NOVA

University of Newcastle Research Online

nova.newcastle.edu.au

Ha, Huong & Jose, Jim. "Public participation and environmental governance in Singapore" Published in the *International Journal of Environment, Workplace and Employment*, Vol. 4, Issue 3, pp. 186-204, (2017).

Available from: <http://dx.doi.org/10.1504/IJEWE.2017.10008689>

This is the accepted manuscript version of an article published in final form in the *International Journal of Environment, Workplace and Employment* available from <http://dx.doi.org/10.1504/IJEWE.2017.10008689>.

Accessed from: <http://hdl.handle.net/1959.13/1355118>

PUBLIC PARTICIPATION AND ENVIRONMENTAL GOVERNANCE IN SINGAPORE

Huong Ha

UON Singapore and University of Newcastle, Australia

E-mail: artp6075singapore@yahoo.com

*Corresponding author

Jim Jose

University of Newcastle, Australia

E-mail: Jim.Jose@newcastle.edu.au

Abstract

Singapore is as a very small city-state with limited human and natural resources. It has successfully moved from a developing to a newly developed country, and has maintained its economic viability during many global economic crises. Effective governance and management of resources has been a key factor in ensuring national survival. However, its formal democratic processes have been considered limited, especially in terms of public participation. Given that effective governance often presupposes some degree of public participation this paper explores the role of public participation in the management of the environment in Singapore. It aims to identify (i) the availability of information about environmental laws and regulations, environmental issues, environmental conditions and other relevant information regarding environmental management, (ii) opportunities for citizens to provide input and comments about environmental issues, and (iii) opportunities for citizens to exchange their ideas with others.

Key words: E-democracy, e-government, environmental management, e-participation, multi-sector governance, public participation, public sector, private sector, civil society, e-citizen, Singapore

Biographical notes: Dr. Huong Ha holds a PhD from Monash University, Australia and a Master's degree in Public Policy from National University of Singapore. She is currently lecturing at UON Singapore. Her previous positions, prior to joining UON Singapore, include Dean, Director of Research and Development, Deputy Course Director, Chief Editor, Executive Director, Business Development manager, etc. She has authored and co-authored several books, journal articles, book chapters, book reviews, invited works and conference papers. Her research interests include e-government, disaster management, climate change, change management, consumer protection, corporate social responsibility and governance. She has been an invited member of (i) the

international editorial boards of many international journals; (ii) the scientific/technical committees of several international conferences; and (iii) international advisory board of many professional associations.

Jim Jose is Professor in Politics & International Relations in the Newcastle Business School at the University of Newcastle (New South Wales, Australia). He is the author of *Biopolitics of the Subject: An Introduction to the Ideas of Michel Foucault* (1998), co-editor of a *Not So Strange Bedfellows: The Nexus of Politics and Religion in the 21st Century* (2013), and a contributor to *Anarchists and Anarchist Thought: An Annotated Bibliography*, ed Paul Nursey-Bray (1992). He has published numerous articles on political theory, feminist theory, and Australian politics and public policy. Further details are available at <http://www.newcastle.edu.au/profile/jim-jose>. His research interests include: (i) Political science, politics and the political, (ii) Feminist theory and the history of political thought, (iii) The discourse of governance and political rule, and (iv) Postcolonial theory, political identity and the politics of memory.

INTRODUCTION

Recent natural disasters such as the earthquakes in Indonesia and Italy (2012), floods in Kenya and the Philippines (2012), dust storms in the Middle East (2012), and the Tsunami in Japan (2011) have destroyed human and ecological systems. In addition, incidents created through human actions, for example, the poisonous fumes in Turkmenistan (*Associated Newspapers Ltd*, 2014), fires in Indonesia (Sidder, 2016), nuclear tests by India, Iran and North Korea (BBC, 2017; Starr, 2017), have reinforced the full swing of natural forces causing environmental destruction. The trans-boundary scope, magnitude and domino effect of environmental issues have become huge and affect economic growth and employment in the affected areas (Thampapillai, Wu and Sunderaj, 2007), which makes the governance for environmental management more challenging and complicated. The resources, power and legal frameworks required for managing the environment are dispersed among different actors at all levels (Ekane et al., 2014). It is virtually impossible for any single actor to address all environmental issues. The key issue here is the responsibility of different sectors, and the level of participation and interaction between stakeholders, in the governance of the environment.

Singapore is a small city-state in Southeast Asia which has very limited natural and human resources, and thus effective governance and management of resources are keys to national survival. Many researchers have noted that the democratic process, in particular in terms of public participation and engagement, has been limited in Singapore (Lee, 2002; Mathl, 2008). In addition, civil society has been in the infant stage, and has largely been co-opted by the government to educate the public on how to be good citizens, instead of being the representatives of the public, fighting for the public interests and benefits (Francesch-Huidobro, 2008). However, Singapore has successfully transferred from a developing to a newly developed country, and is able to maintain its viability and sustainability during many global economic crises. Thus, it is worthy of exploring how government has engaged the public and encouraged public participation in managing the environment in Singapore. The public can only participate in environmental governance if it can obtain adequate and relevant

information, and have opportunities to be engaged and involved in the policy making and implementation process. Also, this type of information is essential to enhance the public awareness of environmental issues.

Traditionally, public governance focuses on the public sector. The reform of public management and rapid political, socio-economic, cultural and technological changes have precipitated attempts to find innovative forms of governance. Thus, new concepts of governance have emerged, such as integrated governance, hybrid governance, multi-sector and multi-level governance, embracing the public and private sectors, and civil society. Multi-sector governance with the contribution of various political sectors has been discussed as an alternate form of governance which can address the shortcomings of the current governance framework (Coghill, 2004; Fisher and Surminski, 2012; OECD, 2017; Schroeder, Burch and Rayner, 2013; Weissman, Varghese and Wood, 2013).

