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Improving Public Participation for Land Use Planning in Malaysia: Can Participatory GIS help?

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ABSTRACT

Technology advancement in the form of Participatory GIS (PGIS) has emerged as a method for gathering public knowledge and opinions to enhance public participation development planning. There is also a huge potential for PGIS to be applied in developing countries because of its capability to pull the public toward a more active role both in participation and the decision-making process. Researchers have used various types of geo-information technology to encourage public participation, but their studies showed that public interest in participating in any kind of planning activities has not increased, thus failing to attract the public attention to participate. The article focuses on the description of the potential benefits and barriers of PGIS implementation for land use planning in Malaysia.

Keywords: *Public participation, Participatory GIS, Land use planning*

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INTRODUCTION

Support and direct involvement from the public in the decision-making process is essential to ensure a successful planning outcome (Maidin, 2011). It also helps to expand public awareness on government planning initiatives and provide prospects for the public to be part of the decision-making process (Fonseca, 1995), which would demonstrate a high degree of democracy within a government system where the voice of the people is vital and unavoidable

(Maidin, 2011).To assist in this democratic process, geographers, planners, and community organizations started to use GIS technology for local decision-making processes (Ganapati, 2010, p. 449). Technology advancement in the form of Public Participation GIS (PPGIS) has developed to become one of the tools and methods for gathering public knowledge and opinions (Floreddu & Cabiddu, 2012) to enhance public participation in land use planning. One of the key objectives of PPGIS is to engage the local community through the use of geographical technologies with the purpose to improve policy management in spatial planning (Obermeyer, 1998; Sieber, 2006; Floreddu & Cabiddu, 2012). To a certain extent, it helps to reduce the limitations and barriers pertaining to the traditional public participation approach.

Historically, the evolution of PPGIS has taken place since the early 1990s. Researchers started to broaden their focus on GIS from technical matters to also include social concerns (Obermeyer, 1998). Various studies have indicated that PPGIS provides an innovative approach on public engagement in the decision-making process. due to its capacity to incorporate spatial information and local knowledge to increase interactions between citizens and public administrations (Jankowski, 2009; Carver, 2003; Ganapati, 2011). Many scholars suggested that PPGIS plays a crucial role as a solution to democratising public participation (Tulloch & Shapiro, 2003; Brown & Reed, 2009; Hanzl, 2007; Kingston, 2000; Carver, 2001).

There is a huge potential for PPGIS to be applied in developing countries because of its capability to pull the public toward a more active role both in participation and the decision-making process. Researchers have used various types of geo-information technology to encourage public participation, but their studies showed that public interest in participating in any kind of planning activities has not increased substantially (Aditya, 2010; Bunch, Kumaran, & Joseph, 2012; Williams & Dunn, 2003; Trung et al., 2004), thus failing to attract the public attention to participate. There seem to be fundamental flaws in the existing public participation planning process (Aditya, 2010) as well as vague and loose legislation has not enabled the local authorities to come out with a programme that attract the public to participate (Maidin, 2011; Marzuki et al., 2012). In addition, weak institutional structures could also hamper the intention of building a solid platform for the implementation of PPGIS (Ramasubramanian, 1999).

Similar to the obstacles faced by traditional public participation in developing counties, barriers to PPGIS adoption in decision-making seem to lean towards institutional rather than technological (Brown, 2012; Ganapati, 2011). Regardless of the technology advancement, GIS applications have failed to

inspire public to participate. Furthermore, both planning agencies and the public appeared to be lacking of readiness in accepting ICT related approach for public participation, (Yigitcanlar, 2003). Some of the shortcomings associated with institutional barriers include the expert-lay divide, trust issues and fear of the public (Brown, 2012). Ganapati (2011) added that even though there has been growth of PPGIS adoption related to providing information to the public, the use of PPGIS in by local governments has yet to gain sufficient momentum to ensure that the public plays an active role in the decision-making process.

