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PUBLIC ENGAGEMENT IN ENVIRONMENTAL IMPACT ASSESSMENT IN HONG KONG SAR, CHINA USING WEB 2.0: PAST, PRESENT AND FUTURE

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Web 2.0 has transformed the way people obtain, understand, analyse and respond to information from a broad range of sources. Users spend several hours a day to access the Web, browse their favourite sites and respond to invitations from friends and other people to participate in discussions that affect their social and business lives as well as their environmental conditions. In this regard, knowing how to promote public participation and engagement in the early stages of environmental impact assessment (EIA) as well as how to gain public acceptance in the consultation phase of an EIA using the Web is important. This study describes how Hong Kong government departments employ the Web to disseminate information and proposes methods for public engagement using Web 2.0 technologies.

Keywords: Web 2.0; public engagement; environmental impact assessment; Hong Kong SAR.

Introduction

The United Nations has projected that the world population will continue to increase from 7.0 billion in 2011 to 9.3 billion by 2050 (UNESA, 2012). At the same time, the world urban population is expected to increase from 3.6 billion in 2011 to

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6.3 billion by 2050. These figures show that the population growth expected in the next four decades is likely to be absorbed by urban areas across the world, which will draw in some of the rural population. As cities grow, urban development and redevelopment will inevitably continue to affect their inhabitants.

Urban development and redevelopment involve interactions between humans and the environment as well as between the existing built, natural, and social environments and future ones (Bugs *et al.*, 2010; Deakin *et al.*, 2002; Howley *et al.*, 2009). Thus, the United Nations Agenda 21 (UNESA, 1992) proposed that governments should develop means to obtain the broadest public participation and encourage active public involvement on issues related to sustainable development. When public participation in environmental planning and assessment is properly conducted, it can improve the quality of environmental assessment and the legitimacy of the decisions (Brown *et al.*, 2013; Dietz and Stern, 2008; Gunes and Coskun, 2005; Kelly *et al.*, 2012). But what is "public participation"? How is it conducted in environmental impact assessment (EIA) in Hong Kong — a densely populated urban environment, with the changing nature of participants? And how can a project proponent (including government departments) better engage the public in the future? This paper aims at answering these three research questions and shed light on the development of public participation in Hong Kong.

Public participation is a complicated process. There is no simple way to achieve it because the "public" includes people from all walks of life with diverse backgrounds, different interests, motivations, opinions, and tendencies of involvement. Public participation encompasses some other similar activities involving the public such as public communication and public consultation (Rowe and Frewer, 2005; Stringer *et al.*, 2006). Public participation goes further by not only informing the public about the decisions and hearing feedback from the public, but by involving and engaging the public in the formulation of the project or program that affects them, the society, and the environment directly or indirectly. Hence, public participation is defined as the practice of involving members of the public in the agenda setting, policy development, and decision-making on projects and developments that interact with the environment and communities (Rowe and Frewer, 2005). In Hong Kong, the government passed the Environmental Impact Assessment (EIA) Ordinance in 1997, which would require each project or proposal that might have an adverse impact on the environment to conduct an EIA. Between 1997 and 2012, 146 designated projects had accomplished EIA reports and received environmental permits (LEGCO, 2013a). Since 2003, the continuous public involvement approach has been adopted as a part of the EIA Ordinance (HKETWB, 2003). Project proponents are required to invite the public to

participate in different stages of the environmental planning and EIA processes (Hui and Ho, 2008).

EIA is a multidisciplinary endeavor and its scope is significantly broader than the training that professional engineers and scientists receive from the universities they have attended. Indeed, an EIA is never complete without a thorough understanding of the relationship between humans and the environment; invariably, the social, economic, spiritual, philosophical and even religious aspects of life may play a part in the assessment.

In the following sections, the evolution of the Web and the adoption of Web-based public engagement practices in EIA in Hong Kong are discussed. The study also argues how Web 2.0 technologies can facilitate EIA processes.

Web Evolution

The advent of the Web has changed the landscape of information collection, generation and dissemination. In the past, people relied on teachers, books and academic journals for knowledge; and they depended on newspapers, magazines, television and radio for news. When the Web was introduced, its aim was to make the Internet, which was still a relatively closed system at that time, become truly accessible and useful to users (The World Wide Web Foundation, 2013). As the Web grew, it became one of the key channels used by organisations such as governments, private enterprises and non-profit organisations to disseminate information to users, consumers, customers, members and the general public. Alternately, users began to use the Web to search for information that could be useful to their business, social lives and even for fun and entertainment. In environmental and resources management, researchers (Owen *et al.*, 2006; Pereira *et al.*, 2003) explored the use of information & communication technology (ICT) tools to support public participation in resource protection, governance and planning. Communities were also encouraged to read the online information and to understand their local conditions (Owen *et al.*, 2006). Nevertheless, web users consumed only content in Web 1.0 environment.