However, it is very challenging to justify a good governance model without a form of democracy promoting some minimal level of active participation of its citizens. One key condition of participation is having access to relevant information, in this case information relating to environmental laws and regulations, environmental issues, the current state environmental conditions, and how facilities and toxic releases are regulated. In addition there also needs to be information about opportunities to participate in both the on-line and off-line environments. In order to contribute to the policy making process citizens need opportunities to provide their inputs to relevant government agencies, to make comments on the environmental regulations and the current mechanisms to address environmental issues, and to exchange ideas with others via the online platform (Beierle and Cahill, 2000; Hřebíček, Schleidt and Legat, 2010).

Singapore is a world leader in the provision of what has come to be known as E-government, a mode of governing encompassing the adoption of Information Communications Technologies (ICTs) as a means to improve “the efficiency of public administration processes, public services for consumers/citizens, to contribute to specific policy outcomes (for example in health policy, environmental policy, and educational policy)” (Kneuer, 2016, p. 669). According to a recent study based on data developed by the United Nations between 2008-2014, of the top twenty-five nations on the E-Government Development Index (EGDI), Singapore ranks third highest (Mensah 2016: 3051). However, whether this level of engagement through ICT use translates into effective citizen engagement remains to be seen. To explore this issue, this paper looks at the specific issue of the provision of environmental information in terms of e-government.

The paper asks a number of questions. First, how accessible is the public provision of information about environmental laws and regulations, environmental issues, environmental conditions and other relevant information regarding environmental management in Singapore? Second, what opportunities are there for citizens to provide input and comments about environmental issues, and third, what are the opportunities for citizens to exchange their ideas with others? The paper aims to answer these questions by examining the information presented for public consumption on the websites of eighteen organisations which have been directly involved in environmental management in Singapore. This includes the promotional material of the website itself and other documents such as annual reports, policy statements, regulatory guidelines and so forth that might be hosted on each website. This provided the study with the raw material on which to base its findings about how Singapore’s E-government approach has affected the capacity for citizen engagement and participation around this key policy issue.

Governance

Public governance has been defined from different perspectives and aspects, such as regulatory regimes, structure, organisational arrangements, authority and power, roles and responsibilities, activation of processes, and implementation in terms of provision of public goods and services to citizens (Ansell and Gash, 2008; Ha, 2012, 2014; Lynn, Heinrich and Hill, 2001; Stoker, 1998). Kooiman (1999) explained that governance embraces the three spheres of governance, i.e. government (the state), business (the private sector/the market/e-retailers) and civil society. It includes:

all those interactive arrangement in which public as well as private actors participate aimed at solving societal problems or creating societal opportunities and attending to the institutions within which these governing activities take place (Kooiman, 1999, p. 70).

Boesen (2006) has defined governance as the management and enforcement of rules and regulations, and how informal and formal actors and institutions exercise their power, legitimacy and authority. Ha (2012, 2014) has adapted various definitions of governance from Kooiman (1999), Akhmouch (2012), Boesen (2006) and the UNDP (2011) to propose that governance encompasses a wide range of elements, including institutional arrangements, organisational structures, rules and regulations, mechanisms, roles, power, legitimacy, responsibility and processes characterised by the interaction and interconnections between different groups of stakeholders in the public and private sectors, and civil society. Thus, for the purpose of this study, governance is defined as:

a complex system of institutions, structures, mechanisms, functions, and processes characterised by the interaction among government, business, and civil society organisations in the management of resources to establish agreements about the standards, policies, rules, and enforcement and dispute resolution procedures – in order to achieve economic, social and political objectives.

Multi-sector Governance for environmental management

Several key environmental issues make the governance of the environment complicated and challenging. Environmental problems are often trans-national in nature in that the impact of environmental degradation is cross-border in nature and can last for a long time (Biermann, 2017). Environmental issues do not spare any individuals, nor do they respect legal or political boundaries. Many environmental issues are unpredictable. Change in temperature, water, air and noise pollution, forest fire, soil depletion and biodiversity destruction may happen in one geographical location and speedily spread to other places (World Health Organization, 2005).

New trends in the external environment, such as a shift in demography, slow or negative economic growth, drastic changes in global politics and economic relationships, speedy technological development and many others have increased the level of societal and environmental complexity which requires new forms of governance, and more active participation of all relevant groups of stakeholders, including citizens (IMF, 2017; Loorbach, 2010). Also, environmental problems and climate change have been global challenges and they need to be dealt with at all levels, including the global level (McNeill and Williams, 2007).

Given the trans-national nature and complexity of environment-related issues, Bäckstrand (2006) and Beisheim and Simon (2016) have explored the role of multi-stakeholder partnerships and networks in governance for environmental protection. Kooiman (1999), Hass (2004), and Provan and Kenis (2007) have also proposed an interactive governance system encompassing various actors, sectors and courses of actions, networks and processes which can be adopted to address the current and future issues associated with global environmental governance. In their view both regulatory and non-regulatory mechanisms, top-down and bottom-up approaches should be employed by different groups of stakeholders in the process of decision making and implementation of environmental policies. Also, new forms of public governance and management require greater collaboration across public sector agencies and as well as across sectors, i.e. the public sector, the private sector and civil society (UNDP, 2015).

In this approach, both state and non-state sectors, including the private sector and civil society, must work hand in hand with each other to achieve the collective objectives of environmental sustainability. All sectors can contribute to the process of environmental management in different capacities. Although each sector has its own resources, capabilities, competencies, purposes and functions, non-state sectors will assist government in the governance for environmental sustainability in terms of information, knowledge and resource sharing, engagement in the process of policy making and implementation, collectively providing educational programs to enhance public awareness of issues associated with environmental degradation and climate change, implementing programs and initiatives, and many others (Bäckstrand, 2006). Yet, this governance model can only function well if the pre-conditions of good governance are achieved.