LITERATURE REVIEW

Public Participation in Land Use Planning

According to F.A.O. (1993), "Land-use planning is the systematic assessment of land and water potential, alternatives for land-use and economic and social conditions in order to select and adapt the best land-use options". Land use planning could generally be considered as activities related to the evaluation and comparison of the suitability of different land uses for specific conditions, identification of the most suitable land use among different alternatives, and allocation of land according to certain optimization rules (Riveira & Maseda, 2006). Land use planning involves land suitability analysis, land use allocation, facility location, and many other aspects (Malczewski, 2004).
The traditional land use planning process has been criticized for failing to meet the demands of stakeholders. This is due to the intensified trade-offs between conservation and development. Public participation involves ordinary citizens in decisions about, and the implications of, social and economic change (Carver, 2001). Arnstein (1969) used a participation ladder to describe the levels of public participation, where the base of the ladder represents zero opportunity to participate. The higher rungs represent increased levels of participation and greater public empowerment in the decision-making process. The top of the ladder represents full public control and responsibility for the final decision.

Public participation in land use planning holds great prospect for improving the transparency of decision-making and promoting sustainable development. Public participation could be seen as a means to achieve democratic decision-making. Chess and Purcell (1999) highlighted several benefits of stakeholder participation, which were promoting good conduct and transparency in the decision-making process, making sure development projects meet the demands of beneficiaries, reducing chances of conflict, including social

values and local knowledge ; and evaluating expert knowledge without biasness.

Public Participation Scenario in Malaysia

Various efforts have been made to encourage public participation in the preparation of development plans. The Town and Country Planning Act 1976 (Act 172) has provided the channel for the public to be involved in the preparation of development plans (Maidin, 2011). However, scholars have noted evidence that points out the structural and operational shortcomings of the public participation process (Dola and Mijan, 2006; Maidin, 2011; Marzuki *et al*., 2012), indicating low level of public involvement in land use planning in Malaysia. Case studies on publicity and public participation carried out by the Town and Country Planning Authority revealed that since 2001, between 1 % and 12 % of the population in the study area had visited the exhibition for the Local Plan Draft and between 1 % and 8 % attended the Structure Plan exhibition (Town and Country Planning Department, 2009). Muhammad, Masron, and Abdul Majid (2015) stated in their study that more than 61% of respondents were not involved in any development plans or improvements in service delivery by local authorities. Furthermore, lack of awareness amongst the local community pertaining to their right to contribute ideas to planning and development programs. The same study also found that less than 35% of the local residents were involved in public hearings for local plans (Muhammad *et al*., 2015). Even though the existing participatory procedure practice fulfil the Malaysian legal requirements, public engagement is still at a low level especially for public participation in land use planning context. Moreover, there has been paucity of research that evaluate the type and quality of information provided by the general public within the planning context.

The significant number of studies reporting low public participation rates indicates that the existing participation mechanism for the land use planning fails to achieve its main objective to have an engaging collaboration between the public and the planning authorities. Ineffective approaches used to engage the public have led scholars to suggest that technological solutions could be the answer to the problem (Omar and Leh, 2009; Hanzl, 2007). Evidently, there is plenty of room for improvement and perhaps an alternative participation mechanism is needed that could help improve public participation for land use planning. Obviously, current participatory activities were not well received by the majority of the public, and the intention for public participation was not fully achieved, even though the current participatory approach may appear to

meet the standard of the existing participation and publicity legislative (Act 172).

Quality public participation is often difficult to achieve. Omar and Leh (2009) highlighted that a poor quality of information, low level of public awareness and inadequate number government programmes that encourage participation engagement have contributed towards lack of quality public participation in the land use planning, especially during decision-making process. Furthermore, ambiguous legal documents and lack of stern enforcement of public participation (Maidin, 2011; Marzuki et al., 2012) could have been the main source of the issue, which helps to explain the structural and operational shortcomings (Dola and Mijan, 2006; Kawasmila and Songorwa, 2009; Marzuki et al., 2012), causing the amount of public participation to deplete. These structural barriers have often been related to limitations related to societal framework and institutional settings whereas the ineffective participatory approach reflects strongly on the operational barriers.

Public Participation Geography Information System versus Participatory GIS

The term Public Participation GIS (PPGIS) was first established at a workshop conducted by the National Center for Geographic Information and Analysis (NCGIA) in 1996. The purpose of the term was to ensure that public participation is supported by GIS technological approach could within a variety of possible applications and at the same time cover a specific geographical context. Tulloch's (2008) definition of PPGIS is a "field within geo-information science that focuses on ways the public uses various forms of geospatial technologies to participate in public processes, such as mapping and decision making". Despite the fact that significant changes have impacted available geo-information technologies and its processes, the PPGIS terminology has rolled over without action being taken to find a more appropriate one that better embody the thrust and extent of the practice.

