

Individual Planning Staff As An Actor Of GIS Translation In The Planning Departments Of Kuala Lumpur City Hall, Malaysia

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ABSTRACT: The context of the planning organisation and the operation of political processes in the planning organisation have a substantial impact on the outcome of computerisation. However, there is also a need to consider the activities and characteristics of the individuals. The activity of individual planning staff can substantially affect the development and utilisation of computer-based systems. This paper explores the contributions of individual planning staff as an actor of GIS translation at the Department of Urban Planning (DUP) and the Master Plan Department (MPD) in Kuala Lumpur City Hall (KLCH) Malaysia. The paper employed a semi-structured interview to investigate role played by the individual planning staff and activities of the department. The findings demonstrate that the organisational context, people and technology has made a highly significant contribution in obtaining the resources necessary for the translation of computer-based information systems in the MPD and the DUP.

Keywords : Individual planning staff; actor; GIS translation; planning organizations

1 INTRODUCTION

Many researchers have highlighted issues in using information technology such as GIS, which are not only limited by hardware and software but depend largely on how individual users accept and utilise the technology [1], [2], [3], [4], [5]. Individual planning staff can perform an important role in the process of GIS translation in planning organisations. It is also important that the role played by the planning staff includes the necessary ability, willingness and awareness to implement and use GIS in the planning organisation. In many instances, key individuals often play an important role in both the initial acquisition of new technology and the subsequent processes of achieving effective utilisation [6]. This means that the purchasing of GIS by the planning organisations is frequently associated with the awareness and readiness of the individual users of the planning staff. Consequently, each planning staff must possess the necessary ability, willingness and intimate knowledge to implement and use GIS successfully [7].

2 GIS AS A SOCIAL TECHNOLOGY

Information technology is a human creation that embodies social purposes, and their potential to improve the social condition is enormous [8]. Consequently, information technology is ambiguous until social process converges to define it. GIS is ambiguous, as many groups including planners compete to define their purposes and uses; influencing the design and production, and shape how individuals understand and use it [9]. Consequently, users have to change their practices accordingly and the information technology evolves to mesh with their culture. As a social process, GIS is an information technology that is usually regarded as a neutral means to social ends defined interdependently, one hopes, by democratic political institutions [9], [10]. In reality, Sheppard [10] adds that the complex, hugely costly, committed and powerful institutions set up as an organisational embodiment of technological means gradually come to define social goals in terms of needs for major public investments. The perception of need – the definition of social values – naturally reflects the commitments of utilising the technology. Meanwhile, an information technology such as GIS may be designed by one organisation, built

by a second, and then transferred into a third for use [8]. In this case, the organisational and individual conditions are involved in a technology development different to those involved in technology use. That is, external entities – the developing organisations – play an influential role in shaping the social processes of the organisations using the technology. The social process involves the setting up of a training programme in order to gain skills and knowledge in GIS. For example, Kling et al., [11] reflecting on the social shaping of technology, comments that new technology does not suddenly leap into existence as the result of a momentous act by a heroic inventor. Rather, it is gradually constructed or deconstructed in the social interactions of relevant groups. Consequently, this view suggests that many notable studies have shown that social contexts play powerful roles in shaping the use of information technologies that trigger social dynamics. They in turn, modify or maintain the structure of the organisations. Therefore, the potential for information technology to transform users in organisations must be considered seriously. The individual planning staff, therefore, is important in this process for the effective use and adoption of GIS in planning organisations.

3 GIS TRANSLATION IN URBAN PLANNING AND MANAGEMENT

The relationship between information technology and planning organisations is diverse and includes contributions from mayors, directors, planning officers and the planning staff. Information technology contains messy, complex, problem-solving components, technological systems that are socially constructed and society shaping [12], [13]. It is socially constructed because it involves the users and each unit in the organisation in utilising the technology which in this context, involves individual staff of the planning organisation [14]. Each implementation of GIS is a unique combination of technological, scientific and social perspectives [15], [16]. The pertinent question is not whether it is a matter of information technology or society but what is indeed the best socio-technological compromise [14]. Consequently, this statement clearly shows the link and relationship between the social and the technical – sometimes they are even combined into a sin-

gle word- in the implementation of information technology, such as GIS, in planning organisations. Further, Latour [14] highlights two important points in the implementation of information technology in organisations. Firstly, information technology has become more stabilised as more users/individuals become committed to its implementation. Secondly, involves the importance of writing the inevitability of the success or failure of any particular invention/innovation back into the record after the invention/innovation has become black-boxed as a success or as a failure. This means that the involvement, participation and feedback from the planning staff is indeed important for the implementation of GIS. The process involved is not so much pushing through a given vision of the future as trying to articulate the often conflicting understandings of planning staff about both the developing technology and the developing institutionalisation aspects in which the information technology would be entangled. This process helps to stabilise both the implementation process of the information technology and the routine operation of the technology that is built up in the planning organisation.