Key aspects of democratic practice such as transparency, accountability, respect for the rule of law, efficiency, and inclusion are some of the prerequisites for good governance (Hope Sr, 2005). Good governance, in turn, has been considered important for promoting environmental sustainability (UNDP, 2014). However, governance measures aimed at mitigating and adapting to environmental issues have been challenging and multi-layered. Since governance processes are shared by multiple actors the level of participation of different groups of actors becomes critical to addressing the on-going and emerging environmental problems (Held and Hervey, 2009). This is partly because democracy requires some degree of citizen participation and different groups of stakeholders, and partly because citizens are the recipients of, and are directly affected by any public policy. Furthermore, participation, representation and deliberation are key features of an effective democracy (Gutmann and Thompson, 2004; Lidskog and Elander, 2010).

Citizen participation thus becomes an important nexus for the democratic development of governance for environmental sustainability. It is part of a number of elements that comprise an innovative form of integrated environmental management which includes, in addition to citizen participation, knowledge and education (Menegat, 2002). Of considerable interest for our discussion, is the understanding that citizen involvement can be more effective via the online platform (Brierley and Cahill, 2000). Therefore the idea of e-participation has become significant in developing effective strategies of environmental governance. Hence this paper gives a brief consideration of e-democracy.

E-Democracy

For purposes of our argument, e-democracy is understood to denote a democracy achieved via online participation or e-participation. E-democracy is defined as the use of information and

communication technology (ICT) to participate in social and political debates and discussion, to be involved in policy decision-making processes (Grönlund, 2003; Päivärinta and Sæbø, 2006; Kneuer 2016). Participation is an essential component of one of the three key dimensions marking the quality of a democracy, namely the procedural dimension (Kneuer 2016, 669). Electronic forms of participation, or e-participation, complement traditional channels of communication such as face-to-face meetings or one-way interaction via mass media (Sæbø and Päivärinta, 2005; Porwol, Ojo, and Breslin, 2016). These forms of technology-mediated dialogues between citizens and public agencies have contributed to improving the relationship between government and stakeholders by promoting transparency and accountability (Bertot, Jaeger and Grimes, 2010; Navarro-Galera, Alcaraz-Quiles and Ortiz-Rodríguez, 2016). The availability and accessibility of government-provided data has also contributed to improving this relationship while at the same time facilitating the process of knowledge creation and encouraging innovation (Zeleti, Ojo and Curry, 2016). Effective E-participation thus becomes essential as the legitimacy of democratic governance depends on the level of trust which citizens have in government and government agencies (Reddick, 2011; Kneuer, 2016).

In democratic societies, citizens should be encouraged to be involved in the governance process via opportunities for debates, contribution and representation through political openness (Freeman and Quirke, 2013; Chadwick, 2011; Coleman & Blumler, 2009). The levels and forms of citizen participation in the governance process in terms of the interaction between citizens and government have been characterised by three models of e-participation (see e.g. Chadwick and May 2003; Kamal 2009; and Reddick 2011). They are the managerial, consultation and participatory models. In the first model (managerial model), the government aims to improve the delivery of public information and service online, i.e. e-government. The relationship between government and citizens is reflected via one-way interaction. This is consistent with the classical model outlined by Schon (1971) in which government utilises technology as an innovative form to communicate with the citizen (Hull, West and Cecez-Kecmanovic, 2011).

In the second model (consultation model), information is exchanged between government and citizens, i.e. there is a two-way interaction between citizens and government. Although citizens' views and feedback are taken into account during the policy making process, this kind of two-way interaction is guided by government. Similarly, an example of this model is the social system model in which technology and social media are engaged to enable and encourage connectivity among users, and motivate content co-creation (Hull et al., 2011).

In the third model (participatory model), the two-way interaction is initiated by both citizens and government. This is the highest level of citizen e-participation where citizens can actively participate in policy decision making which directly affects their welfare and well-being (Reddick, 2011). According to Shaun et al. (2016) and Chilvers (2008), there are three key benefits of a participatory model. Firstly, normative benefits that refer to the improvement of "citizen empowerment, equity and social justice in decisions and the evidence that underpins them" (Shaun et al (2016), p. 277). Secondly instrumental benefits refer to the enhancement of "the legitimacy of evidence and decisions, and the trust that is afforded to them" (Shaun et al., 2016, p. 277). Finally, substantive benefits refer to the increase in the "quality of the evidence underpinning the decisions that are ultimately made" (Shaun et al., 2016, p. 277). The theoretical framework for this study has been built on the concepts of e-participation and the interaction between government and stakeholders.

RESEARCH METHODOLOGY

This is an exploratory study aimed at developing an understanding of a particular aspect of e-government, namely citizen's e-participation in environmental management. A qualitative method of analysis was used to assess and interpret the information presented in reports, policies and other documents hosted on numerous websites of organisations directly involved in environmental management in Singapore. The next section will briefly discuss the data collection and data analysis.

Data collection

According to the Singapore Green Landscape report, 18 government ministries and statutory boards have been directly involved in work and policies pertaining to environmental management in Singapore at the time the study was conducted (Green Future Solutions, 2010). Thus, all 18 of these government Ministries and statutory boards were selected for inclusion in the study. In this respect the websites and the material that they hosted constituted the primary data for analysis in the sense that our key focus was on how these websites facilitated (or not) e-participation and hence citizen engagement with democratic governance. Secondary data were also collected from both academic and non-academic sources, including the selected agencies' annual reports and other third parties' publications, such as reports, newspapers, etc.

The study used nine criteria as listed in Table 1 to identify issues of access and opportunities for engagement. Eight of these were derived from a study undertaken by Beierle and Cahill (2000). Their study, through the use of a survey in which they identified eight criteria of evaluation, aimed to examine how "each of the 50 states [in the USA] is using the Internet to provide citizens with environmental information, gather public input on agency decisions, and foster networks of interested citizens" (Beierle and Cahill 2000, p. ii). To their criteria we added a ninth to explore what other issues can be identified via exploration of relevant government agencies' websites. Since we were concerned with readily identified websites there was no need to conduct a survey. Rather, by navigating through each website we could identify whether one or more of these nine criteria were present. This meant that a simple decision procedure could be adopted, namely did the website facilitate the relevant access or opportunity?