On the other hand, the term Participatory GIS (PGIS) and its practice had a different connotation altogether. The PGIS terminology was the outcome of a spontaneous merger of Geographic Information Technologies with Participatory Learning and Action (PLA) apporach (Rambaldi et al., 2006). In order to enhance their capacity to generate, manage, analyze and communicate spatial information. PGIS insisted on making geo-information technology is accessible to disadvantaged groups in society. Rambaldi (2010)

stated that advancement of GIS technology is practically changing the ways to visualize, represent, and understanding places and environments. Even though GIS-based maps and spatial analysis is the important technical aspect in PGIS, the actual practice of PGIS that is demand-driven, and user-friendly will impact positively on community empowerment innovation and social change (Rambaldi et al., 2006).

With the terms and definition of PPGIS remaining unclear, it has created a debate platform among scholars, even to the extent of having PPGIS renamed to Participatory GIS (PGIS). PPGIS continues to be the most widely used term, but each acronym brings its own contexts, methods, and actors to a collective understanding of PPGIS or PGIS (Sieber, 2006, p. 492-493). Amidst this continuing ambiguity, Brown and Kyttä (2014) have characterized PPGIS, PGIS and VGI to help distinguish the concept and determine the appropriate use of the terminology academically and practically.

In principle, the main objective for both PPGIS and PGIS is to support the empowerment of the deprived community in contributing useful spatial information to inform land use planning. However, the dissimilarity between PPGIS and PGIS is mostly due to the geo-location and its global context in which the applications have been practiced. PPGIS have been applied in developed countries where it focuses on enhancing the participation process to improve the quality of land use decisions, whereas PGIS more suited for developing countries (Brown & Kyttä, 2014).

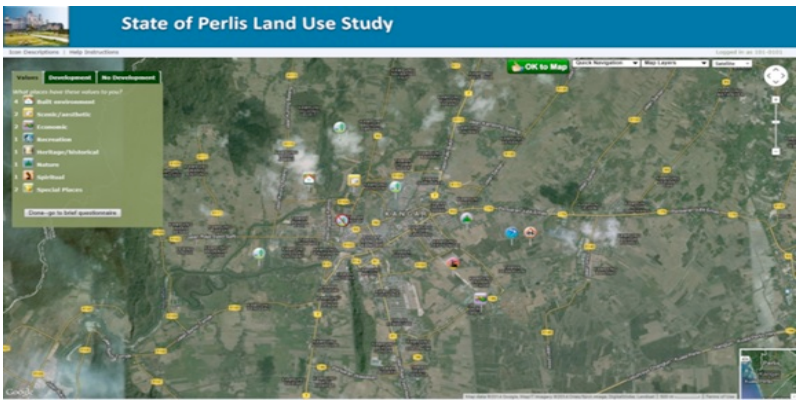
PGIS is used as a tool for capacity building, community identity and social capital building. PGIS aims to encourage the goals of non-governmental organizations, community-based organizations and grassroots groups and that may be opposed to official government policies, particularly with regard to to land tenure, indigenous people's rights, and the current distribution of wealth and political power. In contrast, PPGIS targets urban-centered populations in developed countries with a focus on maps generated maps and how to use spatial data to inform future land use.

Historically, PGIS is more suited for rural settings where it utilised a non-complex, conservative mapping technology and that the demand is more towards practical-oriented mapping exercises. However, the availability of high quality digital base maps and imagery (Google Maps, Bing Maps, and OpenStreetMap) and the development of an application programming interface (API) that provides customized mapping applications, offers high technology options in remote environments. A good example of use of Google

Maps API is the study by Zolkafli, Brown and Yan (2017a; 2017b). The study developed a Web-based PGIS to collect general publics' knowledge on land use in Perlis, Malaysia. (see figure 1.)The prospective benefits of PGIS discussed in this article were the results from the study by Zolkafli et al (2017c).

