders and put them through one week of training and we help them to construct a visual information centre and coach them on how they should be run so that’s one of the first things we do so you get some channel for communication. So what should happen is the supervisor... superintendent, should spend some time with the supervisors and talk about why we’re doing this, then the supervisor should be able to tell their people. Typically that’s pretty patchy”.</td>
<td>The interviewee noted that culturally the approach is patchy as team leaders in their supervisory role don’t openly discuss training sessions with their people. Interviewee opinion, value and attitude is a favourable one towards the importance of the study action team approach in forming informal social structures, however showed some frustration when communication of the innovation is transcended efficiently to operator levels.</td>
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The interviewee discussed the presence of personal heterophily communication through enhanced (internal) relations throughout the organisational environment through the presence of ‘operator

“...we do have kinds of events where operators primarily involved to get their ideas to the surface and to implement some of the things that they’ve been asking for, for years, normally, and management not

Interviewee opinion, value and attitude towards their role was positive in nature, with the interviewee embracing their role.
specific’ eventing.

For the individual their role as a champion and innovator within the organisation enables them to be at the forefront of lean implementation. With the emergence of more opinion leader and change agents within the organisation the type of relationship the interviewee currently will change. However the purpose of such ‘operator specific’ eventing is to enhance and create hetrophilic networks throughout the organisation.

<table>
<thead>
<tr>
<th>Social Norms</th>
<th>The interviewee discussed the presence of advocacy as a core competency within the organisation from a number of differing perspectives:</th>
</tr>
</thead>
</table>
|              | • On a personal level advocacy is about leading forward and sharing knowledge;  
              | • At a leadership level advocacy is about the team;  
              | • At an opinion leader and change agent level advocacy is about the organisation; and  
              | • At an organisational level advocacy is about individuals embracing the lean innovation. |

| “The thing is culture is so much generated by the leader”.  
I just need to be a teacher. At the moment I'm a doer”. |

Although, the interviewee discussed positively how advocacy has influenced the organisational environment. The attitude however towards the organisational embracing was not as widely positive. This negativity emerged as some sub-organisational environments are slower in implementation and acceptance then other sub-organisations.

<table>
<thead>
<tr>
<th>Opinion Leaders &amp; Change Agents</th>
<th>The interviewee discussed the presence of innovation specific opinion leaders. The context of this discussion focused on the interviewee identifying themselves as such a leader and the entailing of their role.</th>
</tr>
</thead>
</table>

| “I train up people in each area and then lead people forward so I can spread out a bit more so, under the current circumstances with, with only one person for the whole of [the region] who has a really good appreciation, you know, a really profound understanding of lean, it’s the only way to do it”. |

The interviewee discussed the positive cultural environment that has formed within the organisation through the utilisation of opinion leaders – highlighting collaboration, open communication. However for the interviewee their role as lean facilitator although empowering can also be demanding due to their being only one innovation specific opinion leader for the organisation.

<table>
<thead>
<tr>
<th>Opinion Leaders &amp; Change Agents</th>
<th>The interviewee discussed the presence of innovation specific and organisational change agents. The context of this discussion focused on</th>
</tr>
</thead>
</table>

| “So for me, for this business, my process is ‘lead forward’ so I take someone from the area that’s going to be next and I have them with me by my hip and I let |

The interviewee was very open about the presence of change agents within the organisation. The interviewee discussed the
Change Agents

The interviewee entailing the educational role of change agents within the organisation.

In terms of both innovation specific and organisation change agents, their role is influenced similar focuses, including:

- Underpinning the role is the presence of ‘leading forward’ through ideas, knowledge and understanding;
- Knowledge of the innovation is taught through the opinion leader; and
- Knowledge creation is focused towards organisational specific goals and requirements.

The interviewee embraces a lead forward mantra which highlights the leader advocating the lean innovation.

<table>
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<tbody>
<tr>
<td>Innovation Decision</td>
<td>The interviewee discussed the nature of the innovation to be authoritative. The decision according to the interviewee was influenced through the organisation’s consulting arm working primarily within the organisation and with another external company assisting in the implementation of basic tools. The organisation’s decision and approach to implementation as “holistic” upon their own knowledgeable recommendation.</td>
<td>“…which is culture and people as well as the tools and the management systems was made here because I proposed that they do that”.</td>
<td>Interviewee opinion, value and attitudes highlighted a strong commitment to the way the lean decision was made. Also valued is the underlining philosophical approach of the organisation’s commitment to the innovation.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>The interviewee identified their role within the organisation to be head lean facilitator for the organisation. They’re identified as having a high level exposure having experienced exposure and knowledge through their role of developing “cultural processes and management systems which sit behind the lean, really the Toyota production system”.</td>
<td>“My role is that, [local] region lean specialist. So my job is to work with businesses like wire and [location] and distribution and so forth to help them develop culture processes and management systems that sit behind the lean”.</td>
<td>The interviewee values their role and the contribution they provide to the implementation of lean into the organisational environment.</td>
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</table>

Implementation Process

Positive cultural environment that has formed within the organisation through the utilisation of change agents – highlighting collaboration, open communication. However again, the interviewee noted the demanding nature of the role in the education and training of change agents for the organisation and getting the workforce to accept these agents, rather than relying solely on the interviewee.
behind lean”.

**Persuasion**

Not discussed

**Decision**

The interviewee discussed how the communication of the lean innovation into the sub-organisational environments has been approached in a similar way. With the approach focused on leadership groupings.

The interviewee identified the presence of education in the form of organisational specific educational programmes utilised through study action team agendas. The study action team agenda is approached as a series of training sessions carried over a pre-determined time.

The nature of the educational programmes used within the organisation is specifically designed to the requirements of each sub-organisation.

The interviewee also discussed the role of the education facilitator as part of the educational programme. These education facilitators are further identified as organisation and innovation specific opinion leaders and change agents.

“So, depending on the business need I give them a taste of all the tools but during that four months, once a week, we do two hours of training for the leadership group. So an introduction to lean, an introduction to why lean is a good thing; what lean is, and depending on the group, the training is customised, what 5S is; what a leader’s... primarily what a leader’s role is in each of these is, you know, basically what it is but what’s your job?; how do you need to behave to coach people?, how do, you know, what is, what is tracking and this is what your role in it is, what is standardised work? this is what your role in it is. The actual experience of that, we do. So after the leaders are kind of, in the first four month period, is usually getting the leadership group just to think differently and experience some of the gains that they can get, in combination we try and get them to ‘lead the effort so to communicate to their people about what’s going on, usually it’s not that well done because they’ve just, not into the habit of doing that very well.

**Process**

The interviewee discussed the strategic approach the organisation has undertaken in the introduction of the lean innovation. The interviewee noted that the organisation has experienced three varying but sustainable implementation processes, including:

- 2008 implementation within one section of a sub-organisation 1, before expansion across the sub-organisation;
- 2009 implementation within sub-organisation 1; and
- 2010 implementation within sub-organisation 3.

The interviewee discussed the strategic approach

“I’ve done it a number of ways historically and

Interviewee opinion, value and attitude is a favourable one towards the importance of the study action team agenda in terms of education and training. A positive and favourable opinion was also present in the training of leaders to further ‘lead forward’ the organisation on its lean journey.

However the success of the communication of the lean innovation from the leadership level through to other organisational levels, highlighted an unfavourable opinion and attitude towards commitment of individual.

The interviewee was open about the resistance experienced within the organisation concerning the strategic approach. Of particular importance for the interviewee was organisational management with each sub-organisational implementation learning from the mistakes of past implementations.
the organisation has undertaken in the introduction of the lean innovation. The interviewee noted that the organisation has experienced three varying but sustainable implementation processes, including:
- 2008 implementation within one section of a sub-organisation 1, before expansion across the sub-organisation;
- 2009 implementation within sub-organisation 1; and
- 2010 implementation within sub-organisation 3.

because sub-organisation] site was relatively new, it really does depend on the maturity of the business and how much, how much there is to do. In wire, for example, they’ve probably been faster at spreading it across the business more holistic... more generally but I find that unless one has more effective deployments when one connects the deployment to a real business need and one sets clear results outcomes as well as, well we’ve done ‘5-S’ or whatever, so we, what we’re trying to achieve is specific business outcomes... my experience is you have to put in all the elements, you have to change, make a verifiable change in all the elements of a system to really make it have some potential cause for lasting sustainability, so to do that, in a broad sense is very difficult, so my preference is to, to have a clear plan, to progress place by place when there is only one of me...So there is only one of me and I just can’t manage to do five at a time. There’s just too much to do”.

The interviewee also discussed when asked concerning the implementation process the current state of the most 2010 implementation within sub-organisation 3 compared to sub-organisational 1 and 2 processes.

“[Sub-organisation 3] is still stumbling through the early stages, I would say...So, I’ve seen some indications that the culture starting to change in [sub-organisation 3]... not, I wouldn’t say ‘yes, there’d been a change’. In [sub-organisation 2], where you’ll go next, I’ve certainly seen dramatic shifts in the way people think, feel and behave. So, yeah, that’s my intent. I want them to do, but, in wire, I would say, I don’t, if I’m honest, I don’t know how successful I was in changing the culture”.

The interviewee became quite frustrated over the success of implementation within two if sub-organisation despite also highlighting an understanding attitude. This attitude is particularly present when the interviewee discussed their intent and the success of the implementation in terms of cultural achievement.

Confirming

The interviewee discussed the presence of one implementation process confirmation, in relation to their perspective of the organisation’s lean transformation. The interviewee discussed heavily the link between the implementation process and the organisation’s cultural environment. Highlighting in this discussion the traditional nature of the organisation being a highly hierarchal

“...the major cultural change, I think that we need is the understanding from leaders that the most important thing is the people and the process... the people on the process. And instead of being someone who tells them what to do, being someone who coaches and supports, and teaches, that is very different. So the concept of continuous improvement, I don’t think I’ve scratched the surface of that because they, they are just so

Although having a favourable view, attitude and opinion of the lean transformation of the organisation so far. The interviewee acknowledges the potential challenges ahead and despite knowing that challenges may increase organisational conflict, they are still willing to undergo such processes.
and dictatorial environment.

People value was highlighted as the key for a successful transformation. However in achieving and supporting this move the organisation needs to be coached in people power.

directive...You know. Anyway, very traditional... very traditional organisation. So the hardest work I do is on valuing their people. That’s the main cultural shift that I think that they need. Instead of being tellers being teachers. Coaches. Because it’s only by doing that that they will release all that... all that power. There’s so much power in people”.

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| Verbal           | The interviewee when asked specific questions about the nature of communication within the organisation associated with the lean innovation highlighted the utilisation communicative tooling. Two specific tooling strategies were highlighted which support verbal mechanisms, including:  
- Integrated learning; and  
- Reflective learning.  
Both of the tools were discussed in a similar context highlighting an organisational-wide strategic approach. The approach embraced by the organisation sees the individual becoming their own learner in terms of behaviour, thinking and communication through others. | “So trying to do a blanket communication strategy, although I do ask them to say ‘you need to tell your people there’s a take you got to do... you got to tell your people what we’re doing’, although we try to get them to do that, the training, takes some time for people to get through to a different way of behaving, you know, more inclusive or more engaging, less directive, more listening, more humble, you know, more focus on the operator and the process, those kinds of things takes quite a long time to evolve, typically, depending on the leaders, sometimes it’s not always, at some stage in the management chain there’s always someone who really just doesn’t get it”. | The interviewee acknowledged some confusion in the way the approach is delivered which assists in further cultural resistance to the innovation. This is evident in the time element and getting individuals to change their own attitudes to the delivery system that is lean.  
The interviewee noted that the approach is a learning based which does create some friction and conflict to emerge within the organisational culture.  
Despite these issues the interviewee embraces the approach and has a favourable opinion and attitude towards the learning strategies. |
|                  |                                                                          | “I do formal 2 hours a week; I do team leader one week, training to get them all off shift. I do at least three times a week an hour walk with the manager. I walk with the superintendents on the shop floor as teaching mechanism and coach the information in the visual information centre. So I spend a lot of time with them one-on-one but also some formal training,... I think it helps. Yeah, I think compared to deployments that I have seen before it’s much, you get a much better rate of acceptance more quickly than ones that I have seen before which didn’t have a structured training process like that”. | The opinion and attitude of the interviewee is generally positive towards the nature of communicative tooling in the organisation. Particularly noting how as each sub-organisation undertakes the implementation process, the nature of communication has improved quite significantly. This is seen inline with the structured training approach utilised by the organisation. |
embraces **homophily** and **hetrophily** communication.
- **Homophily** in terms of bringing like-minded individuals together for training purposes;
- **Hetrophily** in terms of bringing together individuals from differing shifts.

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<tr>
<th>Visual</th>
<th>Written</th>
<th>Challenges</th>
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<td>Not discussed</td>
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| **Direct versus Indirect** | The interviewee addressed during the interviewee a personal challenge associated with their lean facilitator role within the organisation. The challenge discussed by the interviewee involved **education and training** through **change agent** specific **coaching**. The interviewee highlighted that this challenge has both direct and indirect consequences at a personal level, noting lean is about changing the way people think. Both low and moderate impacts are present in the way the interviewee discussed education and training through coaching:
- Direct: for individuals the challenge is about changing the mindset. The rating of such a challenge is dependent on the acceptance and understanding of the individual. **Low** and **moderate** levels deemed to be present; and
- Indirect: for the organisation the challenge is about maintaining the level of **education and training coaching** to assist in the varied development of lean awareness. Again **low** and **moderate** levels deemed to be present | “So the challenges with coaching, that I tend... it’s just logistics. I tend to have a couple going in that phase and it’s hard for me to get the time that, but as long as I can be with them the challenges are relatively minor, you know, it’s the normal change management challenges: challenge with once they start to go on their own, again it’s for me, logistics. Giving them enough time so that they don’t go too far wrong before they can get back on track. The process challenges are always the same, you know. It’s a completely new way of thinking and some people will take to it quickly and some won’t and inevitably stumble over sufficient involvement of people and the biggest, the biggest challenges, the mindset change so that they can make that click to thinking about people as, as important instead of as cogs in a machine”. Interviewee opinion, value and attitude towards their role was positive in nature, with the interviewee embracing the presence of direct and indirect coaching challenges within the organisation. |
| **Desirable versus** | The interviewee addressed during the interviewee an organisational wide challenge associated with “Really, and it’s, you know, that blockage is your bottleneck for change. A manager might be fantastic; Interviewee opinion, value and attitude towards their role was not convincing in |
| Undesirable | the implementation process and employee awareness of the lean innovation. This challenge is identified as undesirable in nature as according to the interviewee one assumes that if top management implement an innovation then there would be some presence of an understanding. This awareness is less of a concern at lower levels of the organisation in earlier phases of implementation. A lack of management awareness to the true nature of the innovation makes this challenge undesirable as there is potential for dysfunctional elements to emerge. | superintendent has a long way to go. Or superintendent is fantastic; supervisor has a long way to go. Or the manager has a long way to go, superintendent… somewhere there’s usually someone who needs understanding, more…. So, it was relatively easy for me to say well you need to address lean deployment on all three dimensions of your system, not just your tools…I think even, even, you know, if we can harness that it can be, even ahead of some of the really good lean companies. The real issue is that top management doesn’t understand. Top, so I’m working at manager level...I’m not convinced that [organisational] leadership, even though they run a manufacturing organisation, really understand the power of what could be if they embraced lean”. | nature. The interviewee is aware that if awareness issues are not brought to the surface then the implementation of the lean innovation will be unsuccessful causing further conflicts. |
| Anticipated versus Unanticipated | Not discussed | Not discussed | Not applicable |
### Organisation & Management Environment

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<td><strong>Formal Social Structure</strong></td>
<td>Sub-organisation is identified as the third for this organisational site.</td>
<td>“We have 12 hour shifts, day and night. One crew comes in during the day for 12 hours and one crew comes in during the night for 12 hours. The shifts are rotating”.</td>
<td>Interviewee opinion and attitude to the nature of the formal environment was generally acceptable.</td>
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<td>The nature of the working environment of this sub-organisation is centred around <strong>24/7 shift work</strong>. For this sub-organisation, this shift is divided into <strong>2x12 hour shifts</strong> on a rotation basis. The sub-organisation has two key focuses hot and cold provision of services/products.</td>
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<td><strong>Informal Social Structure</strong></td>
<td>Not discussed</td>
<td>Not discussed</td>
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<td><strong>Social Norms</strong></td>
<td>Not discussed</td>
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<tr>
<td><strong>Opinion Leaders &amp; Change Agents</strong></td>
<td>Not discussed</td>
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### Implementation Process

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<tr>
<td><strong>Innovation Decision</strong></td>
<td>Not discussed</td>
<td>“I’ve been with the company for a period of 6 years and its only been in the last 12 months that we’ve been”</td>
<td>The interviewee values their role and the contribution they provide to the</td>
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<td><strong>Knowledge</strong></td>
<td>The interviewee identified their role within the organisation to be shift supervisor of sub-</td>
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organisation 3’s hot section. They’re identified as having a low level exposure having experience exposure and knowledge in the last 12 months only.

Exposure has been limited to the sub-organisational environment.

introduced to the lean part of management”.

“Prior to that stage I did not know was lean was or have an understanding. I think there were a lot of other supervisors in the same boat. But as lean was introduced to us and to some stage implemented it started to make a lot of sense and then we could start seeing the benefits of it”.

implementation of lean into the organisational environment. They especially value the unique communicative networks which have been established through lean and their position within the organisation.

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<th>Persuasion</th>
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**Decision**

**Education** was discussed by the interviewee as underpinning the communication of the lean innovation and decision within the sub-organisation. The approach utilised by management is the form of a study action team agenda. The interviewee discussed the educational approach in the form of education around specific tools such as 5Sm which for the sub-organisation was the point of lean introduction. Such tooling was used a basis in which to improve particularly work practices.

The 5S was one of the first things that I could remember that was implemented here, just to minimise the, well because we do a lot of change-overs and a change-over from someone like yourself who’s not familiar with some of our practices.

Interviewee opinion, value and attitude towards the utilisation of information centres as part of the educational strategy and agenda was overwhelmingly positive. The interviewee noted how the information centres are allowing more communication flow (heterophily and homophily) between shifts and also between management and operators - which in turn makes the working environment more positive and empowering.

When asked further questions concerning the education of the workforce in regards to lean, the interviewee discussed heavily the utilisation of visual training methods. The interviewee identified the introduction and utilisation of information centres as a core approach.

In the description and discussion of visual training influenced information centres the interviewee also highlighted the positive aspects the centres have on developing communication networks (heterophily and homophily) and more efficient work practices. These elements are highlighted in the approach and role the centres play in communication particularly between shifts.

The presence of the information centres also "Something that is very different from a lean perspective is the information centres that we have now. We, well in the time that I’ve been here, we’ve never had information centres where we all sort of gather together and sort of discuss the events that happened on the previous shift. What’s coming up and what’s going forward. That to me is quite a good system; there is a lot of information that is transferred section to section that is quite useful. So the information centres is something that I have seen a great improvement in and a lot of benefits from it”. …when a shift comes in to take over another shift before they start the working shift we actually stop for about 15 minutes to do an information centre. So we discuss what happened on the previous shift, we discuss the targets for the next shift and what sort of
enables the transferring of central ‘shift specific’ knowledge in an informal environment.

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<th>Process</th>
<th>The interviewee provided a brief description of the approach organisation management took regarding the implementation of the lean innovation, when asked questions concerning the implementation process. For the interviewee the process involved a simple introduction of the innovation and the potential benefits the application of the innovation would have on the organisation. From this first introduction management have undertaken an approach that is trial and error in nature. The trail and error approach sees the removal of tools or systems if not working efficiently are immediately removed from the strategy and replaced with another tool. This lack of lean model adaptability was also discussed by PM4 in their focus group. When asked about the provision of books at all, the interviewee confirmed that books had been provided for those individuals in management positions. The interviewee found the provision of reading resources as part of the process to be a beneficial aspect of the process.</th>
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<td>“First of all they sort of informed us of what lean was about and how we can actually make the organisation a better organisation by implementing lean. So it was as simple as letting all the supervisors and all the people, staff; just letting them know what lean is all about”. “I do believe we have approach the implementation as more of a trial and error system with the tools and strategies. We have tried something and if it doesn’t really work, it doesn’t mean that we throw it away but we sort of try something else. I think the reason behind that is because if they see things that are helping them they might sort of come back to the ones that they didn’t sort of take to on the first go-around. But to answer your question we sort of do implement something and if it doesn’t work as well as it should have worked then we move onto the strategy. Then try to implement that as well”. “Well I have a couple of books that we’re given to us. However that was only very recent. When I recent that was only 3 months ago. Yeah so just before Christmas, they gave us a couple of books regarding lean. Highlighting what lean was all about”.</td>
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<td>Confirmation</td>
<td>Confirmation of the innovation for the interviewee has occurred in their awareness of lean and its benefits to the organisation, working environment and culture. The interviewee particularly highlighted the changed and changing attitudes of the workforce from the first introduction of lean 9 months ago and lean now, noting that most confirmation occurs when physical benefits are “At the start there was a feeling of you know “we’ve done things this way for 30 years, why do we need to change”. But like everything else once you start to implement it and see the benefits from it, then yeah, it was received a lot better. The culture and working environment did change a little bit. I guess really you just have to try things and see the benefits”.</td>
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<td>Interviewee held neutral opinions, values and attitudes towards the process approach the organisation undertook. However the behaviour of the interviewee change when discussing the provision of lean orientated reading resources, which the interviewee saw was beneficial to their own development. Interviewee held positive opinions, values and attitudes towards their own confirmation of the innovation through awareness. For the organisation this shows a general acceptance of the innovation which can transcend into other working groups.</td>
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A second confirmation perspective was discussed by the interviewee who reflected on their own hesitation concerning lean. The interviewee stated that cultural attitudes begin to mature once benefits begin to be seen.

“I guess the only thing I really have to say is that we are slowly starting to see the benefits from it, from lean. Just like everything, well I spoke about the guys and having a little bit of hesitation in taking it on. I think we all did. At one stage we all thought well I’m not going to put that on them, well I know I did personally as well; thinking ‘oh no, here he comes with something that’s going to be better’. It is a big transformation”.

Interviewee highlighted some of the more negative and conflicting opinions and attitudes operator/trade groups and individuals have concerning the use of specific educational programmes by management. For the interviewee they too expired some apprehension over lean and the implementation of the tools and systems.

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<tr>
<td>Verbal</td>
<td>When asked further questions concerning the communication of the lean innovation of the workforce in regards to lean, the interviewee discussed heavily the utilisation of verbal communicative tools and methods. The interviewee identified the introduction and utilisation of information centres as a core approach. In the description and discussion of communicative tools influenced information centres the interviewee also highlighted the positive aspects the centres have on developing and maintaining communication networks (heterophily and homophily) and more efficient work practices. These elements are highlighted in the approach and role the centres play in communication particularly between shifts. The presence of the information centres also enables the transferring of central ‘shift specific’ knowledge in an informal environment. “Something that is very different from a lean perspective is the information centres that we have now. We, well in the time that I’ve been here, we’ve never had information centres where we all sort of gather together and sort of discuss the events that happened on the previous shift. What’s coming up and what’s going forward. That to me is quite a good system; there is a lot of information that is transferred section to section that is quite useful. So the information centres is something that I have seen a great improvement in and a lot of benefits from it”. “…when a shift comes in to take over another shift before they start the working shift we actually stop for about 15 minutes to do an information centre. So we discuss what happened on the previous shift, we discuss the targets for the next shift and what sort of hurdles we are going to come across on that shift. So we spend around 15-20 minutes at the start of the shift. The information centres have provided a positive working environment”. Interviewee opinion, value and attitude towards the utilisation of information centres as part of the educational strategy and agenda was overwhelmingly positive. The interviewee noted how the information centres are allowing more communication flow (heterophily and homophily) between shifts and also between management and operators - which in turn makes the working environment more positive and empowering.</td>
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During the interview session the interviewee discussed the nature of the working environment prior to the innovation and the first few months of implementation. The interviewee highlighted the conflicting relationships between each shift (direct), which has been minimised with the introduction of the lean innovation, with a move towards integration (unity) and advocacy amongst shift crews.

“If anything there was a bit of a war between the two shifts. There was a little bit of conflict and sort of war like where one shift would leave things in an unsatisfactory condition for the following shift. But now knowing that the next shift is going to following through and it going to have that information centre, then all of those things are going to be brought out into the open. It has brought out a lot of unity between the crews”.

The interviewee also discussed in terms of direct and indirect consequences associated with lean awareness and education. The interviewee in particular discussed how some groups and individuals struggle with understanding the tools and systems underpinning lean, this occurs despite the utilisation of education specific information centres. Although individuals/groups make a genuine attempt to understand the information, sometimes the information can indirectly cause fatigue and frustration. Such an indirect consequence tends to reduce the rate of acceptance of tools and systems within those groups or for those individuals.

“I guess with all that the guys don’t understand it. If they don’t understand it then they don’t tend to question about it. The information centre that we have on the way through to these offices, is quite large and it takes up both walls as you come through. The guys make an effort to understand whats going on, but they feel that it is overcrowded and just too much information. Once that happens they tend to switch off, they tend to not to worry about it. So when it comes to things like that the guys, they are a bit hesitant to say and approach it because it is just overwhelming, just too much information. Once they get to that stage then they go around with blinkers on and just don’t tend to accept that as much as they should”.