Data Analysis

The resultant Yes/No data regarding the information availability and the activities pertaining to environment management of the selected agencies in Singapore were then tabulated as per Table 1. These data were then interpreted in the light of the qualitative analyses of the various sources of secondary data such as reports, policy documents and scholarly literature.

There is no standardised approach to analyse qualitative data (Saunders et al. 2003). However, we determined that a content analysis approach would be most appropriate. This enabled us to situate the meaning of the various criteria so that they could be classified into appropriate categories, and hence explore whether information available on the websites of the selected agencies enhanced one or more of the nine items identified in Table 1.

Reliability

The data was cross checked by two researchers regarding the information posted on the relevant websites. This increased the reliability of the measurements. In other words, the researchers employed inter-rater reliability to evaluate the degree to which different raters/researchers agreed with regard to data coding and checking (Stemler, 2004).

RESEARCH FINDINGS AND DISCUSSION

Provision of information about environment-related issues

The Internet has become a popular channel for users to gather information, and thus the public expect to be able to access information about environmental matters via the online platform, i.e. the websites of the respective organisations. The ready access to environmental information via the internet allows users, both individuals and firms, to know more about the environment, and how to mitigate the adverse effects of environmental degradation which impact the daily lives of millions of people, and also impact business operations. Access to information on the environment is very important since many countries or groups of countries have even enacted legislation relating to the rights of citizens to access environmental information. For example, the European Union has enacted the European Communities' Access to Information on the Environment Regulations 2007 (S.I. No. 133 of 2007) (Government of Ireland, 2007).

The findings from this research project in Singapore regarding information availability and opportunities for the public to be engaged and involved are presented in Table 1 and discussed below.

Table 1: Information availability and opportunities for public participation

N o	Public sector	Access to laws and regulations	Access to informat ion on environ ment-al issues	Access to informat ion on national environ ment-al conditio ns	Access to informat ion on regulate d facilities and toxic release	Access to informati on about opportuni ties for public participati on	Opportu nity to provide input	Opportu nity to commen t on environ ment-al regulation s	Opportun ity to communic ate with other citizens	Any other informat ion relevant to environ ment-al protectio n
1	Agency for Science, Technolog y and Research		v			v	v			v
2	Agri-Food and Veterinary Authority	v					v			
3	Building and Constructi on Authority	v			v		v			v
4	Economic Developm ent Board			v			v			

5	Energy Market Authority	v	v				v	v		v
6	Housing and Development Board				v		v			
7	International Enterprise Singapore	v					v			
8	JTC Corporation						v			
9	Land Transport Authority	v					v			v
10	Ministry of National Development		v	v			v	v		v
11	Ministry of the Environment and Water Resources		v	v		v	v			v
12	Ministry of Trade and Industry						v			
13	Ministry of Transport	v					v			v
14	National Environment Agency	v	v	v	v		v			v
15	National Parks Board	v				v	v			
16	PUB, the national water agency	v	v	v	v	v	v	v		v
17	SPRING Singapore	v			v	v	v	v		v
18	Urban Redevelopment Authority		v	v		v	v			v
	Total available	10	7	6	5	5	18	4	0	11

Source: from the study

Information about laws and regulations

The findings demonstrate that not all government agencies in Singapore have provided information about environmental legislation on their websites. Only 10 out of 18 (56%) state agencies and statutory boards have provided information about environmental laws and

regulations on their websites. The National Environment Agency has provided a comprehensive list of environmental legislations and regulations. Six sets of Code of Practice to guide other state agencies involved in environmental management are also available on its website. Some agencies have provided information about laws and regulations which they themselves administer. For instance, the Agri-Food and Veterinary Authority has posted nine Acts applicable to agricultural food, animals, birds, endangered species, fisheries, etc. The public can access the Building Control (Environmental Sustainability) Regulations 2008 on the Building and Construction Authority's website (Building and Construction Authority, n.d.). The Energy Market Authority has provided details of legislation and regulations relating to electricity and energy on its website. The public can read the full content of such legislation and/or regulations by clicking on the relevant online links.

A few agencies in Singapore only provided a short description of the legal environment in Singapore, and then recommended users to refer to relevant websites for laws and regulations. For example, International Enterprise Singapore included a link to the Singapore Academy of Law on their website. The Land Transport Authority provided information on policies relating to environmental protection. The Ministry of Transportation did not provide information about national laws and regulations related to the environment, but it did provide information about how it has acceded to the International Convention for the Prevention of Pollution from Ships (MARPOL), the details of which are accessible on its website.

Information about environmental issues

Only seven out of 18 (39%) organisations surveyed in Singapore provided easy online access to information on general environmental issues. This suggests that the majority of the state agencies and statutory boards in Singapore are not doing a very good job in this aspect, except two following key agencies which oversee the management of environment. The Ministry of the Environment and Water Resources provided a wide coverage of environmental issues, ranging from haze, air pollution, noise pollution, water pollution, recycling, waste collection and packaging. The content is brief, but there are graphics to illustrate the issues which encourage users to be interested in reading the content. The National Environment Agency posted a list of thirty topics related to environmental problems. They also publish a document about climate change and its impact which can be downloaded online. Information about environmental issues is tailored to the perceived interests of different groups of users, namely businesses, individuals and schools.

Information about national environmental conditions

The current environmental conditions refer to information about air quality, haze, watershed information (Beierle and Cahill, 2000). Water management is especially important to Singapore as Singapore does not have sufficient fresh and ground water and has to buy water from other countries such as Malaysia. Nevertheless, only six state agencies and statutory bodies (30%) post information on the environmental conditions online.