As the capacity of ICT networks have dramatically improved, the difficulty in transferring data to and from the Web has diminished. Web 2.0 gradually transformed the Web into a participatory platform in which users not only consume content but also contribute and produce new content (Lai and Turban, 2008; O'Reilly, 2005). Web 2.0 technologies tear down the barrier between users and data suppliers. According to Hoegg *et al.* (2006) and Schroth and Janner (2007), Web 2.0 is defined as the philosophy of mutually maximising collective

intelligence and adding value for each participant by allowing the sharing and co-creation of information. More specifically, Web 2.0 applications aim to

— enable users to build communities for social networking or knowledge sharing;
— serve as platforms or tools to aid users in creating and sharing content with a broad audience (for example, Web logs and online directories, as well as Mashup platforms that allow users to retrieve content or functionality from arbitrary sources, mix this content with other resources and expose content for further reuse in other applications); and
— function as online tools that support the users in performing certain collaborative tasks.

Thus, Web 2.0 applications have social aspects. No single person can control what messages and images are uploaded on the Web and how information propagates on this platform. Any effort to hinder the propagation of information through word-of-mouth is futile. Moreover, Web 2.0 provides numerous opportunities to learn. This platform allows people to harness collective intelligence (O'Reilly, 2005) and listen to the wisdom of crowds (Suriowecki, 2005). Indeed, experts such as retired professors, engineers and individuals who undertake lifelong self-study contribute significantly to wikis, which is an example of collective intelligence. Rather than making noise, these specialists provide users with knowledge and correct information.

Public Engagement in EIA in Hong Kong: Past and Present

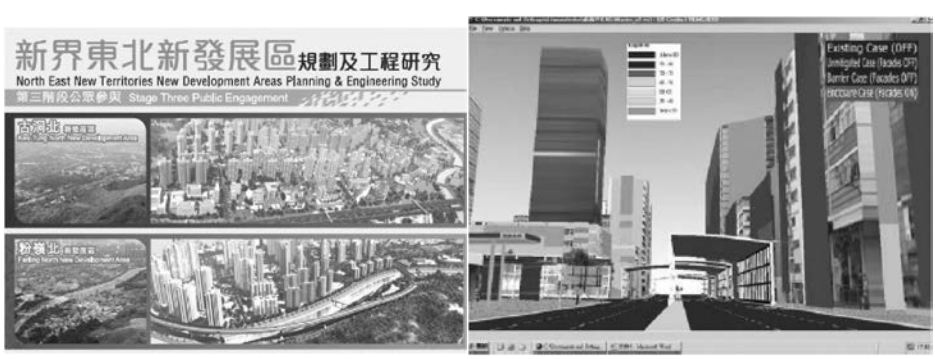
In Hong Kong, EIA information and reports have been available to the public since 1990; that is, before the enactment of the EIA Ordinance (Hui and Ho, 2008). According to Hong Kong's Continuous Public Involvement Approach (HKETWB, 2003), project proponents should initiate either formal or informal early consultation with all stakeholders, including the Environmental Protection Department, District Councils, green groups and individuals whose livelihoods may or may not be affected by the project. In addition, project proponents will involve the public in the other stages of planning, EIA, and Environmental Monitoring and Audit process. In reviewing the development of public engagement in Hong Kong during EIA, Hui and Ho (2008) emphasised that the Hong Kong Government endeavored to provide EIA information and had achieved the following milestones progressively:

— 1998: Under the EIA Ordinance, EIA Reports and related documents were made available on the Web around the clock.

— 2002: Project proponents were required to set up websites about their project to enhance transparency and facilitate public engagement in infrastructure and other development projects.
— 2003: The first webcam system for major civil projects was established.
— 2008: EIA findings were required to be presented in 3D Visualisation format in 23 EIA Study Briefs.

Figure 1 shows several planning and EIA reports displaying 3D visualisation models. Definitely, 3D visualisation is an effective approach to inform the public about the visual, auditory, ecological and environmental impacts of the proposed developments (Chung *et al.*, 2007; El Araby and Okeil, 2004; Elias, 2012; Fischer *et al.*, 2009; Riddlesden *et al.*, 2012).