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<td><strong>Direct versus Indirect</strong></td>
<td>During the interview session the interviewee discussed the nature of the working environment prior to the innovation and the first few months of implementation. The interviewee highlighted the conflicting relationships between each shift (direct), which has been minimised with the introduction of the lean innovation, with a move towards integration (unity) and advocacy amongst shift crews.</td>
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<td>“If anything there was a bit of a war between the two shifts. There was a little bit of conflict and sort of war like where one shift would leave things in an unsatisfactory condition for the following shift. But now knowing that the next shift is going to following through and it going to have that information centre, then all of those things are going to be brought out into the open. It has brought out a lot of unity between the crews”.</td>
<td>Interviewee had some opinion, value and attitude towards the implementation of lean and its beneficial influences within the organisation. The interviewee noted the changed behaviours of shift crews in becoming more integrated and becoming advocates of the innovation.</td>
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<tr>
<td><strong>Desirable versus Undesirable</strong></td>
<td>Not discussed</td>
<td><strong>Desirable versus Undesirable</strong></td>
<td>Not discussed</td>
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<tr>
<td><strong>Anticipated versus Unanticipated</strong></td>
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<td><strong>Anticipated versus Unanticipated</strong></td>
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### Organisation F: Interviewee 3 (PM2)

#### Organisation & Management Environment

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<td>Formal Social Structure</td>
<td>Not discussed</td>
<td>“We’re doing kaizen blitzes….management, they’ve sponsored that we do one kaizen blitz per month, just continuously. We’ve got the authority to take 5 operators out of their roles each month for 5 days with the focus task of getting a step-change. What I can’t get commitment to is superintendents, managers coming out of their roles for 5 days to learn how to facilitate and run a activity. The kaizen blitzes are the biggest; and probably the only tool we have on site that actually allows us to turn the pyramid upside-down. Start supporting the people at the top rather than directing down”.</td>
<td>Not applicable</td>
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<tr>
<td>Informal Social Structure</td>
<td>When questions were focused on organisational communication the interviewee discussed the presence of mass homophily communication through the utilisation of training methods, particularly study action team agendas. The structure of such study action team groupings however are only specified at a particular organisational level for the grouping. For this individual this approach can cause cultural challenges in the form of further dividing the relationship between management, team leaders, operators and trades.</td>
<td>Although favourable interviewee opinions, attitudes and values are present in the discussion of homophily specific study action teams. The interviewee is more of an advocate of study action teams to focus on hetrophily communications between different levels and groups of the organisation. For the interviewee this un-appreciation of shared knowledge and learning neglects to understand all elements of the lean innovation.</td>
<td>Not applicable</td>
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<tr>
<td>Social Norms</td>
<td>Although not specifically discussed in the context of the organisational environment. The social norm of advocacy was present in their understanding and approach to the lean innovation. It is still identified as present.</td>
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<td>Opinion Leaders &amp; Change Agents</td>
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#### Implementation Process

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<tr>
<td>Innovation Decision</td>
<td>Not discussed</td>
<td>“I did science at [university]. I did a double major in geology and geography. Left Uni and got a job straight away as a geologist and worked throughout the [organisational] region for the best part of 10 years, with a stint in Queensland for 6 months in amongst that with</td>
<td>The interviewee values their role and the contribution they provide to the implementation of lean into the organisational environment.</td>
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<tr>
<td>Knowledge</td>
<td>The interviewee identified their role within the organisation to be a lean superintendent of sub-organisation 3. They're identified as having a high level</td>
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exposure to the lean innovation having experienced exposure and knowledge of planning and scheduling involving “information centres and visual factories” at a previous coal-orientated organisation, prior to this organisation.

mainly [organisation] up there. I was with [organisation] for about 7 years - up the [region] – [organisation] as a geologist/mine planner. [I] sort of left geology and got to the mine planning strategy sort of side of it. [organisation] was a pilot area for Coal Australia for [organisation] to introduce lean. We used Lean Manufacturing Resources (LMR) for that. Quite a few consultants came in for that for probably about 12 months. During that time, because I was doing a lot of the planning and scheduling and running a few meetings that involved the information centre and visual factory side of things."

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<td>The interviewee was asked a series of questions concerning persuasive techniques organisational management may use as a way to overcome innovation rejection and challenges. For the interviewee the main challenge that enhances the use of persuasive techniques is connected to strained relationships. Strained relationships for the interviewer are associated with hetrophily relation between management and operators.</td>
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<td>The interviewee discussed the nature of lean persuasion in the context of communication. Particularly the interviewee highlighted the utilisation of organisational specific educational programming. The nature of such programmes embrace homophily study action team agendas, enhancing relationships between like minded individuals. In such a small environment operators are enabled to experience a more intensive and direct understanding.</td>
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<td>There is also presence of hetrophily relationships between operators and management after the study. This is seen particularly in the interviewee’s creation and use of their own “I guess I have this thing called a secret scoreboard. Where the managers are looking for metrics and numbers and all that sort of thing, my secret scoreboard is when I walk through and one of the operators grabs me and says ‘Can you explain a little bit more to me about that stuff we did the other day?’ So I know it’s making sense to him, it’s in his head and he wants to have a go whereas a lot of people discredit that and look for results. What I’m looking for is, when he comes and says that to me and asks for additional training – discretionary effort – to explain something further to him, we are starting to turn the pyramid upside-down because by him asking that open question to me is him actually saying ‘can you come and help me support this 5S or TPM or OCO or Standardised Work, whatever it may be,’ I think we get bogged down looking at the scoreboard but that’s for the fans. I’m looking at the momentum. You’ve got to have that trained eye and know what you’re trying to achieve, I know we’re sticking to the game plan and I can see we’ve got the momentum but the try is about to come. Don’t get bogged down by the fact the scoreboard says ‘zero’ because it’s going to be ‘18-0’ in a very short space of time because I can feel and see and know there’s momentum there. But how do you measure momentum?</td>
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<td>Attitudes, opinions and values of the interviewee are varied in terms of persuasive techniques in use within the organisation. Although they acknowledge the creation of a more open and empowering working environment, they still feel frustrated over the lack of interaction between management and operators at a basis level – which causes strained relations. For the interviewee in their role they value the creation of more open communicative between themselves (management) and operators. The interviewee pointed out that a more integrated approach to the education in the forming of study action teams around members of management and operators would be more beneficial.</td>
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The interviewee discussed how the communication of the lean innovation, particularly within their sub-organisation has been centred on leadership. The interviewee identified the presence of educated lean and opinion leaders as well as change agents. For the interviewee themselves they are a lean superintendent and have a high level of experience and exposure to the innovation. Noting their experience and exposure has been focused towards a more systems-based approach, which although positive in gaining short term success does not embrace a more humanised approach – which the interviewee advocates. The interviewee also commented that the current decision approach undertaken by the organisation is underpinned by system-based applications, which is traditional implementation for lean.

The interviewee suggests that a more appropriate approach for success is human-centric which incorporates the critical mass of people working towards and wanting a common work goal.

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<td>Confirmation</td>
<td>Confirmation of the innovation for the interviewee has occurred in their awareness of lean and its benefits to the organisation, working environment and culture from a philosophical perspective.</td>
<td>“I was getting very frustrated with the focus on tools... and it was 90% tools and very little to do with people. We know lean is 90% about the people and the culture. So an opportunity came up to join [the organisation]...I really liked the way they told me what they wanted to create a culture, a lean culture and get the right people in the right roles”.</td>
<td>Interviewee’s frustrations again emerged when they discussed confirmation awareness of the innovation. Frustrations are heightened for the interviewee due to management although acknowledging the want to create a lean cultural environment; many are still focused on productivity gains.</td>
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Communication

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<th>Interviewee Attitude</th>
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<td>Verbal</td>
<td>The interviewee when presented specific questions about the nature of communication within the organisation, discussed communication in the context of communicative tooling. The interviewee identified one specific communicative that they personally embrace in the form of reflective learning, that of a personal (secret) scoreboard. Such a tool incorporates both verbal and visual communicative mechanisms.</td>
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<td>&quot;I guess I have this thing called a secret scoreboard. Where the managers are looking for metrics and numbers and all that sort of thing, my secret scoreboard is when I walk through and one of the operators grabs me and says ‘Can you explain a little bit more to me about that stuff we did the other day?’ So I know it’s making sense to him, it’s in his head and he wants to have a go whereas a lot of people discredit that and look for results. What I’m looking for is, when he comes and says that to me and asks for additional training – discretionary effort – to explain something further to him, we are starting to turn the pyramid upside-down because by him asking that open question to me is him actually saying ‘can you come and help me support this 5S or TPM or QCO or Standardised Work, whatever it may be.’ I think we get bogged down looking at the scoreboard but that’s for the fans. I’m looking at the momentum. You’ve got to have that trained eye and know what you’re trying to achieve. I know we’re sticking to the game plan and I can see we’ve got the momentum but the try is about to come. Don’t get bogged down by the fact the scoreboard says ‘zero’ because it’s going to be ‘18-0’ in a very short space of time because I can feel and see and know there’s momentum there. But how do you measure momentum?&quot;</td>
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<td>For the interviewee the current approach has a number of limitations which affect the values, attitude and opinion the interviewee has of the organisation’s management. Frustation has been a common emotion held by the interviewee when discussing specific elements of the implementation process. These frustrations are heightened by management not acknowledging the human emotions that emerge when such a major organisational change occurs. This emerges in-spite of the management acknowledging cultural perceptions to be a key goal of the implementation process.</td>
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Verbal communicative mechanisms are present in the communication between the interviewee and operators on the floor. Whereas visual communicative mechanisms are present in the scoring of each operator.

Visual

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Challenges

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<td>Direct versus Indirect</td>
<td>Management expectations was discussed through the out the interview with this interviewee, who highlighted expectations to be a critical challenge underpinning the implementation and success of lean. Expectations of management were discussed in two similar contexts by the interviewee, with both having similar direct and indirect</td>
<td>“…you get so bogged down in the ‘doing’. I think part of the biggest problem, especially people in my role and others is managers want tangible results, and they want to see them quick, and they’ve read the books and lean can deliver them quick, and improve flow and through-put and output and quality and all those sorts of things. So they’re the measures they want to see. Whereas, I knew it takes a</td>
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<td>Although positively supporting the management’s decision in implementing lean, the interviewee shows elements of frustration as higher management does not seem to be able to comprehend what the process involves. The interviewee acknowledges that in order to see cultural</td>
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consequences for the organisation. The context in which management expectations was discussed, included:

- The want for tangible results: this focuses on the expectations of a quick change-over in productivity and waste levels; and

- Higher management expectations: highlights the expectations of higher management in hitting and maintaining specific lean targets.

For the interviewee the **direct** consequence for the organisation of such expectations is associated with time. In particular the setting of non-realistic goals and want for the returns to be rapid. **Indirect** consequences are linked to higher management not understanding the human side associated with the lean process implementation.

Such direct and indirect consequences are not measureable.

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Another challenge identified by the interviewee highlighted consequences associated with the **motivation** at the operator level of the organisational environment. The interviewee highlighted how the organisation has undergone a long time to change people’s mindsets and turn them around and get them using the tools for the right reasons not because you are holding a gun at their head and telling them they have to use it. I guess that’s where my challenge has been, is trying to do my job to the best of my ability and justify my existence that I’m actually adding value to the company if results aren’t getting better because they want immediate results and they’re so focused on the outcomes and the metrics not the processes required to get the outcomes”.

“Don’t get me wrong because we’ve got a General Manager who is very supportive. He’s the one that brought it in so in that aspect we’ve been blessed to have him on board. But with respect to him and all the managers there is still... there are still targets. They still need to hit targets because that’s been told to them in their role descriptions. So they’re pushing for results rather to a 5 year vision of where we want to be, which is understandable. I think the thing that gets me is because we haven’t looked at it as a total package and everyone fundamentally changes the way we work, we delegate people to roll out the lean tools while management can go on with business as usual. I think lean is still seen as standardised workers for operators. Standardised workers would be General Managers, Managers, Superintendents, that sort of thing for the guys on the floor to use the tools and we need to audit them to see if they’re doing it. Finding that real clear link between Upper Management and the guys on the floor is the secret to what we truly haven’t exposed yet. Peel that onion back to get to the middle of it”.

Interviewee was fairly open in discussing the types of frustrations operators have and how these frustrations lead to motivation fatigue. For the interviewee themselves they were very neutral in displaying value and change more time is needed to change people’s mindsets and pre-existing cultural environment. This for the interviewee can be significantly influenced by higher and middle management to become more involved with the operators at the base of operations.
number of changes over the last few years and with each change the management group has implemented a new management strategy.

The nature of the direct and indirect consequences is linked to strategy fatigue at an operator level. However such consequences are not measureable.

way and the only way. 5S, the most basic fundamental visual factory... the guys tell us they’ve already done it. We’re walking through the plant, there’s no 5S out there but they tell us ‘we’ve already done that 4-5 years ago when we did ‘Class A’ on site’. Then they’ve said it was called something else two years before that and they’ll tell you ‘Back in 1994, October 23, they come in here and they call it ‘Pit’ then’ and they’re memories are that good. But that makes our job so much harder because they’ve tried it and failed and tried it and failed. It’s like a kid who tried twice to ride a bike, fell off and took skin off his knees both times; he doesn’t want to get on the bike a third time. But our job is not only to get them back on the bike and ride it but you’ve got two months to do it. They’ve been trying for 2, 4, 6 years to do ‘5S’ and every 2 years they try it fails but now we’re going to try it again. Hopefully it is different and we’ll get a different result but you often wonder ‘are we doing the same thing hoping for a different result?’

Another challenge identified and discussed by the interviewee involved the impact of lean on the working culture through organisational direction and education. This challenge was discussed with direct and indirect consequences.

For the interviewee core to the working environment is culture; however the organisation does not have a clear lean direction concerning this element. As a result and due to western culture without a clear lean direction there is no presence of team unity and more instances of individual and team sabotage (direct consequence). Understanding of the lean process is identified as an indirect consequence.

Supporting the culture through a more structured strategic direction for the organisation according

“it just tells us how much work we’ve got to do. There’s so much variability not just in our processes but in our people and in our people’s mindsets. We might get one group that’s just fantastic and they just go great guns. The next crew comes in and they just want the next crew to fail. They do poor setups or they don’t do setups at all for the next team because they don’t want them to succeed because we’re very much still stuck in a culture and it’s not [the organisation], it’s a Western Culture. The best way to look good is to make the other bloke look bad because then, you get left alone. While I can see he is getting ‘bashed’ they’re leaving me alone. And that’s because that pyramid is always up and we direct people what to do – when, how, why to do it – and do it my way, don’t talk back. They think ‘Oh good, he’s getting bashed... that’s not me.’ That variability in the crews... you can go from department to department and crew to crew, it will be like going to a whole different country”.

Interviewee was fairly open in discussing the cultural working environment and strategic direction of lean implementation. Highlighting an understanding of the greater issue at hand and the need for commitment in addressing such issues.
to the interviewee would minimise the potential for sabotage, however if not implemented well then similar **direct** and **indirect** consequences would still be present.

Such direct and indirect consequences are not measureable.

"We say the biggest thing in lean is about standards but what we don’t have is standards for our people. We have standards for our operations; standards for our processes; standards of how we work; but then we don’t have standards for how we should communicate; how we should lead; how we should develop people. We get bogged down in wanting to see that green metric at the end of the day – ‘have we got the tonnes?’; ‘is everything lined up?’”

Age demographics and overcoming age issues within the organisation was also identified by the interviewee as a current challenge of the organisation. The interviewee noted that currently the organisation has a lot of its workforce in the age bracket of 50-55 years and within 10 years, 50% of the workforce will have to be replaced.

This challenge has both **direct** and **indirect** consequences for the organisation:

- **Direct** in terms of education and replacement of older workers can be viewed as a current waste for the organisation in terms of time and finances; and
- **Indirect** in terms of providing the organisation an opportunity to groom a new generation of younger workers in the lean innovation.

However in removing older generation workers another **direct** consequence emerges with a lose of knowledge sharing between the generations.

Both consequences for this challenge are identified as moderate, however the approach management undertakes can make these consequences minimal as well as high.

"…our biggest age demographic on-site is 50-55 years old. In the next 10 years we are going to have to replace 50% of our workforce. When you are talking about people like that – using an analogy where you can’t teach an old dog new tricks – but we have a lot of work to do to change our biggest age demographic around. If you want to look around in 5 or 10 years, even that big demographic that we’ve turned around – we’ve got to do that for the next generation”.

Interviewee was fairly open in discussing the cultural working environment and strategic direction of lean implementation. Highlighting an understanding of the greater issue at hand and the need for commitment in addressing such issues.
| **versus Undesirable** | challenge that has **desirable** and **undesirable** consequences for the organisation. The interviewee highlighted that although there is management support for education specific programming for operators, they themselves are not committed to partaking in the programmes with operators. For the interviewee this shows:

- **Functionality** in the aspect that management supports the education of operators; and
- **Dysfunctionality** in the aspect that management don’t feel a need to participate as part of the group education.

Again the functional and dysfunctional aspects are not able to be rated. |
| **management, they’ve sponsored that we do one kaizen blitz per month, just continuously. We’ve got the authority to take 5 operators out of their roles each month for 5 days with the focus task of getting a step-change. What I can’t get commitment to is superintendents, managers coming out of their roles for 5 days to learn how to facilitate and run a activity. The kaizen blitzes are the biggest; and probably the only tool we have on site that actually allows us to turn the pyramid upside-down. Start supporting the people at the top rather than directing down. Yet our managers question what level of work that is. I’d be working at the wrong level if come out of my role to run a kaizen blitz with operators for 5 days. To me, the link they haven’t found is the thinking and the philosophies of the operations and kaizen blitz which is all about the PDCA cycle – the ultimate working together that a manager shouldn’t have the answers he should have the questions that lead the people to the answers. But we still have that direct-down ‘I’m smarter... couple of PhDs... I’m the manager ...I must maintain my status’ person on site”. | **Concerning the lack of participant of management within educational programming. Although for the interviewee this would make the operational environment more efficient, those at higher levels still have an attitude they are better than the operators.** |
| The interviewee identified motivation as a form of direct and indirect consequence present within the organisation. This challenge was also discussed in terms of desirable and undesirable consequences in the form of process and tool fatigue. The rapid nature of implementation within this sub-organisation according to the interviewee has introduced a number of specific tools which are not fully understood before the next tool is introduced. For the interviewee this shows:

- Functionality in the sense that there are high level of strategy introduction and awareness of strategies in place; and
- Dysfunctionality in the operators experiencing over exposure to the tools and suffering strategy fatigue. | “It’s a good process. It’s focused. It forces you to focus but, my honest opinion is we try to focus then repeatedly spread our wings and a lot of our people see it as ‘death by a thousand initiatives’. Because we are going through a rapid transformation in a short period of time all of a sudden our operators have got to do 5S, Visual Factory, TPM, QCO, Standardised Work, standardised work for leaders, hourly tracking, Judoka, Hijunka, flow; and that’s just in the first two months, then we go on to everything else after that. Often, we don’t glue them together or align them to one common cause. They’re still seen as individual initiatives. ‘Are we really heading to a common goal?’” |
| The interviewee showed signs of frustration concerning the lack of the speed of the lean transformation management is currently undertaking. For the interviewee a slower paced implementation would assist in the operators and management understanding more efficiently the purpose behind the implementation and adapting the culture to fit those new tools. |
Again the functional and dysfunctional aspects are not able to be rated.

| Anticipated versus Unanticipated | Not discussed | Not discussed | Not applicable |
### Organisation F: Interviewee 4 (PM3)

#### Organisation & Management Environment

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<td><strong>Formal Social Structure</strong></td>
<td>The interviewee provided a general introduction and background to the organisational environment. The interviewee discussed in particularly how the organisational environment has experienced significant change with the organisation experiencing several change ownerships. The nature of such changed ownerships has resulted in the take-over of previous businesses at the plant site. According to the interviewee the lean innovation has been an initiative of the current management team. PM4 and PM5 also lead their agreement to the description provided by the interviewee.</td>
<td>“It is an interesting site, this one because this site has had several owners. In more recent times it has gone through two organisational ownership changes. Because of another mill closed down within the current organisational ownership, some of those employees came across to work on this site. So there have been a few cultural issues there, there was the organisational ownership battle between employees, and then there was operators and trades versus management, operations versus maintenance and then the departmental and the shift. Most of that has gone away, I don’t see to much still going on, but occasionally you might see a little something anti-management. I don’t know for me its certainty improved”.</td>
<td>Interviewee was open about sharing general details of the nature of work the organisation provides. PM4 and PM5 shared similar openness of attitude and opinion.</td>
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<td><strong>Informal Social Structure</strong></td>
<td>The interviewee when discussing the formal social structure also highlighted the presence of heterophily communication through day-to-day shop floor walks. For the interviewee such daily walkthroughs has enhanced internal relations between middle management and operators/trades at a basic communicative level. “…we have a lot of time out on the shop floor, talking, communicating, and monitoring the standards, auditing compliances and standard work. So we do spend a lot of time face-to-face with every operator and trades”.</td>
<td>Interviewee opinion, value and attitude towards the daily walk throughs was positive in nature, with the interviewee advocating the success of this system.</td>
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<td><strong>Social Norms</strong></td>
<td>Although not specifically discussed in the context of the organisation environment. The social norm of integration is present in the nature and structure of the organisation to centre on shift teams (tertiary working groups). Integration is also present in the study action team agenda (Kaizen Blitzes) utilised by management.</td>
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<td>Although not specifically discussed in the context of the organisational environment. The social norm of advocacy was present in their understanding.</td>
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and approach to the lean innovation. It is still identified as present.

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### Implementation Process

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<td>Innovation Decision</td>
<td>Not discussed</td>
<td>“.the very first workshop we had some interesting operators come in with their arms folded, with the attitude that the workshop would be a waste of time and by the end of the workshop there was a completely different attitude about the whole process and they were so proud to be able to present to the general manager about their experience. That is something that is unique is that we have the operators within this style of workshop report and present to the general manager about what they had done during the week, what they had learnt and how they are going to apply that to their day-to-day duties. Those events have had amazing changes and something that is evident across the workshops, whether it is a Kaizen workshop or a activity based workshop or a standard team work building workshop for team leaders. It’s just really good to watch and see how it progresses”.”</td>
<td>The interviewee values their role and the contribution they provide to the implementation of lean into the organisational environment.</td>
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| Knowledge                | The interviewee identified their role within the organisation to be a coordinator and manager for sub-organisation 2. They’re identified as having a moderate level exposure having experience exposure and knowledge through work with another organisation in coal services. | “We actually use and collect data to see what the problem | The interviewee spoke highly and positivity of the approach this particular sub-organisation undertakes in persuading a general acceptance of the innovation within the organisational environment. Such a positive opinion attitude and value towards the approach was supported by PM4 and PM5 – with PM5 also describing this general agreement. |
| Persuasion               | The interviewee was asked a series of questions concerning persuasive techniques organisational management may use as a way to overcome innovation rejection and challenges. For the interviewee the main challenge that enhances the use of persuasive techniques is connected to communication. Communication for the interviewer is associated with hetrophily relation between management and operators. The interviewee discussed the nature of lean persuasion in the context of education. Particularly the interviewee highlighted the utilisation of organisational specific educational programming. The nature of such programmes embrace homophily study action team agendas, enhancing relationships between like minded individuals. In such a small environment | “..the very first workshop we had some interesting operators come in with their arms folded, with the attitude that the workshop would be a waste of time and by the end of the workshop there was a completely different attitude about the whole process and they were so proud to be able to present to the general manager about their experience. That is something that is unique is that we have the operators within this style of workshop report and present to the general manager about what they had done during the week, what they had learnt and how they are going to apply that to their day-to-day duties. Those events have had amazing changes and something that is evident across the workshops, whether it is a Kaizen workshop or a activity based workshop or a standard team work building workshop for team leaders. It’s just really good to watch and see how it progresses”.” | The interviewee values their role and the contribution they provide to the implementation of lean into the organisational environment. |
operators are enabled to experience a more intensive and direct understanding.

Underpinning the nature of the persuasive techniques for this sub-organisation is the presence of sub-organisational specific data collection. Such data enables management of the sub-organisation to specifically target and select known individuals (or aides) who will become activate in advocate the innovation to other individuals.

PM4 also agreed with PM3’s approach and understanding.

areas are, that’s how and where we decide to target the Kaizen Blitz. So for example, our operators might say “we’ll our biggest area or we’ve had an issue with locking heads over quick change-overs or we couldn’t get a component apart etc”. These types of issues consume a lot of time and looking at the data we are able to identify the greatest loss. So we then design workshops around those problem areas and give operators a problem and ask them “well how are you going to fix this?” and the operators have come up with new methodologies. The last time we talked about having issues, the issue being discussed has just gone away”.

PM5 agreed by stating: “The operators that we choose are the one’s that work within that area. And there might be a few but obviously we went through a list, myself and interviewee 2 and looked at who would be or who are very influential out there, people who will get in and behind and get some runs on the board”.

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| Process  | When asked to describe the implementation process the organisation undertook within this sub-organisation, the interviewee noted that it was guided by a diagnostic approach. The interviewee also discussed their involvement in a pilot implementation in small of their sub-organisation, this pilot implementation also utilised the diagnostic mechanism.

According to the interviewee the diagnostic approach involves the following stages:
- Investigation and analysis of current organisational state;
- Identification of future state of the organisational environment;
- Identification of gaps and barriers within

“Well first we did a diagnostic. Well actually I might just focus a bit on the pilot implementation experience first. We did a diagnostic of our current state and identified were we would like to be in a future state and identified the gaps or the barriers which were causing us issues at the moment and then worked out some action plans highlighting the process we were going to take to close the gap, well actually gaps. So that was centred around vulnerability and some of that was around customer product quality, also customer complaints and a fair bit around our culture; particularly in terms of how we engage our workforce differently to get some ownership into the business. We had a number of workshops with our operators and trades: one of the key elements that well I guess that got their attention was operator irritancy. Well we actually did a survey for operators as well and also for

The interviewee was quite positive in their opinion and attitudes towards the process of implementation for the sub-organisation particularly in the pilot implementation. The interviewee valued the approach as it has enabled more specific detailing and details to emerge which the organisation can address more efficiently during implementation.
the organisational environment; and
- Provide work action plans to close the gaps.

Key to the success of lean implementation for the organisation was the targeting of **vulnerability**.

In targeting and identifying operator specific issues management designed **study action team** agendas (in the form of workshops) to assist in identifying more specific issues which operators and trades had within the organisation, a survey tool was another strategy utilised by management.

Such approaches have assisted in the implementation of the lean innovation within the organisational environment. For the interviewee in particular such specific strategies were identified as 5S, quick change-overs and standardised work practices.

**Confirmation**

For the interviewee communication emerged as key to the confirmation of the implementation process within the organisation. The interviewee reflected on how lean has changed the nature of communication particularly within the environment of their sub-organisation. The nature of the communicative environments on the shop floor encourage more open and collaborative (**hetrophily** and **homophily**) between management and operators/trades.

"When we started this I would go onto the shop floor and everybody would just go and scatter. Now we go onto the floor and if there is no-one there I would just stand there and they would just come up and ask "well what is happening? Where are at? What's going to happen next?" and generally having a conversation. We also now have a morning information meeting where there were concerns about how the business was going and it was yesterday when the meeting started that the operators were just pouring into the door, just wanted to listen to the information. It was just wow; we've come a long way, in 18months; because it would never have occurred before".