The Building and Construction Authority (BCA) focused on the Green Mark Scheme (GMS) to promote sustainable development, instead of discussing the current environmental conditions in Singapore. The GMS is a benchmarking scheme introduced by the BCA in 2005 to encourage organisations in the building and construction industry to adopt best practices and green technologies in environmental design and construction in order to achieve a sustainable built environment. Buildings constructed by different organisations will be rated according to

the five criteria, namely “energy efficiency, water efficiency, environmental protection, indoor environment quality, and other green and innovative features that contribute to better building performance” (Building and Construction Authority, n.d., para. 2). Users can also access information about how the government has committed resources to invest in environment and water industries. Users can also access information to address national and global needs on the website of the Economic Development Board. The Ministry of National Development published a 132-page document entitled *Sustainable Blue Print*, which discusses the current state of the environmental conditions in Singapore and explains how different groups of stakeholders in Singapore can act together in order to build a sustainable city-state. This document is comprehensive, yet it is not easy for a lay-person to understand the general state of the environment in Singapore. The public can access information about ambient air quality and haze conditions on the National Environment Agency’s and the Ministry of the Environment and Water Resources’ websites. In the first case this is done directly via the website and in the second via a PDF document. Recently, given the haze conditions and the poor air quality in Singapore due to forest fires in neighbouring countries, the NEA agency has provided 3-hour PSI (Pollutant Standard Index which is an air quality index) and PM 2.5 (fine particulate matter which are 2.5 micrometres in diameter or smaller) readings online. The NEA has also posted health advice to the public regarding how poor quality of air can affect their health. The Public Utilities Board (PUB), the national water agency, post information about the current conditions of flood management, instead of environmental conditions.

Information about how facilities and toxic releases are regulated

This item refers to the availability of “information about regulated facilities applicable to chemical companies, landfills, underground storage tanks” (Beierle and Cahill, 2000, p. 12). Only five Singapore agencies (28%) posted some information regarding how facilities and toxic release are regulated. The National Environment Agency publishes a relatively comprehensive set of information regarding Hazardous Substance Control and monitoring of environmental conditions on its website. The public can also purchase hardcopy versions of these documents directly from this organisation. The BCA posts information about various regulatory measures required by the authority to increase environmental sustainability standards for existing buildings on its website. The Housing and Development Board (HDB) publishes an online handbook for maintenance matters applied to HDB industrial tenants. However, the information on the PUB’s website pertains to preventative measures to manage floods in Singapore. It does not address environmental hazards or similar issue. On the other hand SPRING Singapore provides information about restrictions on the use of hazardous substances and chemicals. This information aims to help Singapore-based enterprises “comply with the standards, technical regulations and compliance requirements for food and electrical/electronics exports as well as in the environmental related areas” when they export products to other countries (SPRING Singapore, 2012, paragraph 1).

Information about opportunities for public participation

This type of information refers to (i) opportunities for the users to join the online mailing list to receive notification from relevant agencies, (ii) rules and processes to be followed when submitting written comments or consultation papers, (iii) how to process the requests for involvement, and (iv) general information about public participation activities (Beierle and Cahill, 2000).

Five out of 18 (28%) agencies in Singapore provide information in this category. The Ministry of the Environment and Water Resources encourages public engagement by inviting the public to join them on Facebook, to report an incident and share their ideas online. The public can report any environmental issue via the Online Reporting Centre e-portal, and they can provide feedback to the Ministry on how the environment and water resources in Singapore can be improved. This piece of information can be seen clearly on the homepage of the Ministry of the Environment, Water and Resources (MEWR) website and there are links on its homepage to report an incident and to provide feedback, as well as a link to Facebook. Information about several public participation activities, such as on-site interviews, focus group discussions, road shows and exhibitions, etc. organised by National Parks Board is provided on its website. Yet, these activities do not focus specifically on environmental matters but rather concentrate on obtaining feedback on how to maintain and improve the parks and roads. Also, the information sought refers to past public engagement activities, instead of being concerned with how the public can participate in similar activities organised by the agency.

The PUB has a “Social media” page on its website where users can access the PUB’s news and publications via Facebook, Twitter and YouTube. Users can also “like”, “follow” or “subscribe” such documents on Facebook, Twitter and YouTube, respectively. The PUB’s website site also provides information encouraging the public to take part in maintenance efforts and outreach programmes and/or to contribute resources such as cash and/or kind to support others who require funding for their outreach programmes. A contact person and email address has also been posted on its website. SPRING Singapore has a homepage to invite public comments on the standards of a number of goods and services. Nevertheless, these comments may not pertain to environmental issues. The Urban Redevelopment Authority posts calls for research proposals to explore the balance between economic growth and environmental sustainability. Rules and selection criteria are stated clearly on the website.

Interaction between government and the public

Opportunity for the public to provide input on environmental matters

All the organisations (100%) provide avenues for public feedback on their websites, i.e. phone and fax numbers, e-mail addresses or feedback button/function. However, the feedback avenues are meant for public feedback on all issues regarding the organisations’ operations, policies, etc., and they do not necessarily pertain to environment related issues. The Ministry of the Environment and Water Resources provides a hotline for the public to contact them 24 hours a day.

Opportunity for the public to comment on environmental regulations

Only four agencies (22%) provide the public with opportunities to comment on regulations. Public Consultation on the New Regulatory Framework for the Real Estate Industry has been posted on the website of the Ministry of National Development. SPRING Singapore (2012) invites public comments on Singapore Standards (July 2012) via information posted on its website. The link to this invitation also appears on the website of the PUB. Yet, these regulations may or may not be directly associated with environmental protection.

Interaction among the public via the organisations’ websites

Members of the public are not able to use the government website effectively because the system/website has not been made user-friendly, i.e. there is no opportunity for citizens who access the information on the websites of the examined organisations to communicate directly with other users via the online platform of these bodies. However, such interactions can take place, to the extent that they might occur, via mechanisms outside of those provided by the official websites of government agencies. For example, the Ministry of the Environment, Water and Resources (MEWR) does provide a MEWR Facebook page for the public, who access the MEWR's website, to be updated with the MEWR news and to communicate/interact with other like-minded individuals (MEWR, 2017).

Other information relevant to environmental protection

Eleven organisations (61%) in Singapore provide other information associated with environmental management. This falls into three distinct categories, namely (i) sustainable development (six organisations), (ii) green technology and environmental protection (three agencies), and (iii) educational programs (two organisations). The National Environment Agency also posts information. Singapore's International Water Week can be found on the Urban Redevelopment Authority's website.