Nevertheless, by reviewing the progress of public engagement during EIA, we find that Web 2.0 applications have never been adopted. For example, Fig. 2 presents the details of the public engagement exercise of the North East New Territories New Development Areas Planning and Engineering Study (The 3D visualisation models are illustrated in Fig. 1(a)). Although the concerned departments expressed their interest to incorporate public opinion in refining the development proposals, these departments adopted a traditional way of obtaining information, namely, inviting people to write reports and/or letters, making phone calls and sending messages through fax and email systems, and organizing a few briefings with the concerned parties and meetings with representatives from the affected villages. In 2012, the government received only approximately 60 submissions for this particular study from individuals, interest groups and associations (LEGCO, 2013b). Thus, public engagement in this project was far from satisfactory.



(a) 3D solid models of proposed buildings (b) 3D noise map due to road traffic noise

Fig. 1. Examples of planning studies and EIA reports in Hon Kong.


公眾參與日期 Public Engagement Period
由2012年6月中 至 2012年8月尾
From Mid June 2012 To End August 2012
我們歡迎您提交書面意見。請填寫意見收集表（可於研究網站下載：http://www.nentnda.gov.hk），並在2012年8月31日或之前遞交至奧雅納工程顧問、規劃署規劃研究組或土木工程拓展署新界西及北拓展處。
You are welcome to submit written comments by returning the completed Comment Collection Form (available from the Study Website: http://www.nentnda.gov.hk) to Ove Arup & Partners Hong Kong Ltd., Studies and Research Section - Planning Department or New Territories North and West Development Office - Civil Engineering and Development Department by 31 August 2012.
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Fig. 2. Methods through which the Hong Kong government solicited public opinion.

In addition, the Hong Kong government has implemented Internet platforms to solicit ideas and opinions on environmental affairs from the public. On the one hand, this move promotes public participation. On the other hand, this system still relies on a traditional method to obtain feedback; that is, guiding the public to the Customer Service Center of the Environmental Protection Department (see Fig. 3).

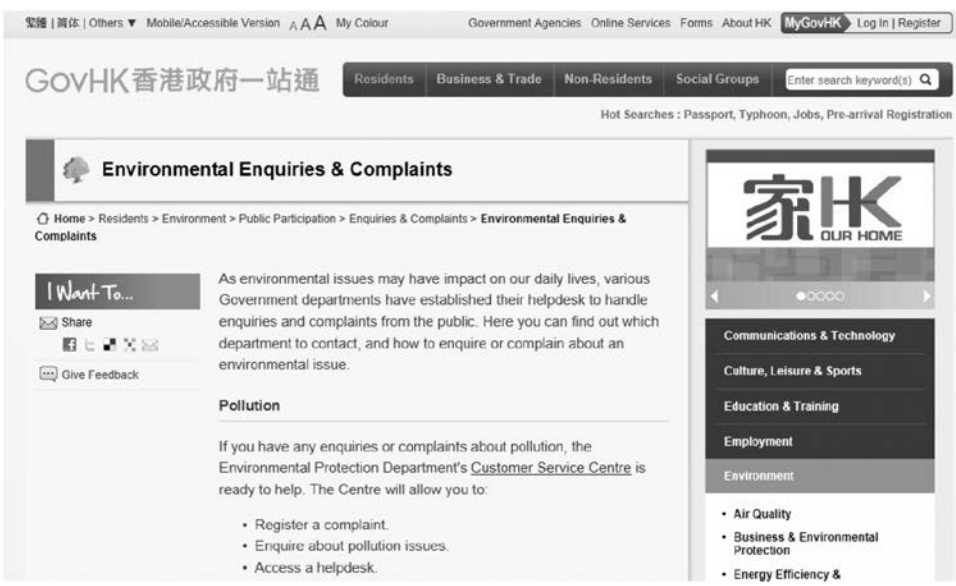
繁體 | 简体 | Others ▼ Mobile/Accessible Version AAA My Colour Government Agencies Online Services Forms About HK MyGovHK Log In | Register
GovHK香港政府一站通
Residents Business & Trade Non-Residents Social Groups Enter search keyword(s)
Hot Searches : Passport, Typhoon, Jobs, Pre-arrival Registration
Environmental Enquiries & Complaints
Home > Residents > Environment > Public Participation > Enquiries & Complaints > Environmental Enquiries & Complaints
I Want To...
Share
Give Feedback
As environmental issues may have impact on our daily lives, various Government departments have established their helpdesk to handle enquiries and complaints from the public. Here you can find out which department to contact, and how to enquire or complain about an environmental issue.
Pollution
If you have any enquiries or complaints about pollution, the Environmental Protection Department's Customer Service Centre is ready to help. The Centre will allow you to:
• Register a complaint.
• Enquire about pollution issues.
• Access a helpdesk.
家 HK OUR HOME
Communications & Technology
Culture, Leisure & Sports
Education & Training
Employment
Environment
• Air Quality
• Business & Environmental Protection
• Energy Efficiency &