The interviewee acknowledged through their opinion, values and attitudes the empowering experiences the lean innovation have brought to the organisational environment in terms of communication (both hetrophily and homophily).

| Each of the interviewees was given an opportunity to openly reflect to provide additional thoughts on lean (confirmation). The interviewee discussed the confirmation of lean in terms of their way of life and their role within the organisation. | "For me it’s actually a way of life. It’s doing business differently. It’s a structured approach for continuous improvement through the use of a set of tools to be applied consistently to give us a much better outcome. I’m a little different to interviewee 3 about whether its changed me as a manager, I would say absolutely. It has changed the way | The interviewee acknowledged through their opinion, values and attitudes the empowering experiences the lean innovation has brought to their:
- Role within the organisation; and |

| trades to find out what they thought about their leadership and the management of the site". | “And then we started a process that was focused on lean tools and utilising the lean tools on particular problem solving for some, 5S, quick change-over, standardised work and more recent interviewee 3 has implemented leaders standardised work for the front-end leaders of the team. So each with step we have got some lean improvements". | |
The interviewee when presented specific questions about the nature of communication within the organisation, discussed communication in the context of **communicative tooling**. The interviewee identified one specific communicative that they personally embrace in the form of **integrated** and **reflective learning**, the organisational developed information centres. Such a tool incorporates both **verbal** and **visual** communicative **mechanisms**.

As a strategic means the information centres for the interviewee enables the tracking of individual learning through the lean strategies in place (including 5S, Information Centres etc). For the interviewee such a **reflective learning** tool is about the momentum of learning, rather than how much one knows.

**Verbal** communicative **mechanisms** are present in the communication between the interviewee and operators on the floor. Whereas **visual** communicative **mechanisms** are present in the scoring of each operator.

The nature of the information centres was supported by PM6, who further identified PM4’s role in maintaining the centres and centre content.

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<td>The interviewee when presented specific questions about the nature of communication within the organisation, discussed communication in the context of <strong>communicative tooling</strong>. The interviewee identified one specific communicative that they personally embrace in the form of <strong>integrated</strong> and <strong>reflective learning</strong>, the organisational developed information centres. Such a tool incorporates both <strong>verbal</strong> and <strong>visual</strong> communicative <strong>mechanisms</strong>.</td>
<td>“I see one or two operators a day standing there and reading the information centre, which to me is like ‘Wow, they want to know stuff about the business; what are they reading it for?’ Admittedly, some of them are reading it to go and tell their mates this is a load of bullshit and they understand all about it but others I see read the information centre trying to [or actually being able to] understand some things that are on there and then come and say ‘You know we missed the target last night? I was just down there and saw you miss the target. Did you know you could get an extra two tonnes per hour out of that machine if you used a left-handed screwdriver?’ So they can start to see a couple of things. They get that sense of achievement but they can see how they can contribute to the success and the most important thing is know their contribution is valued by the organisation because there is now a mechanism for them to contribute to the success of the business whereas often, we don’t give our employees, which are our biggest asset, the opportunity to contribute to the business”.</td>
<td>The interviewee spoke highly and positivity of the approach this particular sub-organisation undertakes in terms of communicative tooling and the presence of information centres within the organisational environment. Such a positive opinion attitude and value towards the approach was supported by PM5 with also describing this general agreement.</td>
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PM5: “Interviewee 1 also runs every couple of months a bit of an update on where the business is up to. This update is for everyone and is run across the site”.

“I see one or two operators a day standing there and reading the information centre, which to me is like ‘Wow, they want to know stuff about the business; what are they reading it for?’ Admittedly, some of them are reading it to go and tell their mates this is a load of bullshit and they understand all about it but others I see read the information centre trying to [or actually being able to] understand some things that are on there and then come and say ‘You know we missed the target last night? I was just down there and saw you miss the target. Did you know you could get an extra two tonnes per hour out of that machine if you used a left-handed screwdriver?’ So they can start to see a couple of things. They get that sense of achievement but they can see how they can contribute to the success and the most important thing is know their contribution is valued by the organisation because there is now a mechanism for them to contribute to the success of the business whereas often, we don’t give our employees, which are our biggest asset, the opportunity to contribute to the business”.

“The meeting is about providing an update on the state of the nation and I usually tell them what is happening within...
The interviewee also discussed the presence of the study action team agenda of the organisation to also advocate communicative tooling and more specifically integrated learning. The tool incorporates verbal mechanisms of communication.

The nature of the organisation’s study action team agenda is designed around workshop style Kaizen Blitzes. Such agendas incorporate homophily communication at a basic level with individuals with like-mindedness (individuals of a similar working environment) brought together.

For the sub-organisation and the organisation as a whole verbal centric workshops (study action teams) are deemed more efficient as reading resources not as efficient.

“We’ve done some lean workshops where we take people on a one or two day training course where we talk to our operators about what is lean and what’s its purpose and get them to build an opinion. But to give our trades and operators’ books, no, some would, with some it would probably make its way to the first garbage bin and some people don’t like reading too much and are very slow, unless of course it is a textbook. And sometimes its seen ok we’re doing lean now so this is the latest flavour, a lot of the team members here have been through continuous improvement quality circles, QUC, TQM, all these and now we are going down the lean path. So they are a few people going well what’s the point. So its seen as something else they have to learn. They see it as an initiative rather than a way of doing business”.

PM5 stated in support of PM3: “…the best way to get the operators involved and on board is to give them enough context and purpose”.

The interviewee spoke highly and positivity of the approach this particular sub-organisation undertakes in terms of communicative tooling and the presence of study action team agendas within the organisational environment. Such a positive opinion attitude and value towards the approach was supported by PM3 and PM5. PM5 voiced and described their general agreement.
### Organisation and Management Environment

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<tbody>
<tr>
<td><strong>Formal Social Structure</strong></td>
<td>The interviewee provided a general introduction and background to the organisational environment. The interviewee discussed in particular how the organisational environment has experienced significant change with the organisation experiencing several change ownerships. The nature of such changed ownerships has resulted in the take-over of previous businesses at the plant site.</td>
<td>“I think there is a lag in the culture. You know the culture prior to the current [organisational takeout] was very dictatorial, it was very ‘you must have hands on desks’, ‘do what you are told’ and that was the culture for many, many years and current management has been trying to change that. But it is tough going, as I was saying before because that culture is so deeply ingrained in people, and people are so suspicious and people are constantly expecting the current fad to go away and for us to revert back to what they have always known. So there is that element of mistrust still present within the environment”.</td>
<td>Interviewee was open about sharing general details of the nature of work the organisation provides.</td>
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<tr>
<td><strong>Informal Social Structure</strong></td>
<td>The interviewee discussed the presence of <strong>heterophily</strong> communication between management and operators in the context of the organisation’s educational programmes and study action team agendas. <strong>Heterophily</strong> communication emerges with the study action teams (formed through the Kaizen blitzes) being given the opportunity to present their team findings after their training session. <strong>Homophily</strong> communication is also present in the form of the teams working together as a means to communicate they knowledge and understanding of lean. The interviewee also reflected on their own communication networks, highlighting similar <strong>heterophily</strong> and <strong>homophily</strong> networks to be present.</td>
<td>“…probably at the end of each week we invite all the managers on site as well as the GM and the guys present what they have done throughout the weekly Kaizen Blitz events. So that gives the managers the opportunity to see the groups positively reinforce what they have done and I think the managers can see how the groups are nervous about it but it allows a non-judgemental communication between management and worker groups”. “Well speaking from my own responsibilities and counter abilities, it has been a huge positive thing. I can go out and speak with individuals about projects that we are working on and have a positive interaction with them and get feedback from them. I don’t feel overwhelmed from it. I feel encouraged by it. I feel useful. It gives me some more hope for the future of the organisation and getting that certain level of interest from the guys who I said before were culturally brought up not to have any interest and not have a want to learn”.</td>
<td>Interviewee opinion, value and attitude is a favourable one towards the importance of the study action team approach in forming informal social structures, however showed some frustration when communication of the innovation is transcended efficiently to operator levels.</td>
</tr>
<tr>
<td><strong>Social Norms</strong></td>
<td>Although not openly discussed an a clear example</td>
<td>Not applicable</td>
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**Opinion Leaders & Change Agents**

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<tr>
<td>Innovation Decision</td>
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<td>Not applicable</td>
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**Knowledge**

The interviewee identified their role within the organisation to be a superintendent for sub-organisation 1.

They’re identified as having a **low level** exposure having experienced exposure since 2009.

The interviewee values their role and the contribution they provide to the implementation of lean into the organisational environment.

**Confirmation**

Each of the interviewees was given an opportunity to openly reflect to provide additional thoughts on lean (confirmation). The interviewee discussed the confirmation of lean in terms of their way of life and their role within the organisation.

“For me lean is about the visualisation and the solving of problems by everyone, all day every day. It’s about people being 100% engaged and working as a team. It’s all about being a learning organisation and challenging things and proving things and understanding things”.

The interviewee acknowledged through their opinion, values and attitudes the empowering experiences the lean innovation has brought to their:

- Role within the organisation;
- Way of life.

**Communication**

The interviewee also discussed the presence of the **study action team** agenda of the organisation to also advocate **communicative tooling** and more specifically integrated learning. The tool incorporates **verbal mechanisms** of

**PM3**: “We’ve done some lean workshops where we take people on a one or two day training course where we talk to our operators about what is lean and what’s its purpose and get them to build an opinion. But to give our trades and operators’ books, no, some would,

The interviewee displayed similar attitudes and values to PM3 with who they agreed with here. PM5 also agreed with the discussion.
The nature of the organisation’s study action team agenda is designed around workshop style Kaizen Blitzes. Such agendas incorporate homophily communication at a basic level with individuals with like-mindedness (individuals of a similar working environment) brought together.

For the sub-organisation and the organisation as a whole verbal centric workshops (study action teams) are deemed more efficient as reading resources not as efficient.

Visual
Written
Not discussed
Not discussed
Not discussed
Not discussed

### Challenges

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<td>Direct versus Indirect</td>
<td>The interviewee discussed one core challenge impacting on the implementation of lean within the sub-organisation. The discussion of this challenge focuses on implementation management, specifically highlighting the lack of strategic direction organisational management have taken in the implementation process. This is highlighted by the interviewee to be linked to a direct consequence with maintenance of the implementation. PM5 also agreed with these thoughts provided the indirect consequence of problems associated with attitude. Consequences of this challenge were not identifiable by the interviewees’.</td>
<td>“…the other challenge is we keep on butting up against the issues of maintenance and the maintaining of things at each stage of the implementation process. You know getting the traction and getting people to understand that is apart of the process and sustainability for the organisation. It is a huge challenge. Every time we have tried to implement a new stage, this remains an underlining element”.</td>
<td>Interviewee was fairly open in discussing the frustrations they have with how lean has been implemented. For the interviewee themselves they were very neutral in displaying value and attitudes in potential mechanisms to improve the process. PM5 displayed similar values, opinions and attitudes.</td>
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<tr>
<td>Desirable versus Undesirable</td>
<td>The process approach was another challenge discussed by the interviewee, discussed in an undesirable context. The interviewee highlighted with some it would probably make its way to the first garbage bin and some people don’t like reading too much and are very slow, unless of course it is a textbook. And sometimes its seen ok we’re doing lean now so this is the latest flavour, a lot of the team members here have been through continuous improvement quality circles, QUC, TQM, all these and now we are going down the lean path. So they are a few people going well what’s the point. So its seen as something else they have to learn. They see it as an initiative rather than a way of doing business”.</td>
<td>“…we have tried to fix the lean model across all areas rather than adapt the lean model to fit to suit our organisation and make ownership of it. We have rather</td>
<td>Interviewee was open in discussing their frustration of opinion and attitude towards management in terms of approaching the</td>
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how management throughout the process have attempted to fix the lean model to the organisational environment, rather than adapting the model to the organisational environment. Although some measures of success have occurred with the approach, the dysfunctional nature of the challenge suggests the organisational management and the environment is not adaptable to the requirements of lean.

PM5 had a similar challenge perspective and view, focusing on change resistance.

Consequences of this challenge were not identifiable by the interviewee.

taken the approach of religiously focusing on the structured formula of lean. I think where we have had some measures of success was where we had stepped back and said “well we actually own this system and we can tweak it to how we like”.

| Anticipated versus Unanticipated | Not discussed | Not discussed | Not applicable |
## Organisation F: Interviewee 6 (PM5)

### Organisation & Management Environment

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<tr>
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<tr>
<td><strong>Opinion Leaders &amp; Change Agents</strong></td>
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### Implementation Process

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<td><strong>Innovation Decision</strong></td>
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<td>Not applicable</td>
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<tr>
<td><strong>Knowledge</strong></td>
<td>The interviewee identified their role within the organisation to be cooperation superintendent of sub-organisation 1. They're identified as having a low-moderate level exposure having experienced exposure for around 3 years.</td>
<td>The interviewee values their role and the contribution they provide to the implementation of lean into the organisational environment.</td>
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<td><strong>Persuasion</strong></td>
<td>The interviewee was asked a series of questions concerning persuasive techniques organisational management may use as a way to overcome innovation rejection and challenges. For the interviewee the main challenge that enhances the use of persuasive techniques is connected to communication. Communication for the</td>
<td>The interviewee spoke highly and positivity of the approach this particular sub-organisation undertakes in persuading a general acceptance of the innovation within the organisational environment. Such a positive opinion attitude and value towards the approach was supported by PM4 and PM5 – with PM5 also describing</td>
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The interviewer is associated with *heterophily* relation between management and operators.

The interviewee discussed the nature of lean persuasion in the context of *education*. Particularly, the interviewee highlighted the utilisation of organisational specific educational programming. The nature of such programmes embrace *homophily* study action team agendas, enhancing relationships between like-minded individuals. In such a small environment, operators are enabled to experience a more intensive and direct understanding.

Underpinning the nature of the persuasive techniques for this sub-organisation is the presence of sub-organisational specific data collection. Such data enables management of the sub-organisation to specifically target and select known individuals (or *aides*) who will become activate and *advocate* the innovation to other individuals.

PM4 also agreed with PM3’s approach and understanding.

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<td>Process</td>
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<tr>
<td>Confirmation</td>
<td>Each of the interviewees was given an opportunity to openly reflect to provide additional thoughts on lean (confirmation). The interviewee discussed</td>
<td>&quot;Lean for me is essentially about eliminating waste, which obviously helps us be more productive which gives us the dollars on the bottom line. To me that's this general agreement.</td>
<td>The interviewee acknowledged through their opinion, values and attitudes has not changed as a result of the lean innovation.</td>
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how the confirmation of lean is about tools, the elimination of waste and increased productivity.

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<td>Challenges</td>
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PM5 discussed the indirect consequence associated with the implementation stating: “...we then try to jump onto another part of lean and implementation. For example we implement one element of the process, we then go ‘well we’ve done that, so let’s move onto the stage’.

**Desirable versus Undesirable**

| Desirable | The process approach was another challenge discussed by the interviewee, discussed in an undesirable context. The interviewee highlighted the presence of resistance to change when an innovation is implemented. Particularly the interviewee highlighted challenges between management and operators/trades in communicating the innovation. Although some measures of success have occurred with the approach, the dysfunctional nature of the challenge suggests the organisational management and the environment is not adaptable to the requirements of lean, particularly when resistance occurs.

PM5 had a similar challenge perspective and view, focusing on lean adaptability.

Consequences of this challenge were not identifiable by the interviewee. |
|---|---|

| Undesirable | “Sure. I mean anyone who gets used to undertaking tasks in a certain way will resist when change is introduced that affects the way they do something. Everyone is going to go through that resistance, they don’t want or they don’t want to see, that sometimes doing it in a different way is more efficient and beneficial to the process and work practices. Especially if you have to deal with people who have been doing the same job for 10 or 15 years and then you go “well we no want to do it this way”, their first reaction is “well what’s the problem, because we’ve been doing it this way for so long, why do we need to change”.

“I think some of the other fundamental factors is what interviewee 3 touched on, you know about the guys been working the same jobs, that it becomes easier for them to do it that way. They then don’t see a need as far as they are concerned to want to change. They view lean as fad that is just going to past and all they have to do is wait it out”. |

**Advocacy** was another challenge discussed by the interviewee with undesirable consequences. The interviewee reflected back on how education of the process focused primarily on one grouping (operators/trades), without getting the team leader involved as well. For the interviewee dysfunctional aspects emerge with the lack of authority the operator has within the working environment to further advocate and lead forward

Probably one thing, if I look back. We have gone to the extent where we get the operators involved in the process and we have had some success. Ok so we get them involved and they like own it. But where we probably fell down a bit is not getting the team leader involved…. Ok so we get the operator involved and they go out and they own it, but then they don’t have any authority around the mill. So they are trying to implement something and get behind it but they really |

| Undesirable | Interviewee was open in discussing their neutral opinion and attitude towards management in terms of approaching the implementation of lean. The interviewee also expressed a need for management to better understand operators/trades and their cultural environment – this understanding is essential for successful implementation. |

Interviewee was open in discussing their frustration of opinion and attitude towards management in terms of approaching the implementation of lean.
the innovation. The lack of operator support for the interviewee is underpinned by the team leader and not having both groups integrated into the educational programmes. For the interviewee this is a core challenge the organisation is currently facing.

don’t have the support of their team leader because the team leader wasn’t involved in that process and doesn’t understand how important it is for the operator and the rest of the team. So that’s probably we have failed and where we need to extend this leader standard workshop that has started to get them involved and supporting their guys who have done the Kaizen blitz and other workshops.

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Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

Interviewee: No
Okay, so let’s begin. I wanted to start off and learn a little about your role within the organisation, when you first learned about lean and your exposure since.

My background, well I’ve got a very diverse background through lots of different industries. So telco industry, automotive industry, printing industry, construction materials industry and obviously now in construction itself. My background here is that I work and head up our national operations group and we work on business strategies and business processes trying to build capability with our people across all functions nationally. One of the things we are looking at is, well we have a business improvement arm or stream, who you will meet a few of those people today. One of the things we are looking to introduce is lean construction. We have an enormous amount of waste in our business given I guess the unsophisticated nature of the construction industry. We can’t call it lean we just call it ETS which is Extra To Schedule which is margin erosion, we actually order our homes and our costs to homes and order that and its leakage to that. So additional orders to trades, supply whatever it may be for a whole range of things. That costs us about 4% of revenue, 3-4% of revenue; it needs to be under 1%. Right, so and its probably costing the [city office] business about $30million a year, so the business has about $30million a year of leakage. So that’s sort of one of the areas of focus that we are looking at, so how do we eliminate waste and that is in that margin erosion space. But we also know we have a lot of the other waste as well, but I couldn’t rattle them off to you off the top of my head. But I know that physical waste on site is a big issue we’ve got tighter sites that we have to construct on, because developers are building smaller lots and houses well they are trying to grow the size of that footprint. So being able to produce and construct efficiently and effectively, physically waste becomes very important and obviously the cost of physical waste is escalating at a rapid rate so we have to be mindful of that too and eliminate that. We also have a lot of waste in terms, well it’s one of our biggest waste issues is cost which is hidden in our efficiency. So we have quite an overhead intense business, we have about in [the city] about 100 site managers or construction personnel – that is a huge cost and we need them to build our homes as fast as possible to reduce that fixed cost component of that. So if we build slow, efficiency is down and our overheads go up comparative to the revenue we earn. So we call it white-space. White-space is no construction activity on site per day. We have a lot of white-space. So we are currently building single storeys on average about 24-25 weeks, double storeys probably about 36-38 weeks and in some areas 42-43 weeks which is just too slow. So that would mean that we have a lot of white-space on most days where we are not doubling up trades where we can and when its safe. We have no trades on
site some days, so there are a whole range of reasons for that. But that is probably the biggest prize that we are going after.

**Do you find it difficult particularly in terms of managing the project sites with over 100 site managers and therefore multiple site teams? Also is this complicated by whether or not site teams (trades) are part of the organisation?**

Yes. All trades are subcontracted out. So the site manager’s function is to really just to schedule the job, engage the trades and the supply is sourced from one of my procurement teams as well. So all labour is subcontracted.

**So it can get complicated. In overcoming such complications at a site level are there any specific strategies current in place? And if so how effective have these strategies been in minimising waste within the organisation?**

It all depends on what type of waste you are talking about. So the physical waste as an example, so we are looking at but I wouldn’t we’ve got a huge focus on but we are looking wastage factors that allow for our estimating space and I don’t know but you would have to find out from one of my team but for plasterboard we may allow 5% wastage or 7% wastage on every house now and we could reduce that to 3% on every house and what are the challenges to do that. I don’t think we have tackled that adequately but I know that we do have a lot of physical waste that we are moving off-site. When we calculate how much waste we should have, so right call it 3 cubic metres of waste to end up with 14 cubic metres of waste something is going wrong. Something is going wrong somewhere. So [interviewee 3] who you will be speaking to today is looking at that physical waste component and how we can actually get it down and we actually have got a strategy to work with a company called site-clean up, who actually does hand site-clean ups and recycling waste streams. You know minimising the presence of waste in landfill and increasing the amount that is going to the recyclers.

Strategies for the time related waste we are looking at how do we get our management structures right. So we have site managers manage between, say in the [location 1] business, about 15 jobs each. Now in a suburban business that’s a knock down rebuild market they manage about 8 jobs each. They report to a construction manager, construction manager reports to a building manager and I have another role which I manage as an executive building manager. I manage that whole
team as well. But we are trying to get our management structures right, where there is greater onsite presence. So our construction manager should be in the field far more often because then they are actually looking at all their sites under their realm and are actually trying to identify why there is no activity on site or why aren’t there two activities on site, why have we been held up and actually working back on root causes for that. We have found that in that time space the root causes are pretty simple probably five, one we can’t control which is the weather – but that doesn’t apply when you’ve locked up your house anyway or are enclosed, so that shouldn’t impact internal trades at all other than getting out on site, which may happen on occasion. But it is either a trade issue, so we have trade shortages potentially or we aren’t managing our trades effectively enough. It’s a supply related issue, so our suppliers haven’t delivered for a on time, so either in full or on time. It could be a pre-site issue, so we have had issues with the drawings or the estimates or quantities, there could be some issues with the contract, which hasn’t been translated into orders. And the last one is probably the site manager/construction manager issue, so either inadequate scheduling, so we aren’t scheduling tight enough, firm enough or assertively enough or the site manager and the construction manager aren’t managing their jobs closely enough. So they are not demanding enough from their trades or suppliers, they are not demanding enough from themselves. They are the core issues and we are targeting all those issues other than weather. In fact even on weather we are targeting by trialling putting crushed rock gravel on all our sites, so we getting a better working environment when it does get a bit wet. We are probably tackling all those areas in different ways.

Do you find that also communication can be an issue as well? Particularly in the structure of the project delivery are of the organisation with trades, site managers, construction managers etc?

Yes for sure. And that comes with that issue about; you know that last issue with the site manager and construction manager. Really one of the key aspects to that is communication. So to what extent is the company’s objectives translated from the building manager to the construction manager to the site manager to the trades. What clarity are we giving the trades about executing a task that we have just asked them to do, what communication is coming back when there are challenges that arise or things that can’t be done or uncertainty – you know do we have adequate communication and the answer is probably, you know, generally it is a big challenge.
I see. Do you then have any communicative strategies or programmes in place as a means to improve communication within the organisation?

Yes, the down-the-line channel is one where we have just refined the structure. The one I spoke to you about before, you know as an executive building manager, building manager, construction manager and site manager, it’s a really rigid structure that we are trying to make sure that messages get down that line. So we have a strategy to improve that cause it is not adequate, not just down the line but also back up the line, when challenges arise. So that’s the internal challenge. The external challenge with our trades and suppliers, so we actually have started to embark upon trade quarterly meetings, so that’s run by the building manager within each of our districts and at each quarter we are know getting our trades together with our construction team to talk about what is going on with the business, what’s the business strategy, what’s coming forward, what are some of the challenges in the area, what are the needs we have of these and what needs that have of us – trying to really build that trade partnership type of environment.

We have done a lot of training with our site teams in terms of the way they engage and communicate with trades and give feedback.

Is the approach more about specifically targeting each group first and then expanding to include or groups?

Yes, they are. I would say the quarterly meeting is more designed to target a mass gathering but the construction managers should be holding with their teams. So they have 3, 4 maybe 5 site managers they should be getting their trades together within their local district/s and having toolbox talks and those sorts of things as well to increase that communication.

Has the approach been successful?

I think it’s improving. It’s quite embryonic, I think its improving and again we are coming from a long way back. Really a site manager owns the trades and the construction manager knows who the trades were. So when a site manager left the business they took their trades with them and so now we are asking the construction managers now to build that intimacy, that’s probably not the best word for it, but that intimacy with the trades. So then they have that link and again
establishing a relationship between the trade and the construction manager rather than the site manager.

**How long have you been focusing on the development of those types of relations?**

That’s probably been somewhere around 12 months, probably 12-14 months. But we have probably really enhanced it, increased it over the last 6 months, 6-8 months.

**Do you any form of internal education to assist in the implementation of lean and making organisational employees more aware of why you are implementing if? Or have internal education programmes been present within the organisation prior to lean implementation?**

Yes, [interviewee 2] knows a lot more than I do about that. But do ask her about we call it [organisation] excellence and that is a business improvement programme where we have been documenting processes and procedures for the last 18 months. Part of that was a piece of performance management excellence and as an example ask her about a process called STOP its about, it’s just a feedback process. When out site managers communicate to trades we want them to give feedback, and STOP is an acronym for specific feedback, its timely, its outcome focused and is it productive. That is one of the tools we have trained our site management teams in by giving feedback in a structured way. We have also done a lot of work with our managers, our construction managers, our building managers about presentation skills and communication skills. Again it’s targeted to how they coach and mentor the teams as well, so that is trying to help as well.

**Have you experienced any other non-waste challenges associated with lean?**

I think, well it’s a combination of a larger business and the industry. So when I say the large business, we have 100 site managers, we have 1000 people in this business nationally and if you think about the role of, well in [the city] we’ve got 906 jobs under construction right now. So it is a very decentralised operation. So if it was centralised and its in one manufacturing plant your levels of control are far greater than they are then what we have with 906 jobs under construction. So that’s probably the biggest challenge is how do you get a message from a senior executive down to one of the 906 sites and one of the trades that is servicing one of the 906 sites. That is the biggest challenge I think and its apart of the business and the size of the business. The lack of
sophistication and the industry and the trade and the site managers and our people also perpetuates and makes that issue harder again. So that’s another big challenge. They want to do it as they have always done it, change is very difficult and its difficult to understand and sometimes difficult to comprehend and its difficult to implement, when I’ve done something for 30 years as a tradesman and now you’re telling me to do it differently. So probably the other big challenge. So its cultural and its industry.