Discussion

Overall, most of the websites provide information about environment related issues. A search box is available in all 18 websites which helps to facilitate the filtering of information. In addition, a feedback link is placed consistently at the top right hand side of the page which allows users to provide feedback. Access to law and regulations were also available in ten websites. This included relevant legislation and codes of conduct for environmental protection. Seven websites provided information on current environmental protection measures, conditions and issues, and six websites merely explored these topics as a form of Corporate Social Responsibility effort. However, this might be explained by the fact that environmental protection may not be part of their core business although voluntary environmental protection mechanisms would have an impact on their environmental performance (Annandale, Morrison-Saunders and Hughes, 2007). Five websites welcomed members of the public to submit proposals and comments on existing or new regulations in order to improve them. Only five websites provided updated information on toxic releases such as the PSI index or Flood Level statutes across Singapore. None of the websites provided the means to communicate with other citizens through platforms such as forums, chat rooms, or discussion lists.

Many of the websites were not very intuitive. That is, users not familiar with these websites would find it difficult to find the information needed. On many of these websites, it was necessary even after browsing through the websites several times to use the search function from Google to locate the required information. A significant issue identified from the project is that citizens have no opportunity to discuss environmental issues with other citizens. The websites of government agencies are one-way communication systems, from government to citizens. If citizens want to share their views with others then they have to do so via non-government channels, such as private forums and blogs, and various social media platforms.

Given the manner in which the Singapore government provides information about environmental issues on its websites it is clear that one-way interaction predominates. This fits the managerial model of e-participation (Hull, West and Cecez-Kecmanovic, 2011) when government agencies just make environmental information available on their websites. It might

be that government officials can point to channels for public feedback as providing some degree of two-way interaction as all examined organisations have provided a channel for public feedback. However such mechanisms are for general feedback. They are not designed for feedback specifically on environmental issues, or for specific commentary (by members of the public) on key policy issues being formulated by that organisation. This form of two-way interaction, offered by all the organisations surveyed is a poor version of the consultation model of e-participation.

CONCLUSION

It is concluded that Singapore has a considerable way to go if it wants to attain the highest level of e-participation, i.e. the participatory model. However, Singapore has still been able to maintain its economic efficiency in terms of environmental sustainability. This may be explained by the fact that Singapore is a small city-state, and thus the socio-economic and political conditions have contributed to the effectiveness of environmental governance, given its infant stage of democratic development. It also suggests that the connection between economic efficiency and environmental sustainability, at least as currently practiced in Singapore, is mediated by the autarkical nature of Singapore's democracy rather than public pressure.

We have only examined a few elements regarding the availability of environmental information and opportunities for public participation. Other factors affecting the participation of citizens in the online environment, such as security, privacy, accountability, usability and website maturity (Yetano, Royo and Acerete, 2010) have not been included in this project. These can be considered subjects for further research. Future directions of research should focus on other factors affecting the management of the environment, and factors encouraging or discouraging citizens to participate in online discussion of environmental matters such as security and privacy. Furthermore, different e-participation models need to be explored to understand how they can be modified and applied to different countries where different political, economic, socio-cultural and technological conditions exist.

If it is the case that e-participation is one of the key platforms to encourage greater public engagement in order to enhance the democratic development process then focusing on models of e-democracy is required. The public can only participate in the decision making process if relevant, timely and sufficient information is available to it. This would seem the minimum necessary for effective democratic environmental governance.

REFERENCE LIST

- Akhmouch, A. (2012). *Synthesis Report for the Condition for Success 1: Good Governance*, OECD, Paris.
- Annandale, D., Morrison-Saunders, A. and Hughes, M. (2007). 'Measuring the impact of voluntary environmental protection instruments: perceptual vs. archival techniques', *International Journal of Environment, Workplace and Employment*, Vol. 3, No. 1, pp. 1-14.
- Ansell, C. and Gash, A. (2008). 'Collaborative Governance in Theory and Practice', *Journal of Public Administration Research and Theory*, Vol. 18, No. 4, pp. 543-571.
- Associated Newspapers Ltd* (2014). Want to see what Hell looks like? The burning crater that is set to become Turkmenistan's hottest tourist destination (thanks to a blunder by Soviet scientists). *Associated Newspapers Ltd*, 3 June 2014. Available at <http://www.dailymail.co.uk/travel/article-2665755/Turkmenistans-Door-Hell-latest-adventure-thrill-seekers.html#ixzz4c7J20TXs> (Accessed 20 March 2017).
- Bäckstrand, K. (2006). 'Multi-Stakeholder Partnerships for Sustainable Development: Rethinking Legitimacy, Accountability and Effectiveness', *European Environment*, Vol. 16, pp. 290-306.
- BBC (2017). North Korea's nuclear programme: How advanced is it? BBC, 6 January 2017. Available at <http://www.bbc.com/news/world-asia-pacific-11813699> (Accessed 20 March 2017).
- Beierle, T. and Cahill, S. (2000). *Electronic Democracy and Environmental Governance: A Survey of the States*. Discussion paper 00-42, Resources for the Future, Washington, D.C.
- Beisheim, M. and Simon, N. (2016). *Multi-stakeholder partnerships for implementing the 2030 Agenda: Improving accountability and transparency*. Berlin: SWP Stiftung Wissenschaft und Politik (German Institute for International and Security Affairs).
- Bertot, J.C., Jaeger, P.T. and Grimes, J.M. (2010). 'Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies', *Government Information Quarterly*, Vol. 27, 264-271.
- Biermann, F. (2017). Transnational Environmental Governance. The International Encyclopedia of Geography. 1–6. DOI: 10.1002/9781118786352.wbieg0262
- Boesen, N. (2007), 'Governance and accountability: How do the formal and the informal interplay and change?' in J. Jütting, D. Dreschler, S. Bartsch, and I. de Soysa (Eds.), *Informal Institutions. How Social Norms Help or Hinder Development*, OECD, Paris.
- Building and Construction Authority (BCA). (n.d.). About Green Mark. Building and Construction Authority, Singapore. <http://www.greenmark.sg/about.html> (Accessed 25 Nov 2015).