Fig. 3. Channels for environmental inquiries and complaints in Hong Kong.

Public Engagement in EIA in Hong Kong: Future

Thus, the difficult question of how major projects can be accepted by majority of the population remains. In fact, if the entire project is conceived by a small team of town planners, with input from other professional, technical and financial teams, the result will be a limited number of options with more or less the same functionality, outlook and presentation. The public is rarely informed about the projects in advance, much less allowed to participate in the drafting stage of the proposed project. In the past, the dissatisfaction of a small group of users seldom spread far and fast enough to incite public opposition and condemnation. Now, with the advent of Web 2.0, a simple statement of dissatisfaction can reach hundreds of thousands of individuals within a split second, thereby resulting in damage that can never be undone.

Web 2.0 provides government departments with numerous opportunities to empower and motivate people, and, more importantly, to obtain resources from the crowd. Emerging technologies harness collective intelligence as well as turn threats into opportunities and weaknesses into strengths. For example, public participation geographic information systems (PPGIS), volunteered geographic information (VGI), wikis, crowdsourcing, and games are some of the more popular tools that provide information and have special functions that enable individuals to manipulate data and add value, such as comments, pictures and sound clips, to enrich the content of the sites and provide feedback. A brief description of these tools, along with examples of possible applications, is provided as follows.

PPGIS and VGI

PPGIS refers to the practice of having non-experts providing spatial information to augment expert GIS data via the Web. It has been utilized by governments in developed countries to inform and engage public about urban and land use planning and policy development. VGI refers to using the Web to create and disseminate GIS data voluntarily by individuals. In general, there is no explicit purpose other than to pursue self-esteem in VGI. Brown *et al.* (2013) examined the effects of sampling in a PPGIS/VGI application for national forest planning in the U.S. They found that responses from a random sample of households and that from a volunteer public were different. Brown *et al.* (2013) suggested that PPGIS/VGI methods should include scientific sampling to ground-truth voluntary participation. More specifically, stratified random sampling shall be adopted in Hong Kong as participants who live in urban and rural areas having different understanding of their environment. Besides, the silent majority of public land stakeholders must be encouraged to get involved in consultation and engagement activities.

Wikis

A wiki is a website that allows users to create new Web pages as well as to edit existing pages on the site. Wiki was developed by Cunningham (Leuf and Cunningham, 2001), who believed that users could contribute to collective intelligence; that is, more users would be better than a single expert, and users could continually enhance the available information uploaded to wikis. The most popular wiki is Wikipedia. A growing number of users contribute and safeguard the accuracy, amount, quality and the accessibility of the available information on Wikipedia, which makes it a better alternative to traditional encyclopedias (e.g., Encyclopedia Britannica). At present, Wikipedia is already accepted as a source of information in academic articles (e.g., Laurent and Vickers, 2009).

Nevertheless, not all wikis are successful. Many wikis have failed because of the lack of community participation. For example, the United Nations University has developed an EIA wiki (http://eia.unu.edu/wiki/) to provide resources and channels for practitioners working in EIA to share their knowledge and insight within the EIA community. However, this wiki failed to attract user contribution and participation; thus, only a few materials have been added since its creation. Furthermore, the International Association of Impact Assessment is a worldwide organisation supported by EIA communities across the world. This organisation created a wiki (http://www.iaia.org/iaiawiki/) in 2009 to encourage its members to share their knowledge in EIA. However, this wiki had only 76 updates from June 2009 to October 2012, and only three members and an administrative employee contributed to these updates.