So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

I think you’ll find in terms of lean, well I guess linking it back to lean we’ve had a big push on customer service and quality. They are probably your classic, you know, TQM scenario of time, cost and quality. But we have been focusing on customer service, quality and efficiency; they are probably the three key areas. We’ve really ramped up our quality assurance and we have probably 6 stages of QA checklists through-out construction that a house will go through. We have internal QA teams that look at a pre-plaster checklist and then a final checklist. That final checklist, well its not a checklist, but rather the final QA check is like though the customer is walking in and they want to see a defect free home. That has actually, well these checklists focusing on quality has actually reduced waste, believe it or not, its reduced the amount of rework, its reduced, its clarified that task, the scope of works, the specification for things – so that is that focus. The other thing is about customer service, we are being more engaging with our customers through the journey, so we actually call our customers on a weekly basis mandatorily – so there are no surprises at the end of the home when the customer asks ‘well what about this, what about that, what about this I didn’t know about that’ and that was a big contributor to waste, in the time sense. So we had to come back and appease the customer and do this and do that and delay the handover of their home or the progress of their home. So we have been focusing on that. The efficiency appease is the biggest price for us and its got so many elements to it, you know trade management, scheduling of the site manager, the management of the site manager, management of the construction manager, the level of training provided within the field. Its just got so many facets to it. So those are probably the key areas.
Some interesting reflections made there. I wanted to extend an additional thank you for participating in the research.

Thank you
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

No
Okay, so let’s begin. I wanted to start off and learn a little about your role within the organisation, when you first learned about lean and your exposure since.

My role manager of the business improvement team and I’ve been in this role for two years, well just over two years and with [the organisation] nine years before that. What we are doing in business improvement, well just for some background the business has been around for 36 years, its been, it was fairly small for the first 26 years and it has grown rapidly over the last 10-11 years. By rapidly I mean we went from 50 homes a year to building about 3,500 homes a year over that ten year period. The business had no standard processes or procedures and as a business has grown organically, just more people have been added to the business and nothing has been documented or standardised across the entire organisation. So from a business improvement perspective we are very early in the journey and for the last kind of 2-3 years we’ve just been working on trying to get a standard operating platform for everybody to work towards with a view from there that once we’ve got everybody on the same page at least then we can start to ramp up the improvement side of it. So probably this is stage one and its all about standardised at the moment. Before we started this programme we had 14 different business units across 3 states in Australia all operating in a different way. So if you were a customer of [the organisation] you would receive a different customer experience and a different quality of home depending on where you were building and it was pot-luck for you as a customer. So you may at some point have gotten a really great experience and a really fabulous home or you may not. As a business we have no control over that and we didn’t understand where that was coming from and our results across all of our business divisions were very, very different in terms of their profit performance and so obviously the directors in the back of their minds in the continue growth of the company realised that the approach was really unsustainable and quite risky for them. We had huge issues with consumer affairs and customers making complaints with V-Cat and those types of things and huge exposure as we offer a 25 year structural guarantee on our homes and we had a huge exposure there because we weren’t managing the quality aspect of it properly. So we began this standardisation process under the banner of business improvement and
the banner or brand we’ve used internally is called ‘the excellence programme’ so that’s the programme that I manage and that’s all about trying to be the best we can possibly be. But step 1 was getting 14-15 stakeholders from across the country just to agree on the standard process regardless of whether or not that’s best practice or the most efficient, step 1 was all about getting agreement for everyone to do the same thing. The problem that I en-counted over that period was from people within our industry is that we have a lot of people who have been in the industry for 30 odd years or 20 odd years and their way is the best way and there is no negotiation and its what they had done at the previous company and I’ve been doing it for 20 years so therefore that’s the way we should be doing it. After about a year or so we managed to get agreement on what a consistent standard platform would be in some areas but it is by no way the most efficient or cost effective process. But it is baby steps by getting them to agree and then move on from there. So we are just about to embark on round two which is about reviewing the standard practice process that we have agreed on and then looking towards how we can make that better and ‘best in class’.

We are focused, we are an entrepreneur business so from a business culture point of view we encourage entrepreneurism and a competitive kind of spirit its one of our values. So we don’t necessarily like restriction and standardisation as a culture in the organisation so we have been very selective about which battles we choose to fight to get standardisation. So the things that we don’t have compromise on in terms of standardisation are safety, so safety is a non-negotiable, customer experience is a non-negotiable and so is quality; and its quality of other materials going to site and the finished home to the customer. So those have been the battles that we have chosen to fight with the teams and corral into standardisation outside and around that we have almost kind of said well you have some creative license going, then knock yourself out and do the best that you can. Then round two is about trying to tie up some of those other loose ends. So there will be, well different teams will have different means to get to an ends in terms if their process but they will be producing the same quality of home at the end of the day. So we have kind of allowed and said final quality check is this, these are the steps that you go through, but
how you get there is up to you, in some ways. Except when you are meeting with a customer or you are dealing with a safety issue and they are some of the non-negotiables.

**Are there any challenges associated with the communication and education of the building excellence programme**? And if so what strategies do you used to minimise such challenges?

So what we have done without programme is we have, well when we agreed on what those key things were around safety, customer experience and quality we put together documentation around those and a training programme to deliver those to the team. So everything that we have rolled out has been supported by a fairly robust training programme to go with it. So for example, one of the changes we made in the building team in the field was make them the primary contact point for the customer and making it a mandatory weekly update phone call to the customer. So the customer remains informed. We could have just said do a mail out or you have to make a phone every week, we put together a training programme on how to actually make that call effectively, how to get your time under control to make that call, how to give a better experience to the customer from that call and we would repeat that training session, monitor it through survey results with our customers and then retrain. So from a communication point of view in that we have over communicated and over supported it, you can’t do that with everything obviously. But I think communication for us is one of the biggest issues that we have in terms of rolling out new things, a large part of our customer base in terms of who we need to roll it out to aren’t really on computers or online or work remotely from the office so that is a challenge. But we have been trying to track their management lines and get their managers to roll things out instead of it coming from a like a corporate services business, so it is rather seen as the managers process rather than a business process. And we have been doing it that way.

**How are the training programme and training sessions structured within the organisation?**
We do a mixer of both mass or blanket training as well as specific group training. So the very thing we were, we had a bit of an approach where we put through the entire building team, which is our main focus initially. The entire building team went through a three day conference where we communicated to them the vision for the company, where we are heading in the future; you know customer philosophy that we had. We gave them; I guess what you would call modules from our new processes and training around those new modules at that conference. But we also gave them like an experience too where we gave and put them through some physical challenges and some mental challenges and mental exhausted them and broke them and rebuilt them in the three days. So that was kind of targeting a large group. So we ran three conferences back-to-back and we had about 60 people at each conference over a ten day period. Then we followed that up with some group work, so we would take individual groups from that large team and roll out or communicate or try to implement particular items to small groups. And then what we actually did then was look at the poor performers based on out survey results by customers and audit results and target individuals and give them one-on-one kind of training or counselling or support in those areas that they needed it.

Oh okay. Have you found that those training sessions have increased communication amongst those teams within the organisation? And if so, can you describe this communication.

The conference that we had definitely helped build team, well the team cohesiveness across all areas. It allowed people to meet other people from other areas of the business that are doing similar roles. So it increased relationships across the business and they felt like they weren’t being targeted and it wasn’t just them and it was applied to everybody so that was a good thing to do. It also managed to break down barriers between support services and the operational teams, because the support services attended the conferences and such and those teams have been involved in the training programme as well. So it has kind of helped build relationships in that area.
Within the organisation are there any other specific training sessions or programmes which further assist in improving the cultural environment? Interviewee 1 mentioned the STOP and excellence programmes as other training programme examples.

So as part of the conference and the initial set of training we had, we chose five key modules which we wanted to entertain and advocate out to the conference. So we had one around customer….wait did interviewee 1 mention anything about the golden rules we have?

No.

Ok we’ll start with those as they are a part of the excellence training programme. The change we are trying to get is a cultural change rather than a business change and a process change. People’s attitudes are pretty rank, so we have been working really hard on the attitude stuff. So part of the programme that we ran we actually put together a set of what we call ‘Golden Rules’ for each of the functions and this is kind of like the guidelines or the behaviours or attitudes that we are looking for irrespective of what the business process is. So the idea behind the golden rule is you can understand this and you can operate according to those golden rules everyday then you can’t be doing too much wrong. So regardless of what the process is. So the ‘Golden Rules’ fit around some of the key business strategies that we have so, number 1 for building each team has got a set of these so we have safety linked into quality, customer satisfaction and efficiency, presenting a professional image – so the way you speak to customers and the way you deal with people, and trades and suppliers being apart of the team. So we have anyways had a very adversarial relationship and we have now tried to make it an inclusive partnership.

So what we did for our conference was we structured, well we have had these ‘Golden Rules’ in place for probably two years now and what we did at the conference is that we gave people a business process or a training package around each one of these ‘Golden
Rules’ to say well you know what the behaviour expected here is, well here is a tool or process or some training to help you deliver on that. So at our conference we had five units that we basically deliver to the team, the first one was around safety so we re-workshopped the first in safety procedure, repacked it and recreated a DVD package for it - so presenting in some new simple forms, rolled out that training at the conference. The second one was around being proud of your home; the home that you build. So we linked that into our quality control programme and our very first item in quality control is the write up you do of the file when you receive it, the one which you begin before you get on site. So we gave them a process and a training package around how to do that concerning quality home delivery on time. So we spoke about efficiency, so before you start organising the project management of a home you need to be well organised yourself, so we gave them a piece on time management and efficiency of their own personal space. So the next one was about presenting your personal image, so in that we spoke about how they present themselves and customer service and we gave them a ten step process on how to make a weekly phone call to your customer, because you would think that would be fairly straight forward – but they’ve got no idea. So we did role plays and things like that and when we actually observed the role plays, you realise that these people have no idea as they haven’t been employed on their customer service skills. None of our competitors make the site managers call customers. So this is a huge skill gap for us, so we gave them some training on that. And the last was about trades and suppliers being part of the team. And we gave them some training on what a best practice to managing trades would be. It is a four step kind of philosophy for managing trades and one of those we’ve got is about managing the trades that you do. The steps are that you need to attract them, you need to induct them, you need to manage them, and you need to retain them in the business. In the manage stage we gave them a process to follow on how to give feedback. So I think it’s either an adversarial relationship where you swear at them or your best mates and you don’t necessarily manage them on anything. So we go from a process which was a top process which is where you give feedback which is specific, timely, outcome focused and professional – so cutting out the bad language and that kind of stuff. So our training packages usually support one of these ‘Golden Rules’ and we deliver it in a way that you go, that you know that we want to be safe at all times.
here is a way that helps you do that. So as well as the physical on the day delivery, we also do like a take-away. So this card here (interviewee shows an example of training take-away) is just a copy of the ten step process in how to make a call. On the back are the nine steps in how to make a safety inspection. So they can pop that in the car or have in a folder and when they make a call pull it out and make sure the call is inline with the guidelines. Another thing that we do is a CD, we’ve done face-to-face delivery, we’ve got the training package and we’ve also provided CDs that you can listen to in your car also highlighting how you can complete the call as well. So you can refresh yourself in your own time and we call this ‘Up on the Move’ training. So they just pop it in the car, not sure if they actually listen to it, but they do have it in the car,

So we have always tried to do multiple touch-points in our training because you know that one-off doesn’t really cut it or work. That is what we have been trying to do with our programme. What we have done is target the five key operating functions of the business, so we have looked at the sales team, the drafting team, the estimating team, the customer support team and the building team. We prioritised the building team first and we basically started off with them and we’ve been filling in with the other areas as well - pretty much with the same approach throughout.

**Have you ever considered as part of the training approach to mix the organisational groups?**

We have been doing some team building work outside and around that. We had a huge issue with, we’ve kept it quite functionally focused at the start and then we have been doing more cross-functional work. So the reason we did the functional work was because people are working, building teams and developing teams within their own operating business unit, so there was some cross-functional development in that but it was only at the business unit level. What would happen was a drafting person from our metro-south business unit would be sitting a foot away from a drafting person from metro-north they would never have spoken, never meet, never shared ideas, and didn’t even know they were doing the same job - so no collaboration across the job at all. So what have tried to
do is get all of the drafting team together, meet each other, have a team building experience together first, be on the same page, just be able to have a coffee and say hi to somebody that does the same role as you and maybe be encouraged to share some ideas across those barriers and is kind of where we started with that one. We knew we had a huge issue and our feedback from the team around that was really positive, you know people have new friends, new people that they can draw experiences from and share ideas with etc.

Those targeted groupings how were they structured? Were they smaller groups or larger groups?

Each team, well for each operating area, take for instance the drafting and customer service and estimating teams. Each metropolitan group as we kind of did metropolitan together, regional together and we have done some across both. In the metropolitan areas it is about 50-60 draftees, estimators and customer support teams so we have done things in a group of 60. We have had some events where we had the entire group together and we did some physical activities and team building and some stuff around attitude. And then we would also have some smaller sessions were we might mix one or two of the groups together of the four or five groups and maybe have a group of 12 or 15 in a session. So we have tried, so we change the groups that they mix with constantly as well, so then you’ve always got different influences in the areas as well. So it is just trying to encourage something around that.

We have also just started to do cross-functional training. We are facilitating entire team type work and we are also trying to get boundaries outside of teams. We are running a programme or just about started to run a programme at the moment where we are having our customer focus so we are incorporating people from all different areas. So you basically just register on the day that you can attend and it doesn’t matter which group you are in or whatever, as you go through the same workshop around customer focus. So we are just starting to do it and it’s a little bit harder and what we have found is that people have better follow up. In our experience so far, better follow up of they are in their
teams and they can go back and have the same experience as a team and talk about as a team and then the manager is there and supports it and reinforces it in the field.

We have done a couple of smaller things where one person from a divisional has attended, they go back and they are all excited about it and no-one else has been yet and it kind of dies. We’ve had at times where another group has gone, with a different group and different group dynamics and experience, and they haven’t had the same kind of cultural impact as others.

So what we have tried to do with the cultural stuff and really in terms of applying principles to process efficiency we haven’t really done a lot in that space. It has been more about culture. So with our cultural stuff we have tried to do a lot of things around experience and having a experience rather than being sat in a classroom and having a lecture. So we’ve been to boy scout activity courses, we’ve done small obstacle courses, we’ve done and build bicycles and given them to children with cancer, we’ve been on study tours of other organisations, we’ve been blindfolded, we’ve learnt to juggle, you know different experiences. So trying to some learning with meaning behind, but it has always been an important message behind it at the end of the day. We’ve used images in our sessions and then brought them back and had posters in the office to remind people of those images and we’ve been quite successful with maintaining language and some things around that. It’s like this card here (shows the interviewer another training example).

Which is another cultural message that we were driving was trying to drive a buffer line behaviour so everyone takes ownership and responsibility and is accountable for what they’ve done and we move away from blaming other people, excusing poor performance and denying we were ever in the room and heard that. So we have a language now where people would say ‘well that’s below the line’ or ‘you’re not above the line today’. We have posters up supporting and reminding people of these things. We’ve got images around; we’ve got one about passing the batten. So we often have a physical batten that we’ve used, so some physical things as well and passing the batten is about making sure, there are also posters for that to, but making sure that when you do something, you’ve done your personal best, so when you pass the batten on you’re able to put it in the hand
of the next person, like solidly, so now the customer or the file doesn’t get dropped in the middle and forgotten about as each person in the chain deals with something it’s a bit like a relay race where we make sure it is being received before we walk away.

**It’s very philosophical in the approach.**

Yeah, I mean we’ve got zero base in the organisation, you know culturally. So we’ve had to make people want to be part of the journey, so we’ve had to do some fairly interesting things. You would assume that people would understand some of these things but they don’t. So we’ve had to go back and start from ground zero really with this is why we come to work everyday.

**Has that for you been one of the biggest challenges the organisation has faced? And if so how?**

It has been a challenge. It has taken a lot longer to do some of those things then you would like to think when you sit down and do your business plan. You like to think that you are going to be a lot further ahead then what you are, but because the business is slow to receive and slow to adopt. Because at the end of the day we are trying to get them to do things that are different and think different and in new different ways and they actually have a job to do – that haven’t got time in their heads or in their day for new things. So you have to be fairly patient and repetitive with that kind of stuff, but for me if we don’t get the attitudes right it doesn’t matter what kind of processes or procedures or training we give they are not going to do it if their attitude is not inline or they’re not open to new things. So for example with our conference we gave the boys no sleep, we had them working until 1am in the morning, up at 5am in the morning, physically exhausted through doing activities and courses, rolling through mud, you know climbing over walls, that kind of stuff. Then you get them to a point where they are physically exhausted and mentally exhausted and then you break them down and you can like rebuild them and that is kind of like the philosophy behind it. So you rebuild them in the model you want them to be in. I mean it doesn’t work for everybody and after the
conference we had, well the last conference of the three, on the Monday morning following the conference which finished on the Friday, we had 10 resignations on the Monday morning - people who did not want to be part of the journey.

So we have had some fallout from that cultural type change as well. So it happens and we were prepared for that, so we knew that was going to happen.

**Have there been other types of challenges which have affected the organisation and its cultural environment?**

Yes, so my business units think their businesses are different to other businesses within the organisation. So we have kind of split geographically and people tend to think the geography of their area means that they are different or the customer that they have are different or the environment and conditions are different – so therefore their process needs to be different. So we have to constantly manage that. An example of that would be our inner suburban business. They have tougher building conditions no doubt and they have higher contract values, they deal with $500,000-2 million worth of property that we are building so they have a perception that their customers are more demanding and more difficult and therefore everything about them needs to be different. So when you actually break it down, people are still people buying $300,000 or $3 million usually it is at the top of that you can afford, so you have the same expectations as the next person and it doesn’t just because you are spending less, you deserve less quality, less customer interaction. So we have to manage some of those things sometimes and people within this business like to create themselves rather than be given something. So like we have to deal with that quite often and the one thing we do come up against is this ‘well I’ve been in the industry for 30 years, this is the only way it can work’. Sometimes they aren’t open to new ideas, but having said that if you approach them in a different way and deal with those individuals in the right way, then you can get the right outcome that you are looking for. It’s a bit of give and take, so that’s why I said we tend to pick the battles that we can fight. So only fight the important things and let them have small wins along the way and the non-negotiable are always safety, quality and customer service and we will
negotiate on everything else. So that enables us to have a win-win environment, but it also enables us to get clever about getting the outcome that we need in a different way with them. So one example of that would be, the central team, we had a home rating system that we put in place for assessing the degree of complexity and how we draw and estimate a home and that impacts on how we production schedule, how we measure our KPIs that type of stuff. The central team believe that their homes are totally different, are implemented a totally different rating schedule to the one that we rolled out nationally and we actually went back and sat with them and we were able to negotiate from, well we had a three point system before, they went to a nine point system in their world and we managed to negotiate a three to four [point system]. So they still got their wins and we just increased the ratings for everybody else, so everyone had a change and we listened to the valid things, so they actually felt that they has a win in it; but we actually probably got a better outcome which we won. But you have to listen and let them be heard I think in that aspect. I think sometimes we can be quite dictatorial in how we go about some of this stuff but we are very consultative probably over consultative with some points cause we give everybody an opportunity for a say. We’ve recently reviewed our warranty and service process; there were 29 stakeholders in the room, so to move forward that was a lot but everybody got the opportunity to have their say and I know we walked out of there on the same page. Whereas if we has half the people we would have had stakeholders that weren’t going to fall in line, so we probably over consult but it works with us with our level of maturity as an organisation.

**Have there been any specific challenges associated with the presence and implementation of lean within the organisation?**

Well we have just started down the path with [interviewee 3] joining the team and we are looking at lean and how it applies to our environment. The issues that we are finding, this is where we really need to be careful, the issues that we are finding in this area are people in this industry perceive this industry to be different to every other industry and unique and that things can’t apply. And there are some things that’s don’t fit and there are some things that do, but its how you go about articulately and bringing people on board that is
important and I don’t think we’ve got that right yet. We definitely don’t have that right internally. So we’re in very, very early days of that and we’ve got a lot of work to do in terms of being able to fit culturally into the business and influence rather than dictate. People here don’t want to know what happens in manufacturing or what happens in a car plant, they are not interested, they don’t care, and they think it can’t work. In some parts for their defence we don’t have a controlled environment in the building industry, everything happens out on site, it’s multiple individuals, the weather has an impact, it’s a living breathing product, most of the materials we use they’re not cut from the same machine day-in-day-out and there are elements but I think people honestly go on the gut feeling rather than apply any logic to it.

So we haven’t launched lean as a concept or as a strategy, it’s just some disciplines around the business improvement culture and we don’t have space in people’s heads at the moment to adopt a method. Because it’s like well ’I thought we doing excellence this week and now we are doing lean’ so it just confuses people and people start to feel overwhelmed but the fact there’s so much going on and they can’t cope. So we are trying to integrate things slowly. So it’s we are going to have a workshop this week, it’s an excellence workshop but we are going to use tools that come from somewhere else as a disciplined way of looking at a problem. So we are kind of approaching it that way. It’s a lot better then introducing it as a new concept to learn and you have to be a practitioner in. So we are just facilitating and getting what is in their heads out and provide them with some tools in overcoming the problem, rather than giving them tools and sending them on their way. We don’t want to burden them with that type of responsibility at the moment.

So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.
I look at lean and I’ve been to some lean workshops and we’ve done some stuff. To me there is just some element of common sense about it and it’s not, well there is nothing revolutionary in it for me so I sit back and have a look at it and say ‘well there’s nothing revolutionary in it for me in it from a tools perspective, everything about it is fundamental common sense’ but for me the thing about lean where all the value is, is in and around the cultural change. So getting people to think about things and getting a cultural change and with the work that we are doing you say a lot of effort has gone into trying to drive a cultural change. So I would definitely agree with that. I think there are some really great disciplines and tools and stuff that lean brings to the table that eliminates all the personal bias and the ‘I’ve been in the industry for 30 years, this is the only way to do it’ attitudes, so there is some great stuff around that and getting people’s heads into that space to actually use those tools to do that. I think its got its place but I think you have to be really careful about how you integrate it into your business particularly you need to look at your businesses maturity, the structure that you have, the capacity of your people to take on these things, where you are at in the continuous improvement journey and I think there are components integrate in and integrate out. The thing I probably don’t agree with is that ‘well this is the way we operate’ like when you buy something off the stuff and expect it to work straight away, I think there is an element where each company will have a different way of implementing and approach – so like based on those elements of maturity and so on. But I think, the one thing I really like about it is there is discipline and there is, and there is evidence that these things work and so on and that is really good. See we could just sit here and come up with a bunch of things that aren’t tried or tested, you know might not have any impact.

The other thing I think probably is that what we’re doing is that we doing some very small targeted projects to start with because I think you can start really broad with things and actually never achieve anything. So what we are trying to do is pick problems and solve problems that have been in existence for 36 years and actually use it to demonstrate that you can solve a problem and get a really good outcome from it to get by acceptance and get them into the programme as well. So get runs on the boards before you start
announcing this is how we are operating now, so that’s kind of how I feel. And I think at the end of the day a lot of it comes down to the calibre of the individuals that you have championing the programme as well and the level of engagement you have with the business and the team, I think that is really important. As far as lean is concerned here I don’t think we have that yet. Yeah we don’t have that champion. Our lean expert knows what they are doing but their level of engagement with the business isn’t there yet and that is the aspect that we need to work on. Our expert tends to do the ‘I’ve worked in manufacturing, I know what it is, you’re all idiots because you don’t understand this stuff’ that type of approach and that is the type of thing that we try to avoid here. We have yet to hit the nail on the head with that one yet. So that is the bit for me that we need to work on because if we have this kind of, well if we don’t build that bridge we won’t become integrated and it won’t be accepted or successful. We are very good at having fads in this business. So people will look at it as a fad, upfront anyway and that is the thing about the excellence programme – no one thought it would last and its been three years now. That’s what I have been trying to do with lean, we actually have a platform rather than go and create something separately just weave it in. But unfortunately this business, probably isn’t that much different to other businesses but this is all about the people engagement and the relationships in here and the relationships and consultations goes a long, long way here. I’ve been here for 11 years and I had to work it and so I know that’s the bit for me that we have to make sure that if we are going to apply these principles that we have to do it in a way that fits in with that model and then it will work. The approach that we have taken is, we’ve got small projects so let’s get these projects and get some runs on the board, let’s create some level of interest, let’s show some proof and some evidence, the acceptance will be there, we will build relationships along the way and then it is just a case of when the two will come together and it just merges in and it becomes the same thing. So that is what I’m trying to go for rather than two distinct programmes. We have a highly critical culture here so everything is rubbish unless you’ve thought of it, in everything that we do. I mean we ran a sales training session yesterday one of the other general managers went along for 10 minutes and came back and said ‘my team aren’t doing that because it was rubbish’, they made that assessment after 10 minutes. Now if I gone to them and made it look like their ideas then it would
have been fantastic. So we have to cope with that, it’s not right, but it is the way it is and there are a lot of things that happen here that aren’t right but it is the way that they are and we have to work smart to approach those challenges differently. So that’s it for me with lean, we are working on tackling some problems in the business that have been there forever and a day and actually solving some root causes and then we can use that as evidence to say ‘well we applied due process, tools and other methodologies around this particular problem and we have overcome this problem through those mechanisms. So therefore we know this works, it fits in nicely and philosophically with everything else that we are doing, let’s do more projects following these ideas’. So it becomes a bit organic and that’s the way it grows.

Some interesting reflections made there. I wanted to extend an additional thank you for participating in the research.

Thank you
Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its effects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

No
Okay, so let’s begin. I wanted to start off and learn a little about your role within the organisation, when you first learned about lean and your exposure since.

My background is, I started out as an apprentice in the department of defence in about 1979. I went from my trade direct into production planning and engineering and I was the project management officer for two large Royal Australian Navy projects. I then spent some time with at the [……] dockyard on another Naval project. I have also worked in steel for [the organisation] packaging for […] and […]. 15 years in automotive, 5 years as the senior test engineer for an […] parts supplier called […] who are now […]. Then 10 years at […], the last 4 years at […] my role was the […] Production System manager for Asia-Pacific and Africa, so that's about 12 plants in 9 countries. So that role was specifically in regards to implementing lean in […] production facilities. From there I worked for the world’s leading manufacturing consultancy firms, I spent two years in the mining industry implementing lean, then two years in a packaging plant just doing general management roles and doing some total productive maintenance and then one year here, well nearly coming up to a year here at [the organisation]. So where I first found out about lean was through a gentleman called […], he works in Queensland and is one of the leading lean minds in the world, he is […]. Also with a guy called […] who now works with […]. And finally plenty of exposure to […] people through those avenues. So I’ve been involved in some pretty major lean transformations.

Okay so you’ve experience lean in multiple environments. Is this your first exposure to lean implementation within a construction environment?

Yes, it is.

How would you describe the process of lean implementation from a construction perspective compared to a manufacturing perspective? Using this organisation as an example.
Well my role is the programme manager for lean construction and the initial brief is to understand how lean manufacturing fits into the construction process. At the moment I am probably doing more project work than lean implementation. I am trying to implement it by doing a bit of work on the implementation of tools and try and sell the return value to the business to get some momentum around lean. But at the moment the company’s focus isn’t really on lean at the moment.