Chadwick, A. (2011). 'Explaining the failure of an online citizen engagement initiative: The role of internal institutional variables', *Journal of Information Technology & Politics*, Vol. 8, No. 1, 21-40.

Chadwick, A. and May, C. (2003). 'Interaction between states and citizens in the age of the internet: "e-government" in the United States. Britain and the European Union Governance', *Governance: An International Journal of Policy, Administration, and Institutions*, Vol. 16, No. 2, pp. 271-300.

Chilvers, J. (2008). 'Deliberating competence: theoretical and practitioner perspectives on effective participatory appraisal practice', *Science, Technology, & Human Values*, Vol. 33, No. 2, 155-185.

Coleman, S. and Blumler, J. G. (2009) *The Internet and Democratic Citizenship: Theory, Practice and Policy*, Cambridge University Press, New York.

Coghill, K. (2004). 'Governance within a Globalizing Framework'. In *The Australian Institute of International Affairs Victorian Branch, Global Challenges for the New Millennium Series, 31 August 2004*, Monash University, Monash Governance Research Unit, Melbourne, VIC.

Ekane, N., Nykvist, B., Kjellén, M., Noel, S. and Weitz, N. (2014). *Multi-level sanitation governance: Understanding and overcoming the challenges in the sanitation sector in Sub-Saharan Africa*, Stockholm Environment Institute, Stockholm.

Fisher, S. and Surminski, S. (2012). *The Roles of Public and Private Actors in the Governance of Adaptation: The Case of Agricultural Insurance in India*, Centre for Climate Change Economics and Policy, Munich Re Programme Technical, and Grantham Research Institute on Climate Change and the Environment, UK.

Francesch-Huidobro, M. (2008). *Governance, Politics and the Environment: A Singapore Study*. Institute of Southeast Asian Studies, Singapore.

Freeman, J. and Quirke, S. (2013). 'Understanding E-Democracy', *Journal of Democracy and Open Government (JeDEM)*, Vol. 5, No. 2, pp. 141-154.

Government of Ireland (2007). *Access to Information on the Environment Regulations 2007 Guidance Notes*. Government of Ireland, Ireland.

Green Future Solutions (2010). *Singapore Green Landscape*, Green Future Solutions, Singapore.

Grönlund, Å. (2003). 'Emerging electronic infrastructures - Exploring democratic components', *Social Science Computer Review* Vol. 21, No. 1, pp. 55-72.

Gutmann, A. and Thompson, D. (2004). *Why Deliberative Democracy?* Princeton University Press, New Jersey.

Ha, H. (2012). 'A Multi-sector Governance Model for Environmental Sustainability - Australia Case', in Barker, J. R. and Walters, R. (eds.), *New Zealand and Australia in Focus: Economics, the Environment and Issues in Health Care*, Nova Science Publishers, Inc., USA, pp. 35-60.

Ha, H. (2014) 'Environmental Governance: A Case Study in Singapore', *Academy of Taiwan Business Management Review*, Vol. 10, No. 2, pp. 15-24.

Haas, P. M. (2004) 'Addressing the Global Governance Deficit', *Global Environmental Politics*, Vol. 4, No. 4, pp. 1-15.

Held, D. and Hervey, A. F. (2009) *Democracy: climate change and global governance*, Policy Network, London.

Hřebíček, J., Schleidt, K. and Legat, R. (2010). 'e-Democracy & e-Environment: Reality and challenges'. Paper presented at the 8th Eastern European e|Gov Days: April 2010, Prague, Czech Republic.

Hope, Sr. K. R. (2005). 'Toward Good Governance and Sustainable development: The African Peer Review Mechanism', *Governance: An International Journal of Policy, Administration and Institutions*, Vol. 18, No. 2, pp. 283-311.

Hull, D., West, G. and Cecez-Kecmanovic, D. (2011). *Two Models of E-Democracy: A Case Study of Government Online Engagement with the Community*. Australian School of Business Research Paper No. 2011 – IRRC -01, The University of New South Wales, Sydney.

IMF (2017). A Shifting Global Economic Landscape. *World Economic Outlook Update*. January 16, 2017, 1-7. Washington, D.C.: IMF.

Kamal, M. M. (2009). 'An analysis of e-participation research moving from theoretical to pragmatic viewpoint', *Transforming Government, People, Process and Policy*, Vol. 3 No. 4, pp. 340-354.

Kneuer, M. (2016). 'E-Democracy: A New Challenge for Measuring Democracy', *International Political Science Review*, Vol. 37, No. 5, pp. 666-678.

Kooiman, J. (1999) 'Socio-political Governance', *Public Management*, Vol. 1, No. 1, pp. 67-92.

Lee, T. (2002). 'The Politics of Civil Society in Singapore', *Asian Studies Review*, Vol. 26, No. 1, pp. 97-117.

Lidskog, R. and Ingemar, E. (2010). 'Addressing climate change democratically. Multi-level governance, transnational networks and governmental studies', *Sustainable Development*, Vol. 18, pp. 32-41.

Loorbach, D. (2010). 'Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework', *Governance: An International Journal of Policy, Administration, and Institutions*, Vol. 23, No. 1, pp. 161-183.

Lynn, L. E., Heinrich, C. J. and Hill, C. (2001). *Improving governance: A new logic for empirical research*, Georgetown University Press, Washington, D.C.

Mathl, B. (2008). 'Growing civil society in Singapore', *Social Space*, pp. 80-83.

McNeill, J.M. and Williams, J.B. (2007). 'Pricing carbon: an ecological economics perspective on the McKibbin–Wilcoxon proposal for Australia', *International Journal Environment, Workplace and Employment*, Vol. 3, No. 1, pp. 50-66.

Menegat, R. (2002). 'Participatory democracy and sustainable development: integrated urban environmental management in Porto Alegre, Brazil', *Environmental and Urbanization*, Vol. 14, No. 2, pp. 181-206.