Figure 1

A Screen shot of a Web Participatory GIS application



POTENTIAL BENEFITS OF Participatory GIS (PGIS)

The Effectiveness of PGIS Process

Planners and planning practitioners have expressed positive views towards PGIS implementation and acknowledged its effectiveness in improving public participation for land use planning. They considered PGIS as a really positive effort that was never implemented before. They also called PGIS as "one of the best alternatives" for public participation and considered that PGIS is the answer to their problems regarding how to involve the public particularly in the preparation of land-use zoning". Furthermore, the PGIS approach is well aligned with the planning policy to increase public involvement in land-use planning. He even pointed out how PGIS could benefit his work, particularly when conducting public participation and advertising with a limited number of staff.

Planners have highlighted the easy to understand icons as their preferred

feature of Web-based PGIS. Additionally, they also stated that people are now leaning towards information technology with a user-friendly, easy access approach. People connect to the internet with PGIS and participate wherever they choose. This can release them in the current process of public exhibition from both the time and locational constraints that they experience

Furthermore, the use of icons to represent opinions or information can be presented and allows the public to view the type of information that they contribute. Compared with the current process, PGIS was assumed to be cost-effective. The experts have additionally stressed that the integration of PGIS on a web-based platform reduces the logistical cost of the public participation process, adding that a web-based public participation method is dynamic in nature, eliminating not only cost issues but also time constraints.

The Value of Spatial Information from the Public

Planners have acknowledged that valuable spatial information was provided by information about location values and development preferences. The type of spatial information, however, depends on the context of the study, area of study and the location values identified by the public were considered more valuables to planners compared to publicly judged development preferences. People with vested interests will take full advantage of their influential positions to dictate any type of development project within their area. Therefore it is only fair that the public share their own subjective location values and non-specific preferences. Although it is important for the public to share their subjective values of place and non-specific preferences, there are some things the general public still does not know.

Improve Quality of Decision-making

One of the purposes of having public participation is effective decision-making. Public participation can contribute to high quality of decision-making (Fiorino, 1990; Carnes et al., 1998; Forrester, Cambridge and Cinderby, 1999; Beierle and Cayford, 2002) because it provides the decision-maker with the necessary information and contributes to the logical identification of problems and their causes (Coenen, 2008). Experts have considered PGIS as a suitable approach in to improve the government decision-making process. PGIS is also seen as a self-evaluation method and it can be used to develop a plan and let people evaluate their knowledge and decision-making skills, whether they plan for fun or actually follow the principle of planning for the

people. PGIS could "definitely" improve the early stages of the decision-making process. For example, before the planner decides the zoning type and the nature of the development project, a PGIS approach would certainly assist the planner in gaining initial information or identify issues as they arose from local residents. Experts believed that the local knowledge obtained from the public through PGIS can be used to develop zoning plans with less public resistance. Through an easy access web-based platform, PGIS allows bigger opportunity to a wider range of demographic, especially the younger generation.

PGIS Implementation in the Planning Process

Planners acknowledged that PGIS has the potential to be used in the early stages of the plan preparation process, especially for early information inventory, i.e. at the initial stage, during the first discussion with the local residents. The planners can utilize PGIS to seek local knowledge from these residents and use it to prepare for their draft local plan.

However, there were more diverse views from the planners regarding whether PGIS implementation should be utilized at other stages of the planning process. For instance, there were Planners who were not keen to implement a PGIS during the public exhibition of the draft plan. They believed it is necessary to implement PGIS at the early stage of planning process, but did not see the benefits of offering the public the opportunity to make matters more complicated. Planners have also thought that utilizing PGIS to obtain local knowledge at the very beginning could result in the elimination of all arising issues. Other planners, however, saw the advantage of having PGIS at multiple stages of participation. For example, PGIS could be used at two stages: the initial stage and the plan evaluation stage.

BARRIERS IN PGIS IMPLEMENTATION

The lack of public initiatives promoting citizen involvement in the online decision-making process signifies shortcomings in encouraging citizen involvement. Floreddu and Cabiddu (2012) argued that planning information and planning technical reports are needed to be available and accessible on the website for all stakeholders. This is an important step to enhance the citizens' planning comprehension and acting as a communication enabler all stakeholders7Ganapati (2011) recommended that in order to ease PGIS

adoption into any current system, local governments must first ensure that the citizen will be able to access the data, the information has to be understandable and clear and public administrations also have to improve PGIS accessibility over time. However, Floreddu and Cabiddu (2012) argued that local governments have not made the necessary commitment to enable citizens to easily access data and the relevant planning information was not provided in a clear and concise manner so that the public can easily comprehend the planning activities that will take place in their neighbourhood.