You mentioned that the focus hasn’t been on lean as such but there has been some focus on the implementation of tools. Can you further explain this position?

Yes, I’ve run a few Kaizen workshops. I’m trying to get practical problem solving up off the ground and concern, containment and counter measure. We are doing in sort of a round-a-bout way some sort of standardised work off the ground, something that the organisation is very poor on and there is a poor understanding of it. So at the moment it is standardised work from a macro perspective of having a standard not necessarily at the micro perspective of time and motion and do a work analysis. Although I’m about to do some activities around that, basically looking at particular parts of the construction process and note where I want to apply some basic quick change-over principles, which is understanding internal and external work. So one of the things I’m looking at is potentially the pre-fabrication of wardrobes and the pre-hanging of doors as a work that can be externalised rather than the way that it is done at the moment. So how I would approach that is I will go out and undertake some time studies and watch people put the job together and do like a standardised work valuation streams around it, starting off with some very basic value streams on workers as well.

Have you investigated or looked at any specific lean tools developed for a construction context such as the Lean Last Planner System?

Yes, I’ve done quite a bit of research since I came here. People here tend to say that construction is unique, construction is only unique in my opinion that it is still a craft based industry and they have yet to take even the most basic steps towards not even the
lean model towards the manufacturing model of quality and logistics. There are so many opportunities that it is probably a little overwhelming from the company’s point of view to try and put some of those concepts forward. So some of the work I looked around concerned the education of some of the more senior managers that even though there is no moving production line, there are still principles that apply from the moving production line to our production line which is the jobsite. So one of the examples, which I have not talked much about yet, one of the examples is there is no logistics strategy. So the logistics strategy is basically multiple suppliers, multiple deliveries so if you were to draw a spaghetti map it would just be a nightmare, there is no thought given too if I engaged a lean logistics supplier who goes to my site, the supplier picks up the bits and they are responsible for delivering their economies of scale and that may add value to the business. There are other things that I find quite interesting and one of the key reasons in my opinion that is difficult to get people to change in housing construction is because they always make profit. So there is no crisis if they don’t sell houses then they don’t lose money. It’s because they work on cost-price margins, there is no real incentive to improve. 

So I saw a very similar attitude in the mining industry. An example of this is, we sold a shipment of ore that had, the water content is supposed to be around 10-20% figures do vary, the water content in this particular shipment was around 40% so 40% of your 400kg per tonne of the ore was water. So let’s say the shipment was worth $20 million, they eventually talked the customer into taking if for $5 million and celebrated the fact that they made $5 million, not that they lost $15 million. Whereas in automotive you would be running for cover. So that is really interesting is that there is a pressure for change in the housing industry but it isn’t great, in my opinion. The market in Australia in particular [the organisation] is the third largest home builder in the country, the other two home builders, the two largest are in Western Australia. Now my understanding is that they for want of a better word are going down some of the lean path in regards to consolidating manufacturing and bring stuff in-house, managing their logistics, but they are in a smaller geographical area. So they are not a national based builder. So [the organisation] basically has the whole east coast, having said that we are only 9% of the
market. So the barriers to entry into housing construction are not big but basically any builder can decide he is going to start selling homes rather than just working for someone else.

So there are a lot of practices that are carried over from [the organisation] being a small company and becoming a big company and they don’t have sophisticated systems that you would expect to see in a manufacturing organisation. So it is often difficult to get people to realise that there is waste in the first place and a lot of that is around discipline. The business is set up and I use a horrible paradigm but the business is set up as silos. So it is basically the site manager is a business amongst himself and within himself, he comes up to the construction manager they are a region and they are basically set up as independent businesses that compete against each other. So it is difficult to get national standardisation across the business as there is a lot of resistance to centralising some items. So it is very interesting.

One of the things I come across as well is there is a fair bit of a blame culture, particularly around site managers. But one of the things that I’ve trying to get up and eventually I will is to do with working menu. Working menu is like a standardised work for longer duration tasks.

I would say that the Lean Last Planner system is more along the lines of a particular tool in the lean toolkit and that is basically visual management. So it s basically what I call a business information centre or a business management centre where all of your KPIs are up there and then you’ve got a well what was I meant to do today up and what did I get done today, you know concern, containment and counter measure and you’ve got that concern, containment and counter measure around I didn’t get that done, what am I doing to prevent it etc. The last planner system I see that as basically that combined with basically having a giant manual Gantt chart, that you are moving stuff around.
How then would you approach the implementation of lean within a construction organisational environment?

Well generally the first step I would take is to make the business visible. So having said you would probably run some workshops before hand to senior management, not just senior management but also the whole organisation as I think it is far more valuable. So site managers, some people from trades all the way to general manager. So I would run some of those first, get some awareness around what lean is and involved in that would be a simulation. Now I haven’t seen a construction simulation of that but I have seen one from mining. I’ve done a mining one, a manufacturing one and I’m trying to get my head around how to do a housing one, because I don’t want to get people into a room and build Lego cars and I think that if you did that in this culture it would immediately result in ‘we don’t build cars, we build houses’ mentality. So the next step is to make the business visible, so an enormous amount of resources have been committed at [the organisation] to putting things on computer systems, having beautiful reporting and one of the issues is that those systems aren’t available to those people at the coal-face. So site managers don’t have access to computers, they have a PDA and they have a system called ‘click-home’. So ‘click-home’ is basically a PDA with a list of, well its basically a live Gantt chart, with a list of tasks that need to be done, this is the supplier, this is the duration, this is when it is scheduled and then you go and click or confirm and if necessarily move the dates around. So they have access to that and all the reporting about how the job is tracking requires them to come back to head office to access which they do once a week.

The approach I would like is similar to working menu which I started to discuss before. Working menu is similar to a work balance chart, valued added and not-value added. Well if you took that and applied that to someone in the office and so you say the site manager then spends x amount of time doing customer calls and QA inspections, so it is at a broader level over a whole day so over an 8 hour duration and I think one of the most valuable things that can be done here is that exercise to be done where people, where management give what their expectation is for the site manager and what they are meant to be doing and how long they think those durations are and then compare that to what
they actually do during the day. An example of that which I will give you is we did something similar in [mining organisation] where they has exactly the same attitude, it was the crew leaders that were the problem and when they plotted out what they expected them to do they were 180% loaded. So their expectation was that they could get 14 hours work done in an 8 hour day.

So the things we have been working on at the moment is basically to get some, well mainly on getting some visibility around the organisation. So my main progress or programme at the moment is working on ETS which is extra-to-schedule costs. So extra-to-schedule costs are any cost/s above the estimate and causes direct margin erosion and that has been focused on getting disciplined data analysis and investigative processes into the organisation. So everyone knew that ETS was a problem, but no work had ever been done on what categories or what are the root causes of what is causing the problem. And typically and I’ve seen this in every organisation that I’ve worked with, typically what people say is the issue isn’t the issue. So if you ask people what are you top three issues they will go bang, bang, bang and when you go look at the data its actually something completely different. So to try and get that into people around, you’ve not just got to look at the job sites that are one off and happen once a year and hurt you big time, it’s the things that happen every day that add up to ten times as much. So we have had some good success around that and we’ve done a little bi of, for one of a better word, error proofing. So for example we are having an issue with roof guard rail which is fall protection on the roof, around the edge of the roof. We hire it for 14 days but the actual task duration is about 3 days and we were actually spending about 21 days on average with the guard rail on the roof. So the task still only took 3 days but we weren’t calling for it to come down. So the process was there was a task to say ‘well you need to put to the roof on and call for guard rail to put up’ but there wasn’t a task to say ‘take it down’. So it relied on the guy remembering to pull it down. We had people who weren’t sure when it was meant to be pulled down, we had some people believe it shouldn’t come down until all the scaffold was gone. So we put in a basic error-proofing thing were it would come done automatically at the end of the 14 days unless you took action to make sure it stayed up. So that is a basic error-proofing technique where you actually have to
take an intervention and make an intervention to cause something unusual or have something unusual happen until you have an intervention.

**Did you find any challenges emerge with the implementation of such a system? If so, please describe.**

We followed, well communication is big here. It’s a face-to-face industry. So one of the things that I struggled with when I first started was having come from very large companies where a lot of the communication is done by other means other than face-to-face. Is in this organisation if you send someone an email or someone data you need to follow it up with a face-to-face to talk to them about it. So that needs to be taken into consideration. There are other interesting things around the way people are used to managing things differently. It’s very much like the fire-fighting industry of waiting til something happens and then doing something about it, so act rather than eliminate the issues.

There are a lot of mavericks in this industry, but I’m used to it by now. You constantly get ‘well this isn’t manufacturing, this is construction’ but the response is ‘well you should expect good quality whether it’s manufacturing or construction’. The only difference between manufacturing and construction is the workplace. There are some really interesting things for example the company experimented with pre-fabricated framing, now from a manufacturing perspective there is no way it is more expensive to pre-fabricate framing then what it is to build on site. Just logically it can’t be that way. If you are doing it one site you are using trades people, if you are doing it in a controlled environment you use unskilled labour. You get it right and inspect it before it gets to site. It is a quicker erection time. However that has been tried a number of times and didn’t do very well. One of the tings I’ve really noticed about construction is if something can’t be managed it fails because we are not managing it; they will outsource it at a higher price. This happens because they will get the moment back from the customer because they will just increase the customer’s paying price plus cost margin. So there is no incentive to say ‘well I’m going to give you this work, you give me the best price based on that I’m going
to give you 4000 units’ that sort of negotiation doesn’t seem to happen. You often have to negotiate higher prices and accept that those prices are ok. So I come from the aggressive world of the automotive environment where at [car company] we had supplier agreements, where you would guarantee a 5% cost reduction per year over the length of the contract, if you didn’t then you wouldn’t get the contract. Where as here the supplier will just come back and ask for more money and you just take the request on board.

So a lot of other things I find is that people will make decisions based on emotion without a disciplined analysis. But we are getting better at that.

**Are there any further challenges that have emerged for you and your role within the organisation to make the organisation more lean aware?**

I have actually found that in all the literature that I read and I have done quite a bit of research and been to a number of forums, that people don’t have a fundamental grasp of what lean is. Now I’m going to give my interpretation against their interpretation, I’m going to give the most basic interpretation. Lean is all about reducing the time between order and delivery by eliminating waste at every stage of the process that is the fundamental thing about lean. It is really interesting because you hear people talk about the seven wastes, the eight wastes and I’ve started to talk about the eight wastes here. Interestingly there is one that does not apply in construction so if you have looked at the seven wastes Ohno’s seven wastes. Over-production is not an issue in housing construction because we only build what the customer ordered. So every house has a customer so there might be over-production in the value streams that are representative of parts of the house. In general there is no over production in construction. So what I’ve replaced that with is human error because human error is a huge cost to construction. So one of the fundamental differences between a manufacturing organisation and a construction organisation and it’s not so much in commercial construction but home construction it definitely is, is that if I wanted to manufacture a bolt you would be given a detailed drawing of the bolt that listed what the material was, what the base length of the material was, how many were required, detailed engineering compositions – so every part
of a car is detailed and every part in manufacturing is detailed; right down to the base level. In housing construction we give people a basic plan with no detail and you’ve got to work it. So some engineering goes on, so all designs go out to an engineering firm for external engineering but they will only give engineering detail around specific engineering concerns. So people are given a drawing and its basically the craft-based method and the expectation is if you were an electrician you have to understand exactly what is happening, that you as a tiling understand exactly what you need to do as well, you as the carpenter understand exactly what you need to do and so on. For example, in our homes they use 21 nail studs for a small corner of the house because it is left up to the people to decide how to do it, rather than engineering.

So it is very interesting and so a lot of work what [……] has done in the states and [……], they come into lean construction from a more traditional perspective. Whereas the last planner system comes into construction from a planning reaction which is a discipline problem solving perspective focused on project management with the lean tools thrown in. [……] however focus on waste incorporating Kaizen blitzes and eliminating waste.

*Change in Interview Location*

Are you aware that Toyota builds houses?

**No**

[……] builds houses in California and Japan. [……] builds pre-fabricated houses on a moving production line and I think, actually I’m not is if it’s done in about 2.5 hours no it has to be 2.5 days to put the house together on site. I don’t think it is very well known but they do it. I actually have photos of a module of a house and on a clam shell on a moving production line.

Following on from your question prior to our move. Another thing that is not evident in construction is design for manufacture. So there are probably some things that are
inherently that aren’t if you read the literature, aren’t considered part of the lean temple, for want of a better word. So you could probably say design for manufacture comes under error-proofing and the example I would give is there are pre-fabricated light weight panels that you can build a house out of, let’s say they are 1800mm wide. The designers would do this (*produces a drawing*) instead of doing this (*finishes the drawing*). So there is very little standardisation of housing in construction and it comes back to this that there is very little detail and engineering detail around what is actually being built. There is not much consideration given to doing the job that is being done more efficiently, so because most places that work on a subcontractor basis, so the labour is all subcontracted, you will find that no work goes on at all into making sure that the work is done to a particular standard and in a standard and repeatable way; which is another fundamental aspect of lean standardisation of the process. So really if you don’t have a standard process then you don’t have too much of a quality control system.

So there is a big opportunity for someone to step back and look at some of the key ways are done and say ‘is this the most efficient way of doing this?’. So an example of this, I found out relatively recently that around the same time that Deeming was doing his work there was another colleague of his who specifically worked around bricklaying and actually did time-in-motion studies on bricklaying back in 1920. I have actually found the videos on YouTube and he is responsible for the way bricklaying has been done every since. So I doubt whether anyone has gone back and looked at bricklaying again.

Another thing along those same lines is one of the fundamental things about lean is flow and making your processes and information flow. From my observations of housing construction is that the house is done, in what I would call a batch and manufacture method. So I would pour my concrete slab, then I would build the whole frame and once the whole frame is done, I then do all the wiring and when all the wiring is done I’ll come in and do all the plumbing, when all the plumbing is done I’ll come in all do all the plastering, then I’ll do all the painting. So a really good example of this is that one of the things that holds up time in a house is the kitchen. So there is a delay between when they measure to confirm the dimensions are right in the house and when they deliver the
kitchen. One of the things that happens is that they don’t do that until all the plaster is
done. So they wait until the whole house has been plastered before they come in and
measure the kitchen. So that might be a weeks work. But there is no reason, and from
experience you would usually get 40% increase in productivity by making stuff flow, is
that the plaster guys could plaster, they do a thing which they call hang the plaster. So
they hang the plaster in the whole house, then they do what is called a stop and fix which
is smooth over all the nail holes and do that for the whole house, then they do the
cornices and skirting boards for the whole house. Where as what they should be doing is
do the whole job for one room, the whole job for the next room. So the first crew would
hang the plaster, when that room is done they move into the second room, while the next
crew stop and fixes the plasterboard and then have a crew come in and do the skirting
boards. So if you pick the rooms you need to do that have cabinet work then you take out
a week of the build to do that. But trying to get people to understand how it works is a
huge challenge.

Another thing I would say you would need to take into account culturally is the western
culture. So in my role in the Asia-Pacific one of the things I found was, well there were a
couple of key things. If a process fails due to a lack of discipline in a western
management style the first thing that will happen is people will reinvent the process, so
instead of getting in a room and discuss what went wrong with the process they say’ how
can we do the process better’, invent a new process and that process will fail due to lack
of discipline. It will then just repeat. The attitude is don’t come and tell me how to do my
job, you give me the outcome that I want and how I get there is up to me. The Asian
culture is yeah the concepts are really nice, tell me exactly step-by-step what to do and
I’ll do it. So that’s a really interesting thing as well. So there is not just the culture of the
industry, there is also the management culture overall to look at as well. So probably the
biggest thing I see is you can call it lean, you can call it anything thing you like is lack of
discipline in systems kills you as an organisation. So that’s where the waste comes from
in general in my opinion is lack of discipline and lack of looking for the waste.
Have you found that those challenges also emerge through a lack of basic communication within the organisation? And how so?

Yes, that’s a thing that doesn’t happen due to the fact that you never have all the people on site, all at once. So you have these little packets who never talk to each other, so the guy who does the plasterboard is never there when the guy who did the frame and so you don’t get the ‘if you did this then it would make my job a lot easier’ type communication. That type of communication issue within this industry, partly because people would use the excuse of geographical issues but people also say that ‘if I send someone a piece of paper telling them something that I have communicated or if I put in on an email or if I put in on the computer then I have communicated’ because it seems difficult to get everyone together.

Have you in your role as lean specialist come up with any specific strategies to overcome such communication specific challenges?

I don’t think it really has come on the table yet. So basically the next 6 months of this year is I have to develop a strategy, an implementation strategy. So the key strategy would be, is run some workshops and then make the business visible and then at the moment I’m getting some stuff and basically doing some Kaizen blitzes and just calling them another name. So get people used to that brainstorming and get them used to the process and allow them to see how problems go away.

How are you approaching the utilisation of the Kaizen Blitzes within the organisation?

The ones that have been done so far within the business have focused on specific issues associated mainly with ETS. The blitzes have highlighted specific cost and cost issues and in that case I have had site managers in on the meetings as well but not external trades yet. But in the longer term yeah I will be including external trades.
So one of the other things is go-look-see is one of the things I tell people is that the expert is the person who sees the job everyday. It’s not the person who sits in the office or the person who looks at numbers; it is the person who sees the job everyday. So I try and spend and I have been successful in the last couple of weeks, I usually spend at least 1 day a week on the road and just go around and have a look at all of the different types of waste and issues in house. Interestingly there are things that people don’t know about such as we discovered an excess in bricks is an issue.

**Do you find that by going out on site trades and even site managers are more open to discussing problems or issues associated with housing construction? So there is the forming of some form of informal communicative relationship?**

We try to, but the problem is you rarely see anyone on site. I know that is might sound strange but that is one of our observations. I have probably visited at least 400 sites now and there would be probably about 10% that you would see people working on. Probably about 1% you would see a site manager.

**So that type of site representation would be identifiable as a significant challenge for the organisation?**

Yes. But that also comes downs to the Toyota method of the working menu. Because what the working menu says is….so here is my site manager, at between 8-9am I’m at my first house doing a QA check, between 9-9:30am I’m ringing the customer then there is 15 minutes travel time and then I’ve got another house and another house. So the construction manager, he is one step above, so where as the site manager might visit three sites a day, the construction manager has that everyday he starts with one of his site managers confirming that process is being done. So he is actually there on the site and the business manager once a week go with these two and so you would have an aligned calendar where the process confirmation occurs. That is another one that you don’t hear people talking about much in lean. So interestingly I spent a lot of time with Toyota people and I’m probably learnt more off then in lean and what you would learn from an
American lean practitioner. Lean in the states has become a bit driven by the […] and the […] and there is another fundamental thing missing in nearly very lean implementation I have ever seen and that is Toyota is a small group organisation. The business is managed from the lowest level of the business and I have yet to see that anywhere else in the world, we did [in previous employer] make a good go of it particularly in Chinese plants and there were some very good successes. But if you read a lot of the literature and you follow a lot of what people say, they completely overlook, which I find quite interesting that small group of total quality management, management circles, call it whatever you like those natural work groups that is really overlooked as part of the business in a lot of instances. The good lean consultants tend to have a focus on that and getting heavily involved in the running of the business.

So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.

I tend to discuss lean from a fundamental perspective and that is the elimination of waste to reduce the time from the order to when the customer receives the product and that pretty much encompasses everything. But there is a lot of stuff that goes with it and cheery picking particular tools and only implementing them, that is probably the other fundamental thing that most people don’t get is the system. It’s not individual pieces. Individual pieces can give you a great result and return but eventually they will fall over if they are not integrated together. So yeah it’s a challenge.

It is also about how you work the tool to your advantage. So for example quick change over it is not about getting it done quickly but the steps involved in making the process or activity more efficient, in terms of internal and external components. So for construction it is about identifying, well in my theory anyway, is internal work is work that we can
only have happen on site and external work can happen off site. So the example is we currently pay for people to hang the doors on site. So when they frame a house, they will leave an opening for a window. What they then do is put the whole window into the hole which has been made and you just plaster around it. With a door we leave the hole for the door and then we come back and put a frame around that hole, then we put a stopper strip around the frame, then I drill and put the hinges on the frame and put the hole in the latch for the frame and hang the door. I then take the door on and off about four times. So when I paint the door I take it off again, paint it and when it’s dry put it back on again. When I want to do the carpet I take the door off, do the carpet and put the door back on again and if there is not enough room under the door, I’ll take the door off again and shave it back. So why wouldn’t you do doors exactly the same as windows, buy the door already, external to the site, put the handle on the door, hang the door in the doorframe, you would just need a metal transit strip across the bottom. Bring that whole frame to the site, put in the hole in the frame as you would with a window and just plaster around it. Why do all that work on site? But that is the sort of stuff in lean from what I have looked at in lean construction people aren’t looking at. So they are looking at particular things, so the [……] of the world are making mistakes, not necessarily taking it like that extra step.

A classic example is, we were out looking at brick supply. In certain instances we don’t understand the root cause yet of why we have excess bricks left on site. So we spoke to a brick supplier and everyone was of the opinion that we can’t take them back logistically because it’s just too hard to take them back. As we are driving out from the meeting how many empty brick trucks did I see back into the brick plant within about 2 km about 8. So the truck has to go there to deliver as housing is built in clusters. So people talk about the diversity or the diverse workplace but housing is generally built in clusters, so you will have a housing estate here, a housing estate here. So if a truck is going there to deliver bricks to one house, you can absolutely guarantee that somewhere in a 5 minute duration drive they could be picking up bricks to take back to another house. But people don’t see it because we don’t have that holistic get things from a big picture and it’s the same for the lean logistics supplier. There is probably a huge potential to engage someone like Toll
and someone from our IT is about to do a PhD on logistics in construction. But the same thing is we might pay $50 for a truck to deliver 3 hinges, but it happens. So door handles and hinges and things all fit into a small to medium sized box, I could deliver. However we have a truck that delivers that box to each house. So there are lots of things that can be done.

**Some interesting reflections made there. I wanted to extend an additional thank you for participating in the research.**

Thank you
Interview Transcript 4:

Transcribed by Brianna Chesworth in accordance with University of Newcastle policy 000873

Organisation G

Interview conducted on Tuesday May 2 2011

In attendance: Interviewer and 1Interviewee

Start Time: 12:30pm

Finish Time: 1:00pm

Phrases and words bolded are those of the interviewer

Thank you again for consenting for your participation in my PhD research studies. For the purpose of the interview I will summarise the purpose of the research and the type of information I will be collecting in terms of my topical area. The research project is about the lean implementation process and its affects on construction organisational culture, more specifically the aim of the research is to diffuse and understand how and why the culture of construction organisations mature as a direct result of the implementation of lean strategies. The questions that will be asked are done in the format of structured (questions you have already had access to) and unstructured (questions which emerge from the discussion), further to this the questions are generally grouped into five categories which form the investigative nature of the research, these are organisation/context, management, communication, culture and process.

Do you have any further questions?

Interviewee: No

Okay, so let’s begin. I wanted to start off and learn a little about your role within the organisation, when you first learned about lean and your exposure since.
Sure. I came from a finance background so I originally didn’t start off in this particular industry. So four years ago I thought it was a good idea to come across into property prior to the GFC and made the transition across. Unfortunately the GFC hit. So I’ve been in the industry ever since. I’ve been with [the organisation] for over 18 months and I first learned about lean about 12 months ago. We were taken out on a session, three of us here [individual], myself and [interviewee 2] to be introduced to this whole concept of lean. We were taken through a two day session for that and I think that was the basic sort of parameters of what lean was about. So that was when I first touched base with it.

**Oh, okay. What were you initial attitude to the concept of lean as provided through the introductory session?**

Well fundamentally its pretty self explanatory in a lot of instances. I don’t think its that ground breaking in what they are trying to achieve. When you look at a system and the way something works, of course there are going to be bottlenecks in how you are going to deal with it and whether there are tasks you have to do and what is to be done subsequently or preceding which helps things. So I was accepting of it I just don’t think it is ground breaking stuff, I thought it was relatively fundamental and it had an application from a manufacturing background and the examples shown weren’t particular to the building industry. So I thought it had some good ideas and applications, but I guess my main comment to a system like lean is that we almost need to know and understand buildings. I say that in terms of this is probably where you will get your rejection from guys in the field, when and if you come in with a concept or structure, but you don’t know the composition you are trying to influence then, you got little to no chance of acceptance in that.

**That’s very interesting. Are there any strategies that you know of within the organisation that can influence the acceptance of lean strategies particularly at a project and field level?**

To date well I guess [interviewee 3] is probably the person at the forefront of the lean application in what he is doing. He has only been around for under 12 months. So I think the outcomes of what he has started on have just started to hit the business, to an extent. So I guess the business itself, you go out and speak to a guy on the street who is working for [the organisation] as a site
manager would probably know what lean is, but probably hasn’t seen the application of the process thus far.

So what you are saying is that the implementation of lean within the organisation has yet to begin as a strategic process?

Correct, it is still within its infancy. But I must say without the formalised approach of lean, guys like myself in building capabilities and [individual] who works in the supply chain would be applying some of the characteristics that would be evident in lean – but we wouldn’t know that we would be doing it. We would be taking down a problem, looking to see where that problem is coming from and trying to look for a solution to that particular problem. So we are probably doing components of lean in some way but we are not formally following a set structure.

I see. Are there any specific programme approaches that are being or have been developed to assist in the implementation of lean within the organisation and at a site level?

Yeah I don’t know. We are undertaking, well [interviewee 3] and I have a session in two days time. In the session we are undertaking an analysis of how we can deliver homes in 20 weeks, that is starting off with a workshop and getting guys from the site management level up to the building management level in a room and talking through a day of exploring where the issues are. So to date there hasn’t been any official formal approach to get people to think that way. I think we work on an as needs basis, so if a component of our building process isn’t working we will go away and try and formulate a plan to deal with that and that formulated plan isn’t super-structured in the lean format or although it may change with [interviewee 2’s] further workings with us. But I don’t think at the site management level, I don’t think they will be given a training session on lean specifically but I think some of the outcomes that we produce from here will be influenced by that lean system.

Is the approach being utilised of this workshop been utilised before within the organisation?

Or is this data collection a first?

So [interviewee 3] has done a few. What sessions have I run…well no, I don’t think I’ve run a session like I will on Thursday, probably not to date. [Interviewee 2] who has done a lot of the excellence stuff has run sessions that are similar but they aren’t really lean they are more
documenting the process itself, because we are a growing company and she is all about the documentation of what we actually do.