Mensah, I. K. (2016). 'Electronic Government Around the World: Key Information and Communication Technology Indicators', *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, Vol. 10, No. 9, pp. 3050-3061.

Ministry of the Environment, Water and Resources (MEWR) (2017). *Get Involved*. Singapore: Ministry of the Environment, Water and Resources.

Nasir, A. (2004). e-Consumer Complaints about On-line Stores. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behaviour*, Vol. 17, 68-87.

Navarro-Galera, A., Alcaraz-Quiles, F. J. and Ortiz-Rodríguez, D. (2016). 'Online dissemination of information on sustainability in regional governments. Effects of technological factors', *Government Information Quarterly*, Vol. 33, No. 1, pp. 53-66.

OECD. (2017). *OECD Territorial Reviews OECD Territorial Reviews: Sweden 2017 Monitoring Progress in Multi-level Governance and Rural Policy*. Paris: OECD.

Päivärinta, T. and Sæbø, Ø. (2006). 'Models of E-Democracy', *Communications of the Association for Information Systems*, Vol. 17, No. 37, pp. 818-840.

Porwol, L., Ojo, A. and Breslin, J. G. (2016). 'An ontology for next generation e-participation initiatives', *Government Information Quarterly* (2006), <http://dx.doi.org/10.1016/j.giq.2016.01.007>

Provan, K. G. and Kenis, P. (2008), 'Modes of Network Governance: Structure, Management, and Effectiveness', *Journal of Public Administration Research and Theory*, Vol. 18, pp. 229-252.

Reddick, C. G. (2011). 'Citizen interaction and e-government: Evidence for the managerial, consultative and participatory models', *Transforming Government, People, Process and Policy*, Vol. 5, No. 2, pp. 167-184.

Reuter. (2017). Iran tested nuclear-capable cruise missile-German newspaper. *CNBC LLC*, 2 Feb 2017. Available at <http://www.cnbc.com/2017/02/02/iran-tested-nuclear-capable-cruise-missile-german-newspaper.html> (Accessed 20 Mar 2017).

Sæbø, Ø. and Päivärinta, T. (2005). 'Autopoietic Cybergenres for e-Democracy? Genre analysis of a Web-Based Discussion Board', in R. H. J. Sprague (ed.) *Proceedings of the 38th Annual Hawaii International Conference on System Sciences; Genre in Digital Documents*, IEEE Computer Society, Big Island, Hawaii.

Saunders, M, Lewis, P. and Thornhill, A. (2003). *Research Methods for Business Students*, 3rd Ed, Prentice Hall - Financial Times, Harlow, London, New York, Boston, San Francisco, Toronto, Sydney.

Schon, D.A. (1971). *Beyond the Stable State*. London: Temple Smith.

Schroeder, H., Burch, S. and Rayner, S. (2013). 'Novel multisector networks and entrepreneurship in urban climate governance', *Environment and Planning C: Government and Policy* 2013, Vol. 31, pp. 761-768.

Shaun A., Maskrey, S. A., Mount, N. J., Thorne, C. R. and Dryden, I. (2016). 'Participatory modelling for stakeholder involvement in the development of flood risk management intervention options', *Environmental Modelling & Software*, Vol. 82, pp. 275-294.

Sidder, A. (2016). Indonesian Fires Girdled Half the Globe in Smoke. *National Geographic Partners, LLC*. Available at <http://news.nationalgeographic.com/2016/08/indonesia-fire-el-nino-nasa-satellite-smoke-pollution/> (Accessed 20 March 2017).

SPRING Singapore. (2012). Export Technical Assistance Centre (ETAC). <http://www.spring.gov.sg/QualityStandards/etac/Pages/about-etac.aspx> (Accessed 25 Sep 2012).

Starr, B. (2017). US anticipates new round of missile, nuclear testing by North Korea. *CNN Sans*, 17 March 2017. Cable News Network. Available at <http://edition.cnn.com/2017/03/16/politics/north-korea-nuclear-missile-testing/> (Accessed 20 Mar 2017).

Stemler, S. E. (2004). 'A comparison of consensus, consistency, and measurement approaches to estimating inter-rater reliability', *Practical Assessment, Research, and Evaluation*, Vol. 9 No. 4., online <http://pareonline.net/getvn.asp?v=9&n=4>.

Stoker, G. (1998). *Governance as Theory: Five Propositions*, UNESCO, Paris.

Thampapillai, D.J., Wu, X. and Sunderaj, L.R. (2007). 'Economic growth, the environment and employment: challenges for sustainable development in China', *International Journal of Environment, Workplace and Employment*, Vol. 3, No. 1, pp. 15-27.

UNDP (2011). *8 Governance Principles, Institutional Capacity and Quality*, United Nations Development Programme, New York.

UNDP (2014). *Governance for Sustainable Development Integrating Governance in the Post-2015 Development Framework*, United Nations Development Programme, New York.

UNDP (2015). *From Old Public Administration to the New Public Service Implications for Public Sector Reform in Developing Countries*, UNDP Global Centre for Public Service Excellence, Singapore.

Weissman, S, Varghese, S. and Wood, Z. (2013). *Effective Governance for Multi-Jurisdictional, Multi-Sector Climate Adaptation*, Centre for Law, Energy and Environment, University of California, USA.

Wolcott, H. F. (2001). *Writing Up Qualitative Research*, Sage Publications, Thousand Oaks, London, New Delhi.

World Health Organization. (2005). *Ecosystems and Human Well-Being: Health Synthesis*, World Health Organization, Paris, France.

Yetano, A., Royo, S. and Acerete, B. (2010). 'What is Driving the Increasing Presence of Citizen Participation Initiatives?' *Environment and Planning C: Government and Policy*, Vol. 8, No. 5, pp. 783-802.

Zeleti, F. A., Ojo, A. and Curry, E. (2016). 'Exploring the economic value of open government data', *Government Information Quarterly* (2016), <http://dx.doi.org/10.1016/j.giq.2016.01.008>