Despite a spurt of participatory GIS research, there is paucity of research that combines both the traditional and advanced participatory approaches. Some scholars believed that by combining suitable traditional methods with Web-based participatory tools (Stern et al., 2009; Aditya, 2010; Bugs, 2012). Only a few studies exists, suggesting that web-based public participation is an effective complementary means for public engagement. However, the web-based participatory approach is still far from completely replacing the conservative and traditional participation techniques (Stern et al., 2009). The land use plan issue has, however, not been dealt with explicitly through the combination of traditional and advanced participatory approaches. Essentially, Bugs (2012) believed that the combination of traditional participation approach and Web-based tools would lead to a strong participation process in urban planning and ultimately create citizen empowerment.

Meanwhile, Brown (2012) and Ganapati (2011) are in agreement that the actual barrier to PPGIS adoption in decision-making seems to be leaning toward institutional rather than technological factors. Elwood (2008) further explained that while the technical aspect of PPGIS are well-known, the socio-cultural and institutional mechanisms, and the potential barriers related to the practical application of PGIS tools for public participation require further investigation. Ganapati (2011) revealed that the presumption in this strand is that the institutional environment of public policies and laws surrounding access to information, the legal requirements of participation in decision-making and organizational structures and attitudes toward participation influence the adoption of information technologies, including GIS (p. 247).

The authorities and the experts tend to have a cynical attitude toward the value of participation and are concerned that an overactive citizenry may lead to social disorder and conflict. Under these circumstances, they may choose to expedite the participatory process by rendering the whole public participation exercise a mere formality (Obermeyer, 1998). Having devoted a significant amount of time and effort to obtain the technical skills and

qualifications in the area, many experts felt that it would be unjust to them if the less educated public were to be handed the decision-making responsibility. They also believed that they have the necessary expertise to make sound technical decisions and do not believe public involvement will substantively improve the knowledge base for decision-making (Brown, 2012).

CONCLUSION

A well-designed public participation program has considerable positive impact to offer in various areas, especially in land use planning. However, it can be argued that the issues and problems of public participation often be subject to various planning issues which differ across different stages of the planning procedure. With the risks of failure looming, the decision-maker would frequently persuade themselves to minimise or avoid public participation altogether (Thomas, 1995). It is crucial that all affected stakeholders in any development project be aware of all these potential barriers to participation. The correct identification and addressing these barriers to the process of public participation are important steps to help motivate the stakeholders to participate, remove the significance of such barriers and improve the process of public participation process itself (Stewart & Sinclair, 2007). Another solution is to seek new innovative and effective approaches that provide the public with the ability to freely access relevant planning information and thus be part of the decision-making process.

In the Malaysian context, this is able to translate into active recruitment of organized workshops appeared to be an effective method for engaging the public. Combining together PGIS with the facilitated workshop setting would be a feasible solution for increasing participation. At the initial stage of preparation a land use plan, planners can organize series of workshops and utilizing community leaders to facilitate the recruitment of participants. The PGIS workshops should be complemented by alternative respondent recruitment procedure (i.e. PGIS mapping stations). These mapping stations are set up at a convenient locations within the project area to expand the number and diversity of respondents. The main point is that PGIS recruitment should be non-passive and targeting the public both from urban or rural areas. While the legal requirements for public involvement in Malaysia set at a minimum standard, the laws provide planning authorities with discretion to use expanded and enhanced participatory methods such as PGIS. This article highlighted that PGIS can be an effective method of generating quality spatial information given that participant recruitment is active rather than

passive, and that the PGIS process is facilitated particularly as computer and internet access and skills varies considerably between the country's socio-demographic groups and regions.

Regardless of the ongoing debate regarding which acronym is preferable, PPGIS or PGIS is an area that is still growing in interest and attracts many researchers to look into demystifying the issue of public participation. Technological advancement has helped this area to rapidly evolve, and there have been high expectations. However, success stories are few and far between. Barriers still exists, and these hinder its implementation to progress. Non-technical issues related to institutional demands need to be addressed so that the technological advancement and effective implementation can be aligned to move in parallel. It is vital that both experts and non-experts have a sound understanding and are made aware of the availability of such technologies that can assist in achieving the ultimate goal in public participation.

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