**So for [interviewee 2] their role is more about developing a specific cultural identity for the organisation?**

Yes, I think that’s what [interviewee 2] is trying to develop. I would love for the cultural environment to change overnight and so would [interviewee 2] but it is a long journey to try and get the processes documented. Not only that but to get people to start following them.

**Okay then. I would like to discuss whether through the workshops there has been the development of more open communicative networks between individuals like yourself and for example site management?**

I guess some of the IT platforms we have now will assist in that. We have gone from a calling up type mentality, to now with technology in place where you click things in. We now have a platform that does that and [the IT] team looks after that. So technology has come away with providing us with efficiency gains in our communications, probably more so than a structured system like lean to date.

**You mentioned technology. How beneficial have such visual mechanisms been within the organisation?**

Not really. With us presenting outside an idea or a concept in a powerpoint presentation technique to building management, we would simply say ‘well what do you think of this idea?’ . No we haven’t used a common symbol or a numeric or any convention that is dictated down to the site manager guys. So no we haven’t really used anything like that to date.

**Ok then. In terms of lean and its implementation/communication within the organisation have you seen or been faced with specific challenges?**

Look I guess the original point I would make is that the adaptability to our particular circumstance and our circumstance is different to a manufacturing warehouse where you have controlled conditions, controlled staff, you can dictate virtually what happens along each point of
the manufacturing process. When you have 1500 live sites spread across you know the size of Europe you don’t have the capability of that same control. So I think my concerns about it is the adaptability it does have for the residential market in particular and about how we can fully utilise it given our geographic pull constraints.

**Are there any other challenges other than lean’s adaptability? For example, is it a challenge with the structure and the viewing of site managers being viewed as a separate organisational entity?**

We do have a structure in place here where you have business groups around [the city] and regional [state locations] that have leaders at the top of certain trees and they can heavily influence the nature in which someone goes out and builds a home. So that structure has been consistent outside the business for a long time. I fully think we could, if we were to put it into one big silo and have one man at the top of the tree, programmes like lean and any other initiatives we bring into the business would be flowed to those guys a lot easier but due to the nature of the individuals themselves, you know, ‘builders being builders’ and the fact that they are so diverse and spread around. There is a big impediment there just through the management structure and the way that the building groups are set up and not only the building groups but all the other groups that feed into building which is operations, drafting, estimating, sales and all the national functions as well. Because I suppose it occurs because we all work within our own little silos and we are all trying to do good but there is no common thread between a lot of us. It is hard to implement trades across all those business groups as well.

**Through the identification of such organisational challenges or impediments are there any specific strategies other than lean that you or others have developed to overcome the challenges?**

Yeah I’m a bit advocate and I’ve said before that we need to group into the functional areas a lot more than we currently do. We are quite spread out and in the culture that building is building, whilst you’ve have geographically areas you should all report up the one tree – which to an extent we kind of do but not really, guys do still go off and do their own thing. It’s the same for operations and sales. I think operations is operations and they should all conform to some convention that is designated at a level above a region or an area and everyone does the same thing. So I think the structure of which [the organisation] is should be in larger groups that are
more consistent, then opposed to the way we’ve got it now which is where you have an area and
in that area you have a specific building team, operations team, sales team and they all sort of do
their own thing. As opposed to in other areas. So I think if you forget about the areas for a
moment and you have building in building, operations in operations, sales in sales.

So essentially what you are describing is that have a uniformed organisational network of
senior management, middle management and then the sub-organisational teams?

Yes, that’s right, have everyone more a part of the organisational tree.

**Do you feel that the structure of the organisation has been affected by the rapid growth of
the organisation over the last 10 years?**

Yes, to an extent. Look they get caught up, well we work on the business side within the business
as much as the guys in operations and they are working in the business. And you know they have
deadlines to meet and things to do and they can’t wait for a decision they need to make for an
afternoon, they can’t wait 3 months for that to go through the proper channels. So it’s a function
of the growth of the company but it’s also a function of the fact that these guys are in a time
limited space and they need to make decisions on the run.

**Ok then. Do you think that lean has the capacity to improve the challenges and procedures
of the organisation?**

From my limited understanding of it, it seems to be more down the tools path but it saying that if
those tools are applied correctly then they should be able to dictate the structure should be as
well. So it’s almost the horse pulling the cart, it’s going to have to go in that one direction that the
tools see fit. So I would suggest without knowing it as well as someone like yourself or
[interviewee 3] that I think lean could probably influence change for the structure of the business.

**From an organisational perspective you believe that the sub-contracting out to trades for
specific works can in the future impact the implementation of lean?**

Yes most certainly. You lose a lot of control but you also gain a lot of flexibility in the costs
associated with putting people on the books. So you do lose a great deal of control. I wouldn’t say
for the fact that you have subcontractors that you can’t implement the tools of lean, but you would have to be very strong from the outset, you would have to have your structures in place from the word go to be impacted fully.

**Hypothetically, speaking then would you as a lean business be more or less inclined to operate with non-lean subcontractors?**

I think, you know…well I wouldn’t think you would be able to influence subcontractors if they didn’t know anything about lean provided that you fully understood it and you had the systems in place. In a way it would almost dictate to the subcontractor what they needed to do to comply with the standards they set and whether they would be standards of lean or whether they would be standards that you dictate from another industry initiative put forward – as long as you are consistent, as long as you have communicated it well. I can’t see why you couldn’t work with any subcontractor.

**So they were the main questions which I had planned to ask you – some very interesting ideas and elements emerged throughout the interview which hopefully will translate into some very interesting discussions within the thesis and subsequent reports. But I also would like to and extend and provide you with the opportunity to provide some of your own or additional thoughts on lean construction and its impact on your company.**

Well look, I guess, you know the point I touched on earlier any concept or structure has potential it’s through its application, it’s through it’s relevance to a particular industry or its adaptability. As you know anything looks good on paper, but when the rubber hits the road is the true acid test of where anything like these things work. Back in a second life of mine, I was in the military and they are very strong in their systems and their communication guidelines and their understanding of certain protocols and to this day I can still tell you certain things that every member of the military would know through the communication, the guidelines and the methodologies they used. Now whether or not they are the methodologies used to instruct soldiers through an audit process, what is right, wrong and different, it is the same methodology, it is consistent. Sure enough there can be refinements made to any system but the true value of the system is if everyone uses it, it is easily understood, it is recognisable and it does the job. So from the experience that I had from that sort of life in the military the methods that they use could have been improved but the methods that they use are well understood, well known and tested and so
they worked exceedingly well. And that is something I would say to lean, if we were to implement it and it didn’t have all the answers and it was a hybrid of something else or we penny pinched some good ideas from it and then used a lot of existing ideas from the business as long as that is consistent and well understood then that’s the real benefit from it all.

Some interesting reflections made there. I wanted to extend an additional thank you for participating in the research.

Thank you
Interview Notes

During each interview session hand written notes were taken. The following notes were taken at each interview forming organisation G, they have not been edited in any way other than for spelling errors.

Interviewee 1:
- The implementation of the innovation is not being packaged as lean, rather lean is identified as more of a strategic objective of the strategic direction which underpins the organisational change
- Organisation has an organisational specific education or ‘excellence’ programme which is assisting informing all groups of impeding organisational change
- Waste elimination is core to the organisation’s strategic direction and presence of lean principles

Interviewee 2:
- Head of the management improvement team
- Company around for 36 years, 26 years slow growth, rapid growth past 10 years
- Company is early in the journey – 2-3 years focusing on the standard working platform (first step)
- Excellence programme focused on 15 groupings
- Standard platforms first grouping
- Second grouping reviewing the standardisation process
- Standard platforms have non-negotiable elements
  - Safety
  - Customer experience
  - Quality
- Training programme
  - Type – 3 day building team conference
- Training challenge
  - Communication – extent and form between groups
- Strategic direction underpinned by golden rules – 2 years of development
- Key to the organisation’s mission is the making of the customer as part of the process
- Strategy utilised is base on a take-away philosophy – very similar to the plus/delta style of learning employed in US lean organisations
- Communicative approaches utilised as a means to support the education specific excellence programme
  - Verbal
  - Written
  - Visual
  - Physical
  - Philosophical
- Approach to the excellence programme is functional at the start (similar organisational groupings) with cross-functional teams at latter stages
- Programme incorporates targeted informal training – variable due to the size of the organisation
- Culture based programmes more about experience – informal
- Excellence programme approach is influenced by the varying and different cultures of the organisation
- Time is a challenge
- Currently experiencing a break as a means to rebuild
- Issues with managerial attitudes in the excellence programme approach
- Challenge – communication is typically dictatorial but also over compensating – there is a need to refocus how communication is utilised for the programme to be effective
- Elements underpinning the strategic approach to the introduction and implementation of lean:
  - Culture related
  - Testing of the lean theory
  - Champion dependent

Interviewee 3:
- Trade background through the department of defence
- Engineering background – manufacturing and production
- Worked with in environments with specific lean implementation
- Project role as a lean specialist
- Conducts Kaizen workshops such as:
  - Standardised work - in some capacity
More focused on the micro perspective

Activity specific workshops
  - Basic work value streams

Housing market is all about profit, cost and margins

Hard to centralise the lean approach as each operator is viewed as separate entities within the organisation

Incorporating all parties in education is a strategy the organisation is utilising encouraging mass education

Focus on specific tools on a smaller scale as a means of introduction

Error proofing is one specific tool that the interviewee is targeting for implementation as part of the lean strategic direction

Communication within the organisation is primarily face-to-face, the interviewee had some issue with this

Interviewee has been faced with the general organisational attitude of ‘what are not manufacturing’ – this affects the interviewee’s effectiveness of introducing lean within the organisation

Approach to lean needs to be varied between individual organisational environments

Toyota has an arm that builds homes – the approach is a moving production line

Not evident design manufacturing (error proofing construction)

Challenges
  - Standardising the process and quality assurance issues
  - Western culture present within the organisation

Strategy needs to incorporate all parties within education

Interviewee 4:

Economic background

Exposure has been limited to 12 months

Must understand lean from a particular level

Lean in its infancy as a higher level at a higher level of the organisational structure

Interviewee views lean as more of an analysis strategy, incorporating
  - Informal ideals
  - Homophilic relations
  - Data based support
There are no formal communicative tools used within the organisation as part of the implementation strategy.

Organisation is divided into separate mini organisations or entity groups – this is categorised by subcontractors, site managers, construction manager, building executive, sales team, operations team etc.

Issues present with cultural attitudes and behaviours.

Growth of the company is another issue.

Issues are present with decision capabilities.

Tool based strategic approach – target of waste elimination.

Communication is dictatorial within the organisational environment.

The interviewee identifies themself as an advocate for change particular in lean.

There is potential for adaptability of lean within the organisation’s strategic direction.
Interview Analysis

Each interview will be analysis separately and in accordance with the thematic analysis guidelines discussed in chapter 4 Methodology. Four data types are to be addressed as part of the analysis as per diffusion theory considerations. The presentation of the data types in terms of the following analysis will be further broken down in four core diffusion theory groupings addressing:

- The organisational and managerial environment (incorporating data type 1);
- The implementation process (incorporating data types 2 and 4);
- Communication (incorporating data types 1 and 2); and
- Implementation/transformation challenges (incorporating data type 3)

Interviewee 1 will be analysed first. Relevant primary codes emerging in the analysis will be boldly highlighted blue and underlined with secondary codes will be boldly green highlighted with underlined. Where features of diffusion groupings are not present a description of ‘not discussed’ be placed. A third level of analysis is included which highlights the attitude of the interviewee when discussing the element and/or issue. The underlined italics text highlights the key message of the interviewees’ perception and will be used as part of the descriptive analysis addressed in chapter 5 Results: Descriptive Analysis.
## Interviewee 1: Senior Executive

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<th>Overview</th>
<th>Interviewee Attitude</th>
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| Overview| The interviewee highlighted that lean is being considered as a strategy for the organisation to reduce and essentially eliminate waste. The level of awareness of lean is limited to a small group suggesting that if incorporated then the decision is authoritative in nature.  
“One of the things we are looking to introduce is lean construction. We have an enormous amount of waste in our business given I guess the unsophisticated nature of the construction industry. We can’t call it lean we just call it ETS which is Extra To Schedule which is margin erosion, we actually order our homes and our costs to homes and order that and its leakage to that” |
|         | The interviewee discussed that the organisation is quite large and as a result is fairly decentralised. The nature of the decentralisation of the business according to the interviewee may be in part due to the industry rather than the business. The decentralised nature of the organisation was also indentified by the interviewee as an additional challenge.  
“...the large business, we have 100 site managers, we have 1000 people in this business nationally and if you think about the role of, well in [the city] we’ve got 906 jobs under construction right now. So it is a very decentralised operation” |

| Strategic Direction | Central to the organisation’s decision according to the interviewee is a focused on customer service, quality and efficiency. Strategically focusing on these issues first for the organisation will assist in overcoming other issues such as communication and waste – the interviewee discussed in terms of QA.  
“...we have been focusing on customer service, quality and efficiency; they are probably the three key areas...”  
This is also addressed as part of the process stage of confirmation. |                                                                                                                                                                                                 |                                                                                                                                                                                                 |

## Organisation & Management Environment

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| Formal Social System | The interviewee described the organisation to be fragmented in the structure due mainly to the intensive overhead nature of the business. A more minor fragmentation is associated with organisational groupings and also due to the nature and type of growth experienced within the organisation. The type of organisational structure for the interviewee has also caused much concern for the presence, treatment and assessment of waste within the organisational environment.  
“So we have quite an overhead intense business, we have about in [the city] about 100 site managers or construction personnel – that is a huge cost and we need them to build our homes as fast as possible to reduce that fixed cost component of that” |                                                                                                                                                                                                 | The interviewee was very open about the nature of the organisational environment and the concerns/issues the structure has created for the organisation. The interviewee did highlight that the organisation experience high levels of unnecessary waste. |
Within the organisation there is presence of site managers with trades for housing projects to be subcontracted out

“All trades are subcontracted out. So the site manager’s function is to really just to schedule the job, engage the trades and the supply is sourced from one of my procurement teams as well. So all labour is subcontracted.”

When discussing the presence of time as form of waste, the interviewee highlighted more of the fragmented nature of the organisational structure.

“...site managers....They report to a construction manager, construction manager reports to a building manager and I have another role which I manage as an executive building manager”.

The interviewee described and discussed the formal communicative networks of the organisation to be rigid and down-the-line which causes some challenges.

Refer to verbal communicative strategies

Informal Social Structure

The interviewee discussed when asked questions about communication networks between on-site and off-site parties (Tertiary Working Groups) highlighted the presence of homophilic relations. The nature of such tertiary relations are emerging with current changes that are occurring within the business with the refined strategic direction targeting issues associated with performance and waste.

Refer to verbal communicative strategies

### Implementation Process

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<td>Knowledge</td>
<td>The interviewee is identified as having a low to moderate understanding of the lean concepts and construction industry.</td>
<td>“My background, well I’ve got a very diverse background through lots of different industries. So a telco industry, automotive industry, printing industry, construction materials industry and obviously now in construction itself. My background here is that I work and head up our national operations group and we work on business strategies and business processes trying to build capability with our people across all functions nationally.”</td>
<td>Not Applicable</td>
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<td>Persuasion</td>
<td>The interviewee when discussing techniques associated with the refinement of current organisational practice, highlighted the presence of specific education/training programmes to be apart of the new organisational direction. The</td>
<td>“We have done a lot of training with our site teams in terms of the way they engage and communicate with trades and give feedback”</td>
<td>The interviewee was not committal over with the success/experience so far with the new training/education framework.</td>
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<td>Decision/Implementation</td>
<td>“...we call it [organisation] excellence and that is a business improvement programme where we have been documenting processes and procedures for the last 18 months. Part of that was a piece of performance management excellence and as an example ask her about a process called STOP its about, it’s just a feedback process. When out site managers communicate to trades we want them to give feedback, and STOP is an acronym for specific feedback, its timely, its outcome focused and is it productive. That is one of the tools we have trained our site management teams in by giving feedback in a structured way. We have also done a lot of work with our managers, our construction managers, our building managers about presentation skills and communication skills. Again it’s targeted to how they coach and mentor the teams as well, so that is trying to help as well”.</td>
<td>The interviewee noted that they did not know many details about the excellence programme or its influence on the cultural environment of the organisation.</td>
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<td>Confirmation</td>
<td>“I think it’s improving. It’s quite embryonic, I think it’s improving and again we are coming from a long way back. Really a site manager owns the trades and the construction manager knows who the trades were. So when a site manager left the business they took their trades with them and so now we are asking the construction managers now to build that intimacy, that’s probably not the best word for it, but that intimacy with the trades. So then they have that link and again establishing a relationship between the trade and the construction manager rather than the site manager”.</td>
<td>Interviewee although seeing some improvement was a little reluctant to acknowledge the positive steps as they reinforced the process is in its infancy and there has been multiple challenges arising from the change implemented so far within the organisation.</td>
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The interviewee highlighted that the persuasive techniques in place within the organisation are supported by the organisational specific education/excellence programme.

An organisational specific educational programme centred around excellence has been a key strategy in educating employees about changes in organisational practice and strategic direction. The approach of such training is currently specific to individual organisational groups.

The interviewee also discussed to an extent the presence of the implementation process associated with the excellence programme. This was highlighted by the targeting of education to specific organisational groupings within the organisation.

Confirmation The interviewee sees some benefit in the presence of the education/excellence programme particularly in its facilitation of informal communicative networks. For the interviewee there is a clear distinction of improvement present within the organisation from the introduction of the excellence programme. The nature of the change for the interviewee is dependent very much on the culture and groups within the culture.

The process associated with communication has been ongoing for a period of 14 months and according to the interviewee the training has become more intensive over the last 6 months

Central to the organisation’s decision according to the interviewee is a focused on customer....We’ve really ramped up our quality assurance and we have probably 6 stages of QA checklists through-out
service, quality and efficiency. Strategically focusing on these issues first for the organisation will assist in overcoming other issues such as communication and waste – the interviewee discussed in terms of QA.

construction that a house will go through. We have internal QA teams that look at a pre-plaster checklist and then a final checklist. That final checklist, well its not a checklist, but rather the final QA check is like though the customer is walking in and they want to see a defect free home. That has actually, well these checklists focusing on quality has actually reduced waste, believe it or not, its reduced the amount of rework, its reduced, its clarified that task, the scope of works, the specification for things – so that is that focus. The other thing is about customer service, we are being more engaging with our customers through the journey, so we actually call our customers on a weekly basis mandatorily – so there are no surprises at the end of the home when the customer asks ‘well what about this, what about that, what about this I didn’t know about that’ and that was a big contributor to waste, in the time sense. So we had to come back and appease the customer and do this and do that and delay the handover of their home or the progress of their home. So we have been focusing on that. The efficiency appease is the biggest price for us and its got so many elements to it, you know trade management, scheduling of the site manager, the management of the site manager, management of the construction manager, the level of training provided within the field. Its just got so many facets to it. So those are probably the key areas”.

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<td>Verbal Communication</td>
<td>The interviewee did not specify the type of communicative strategy that has been utilised rather stating that the strategy has been a general refinement. This refinement has involved changing the general nature of the verbal communication which is currently downstream has to also incorporate upstream communication. The current focus is on trying to overcome potential challenges when this is addressed.</td>
<td>“...the down-the-line channel is one where we have just refined the structure....you know as an executive building manager, building manager, construction manager and site manager, it’s a really rigid structure that we are trying to make sure that messages get down that line. So we have a strategy to improve that cause it is not adequate, not just down the line but also back up the line, when challenges arise”.</td>
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within the organisation. This type of communication is internal.

External communication was discussed by the interviewee highlighting the refinement of communication between on-site and off-site teams. The nature of this communication highlights a move towards informal homophilic communicative networks.

“The external challenge with our trades and suppliers, so we actually have started to embark upon trade quarterly meetings, so that’s run by the building manager within each of our districts and at each quarter we are know getting our trades together with our construction team to talk about what is going on with the business, what’s the business strategy, what’s coming forward, what are some of the challenges in the area, what are the needs we have of these and what needs that have of us – trying to really build that trade partnership type of environment”.

“I would say the quarterly meeting is more designed to target a mass gathering but the construction managers should be holding with their teams. So they have 3, 4 maybe 5 site managers they should be getting their trades together within their local district/s and having toolbox talks and those sorts of things as well to increase that communication”.

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<td>Direct versus Indirect</td>
<td>The interviewee discussed the presence of challenges within the organisation in the context of waste. The interviewee highlighted that lean will be incorporated as one element into the strategic direction as a means to reduce direct and indirect waste. Lean is not specifically identifiable rather it is known as ETS (extra to schedule). The interviewee identified 5 forms of waste (challenges) to be present within the organisation. This waste (or challenge) is about trades and supply.</td>
<td>“So additional orders to trades, supply whatever it may be for a whole range of things. That costs us about 4% of revenue, 3-4% of revenue; it needs to be under 1%. Right, so and its probably costing the [city office] business about $30million a year, so the business has about $30million a year of leakage. So that’s sort of one of the areas of focus that we are looking at, so how do we eliminate waste and that is in that margin erosion space”.</td>
<td>Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.</td>
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<td>This waste (or challenge) is physical in nature.</td>
<td>“I know that physical waste on site is a big issue we’ve got tighter sites that we have to construct on, because</td>
<td>Interviewee was culturally open about the challenges associated with waste within the</td>
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developers are building smaller lots and houses well they are trying to grow the size of that footprint. So being able to produce and construct efficiently and effectively, physically waste becomes very important and obviously the cost of physical waste is escalating at a rapid rate so we have to be mindful of that too and eliminate that”.

“…so we are looking at but I wouldn’t we’ve got a huge focus on but we are looking wastage factors that allow for our estimating space and I don’t know but you would have to find out from one of my team but for plasterboard we may allow 5% wastage or 7% wastage on every house now and we could reduce that to 3% on every house and what are the challenges to do that. I don’t think we have tackled that adequately but I know that we do have a lot of physical waste that we are moving off-site. When we calculate how much waste we should have, so right call it 3 cubic metres of waste to end up with 14 cubic metres of waste something is going wrong. Something is going wrong somewhere. So [interviewee 3] who you will be speaking to today is looking at that physical waste component and how we can actually get it down and we actually have got a strategy to work with a company called site-clean up, who actually does hand site-clean ups and recycling waste streams. You know minimising the presence of waste in landfill and increasing the amount that is going to the recyclers”.

This waste (or challenge) is about cost and efficiency

“We also have a lot of waste in terms, well it’s one of our biggest waste issues is cost which is hidden in our efficiency. So we have quite an overhead dense business, we have about in [the city] about 100 site managers or construction personnel – that is a huge cost and we need them to build our homes as fast as possible to reduce that fixed cost component of that. So if we build slow, efficiency is down and our overheads go up comparative to the revenue we earn. So we call it white-space. White-space is no construction activity on site per day. We have a lot of white-space, So we are currently building single storeys on average about 24-25 weeks.

organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.
double storeys probably about 36-38 weeks and in some areas 42-43 weeks which is just too slow. So that would mean that we have a lot of white-space on most days where we are not doubling up trades where we can and when its safe. We have no trades on site some days, so there are a whole range of reasons for that”.

| This waste (or challenge) is about time and coordination | “Strategies for the time related waste we are looking at how do we get our management structures right. So we have site managers manage between, say in the [location 1] business, about 15 jobs each. Now in a suburban business that’s a knock down rebuild market they manage about 8 jobs each. They report to a construction manager, construction manager reports to a building manager and I have another role which I manage as an executive building manager. I manage that whole team as well. But we are trying to get our management structures right, where there is greater onsite presence. So our construction manager should be in the field far more often because then they are actually looking at all their sites under their realm and are actually trying to identify why there is no activity on site or why aren’t there two activities on site, why have we been held up and actually working back on root causes for that. We have found that in that time space the root causes are pretty simple probably five, one we can’t control which is the weather – but that doesn’t apply when you’ve locked up your house anyway or are enclosed, so that shouldn’t impact internal trades at all other than getting out on site, which may happen on occasion. But it is either a trade issue, so we have trade shortages potentially or we aren’t managing our trades effectively enough. It’s a supply related issue, so our suppliers haven’t delivered for a on time, so either in full or on time. It could be a pre-site issue, so we have had issues with the drawings or the estimates or quantities, there could be some issues with the contract, which hasn’t been translated into orders”. |

| Interviewee was culturally open about the challenges associated with waste within the organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation. | This waste (or challenge) is associated with relations and the state of relations between site managers and construction managers and so either inadequate scheduling, so we aren’t scheduling right |
managers and construction managers – highlighting both physical duties and communication

enough, firm enough or assertively enough or the site manager and the construction manager aren’t managing their jobs closely enough. So they are not demanding enough from their trades or suppliers, they are not demanding enough from themselves”.

organisation. The interviewee did show some frustration concerning the nature of the operations and how they have led to the presence of waste within the organisation.

When asked questions directly about the nature of communication between organisational groupings and site groupings the interviewee discussed communication as another organisational challenge. Within the discussion the interviewee further highlighted the nature of the formal social structure particular in the general bureaucratic approach which underpins management style and direction.

“…that comes with that issue about; you know that last issue with the site manager and construction manager. Really one of the key aspects to that is communication. So to what extent is the company’s objectives translated from the building manager to the construction manager to the site manager to the trades. What clarity are we giving the trades about executing a task that we have just asked them to do, what communication is coming back when there are challenges that arise or things that can’t be done or uncertainty – you know do we have adequate communication and the answer is probably, you know, generally it is a big challenge”.

Interviewee was open in their discussion of communication within the organisational environment and the fragmented nature of the communication between groups. The interviewee is cultural aware.

Desirable versus Undesirable

Although for the interviewee themselves the want for change is an important aspect, however desirable there emerges undesirable challenges. For the interviewee undesirable challenges emerged mainly through the nature of the industry and the need to make the organisation and its operations centralised rather than decentralised. Further to this the size of the organisation is also an undesirable challenge.