Therefore, wikis may be useful as long as these do not fail to attract contributions. To understand how government departments can employ wikis in enhancing the quality of planning and EIA studies, we have to emphasise what wikis do best and in which areas EIA reports generally fail to gain public acceptance. In fact, most EIA reports received criticism and opposition from citizens because EIA reports focused on conformity to environmental regulations but neglected human perceptions and feelings, particularly about the visual impact and the alternation of the natural environment after the development. In addition, EIAs were sometimes implemented by professionals without local knowledge, and relied on sampling and observations during a short period of time within a particular season. For citizens who have in-depth local knowledge, care about their own environment, and understand the ecological cycles of their area, the results of EIA reports may be unacceptable and sometimes deceptive. Thus, a better way to obtain local intelligence is to create wikis using local people, language, photos and sounds, as well as to moderate the uploaded information within the local context. Only when

inhabitants have channels to air their opinions and ideas will they be more open to other suggestions, including urban development and redevelopment.

Crowdsourcing

Crowdsourcing is a mechanism for leveraging the collective intelligence of Web users toward productive ends (Brabham, 2009). The term "crowdsourcing" was coined by Howe (2006a) in *Wired* magazine. According to (Howe, 2006b), "crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. The crucial prerequisite is the use of the open call format and the large network of potential laborers (para. 5)." Thus, crowdsourcing has become a business model. Companies use crowdsourcing services to solve their problems. However, not all problems can be solved by crowds. For example, BP i.e. the former British Petroleum received more than 20,000 suggestions on how to control the oil spill in the Gulf of Mexico in 2010 (Crowe, 2011). None of the suggestions were practical. However, for political and social reasons, BP had to acknowledge each of these suggestions, thereby spending an enormous amount of time as well as human and financial resources.

Crowdsourcing platforms vary from conducting simple tasks such as data collection and matching (e.g., Amazon's Mechanical Turk) to performing complex tasks such as solving and researching highly technical problems and development challenges (e.g., InnoCentive). Some platforms, such as Taskcn and Zhubajie, employ millions of active Web-based workers. Brabham (2009) argues that crowdsourcing is an effective method to harness collective intelligence and creative solutions from citizen networks in an organised manner, thereby serving the needs of planners. As long as the problem is relevant to citizens and the data and information are sufficient, the networks of inhabitants can have sufficient knowledge to conceptualise creative solutions, even for highly complex data (Schlossberg and Shuford, 2005). EIA, as a part of urban planning, is no exception.

Games

Games are now a part of edutainment — the act of learning through a medium that both educates and entertains (Virvou and Katsionis, 2008). Games have been used to create environmental awareness (To *et al.*, 2013) and invite younger generations to construct their dream environments (Chung *et al.*, 2013). 3D immersion games provide futuristic and realistic environments that allow users to understand how the environment may change with new development and whether the effects they would experience are adverse or beneficial. Results demonstrate that

environmental technologies and solutions can be learned more easily if this information is presented in a casual, gamification environment i.e. the use of game mechanics in non-game contexts to engage users in solving problems (Chung *et al.*, 2013; To *et al.*, 2013). Various options indicated in EIA reports should be presented in a more interesting manner so that both young and old users can obtain more understandable and intuitive information. Nevertheless, it should be noted that games are attractive to kids and kidults i.e. adults who indulge in the child's games but not to other social groups.

Conclusion

The power of Web 2.0 was demonstrated in the 2008 US presidential elections, in which Barack Obama was elected. Web 2.0 technologies render the Web as an effective platform for information exchange in which consensus can be reached and ambiguities can be clarified. As the outcomes of EIAs have a significant influence on the changes that affect the lives of citizens, the government has an obligation to seek public involvement and participation as early as the conceptual phase of urban development and redevelopment (i.e., prior to the EIA commissioning). Only when the opinions of the citizens are heard, accepted and incorporated into the solutions can they be willing to explore the potential environmental impacts of development and agree to undertake an EIA. PPGIS and VGI can promote knowledge production as communities know what is important to them.

Nevertheless, the technologies mentioned above are not appropriate in all situations, they have their limitations. Games can be used to provide basic information on environmental technologies and consequences. They are particularly useful to the younger generations. Crowdsourcing can provide opportunities for people to seek local knowledge and expertise, as well as obtain a vast amount of local environmental and ecological data prior to urban development and redevelopment, but only when the problems are properly defined. Finally, wikis will allow citizens to express their views and concerns continuously, and provide rich multimedia information, including texts, sound clips, photos and even videos. The government should embrace Web 2.0 technologies and enable the public to participate in making crucial decisions.

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