“…the large business, we have 100 site managers, we have 1000 people in this business nationally and if you think about the role of, well in [the city] we’ve got 906 jobs under construction right now. So it is a very decentralised operation. So if it was centralised and its in one manufacturing plant your levels of control are far greater than they are then what we have with 906 jobs under construction. So that’s probably the biggest challenge is how do you get a message from a senior executive down to one of the 906 sites and one of the trades that is servicing one of the 906 sites. That is the biggest challenge I think and its apart of the business and the size of the business. The lack of sophistication and the industry and the trade and the site managers and our people also perpetuates and makes that issue harder again. So that’s another big challenge. They want to do it as they have always done it, change is very difficult and its difficult to understand and sometimes difficult to comprehend and its difficult to implement, when I’ve done something for 30 years as a tradesman and now you’re telling me to do it differently. So probably the

The interviewee was open to discussing the challenges that are faced from an organisational perspective.
other big challenge. So its cultural and its industry.”
Interviewee 2: Project Manager

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<td>Background</td>
<td>According to the interviewee when asked about the business environment the nature of the business has been affected by rapid growth and expansion. The nature of such growth and expansion of the business has impacted the delivery, process and procedures associated with construction.</td>
<td>“...the business has been around for 36 years, it has been, it was fairly small for the first 26 years and it has grown rapidly over the last 10-11 years. By rapidly I mean we went from 50 homes a year to building about 3,500 homes a year over that ten year period. The business had no standard processes or procedures and as a business has grown organically, just more people have been added to the business and nothing has been documented or standardised across the entire organisation. So from a business improvement perspective we are very early in the journey and for the last kind of 2-3 years we’ve just been working on trying to get a standard operating platform for everybody to work towards with a view from there that once we’ve got everybody on the same page at least then we can start to ramp up the improvement side of it”.</td>
<td>Interviewee was open about discussing the nature and reasoning behind the growth and expansion of the business. The interviewee was highly critical over the lack of progression and standardisation of some business practices.</td>
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<td>Nature</td>
<td>When discussing the excellence programme the interviewee also highlighted that the cultural nature of the business is focused towards entrepreneurism.</td>
<td>“We are focused, we are an entrepreneur business so from a business culture point of view we encourage entrepreneurism and a competitive kind of spirit its one of our values. So we don’t necessarily like restriction and standardisation as a culture in the organisation...”</td>
<td>The interviewee although open in their discussion of the organisational environment, there was some issue in terms of the cultural environment accepting the standardisation of work practices, processes and procedures emerging as part of change.</td>
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Organisation & Management Environment

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<td>Formal Social Structure</td>
<td>When discussing education and training within the context of the organisation the interviewee identified the business to be divided into five key operating areas. The key functions of the business include sales, drafting, estimating, customer support and building teams.</td>
<td>“…the five key operating functions of the business...the sales team, the drafting team, the estimating team, the customer support team and the building team”.</td>
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<td>Informal Social Structure</td>
<td>Education and training for the interviewee has been an essential component in the establishment of an improved organisational cultural environment.</td>
<td>“So what have tried to do is get all of the drafting team together, meet each other, have a team building experience together first, be on the same page, just be able to have a coffee and say hi to somebody that does...”</td>
<td>The interviewee held a very positive and embracing attitude over the nature of the change that has occurred within the organisation as a result of education and...</td>
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According to the interviewee prior to the introduction of functional team education and training as part of the excellence programme there was essential no homophilic communication amongst organisational teams.

Targeting functional organisational groups/teams has assisted in not only the development of better homophilic relations but also heterophilic relations.

The discussion here by the interviewee uses the drafting team as an example.

| Informat Social Structure/Social Norms | According to the interviewee prior to the undertaking of specific group education and training there was minimal communication between similar working groups (see). This was due mainly to the nature of the organisational environment and how operations were approached as formalised practices, processes and procedures. For the interviewee the introduction of specific group education and training has assisted in the opening of informal social structures (homophilic relations) of the organisation and the presence of greater integration of specific organisational groups. The breaking down of barriers within the organisation between teams (heterophilic relations) has also been beneficial for the organisation’s cultural environment. | “The conferences that we had definitely helped build team, well the team cohesiveness across all areas. It allowed people to meet other people from other areas of the business that are doing similar roles. So it increased relationships across the business and they felt like they weren’t being targeted and it wasn’t just them and it was applied to everybody so that was a good thing to do. It also managed to break down barriers between support services and the operational teams, because the support services attended the conferences and such and those teams have been involved in the training programme as well. So it has kind of helped build relationships in that area”. | The interviewee held a very positive and embracing attitude over the nature of the change that has occurred within the organisation as a result of education and training programmes. |
|--------------------------------------|
| Formal training programmes. | “The change we are trying to get is a cultural change rather than a business change and a process change. People’s attitudes are pretty rank, so we have been working really hard on the attitude stuff. So part of the | |
| ------------------------------------|--------------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Informal Social Structure/Social Norms | “The conferences that we had definitely helped build team, well the team cohesiveness across all areas. It allowed people to meet other people from other areas of the business that are doing similar roles. So it increased relationships across the business and they felt like they weren’t being targeted and it wasn’t just them and it was applied to everybody so that was a good thing to do. It also managed to break down barriers between support services and the operational teams, because the support services attended the conferences and such and those teams have been involved in the training programme as well. So it has kind of helped build relationships in that area”. | | The interviewee held a very positive and embracing attitude over the nature of the change that has occurred within the organisation as a result of education and training programmes. |
known as the ‘Golden Rules’. The approach underpinning the organisational ‘Golden Rules’ was linked to the general cultural attitudes of employees.

The ‘Golden Rules’ approach is the philosophy of the change focused on that of a cultural change rather than business and process.

The nature of the ‘Golden Rules’ is reflected in the key business strategies of the organisation and assist is the establishment of standardised processes and procedures (or social norms).

The ‘Golden Rules’ are representative of organisational social norms including advocacy, integration, stability and culture achieved through education.

programme that we ran we actually put together a set of what we call ‘Golden Rules’ for each of the functions and this is kind of like the guidelines or the behaviours or attitudes that we are looking for irrespective of what the business process is. So the idea behind the golden rule is you can understand this and you can operate according to those golden rules everyday then you can’t be doing too much wrong...So the ‘Golden Rules’ fit around some of the key business strategies that we have so...we have safety linked into quality, customer satisfaction and efficiency, presenting a professional image...and trades and suppliers being apart of the team".

“...we have had these ‘Golden Rules’ in place for probably two years now and what we did at the conference is that we gave people a business process or a training package around each one of these ‘Golden Rules’ to say well you know what the behaviour expected here is, well here is a tool or process or some training to help you deliver on that”.

The interviewee is excited with the success of the organisational specific ‘Golden Rules’.

The nature of the education and training within the organisation for the interviewee is about more about the establishment of a cultural environment that supports the needs of the business. This cultural approach is representative in the approach of the organisational education and training programmes specifically targeting social norm and social norm development.

The interviewee hear discusses how the approach to education and training is not only limited to a classroom setting but also encourages learning outside the organisation. Such education and training assists in further strengthening advocacy, integration, culture, education and stability.

Underpinning the approach is the basis that the organisation had a zero base in which to address issues of cultural importance. With such an

training programmes. More specifically the interviewee is excited with the success of the organisational specific ‘Golden Rules’.

The interviewee held a very positive and embracing attitude over the nature of the change that has occurred within the organisation as a result of education and training programmes.

“...another cultural message that we were driving was trying to drive a buffer line behaviour so everyone takes ownership and responsibility and is accountable for what they've done and we move away from blaming other
innovative education and training programme management wanted their employees to go on the journey with them. However the interviewee did note that this philosophical approach was not initially understood well.

“We’ve got images around; we’ve got one about passing the batten. So we often have a physical batten that we’ve used, so some physical things as well and passing the batten is about making sure, there are also posters for that too, but making sure that when you do something, you’ve done your personal best, so when you pass the batten on you’re able to put it in the hand of the next person, like solidly, so now the customer or the file doesn’t get dropped in the middle and forgotten about as each person in the chain deals with something it’s a bit like a relay race where we make sure it is being received before we walk away”.

“I mean we’ve got zero base in the organisation, you know culturally. So we’ve had to make people want to be part of the journey, so we’ve had to do some fairly interesting things. You would assume that people would understand some of these things but they don’t. So we’ve had to go back and start from ground zero really with this is why we come to work everyday”.

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<td>Knowledge</td>
<td>When asked about their knowledge within the construction industry, organisation and lean the interviewee discussed mainly their role within the business and experience in the industry. Their exposure to lean was identified by interviewee 4 who highlighted that exposure has been limited to the last 12 months. The interviewee is identified as having a moderate level of knowledge within the construction industry and business.</td>
<td>“My role manager of the business improvement team and I’ve been in this role for two years, well just over two years and with [the organisation] nine years before that”.</td>
<td>Interviewee was open about providing information on their background, experience and role with the organisation. In terms of lean awareness the interviewee forgot to specify.</td>
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<td>Persuasion</td>
<td>The interviewee described the nature of the</td>
<td>“….so we have been very selective about which battles</td>
<td>The interviewee was culturally and mentally</td>
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cultural environment in implementation standardisation as a series of battles. According to the interviewee these smaller battles as utilised as part of persuasion to implement elements of standardisation and the excellence programme.

For the interviewee the presence of flexibility in negotiable elements of project delivery enables the cultural environment of the organisation to remain fairly constant.

we choose to fight to get standardisation. So the things that we don’t have compromise on in terms of standardisation are safety, so safety is a non-negotiable, customer experience is a non-negotiable and so is quality; and its quality of other materials going to site and the finished home to the customer. So those have been the battles that we have chosen to fight with the teams and corral into standardisation outside and around that we have almost kind of said well you have some creative license going, then knock yourself out and do the best that you can... So there will be well different teams will have different means to get to an ends in terms of their process but they will be producing the same quality of home at the end of the day. So we have kind of allowed and said final quality check is this, these are the steps that you go through, but how you get there is up to you, in some ways).

adamant that the standardisation of particular processes, practices and procedures will assist the organisation in not only improving the business environment but also the impending lean adoption.

The nature of the business and its workforce is structured around individual entities. This type of organisational structure impacts on the nature of communication. Management of the organisation track the roll out of new practices, processes and procedures through management lines as a means of eliminating the dictatorial nature of communication within the organisation. For the interviewee this is seen as a way of assisting the cultural environment.

“...we have been trying to track their management lines and get their managers to roll things out instead of it coming from a like a corporate services business, so it is rather seen as the managers process rather than a business process. And we have been doing it that way”.

Interviewee was open in discussing communicative strategies associated with the implementation of standardised work practices, procedures and processes.

The nature of the education and training sessions when implementing the excellence programme according to the interviewee represented both mass and specific education/training. Each specific group was broken into smaller study action teams of around 60 individuals and then sent to a 3 day conference designed to physically and mentally exhaust the individuals as a means of re-building them to fit within the new cultural environment of the organisation. Following up the conference was more specific group training

We do a mixer of both mass or blanket training as well as specific group training...The entire building team went through a three day conference where we communicated to them the vision for the company, where we are heading in the future; you know customer philosophy that we had. We gave them; I guess what you would call modules from our new processes and training around those new modules at that conference. But we also gave them like an experience too where we gave and put them through some physical challenges and some mental challenges and mental exhausted them and

Interviewee was open when discussing the nature and approach of the education and training programmes utilised by the organisation.
as a second stage of training and then a final stage of training for individuals who were identified as poor performers.

The initial focus of this style of education and training was the organisation’s building group.

The approach was supported by the collection and analysis of individual specific performance data.

Broke them and rebuilt them in the three days. So that was kind of targeting a large group. So we ran three conferences back-to-back and we had about 60 people at each conference over a ten day period. Then we followed that up with some group work, so we would take individual groups from that large team and roll out or communicate or try to implement particular items to small groups. And then what we actually did then was look at the poor performers based on our survey results by customers and audit results and target individuals and give them one-on-one kind of training or counselling or support in those areas that they needed it.

The interviewee was asked about the incorporation of cross-functional training initiatives within the organisation. According to the interviewee the nature of the decision particularly concerning the standardisation of work practices, procedures and processes has been directed towards functional organisational working groups. As education and training becomes more contextualised to the requirements of the organisation the programme delivery will reflect that movement. Although the interviewee did highlight that there has been some cross-function training present in organisational groups where this is already present.

“We have been doing some team building work outside and around that. We had a huge issue with, we’ve kept it quite functionally focused at the start and then we have been doing more cross-functional work. So the reason we did the functional work was because people are working, building teams and developing teams within their own operating business unit, so there was some cross-functional development in that but it was only at the business unit level”.

Interviewee was open when discussing the nature and approach of the education and training programmes utilised by the organisation.

The interviewee provides an another strategic approach to the education and training programme employed within the organisation.

“Each team, well for each operating area, take for instance the drafting and customer service and estimating teams. Each metropolitan group as we kind of did metropolitan together, regional together and we have done some across both. In the metropolitan areas it is about 50-60 draftees, estimators and customer support teams so we have done things in a group of 60. We have had some events where we had the entire group together and we did some physical activities and team building and some stuff around attitude. And then we would also have some smaller sessions were we might mix one or two of the groups together of the four or five groups and

Interviewee was open when discussing the nature and approach of the education and training programmes utilised by the organisation.
### Implementation

According to the interviewee the organisation is investigating specific elements of lean implementation and adoption. For the interviewee the presence and adoption of the excellence/best performance programme offers a model and process in which to approach the adoption of lean.

For the interviewee the process associated with the excellence programme is about specific steps:

- **Step 1** is associated with the establishment of a standard practice process.
- **Step 2** is a reviewal process of step 1.

As the programme is only in its infancy only two steps or stages have been considered. However for the interviewee the excellence programme needs to be established prior to the implementation of lean.

When asked about the extent to which lean is currently being implemented within the organisation the interviewee highlighted that it has not been launched as a concept or strategy as such but is rather being approached as a discipline being applied to specific activities or tasks.

The discipline/activity/task approach according to the interviewee is more beneficial from a cultural point in enabling organisational groups to understand lean in a practical sense. Introducing lean this way also enables the interviewee to address the organisation’s cultural attitude towards lean and its potential application within the operational environment. The interviewee noted that the general organisational groupings depending on the way the lean innovation is approached and implemented would generally be highly critical of what lean would bring to the existing environment.

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<table>
<thead>
<tr>
<th>Implementation</th>
<th>Interviewee was open in discussing the introduction of the excellence programme for the organisation. The interviewee did become a little critical when discussing the intended approach of the champion and innovator – who prefers the implementation of lean to be under a different implementation programme (refer to interviewee 3 for more).</th>
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<tr>
<td>According to the interviewee the organisation is investigating specific elements of lean implementation and adoption. For the interviewee the presence and adoption of the excellence/best performance programme offers a model and process in which to approach the adoption of lean.</td>
<td>“So we have tried, so we change the groups that they mix with constantly as well, so then you’ve always got different influences in the areas as well. So it is just trying to encourage something around that”.</td>
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<tr>
<td>For the interviewee the process associated with the excellence programme is about specific steps:</td>
<td>“…step 1 was getting 14-15 stakeholders from across the country just to agree on the standard process regardless of whether or not that’s best practice or the most efficient, step 1 was all about getting agreement for everyone to do the same thing”.</td>
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<tr>
<td>- Step 1 is associated with the establishment of a standard practice process.</td>
<td>“So we are just about to embark on round two which is about reviewing the standard practice process that we have agreed on and then looking towards how we can make that better and ‘best in class’”.</td>
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<td>- Step 2 is a reviewal process of step 1.</td>
<td>“So we haven’t launched lean as a concept or as a strategy, it’s just some disciplines around the business improvement culture and we don’t have space in people’s heads at the moment to adopt a method. Because it’s like well ‘I thought we doing excellence this week and now we are doing lean’ so it just confuses people and people start to feel overwhelmed but the fact there’s so much going on and they can’t cope. So we are trying to integrate things slowly. So it’s we are going to have a workshop this week, it’s an excellence workshop but we are going to use tools that come from somewhere else as a disciplined way of looking at a problem. So we are kind of approaching it that way”.</td>
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<tr>
<td>As the programme is only in its infancy only two steps or stages have been considered. However for the interviewee the excellence programme needs to be established prior to the implementation of lean.</td>
<td>The interviewee was open in expressing the general cultural attitude of the organisation in terms of lean and its potential application within the operational environment. The interviewee noted that the general organisational groupings depending on the way the lean innovation is approached and implemented would generally be highly critical of what lean would bring to the existing environment.</td>
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<tr>
<td>Confirmation</td>
<td>The interviewee was asked about their opinion on lean and its application and presence within the organisational environment. The interviewee highlighted their general opinion of lean and how it would be applied and approached within the organisational environment. For the interviewee the approach is more about the tools and lean discipline in general however for it to make a successful transition the cultural environment of the organisation needs to be established and be inline with strategies of lean.</td>
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<td>“I look at lean and I’ve been to some lean workshops and we’ve done some stuff. To me there is just some element of common sense about it and it’s not, well there is nothing revolutionary in it for me so I sit back and have a look at it and say ‘well there’s nothing revolutionary in it for me in it from a tools perspective, everything about it is fundamental common sense’ but for me the thing about lean where all the value is, is in and around the cultural change. So getting people to think about things and getting a cultural change and with the work that we are doing you say a lot of effort has gone into trying to drive a cultural change. So I would definitely agree with that. I think there are some really great disciplines and tools and stuff that lean brings to the table that eliminates all the personal bias and the ‘I’ve been in the industry for 30 years, this is the only way to do it’ attitudes, so there is some great stuff around that and getting people’s heads into that space to actually use those tools to do that. I think its got it’s place but I think you have to be really careful about how you integrate it into your business particularly you need to look at your businesses maturity, the structure that you have, the capacity of your people to take on these things, where you are at in the continuous improvement journey and I think there are components integrate in and integrate out. The thing I probably don’t agree with is that ‘well this is the way we operate’ like when you buy something off the stuff and expect it to work straight away, I think there is an element where each company will have a different way of implementing and approach – so like based on those elements of maturity and so on. But I think, the one thing I really like about it is there is discipline and there is, and there is evidence that these things work and so on and that is really good. See we could just sit here and come up with a bunch of things that aren’t tried or tested, you know might not have any impact”.</td>
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<tr>
<td>The interviewee openly expressed their opinion of where lean fits within the context of the organisational environment and how the business needs to aligned their culture to the principles/strategies of lean.</td>
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</table>
Confirmation of the approach and process

For the interviewee this involves the application of strategies as part of a discipline approach and scoring small victories along the way to show how lean can be successful.

“I’ve been here for 11 years and I had to work it and so I know that’s the bit for me that we have to make sure that if we are going to apply these principles that we have to do it in a way that fits in with that model and then it will work. The approach that we have taken is, we’ve got small projects so let’s get these projects and get some runs on the board, let’s create some level of interest, let’s show some proof and some evidence, the acceptance will be there, we will build relationships along the way and then it is just a case of when the two will come together and it just merges in and it becomes the same thing. So that is what I’m trying to go for rather than two distinct programmes”.

Confirmation of the approach and process

The interviewee openly expressed their opinion of where lean fits within the context of the organisational environment and how the business needs to aligned their culture to the principles/strategies of lean.

“...that’s it for me with lean, we are working on tackling some problems in the business that have been there forever and a day and actually solving some root causes and then we can use that as evidence to say ‘well we applied due process, tools and other methodologies around this particular problem and we have overcome this problem through those mechanisms. So therefore we know this works, it fits in nicely and philosophically with everything else that we are doing, let’s do more projects following these ideas’. So it becomes a bit organic and that’s the way it grows”.

The interviewee openly expressed their opinion of where lean fits within the context of the organisational environment and how the business needs to aligned their culture to the principles/strategies of lean.

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<th>Interviewee Attitude</th>
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<tr>
<td>Engagement</td>
<td>The interviewee was asked a series of questions associated with potential challenges associated with communication and education of the building excellence programme. The nature of the education and training programmes within the organisation according to the interviewee is centred on engaging the workforce in terms of specific duties. For the interviewee engagement type education and training communicated within the organisation is centred around 3 key things</td>
<td>“So what we have done with out programme is we have, well when we agreed on what those key things were around safety, customer experience and quality we put together documentation around those and a training programme to deliver those to the team. So everything that we have rolled out has been supported by a fairly robust training programme to go with it. So for example, one of the changes we made in the building team in the field was make them the primary contact point for the customer and making it a mandatory weekly update phone call to the customer. So the customer remains informed...we put together a training programme on</td>
<td>The interviewee was open in their discussion concerning engagement of the workforce in education and training targeting specifically communication. Underpinning the opinion of the interviewee is the presence of three core cultural elements including safety, customer experience and service.</td>
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safety, customer experience and service.

how to actually make that call effectively, how to get your time under control to make that call, how to give a better experience to the customer from that call and we would repeat that training session, monitor it through survey results with our customers and then retrain.”

“So our training packages usually support one of these ‘Golden Rules’ and we deliver it in a way that you go, that you know that we want to be safe at all times here is a way that helps you do that. So as well as the physical on the day delivery, we also do like a take-away”. “So we have always tried to do multiple touch-points in our training because you know that one-off doesn’t really cut it or work. That is what we have been trying to do with our programme”.

The interviewee was open in their discussion concerning engagement of the workforce in education and training targeting specifically communication. Particularly the interviewee highlighted the importance of multiple touch-points as part of education and training.

Lean Tooling

The interviewee discussed the presence of reflective learning to be apart of the education and training programme within the organisation. The interviewee discussed the presence of reflective learning in terms of the education and training programme focusing on organisational specific ‘Golden Rules’. More specifically the interviewee highlighted that with the physical delivery of education and training they also incorporate elements of take-away reflective learning in terms of multiple touch-points.

The interviewee was open in their discussion concerning engagement of the workforce in education and training targeting specifically communication. Particularly the interviewee highlighted the importance of multiple touch-points as part of education and training.

Challenges

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<tr>
<td>Direct versus</td>
<td>When discussing the growth and expansion of the business the interviewee reflected on the impact of the expansion on project delivery and customer service. The interviewee particularly highlighted the emerging challenges the business has indirectly and directly faced as a result. For the interviewee:</td>
<td>“Before we started this programme we had 14 different business units across 3 states in Australia all operating in a different way. So if you were a customer of [the organisation] you would receive a different customer experience and a different quality of home depending on where you were building and it was pot-luck for you as a customer. So you may at some point have gotten a really great experience and a really fabulous home or you may not. As a business we have no control over that and we didn’t understand where that was coming from and our results across all of our business divisions were very, very different in terms of their profit performance and so obviously the directors in the back of their minds in the continue growth of the company realised that the approach was really unsustainable and quite risky for them. We had huge issues with consumer affairs and customers making complaints with V-Cat and those types of things and huge exposure as we offer a 25 year structural guarantee on our homes and we had a huge exposure there because we weren’t managing the quality.</td>
<td>The interviewee was open and highly critical of the faults of management within the business in not implementing some form of standardisation within the business as the business grew. The interviewee showed signs of frustrations over the nature of the work and the attitudes of stakeholders in the process associated with the standardisation changes.</td>
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<tr>
<td>Indirect</td>
<td>Direct challenges are associated with management not adapting the business , its procedures and practices inline with the expansion; Indirect challenges are associated with the type of customer experience the customer has in the delivery of their housing project. For the interviewee that nature of such challenges has resulted in high impacts for the organisation particularly in quality assurance and customer complaints to state bodies. Since the establishment of the new performance</td>
<td>“Direct versus Indirect”</td>
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programme these complaints has decreased significantly inline with new standardised practices for the organisation.

aspect of it properly. So we began this standardisation process under the banner of business improvement and the banner or brand we’ve used internally is called ‘the excellence programme’ so that’s the programme that I manage and that’s all about trying to be the best we can possibly be.”.

When discussing the presence of education and training aspects of the organisation environment, the interviewee noted that management and their own department has a tendency to over communicate.   

The direct nature of communication within the business is the ability to effectively roll out improved practices, procedures and processes.

The indirect nature of communication is that many of the employees of the business are not digitally connected to the business.

When discussing challenges within the organisation the interviewee highlighted that the organisational structure causes direct and indirect challenges.   

For the interviewee this is particular evident in the nature of the cultural attitudes and thought processes within these organisational groupings.

The interviewee linked this discussion back to the viewing of each organisational group as a separate entity.

The direct challenge associated with this is that separate business units perceive their operations system is different to other business units.

The indirect challenge associated with this is that there is the potential for standardisation of the

“…so my business units think their businesses are different to other businesses within the organisation. So we have kind of split geographically and people tend to think the geography of their area means that they are different or the customer that they have are different or the environment and conditions are different – so therefore their process needs to be different. So we have to constantly manage that”.

“So we have to manage some of those things sometimes and people within this business like to create themselves rather than be given something. So like we have to deal with that quite often and the one thing we do come up against is this ‘well I’ve been in the industry for 30 years, this is the only way it can work’. Sometimes they aren’t open to new ideas, but having said that if you approach them in a different way and deal with those individuals in the right way, then you can get the right outcome that you are looking for. It’s a bit of give and take, so that’s why I

The interviewee was open in discussing their frustrations with the nature of the business and the presence of over communication.

The interviewee was open in discussing their frustrations with the nature of the business and the presence of over cultural environment and attitudes present within the organisation.
process to be more difficult in its implementation. *said we tend to pick the battles that we can fight*.

| Culture | “…we are looking at lean and how it applies to our environment. The issues that we are finding, this is where we really need to be careful, the issues that we are finding in this area are people in this industry perceive this industry to be different to every other industry and unique and that things can’t apply. And there are some things that’s don’t fit and there are some things that do, but its how you go about articulately and bringing people on board that is important and I don’t think we’ve got that right yet. We definitely don’t have that right internally. So we’re in very, very early days of that and we’ve got a lot of work to do in terms of being able to fit culturally into the business and influence rather than dictate. People here don’t want to know what happens in manufacturing or what happens in a car plant, they are not interested, they don’t care, and they think it can’t work. In some parts for their defence we don’t have a controlled environment in the building industry, everything happens out on site, it’s multiple individuals, the weather has an impact, it’s a living breathing product, most of the materials we use they’re not cut from the same machine day-in-day-out and there are elements but I think people honestly go on the gut feeling rather than apply any logic to it”.

The interviewee highlighted that successful implementation of the lean innovation needs to be supported by an organisational leader or champion that is approachable and not judgemental of the workforce in understanding the reasoning and implementation approach of the innovation:

For the interviewee:
- The direct challenge is identifiable in the approach of the champion in communicating the lean innovation within...
- The indirect challenge emerges in the judgemental nature and cultural understanding of the champion to the organisational workforce.

The nature of this challenge is **minimal** in its impact at the moment. However the interviewee does note that the champion has issues in terms of organisational engagement and applying lean principles within the organisational environment. 

**Desirable versus Undesirable**

For the interviewee the process associated with the implementation of a building performance programme within the organisation has caused a number of problems. Although according to the interviewee change is desired by the majority of the organisation some undesirable issues emerge in terms of management/stakeholder attitudes. According to the interviewee the general undesirable attitude is associated with pre-conceived attitudes of experience equalling extensive knowledge of all processes.

“The problem that I encountered over that period was from people within our industry is that we have a lot of people who have been in the industry for 30 odd years or 20 odd years and their way is the best way and there is no negotiation and its what they had done at the previous company and I’ve been doing it for 20 years so therefore that’s the way we should be doing it. After about a year or so we managed to get agreement on what a consistent standard platform would be in some areas but it is by no way the most efficient or cost effective process. But it is baby steps by getting them to agree and then move on from there”.

**Anticipated versus Unanticipated**

The nature of the excellence programme process has been a challenge within the organisation due to the anticipated expectations of the programme versus the unanticipated challenges which have emerged.

The interviewee discussed that when the programme was in its developmental stages (i.e. aligning the programme to the business plan) a timeline was formed mapping the expectations of organisational management inline with the training and education. (anticipated challenge) 

“The problem that I encountered over that period was from people within our industry is that we have a lot of people who have been in the industry for 30 odd years or 20 odd years and their way is the best way and there is no negotiation and its what they had done at the previous company and I’ve been doing it for 20 years so therefore that’s the way we should be doing it. After about a year or so we managed to get agreement on what a consistent standard platform would be in some areas but it is by no way the most efficient or cost effective process. But it is baby steps by getting them to agree and then move on from there”.

The interviewee was open in their discussion of the anticipated and unanticipated challenges within the organisation.
organisation and the time which is takes in the education and training of people.

Another unanticipated is the lose of employees as a direct result of the education and training programme.

we gave the boys no sleep, we had them working until 1am in the morning, up at 5am in the morning, physically exhausted through doing activities and courses, rolling through mud, you know climbing over walls, that kind of stuff. Then you get them to a point where they are physically exhausted and mentally exhausted and then you break them down and you can like rebuild them and that is kind of like the philosophy behind it. So you rebuild them in the model you want them to be in. I mean it doesn’t work for everybody and after the conference we had, well the last conference of the three, on the Monday morning following the conference which finished on the Friday, we had 10 resignations on the Monday morning - people who did not want to be part of the journey”.
Interviewee 3: Champion and Innovator

### Overview

**Feature** | **Analysis** | **Quote** | **Interviewee Attitude**
--- | --- | --- | ---
**Approach** | The interviewee highlighted the organisation’s approach to the implementation of lean when highlighting their own approach to the implementation process. For the interviewee the approach underpinning their investigation is centred on the implementation of lean tools, mainly the introduction of the ETS programme. | “So my main progress or programme at the moment is working on ETS which is extra-to-schedule costs. So extra-to-schedule costs are any costs above the estimate and causes direct margin erosion and that has been focused on getting disciplined data analysis and investigative processes into the organisation”. | Interviewee was open in their discussion of the strategic approach underpinning their investigation of lean adoption for the organisation.

**Context** | The nature of the strategic approach and direction to the implementation of the lean innovation is about contextualising the issues present within the organisational environment. Not just identifying the big picture issues but also understanding the smaller issues which are just as important. | “I’ve seen this in every organisation that I’ve worked with; typically what people say is the issue isn’t the issue. So if you ask people what are you top three issues they will go bang, bang, bang and when you go look at the data its actually something completely different. So to try and get that into people around, you’ve not just got to look at the job sites that are one off and happen once a year and hurt you big time, it’s the things that happen every day that add up to ten times as much”. | Interviewee was open in their discussion of the strategic approach underpinning their investigation of lean adoption for the organisation.

**Overview** | When asked about the use of lean strategies as a way of overcoming communication issues within the organisation the interviewee highlighted the current state of lean implementation within the organisation. The interviewee highlighted that the current state of the process is more about making the organisation aware of lean and its application within the business. | “So basically the next 6 months of this year is I have to develop a strategy, an implementation strategy. So the key strategy would be, is run some workshops and then make the business visible and then at the moment I’m getting some staff and basically doing some Kaizen blitzes and just calling them another name. So get people used to that brainstorming and get them used to the process and allow them to see how problems go away”. | The interviewee was open in expressing their opinion concerning the current state of lean implementation. The interviewee however did seem frustrated over how little in terms of awareness and attitudes towards lean in general.

### Organisation & Management Environment

**Feature** | **Analysis** | **Quote** | **Interviewee Attitude**
--- | --- | --- | ---
**Formal Social Structure** | When discussing the strategic approach and specific tool development of the implementation process the interviewee also described the formal social structure. According to the interviewee the formalised structure of the organisation is static and set up as smaller independent entities. This form of formalised organisational structuring according to the interviewee causes issues to | “The business is set up and I use a horrible paradigm but the business is set up as silos. So it is basically the site manager is a business amongst himself and within himself, he comes up to the construction manager they are a region and they are basically set up as independent businesses that compete against each other. So it is difficult to get national standardisation across the business as there is a lot of resistance to centralising | The interviewee was frustrated over the nature of the formalised social structure of the organisation and how such structuring has lead to a number of cultural barriers to emerge that will influence the acceptance of the lean innovation.
emerge concerning independence and lack of group integration and interaction.

The interviewee in particular highlights the difficulty independence and lack of group of integration will have on the lean implementation process. Such a formalised structure according to the interviewee is also cause for concern with the presence of an overall critical attitude towards change.

Informal Social Structure

The interviewee raised awareness of the informal social structure when discussing personal challenges associated with and emerging from the implementation of current lean orientated scheduling tools. According to the interviewee the nature of the communicative environment of the organisation is underpinned by face-to-face heterophilic and homophilic networks.

The nature of these heterophilic and homophilic networks is guided by the requirement that with every email there is a face-to-face discussion follow up.

The interviewee was asked about the strategic approach underpinning lean implementation. The interviewee described that the approach has enabled them to establish more personal heterophilic relations across the organisational environment. For the interviewee the development of these relations are essential for implementation to be successful.

Implementation Process

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<td>Knowledge</td>
<td>The initial question of the interviewee asked the interviewee to describe their role within the organisation in about 1979.</td>
<td>“I started out as an apprentice in [Defence] in about 1979. I went from my trade direct into production.”</td>
<td>The interviewee was open in expressing their knowledge and experience in the organisation.</td>
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The interviewee seemed culturally frustrated with the nature of the informal social structure of the organisational environment. The interviewee struggles with the nature of the communicative environment as in previous organisational environments technological based communications was the main form.

The interviewee seemed extremely happy over the establishment of more personalised heterophilic relations between them themselves and other organisational employees.

“So one of the other things is go-look-see is one of the things I talk people is that the expert is the person who sees the job everyday. It’s not the person who sits in the office or the person who looks at numbers; it is the person who sees the job everyday. So I try and spend and I have been successful in the last couple of weeks, I usually spend at least 1 day a week on the road and just go around and have a look at all of the different types of waste and issues in house. Interestingly there are things that people don’t know about such as we discovered an excess in bricks is an issue”.

“…well communication is big here. It’s a face-to-face industry. So one of the things that I struggled with when I first started was having come from very large companies where a lot of the communication is done by other means other than face-to-face. Is in this organisation if you send someone an email or someone data you need to follow it up with a face-to-face to talk to them about it”.

The interviewee seemed extremely happy over the establishment of more personalised heterophilic relations between them themselves and other organisational employees.
organisation, their experience within the industry as well as their level of lean awareness. Through their knowledge and role of lean the interviewee is identified as the organisation’s champion and innovator.

Although the interviewee has a high exposure level to the lean innovation within a manufacturing context they have a low exposure to the application of lean within the construction industry. As such the interviewee is identified as having a low-high experience/exposure level.

Planning and engineering and I was the project management officer for two large [Navy] projects… I have also worked in steel for [steel manufacturer] in packaging… 15 years in automotive, 5 years as the senior test engineer for a parts supplier… Then 10 years at [car manufacturer], the last 4 years at [the car manufacturer] my role was the [car manufacturer] Production System manager for Asia-Pacific and Africa, so that’s about 12 plants in 9 countries. So that role was specifically in regards to implementing lean in [the car manufacturer’s] production facilities. From there I worked for the world’s leading manufacturing consultancy firms, I spent two years in the mining industry implementing lean, then two years in a packaging plant just doing general management roles and doing some total productive maintenance and then one year here, well nearly coming up to a year here at [the organisation].”.

Decision

When discussing the approach to lean implementation the interviewee highlighted the utilisation of Kaizen Blitzes (Study Action Teams) as a means of mass communication and education. For the interviewee the nature of these study teams have been focused towards the integration of lean tools as part of the greater ETS programme currently being implemented.

“The ones that have been done so far within the business have focused on specific issues associated mainly with ETS. The blitzes have highlighted specific cost and cost issues and in that case I have had site managers in on the meetings as well but not external trades yet”.

The interviewee was open in their opinion and expressions concerning the way the decision is being communicated and educated within the organisation. However seemed frustrated in how they have been approached for specific organisational groupings rather than the organisation as a whole.

The interviewee was asked to provide some description of the approach to the implementation of lean so far within the organisational environment. The interviewee highlighted the presence of education and communication to be of importance in the forming of an approach strategic application of the lean innovation within the organisational environment.

The interviewee stated that the current approach is designed around making those individuals in implementation of lean through out multiple organisational environments.

“…So some of the work I looked around concerned the education of some of the more senior managers that even though there is no moving production line, there are still principles that apply from the moving production line to our production line which is the jobsite”.

Interviewee was open in providing an honest opinion towards the current strategic approach of the lean innovation within the organisational environment. The interviewee seemed a little frustrated over the nature of the approach however can see the benefits in approaching implementation in this way.
senior management roles aware of the innovation prior to any further education within the organisational environment. For the interviewee targeting senior management in the first instance of implementation is essential in the forming of a general acceptance of the lean within the organisational environment.

**Implementation**
The interviewee was asked to describe the organisation’s current lean implementation strategy. In describing this the interviewee identified and described their position in the organisation to be focused towards forming a strategic approach in which lean would be implemented into the organisation environment, particularly in terms of gaining momentum behind the lean innovation.

Currently the strategic approach and direction of the implementation behind lean is focused towards the assessment and application of specific tools for activity, situations, tasks and processes within the organisation.

In terms of describing their position and role within the organisation the interviewee seemed frustrated over their current position and role. This emerged as essentially the organisation has yet to implement lean to the extent with which the interviewee has expected.

The frustration of the interviewee also carried through to the current strategic approach underpinning the organisation’s progress concerning lean implementation.

The interviewee was asked to describe the intended approach they would undertake in relation to the implementation of lean within the organisational environment. The interviewee described their approach to be support by a number of steps or processes which are aimed at targeting specific elements of lean within a context that is approachable by the whole organisation.

The first step identified by the interviewee is about making visibility of the business and organisation. This first stage was referred to as ‘Business Visibility’. Underpinning this first stage is the education and communication of the organisation through study action teams.

The interviewee was open in expressing their opinion and reasoning behind the strategic approach.

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<th>Implementation</th>
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<td>“Well my role is the programme manager for lean construction and the initial brief is to understand how lean manufacturing fits into the construction process. At the moment I am probably doing more project work than lean implementation. I am trying to implement it by doing a bit of work on the implementation of tools and try and sell the return value to the business to get some momentum around lean”.</td>
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<td>“…the first step I would take is to make the business visible. So having said you would probably run some workshops before hand to senior management, not just senior management but also the whole organisation as I think it is far more valuable. So site managers, some people from trades all the way to general manager. So I would run some of those first, get some awareness around what lean is and involved in that would be a simulation”.</td>
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<td>In terms of describing their position and role within the organisation the interviewee seemed frustrated over their current position and role. This emerged as essentially the organisation has yet to implement lean to the extent with which the interviewee has expected.</td>
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<td>The interviewee was open in expressing their opinion and reasoning behind the strategic approach.</td>
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The interviewee was asked to further describe the current focus of the organisation’s implementation process particularly in the approach to implemented specific lean tools. The interviewee highlighted that the current strategic direction and approach is focused towards the application of specific tools being applied to specific activities, situations, tasks and processes associated with scheduling. Underpinning the current approach is the presence of the organisation’s ETS programme.

According to the interviewee the ETS programme or ‘Extra to Schedule’ is about the minimisation of specific organisational wastes. In terms of the implementation process this EST programme is considering to be a second step in the implementation process highlighting ‘Tool Identification & Assessment’.

The interviewee specifically focused on project delivery waste in terms of pre-fabrication wardrobes and hanging doors.

Interviewee 1 also described the ETS programme as a core strategy with which lean tools and principles support. As currently organisational management is concerned about the minimisation/elimination of waste as part of project delivery.

The interviewee discussed the desire to implement a system known as ‘working menu’ as part of the ‘Tool Identification & Assessment’ stage of the implementation process. The nature of the discussion highlighted the organisation’s desire to approach lean implementation in terms of tool delivery.

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<tr>
<th>The interviewee was open in expressing their opinion and reasoning behind the strategic approach. Some frustrations were shown concerning the presence of organisational and industry related cultural attitudes as potential barriers to successful implementation.</th>
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<td>“…I’ve run a few Kaizen workshops. I’m trying to get practical problem solving up off the ground and concern, containment and counter measure. We are doing in sort of a round-a-bout way some sort of standardised work off the ground, something that the organisation is very poor on and there is a poor understanding of it. So at the moment it is standardised work from a macro perspective of having a standard not necessarily at the micro perspective of time and motion and do a work analysis. Although I’m about to do some activities around that, basically looking at particular parts of the construction process and note where I want to apply some basic quick change-over principles, which is understanding internal and external work. So one of the things I’m looking at is potentially the pre-fabrication of wardrobes and the pre-hanging of doors as a work that can be externalised rather than the way that it is done at the moment. So how I would approach that is I will go out and undertake some time studies and watch people put the job together and do like a standardised work valuation streams around it, starting off with some very basic value streams on workers as well”.</td>
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<td>“Working menu is similar to a work balance chart, valued added and not-value added. Well if you took that and applied that to someone in the office and so you say the site manager then spends x amount of time doing customer calls and QA inspections, so it is at a broader level over a whole day so over an 8 hour duration and I think one of the most valuable things that can be done here is that exercise to be done where people, where management give what their expectation is for the site</td>
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<td>The interviewee was open in expressing their opinion of the approach. However they are and were a little unsure on how the implementation of the ‘working menu’ tool would be received within the environment.</td>
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Again when discussing challenges associated with the implementation and awareness of lean the interviewee highlighted a perspective of confirmation. The nature of the confirmation perspective is representative of the interviewee’s own opinion of what lean means. For the interviewee the implementation process is about the waste through the use of tools.

“Lean is all about reducing the time between order and delivery by eliminating waste at every stage of the process that is the fundamental thing about lean”.

The interviewee was open in expressing their opinion and interpretation of the meaning behind lean.

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<th>Challenges</th>
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<td>Feature</td>
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<td>Direct versus Indirect</td>
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<td>The interviewee highlighted another direct versus indirect challenge in the form of specific communicative issues within the organisation. The nature of the challenge highlighted both direct and indirect contexts. For the interviewee: Direct challenges are associated with the lack of communication (homophilic) between organisation; and</td>
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Indirect challenges are associated with the impact the nature of organisational communication structures and networks have within industry. "communicated’ because it seems difficult to get everyone together”.

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<th>Desirable versus Undesirable</th>
<th>When discussing their strategic approach to the implementation of lean the interviewee identified a number of challenges associated with current change occurring within the environment. The interviewee highlighted current challenges associated with technological advancement within the organisation environment particularly highlighting both desirable and undesirable issues. For the interviewee although technological change is desirable and can force change within the organisation environment, the nature of current change has been focused towards the wrong organisational groups. This is particularly evident in the updating of and moving of resources to computer systems which is beneficial. However for those who use the systems the translation of change has been undesirable through the lack of access to the system. The interviewee was highly critical of the current waste of resources on non-essential technological change within the organisational environment.</th>
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<td>&quot;...an enormous amount of resources have been committed at [the organisation] to putting things on computer systems, having beautiful reporting and one of the issues is that those systems aren’t available to those people at the coal-face. So site managers don’t have access to computers, they have a PDA and they have a system called 'click-home'. So ‘click-home’ is basically a PDA with a list of, well its basically a live Gantt chart, with a list of tasks that need to be done, this is the supplier, this is the duration, this is when it is scheduled and then you go and click or confirm and if necessarily move the dates around. So they have access to that and all the reporting about how the job is tracking requires them to come back to head office to access which they do once a week”.</td>
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<td>When asked about the nature of relations between the site and office environments, the interviewee highlighted that informal communicative relations are formed however the nature of the housing construction environment strains these relations. The undesirable challenge associated with the straining of site and office relations is due mainly to the nature of the housing construction environment and the way construction works is planned and scheduled. The interviewee was frustrated mainly due to the nature of project delivery within the construction environment. This frustration was heightened by the presence of general negative attitudes of the organisation and industry associated with project delivery.</td>
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<td>&quot;...but the problem is you rarely see anyone on site. I know that is might sound strange but that is one of our observations. I have probably visited at least 400 sites now and there would be probably about 10% that you would see people working on. Probably about 1% you would see a site manager”.</td>
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<td>When discussing the investigation of specific lean tool development within the construction organisation the interviewee highlighted an &quot;People here tend to say that construction is unique, construction is only unique in my opinion that it is still a craft based industry and they have yet to take even the</td>
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<td>Anticipated versus Unanticipated</td>
<td>Interviewee seemed generally surprised with the overall critical attitude and belief systems of the organisation concerning the lean</td>
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unanticipated cultural barrier to successful implementation. According to the interviewee general cultural attitudes, opinions and behaviours present within the organisation environment concerning lean implementation is a significant barrier to the successful implementation of lean within the organisational environment.

When discussing the overall background and presence of the lean innovation within the organisational environment the interviewee reflected on the nature of the industry. The nature of the industry concerning the overall need to make a profit according to the interviewee highly influences the cultural attitudes, beliefs and behaviours of the workforce. This unanticipated challenge can according to the interviewee cause cultural barriers to emerge concerning the implementation process.

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"...one of the key reasons in my opinion that is difficult to get people to change in housing construction is because they always make profit. So there is no crisis if they don’t sell houses then they don’t lose money. It’s because they work on cost-price margins, there is no real incentive to improve”.

Interviewee seemed generally surprised with the overall critical attitude and belief systems of the organisation concerning the lean innovation.

Interviewee was open in providing an opinion concerning the challenges facing the organisation and the implementation process.
## Interviewee 4: Project Manager

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<tr>
<th>Feature</th>
<th>Analysis</th>
<th>Overview</th>
<th>Interviewee Attitude</th>
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<tr>
<td>Approach</td>
<td>For the interviewee the approach of the lean innovation is directed towards the implementation of tools.</td>
<td>“From my limited understanding of it, it seems to be more down the tools path but it saying that if those tools are applied correctly then they should be able to dictate the structure should be as well. So it’s almost the horse pulling the cart, it’s going to have to go in that one direction that the tools see fit”.</td>
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## Organisation and Management Environment

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<th>Analysis</th>
<th>Overview</th>
<th>Interviewee Attitude</th>
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<td>Formal Social Structure</td>
<td>The interviewee highlighted when discussing challenges associated with the implementation of the lean environment the structure and nature of the organisation environment. The nature of the structure is fragmented particularly in how communication is used to inform down the structure in a dictatorial way. The overview of the organisational structure is bureaucratic.</td>
<td>“We do have a structure in place here where you have business groups around [the city] and regional [state locations] that have leaders at the top of certain trees and they can heavily influence the nature in which someone goes out and builds a home. So that structure has been consistent outside the business for a long time”.</td>
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## Implementation Process

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<th>Overview</th>
<th>Interviewee Attitude</th>
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<td>Knowledge</td>
<td>The interviewee has a low exposure level to the lean innovation however their experience within the construction is moderate.</td>
<td>“I came from a finance background so I originally didn’t start off in this particular industry. So four years ago I thought it was a good idea to come across into property prior to the GFC and made the transition across. Unfortunately the GFC hit. So I’ve been in the industry ever since. I’ve been with [the organisation] for over 18 months and I first learned about lean about 12 months ago”.</td>
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| Persuasion                    | The interviewee reflected on their first exposure to the lean innovation which focused on lean application in a non-construction industry. For the interviewee lean is just another management strategy for it to be different the innovation needs a greater knowledge base within the construction industry and environment. | “Well fundamentally its pretty self explanatory in a lot of instances. I don’t think its that ground breaking in what they are trying to achieve. When you look at a system and the way something works, of course there are going to be bottlenecks in how you are going to deal with it and whether there are tasks you have to do and what is to be done subsequently or preceding which helps things. So I was accepting of it I just don’t think it is ground” | The interviewee although open seemed condensing in their assessment of the lean innovation. This attitude may have been present due to the nature of the introduction. |
breaking stuff, I thought it was relatively fundamental and it had an application from a manufacturing background and the examples shown weren’t particular to the building industry. So I thought it had some good ideas and applications, but I guess my main comment to a system like lean is that we almost need to know and understand building from a [check 2.11 for word]. I say that in terms of this is probably where you will get your rejection from guys in the field, when and if you come in with a concept or structure, but you don’t know the [that word] composition you are trying to influence then, you got little to no chance of acceptance in that”.

The interviewee highlighted that there has been no formalised approach or structure that has developed as a means to introduce the lean innovation. However in discussing this aspect the interviewee noted that they themselves and another individual (interviewee 3) will be conducting a formal session for site managers. The nature of such training sessions seems directed towards a needs basis in line with the current strategic direction of the organisation.

The nature of the session is formal however underpinning the session is the potential for heterophilic communication networks to emerge. This is shown in particular between the site managers and the individual (an office employee).

“We are undertaking, well [interviewee 3] and I have a session in two days time. In the session we are undertaking an analysis of how we can deliver homes in 20 weeks, that is starting off with a workshop and getting guys from the site management level up to the building management level in a room and talking through a day of exploring where the issues are. So to date there hasn’t been any official formal approach to get people to think that way. I think we work on an as needs basis, so if a component of our building process isn’t working we will go away and try and formulate a plan to deal with that and that formulated plan isn’t super-structured in the lean format or although it may change with [interviewee 2’s] further workings with us. But I don’t think at the site management level, I don’t think they will be given a training session on lean specifically but I think some of the outcomes that we produce from here will be influenced by that lean system”.

The interviewee noted that the implementation of the lean innovation is only the earlier stages. The nature of the implementation however for the interviewee is linked essentially in the education of employees and the application of lean within the organisational environment.

“...it is still within its infancy. But I must say without the formalised approach of lean, guys like myself in building capabilities and [individual] who works in the supply chain would be applying some of the characteristics that would be evident in lean – but we wouldn’t know that we would be doing it. We would be taking down a problem, looking to see where that problem is coming from and trying to look for a solution to that particular problem. The interviewee although open seemed condensing in their assessment of the lean process and its presence within the organisational environment.
So we are probably doing components of lean in some way but we are not formally following a set structure.”

“Sure enough there can be refinements made to any system but the true value of the system is if everyone uses it, it is easily understood, it is recognisable and it does the job. So from the experience that I had from that sort of life in the military the methods that they use could have been improved but the methods that they use are well understood, well known and tested and so they worked exceedingly well. And that is something I would say to lean, if we were to implement it and it didn’t have all the answers and it was a hybrid of something else or we penny pinched some good ideas from it and then used a lot of existing ideas from the business as long as that is consistent and well understood then that’s the real benefit from it all”.

| Confirmation | The interviewee reflected back on their own background in the military as a means of assessing the potential benefits lean could bring not only to the organisation but also the construction industry. |
| Challenges | Feature | Analysis | Quote | Interviewee Attitude |
| Direct versus Indirect | The interviewee highlighted that the organisation is challenged by lean direct adaptability into the existing environment. It is of particular concern to the interviewee due mainly to size of live sites being managed as part of operations. | “Look I guess the original point I would make is that the adaptability to our particular circumstance and our circumstance is different to a manufacturing warehouse where you have controlled conditions, controlled staff, you can dictate virtually what happens along each point of the manufacturing process. When you have 1500 live sites spread across you know the size of Europe you don’t have the capability of that same control. So I think my concerns about it is the adaptability it does have for the residential market in particular and about how we can fully utilise it given our geographic pull constraints”. | |
| | When asked about the implications associated with the subcontracting of trades on site and the implementation of lean the interviewee noted that this is a challenge. The nature of the operational environment particularly in construction has dictated the structure of the organisation. Such an approach according to the interviewee has left management with little flexibility in terms of trade employment which can indirectly cause | “You lose a lot of control but you also gain a lot of flexibility in the costs associated with putting people on the books. So you do lose a great deal of control. I wouldn’t say for the fact that you have subcontractors that you can’t implement the tools of lean, but you would have to be very strong from the outset, you would have to have your structures in place from the word go to be impacted fully”. | |
The rapid growth of the organisation was another issue/challenge identified by the interviewee as causing concern. The nature and rate of growth has caused some issue in the standardisation of work and the implementation of standardised work practices.

“Look they get caught up, well we work on the business side within the business as much as the guys in operations and they are working in the business. And you know they have deadlines to meet and things to do and they can’t wait for a decision they need to make for an afternoon, they can’t wait 3 months for that to go through the proper channels. So it’s a function of the growth of the company but it’s also a function of the fact that these guys are in a time limited space and they need to make decisions on the run”.

Desirable versus Undesirable

Although change is wanted and desired by the interviewee that nature of the change and how it is communicated can affect how it is perceived within the organisational environment. Central to desired implementation outcomes for the interviewee is a standardised or central management system, without this then the outcome of implementation can be undesirable and dysfunctional.

“We do have a structure in place here where you have business groups around [the city] and regional [state locations] that have leaders at the top of certain trees and they can heavily influence the nature in which someone goes out and builds a home. So that structure has been consistent outside the business for a long time. I fully think we could, if we were to put it into one big silo and have one man at the top of the tree, programmes like lean and any other initiatives we bring into the business would be flowed to those guys a lot easier but due to the nature of the individuals themselves, you know, ‘builders being builders’ and the fact that they are so diverse and spread around, there is a big impediment there just through the management structure and the way that the building groups are set up and not only the building groups but all the other groups that feed into building which is operations, drafting, estimating, sales and all the national functions as well. Because I suppose it occurs because we all work within our own little silos and we are all trying to do good but there is no common thread between a lot of us. It is hard to implement trades across all those business groups as well”.

As above however the focus is more on the structure of the organisation and placement of organisational groupings.

“We are quite spread out and in the culture that building is building, whilst you’ve have geographically areas you should all report up the one tree – which to an extent we kind of do but not really, guys do still go off and do their own thing. It’s the same for operations and sales. I think
operations is operations and they should all conform to some convention that is designated at a level above a region or an area and everyone does the same thing. So I think the structure of which [the organisation] is should be in larger groups that are more consistent, then opposed to the way we’ve got it now which is where you have an area and in that area you have a specific building team, operations team, sales team and they all sort of do their own thing. As opposed to in other areas. So I think if you forget about the areas for a moment and you have building in building, operations in operations, sales in sales".