4 INDIVIDUAL PLANNING STAFF AS AN ACTOR OF GIS TRANSLATION

The activity of individual planning staff can substantially affect the development and utilisation of computer-based systems. It is emphasised that individual staff members within planning organisations have different values and motivations, and that computerisation tends to challenge their interests; threatening some and offering opportunities to others. This suggests that individual planning staff can perform an important role in the process of GIS implementation in planning organisations. It is also important that the role played by the planning staff includes the necessary ability, willingness and awareness to implement and use GIS in the planning organisation. In many instances, the benefits from the introduction of GIS in planning organisations are perceived by some individual staff as a threat and others as an opportunity. It is likely that the bargaining over the control and distribution of benefits associated with the introduction of a computer-based system will take place at a corporate level, within separate sections and, where appropriate, between agencies [7]. Key individuals often play an important role in both the initial acquisition of new technology and the subsequent processes of achieving effective utilisation [6], [17]. This means that the purchasing of GIS by the planning organisations is frequently associated with the awareness and readiness of the individual users of the planning staff. Consequently, each planning staff must possess the necessary ability, willingness and intimate knowledge to implement and use GIS successfully [6]. Generally, interest in GIS is not confined to individuals most directly involved within the planning organisations. Staff throughout the planning organisations also has to play a role or be concerned with the implication of new technology [18]. Sometimes, they may be opposed to, it because their past experiences with computer technology were not entirely favourable. These issues are especially important in relation to the implementation and utilisation of technology such as GIS. The activities of planning officers in using GIS help to encourage other planning staff to use GIS. These include their contributions in acquiring GIS skills, training and knowledge towards the institutionalisation of GIS in planning organisations. In addition, the awareness and encouragement given to other planning staff to use GIS also play an important role which can determine whether the system is actually used.

These individuals are likely to be members of the senior management in planning organisations as they are most closely involved with the committees which are responsible for budgeting although, in certain circumstances, a middle ranking officer may be able to take the initiative [6], [18]. For example, the role played by the Planning Director or the Head of Department concerning the distribution of GIS within the planning organisation is pivotal in ensuring the effective use of GIS. However, a lack of mutual understanding between them and computer experts can affect the development of GIS in the planning organisation. Failure on this part can lead to wasted and redundant resources of technology in the planning organization. The interpersonal relationships between the users and the technical specialists have a significant impact on the development of information system [5], [6], [18]. This means that some planning staff with computer knowledge and skill in the planning organisation tends to be more interested in the design of GIS. As experts, they become involved in the implementation and utilisation processes of GIS in the planning organisation. They are more likely to act in accord with their perceptions of what the planning staff regards as desirable so as to avoid harming their career prospects. This suggests that the introduction of GIS in planning organisations has both positive (job satisfaction and interest in their work) and negative effects (level of stress and pressure) on individual planning staff.

5 METHODOLOGY

This paper employs a case study method eliciting data which includes a semi-structured interview. The Department of Urban Planning (DUP) and the Master Plan Department (MPD) of Kuala Lumpur City Hall (KLCH) had been chosen on the basis of statutory responsibilities, active involvement with the development of GIS in the development control and the support and willingness given to facilitate the study. It has been suggested by researchers within the GIS community that a case study approach is appropriate for researching a range of GIS implementation, utilisation, and diffusion issues [19], [20]. The issues include identifying the forms of decision-making which have utilised GIS, identifying factors and processes leading to rejections of previously embraced GIS, and identifying organisational and societal consequences of GIS.

5.1 Interview

An interview is simply defined as a conversation with a purpose. In total, 16 respondents were selected for the interview. They were planning officers and top managements officers involved in the development of GIS for the planning activities. They were selected based on their educational backgrounds and experiences in urban planning departments, and their roles in the planning departments concerning policy-making, management and research. This was undertaken in order to ensure that they have a relatively high level of knowledge and expertise in the field. At the same time, they are also involved in managerial and decision-making positions which indicate that they have influence over policy and/or practice on the ground. They are grouped according to the nature of their positions, namely planning directors, deputy directors, senior town planning officers and planning officers.

6 METHOD OF ANALYSIS

The interview data were analysed using content analysis.

6.1 Content Analysis

The analysis of data was conducted through a content analysis technique. Content analysis has become a research tool used by social scientists in making inferences. The process of content analysis involves simultaneously the coding of raw data and the construction of categories that capture relevant characteristics of the document's contents [2005]. In this study, data from the interviews were transcribed and the results are presented in the form of content analysis in order to support and provide more insight into the issues discussed.

7 ANALYSIS AND FINDINGS

7.1 Perceptions of GIS Management

The 16 management officers interviewed include three planning directors (PD), two deputy directors (PDD), four senior town planning officers (STP), and seven planning officers (PO) from the planning departments and agencies. Each respondent was given a code according to their position. For example 'PD1' represents respondent number 1 of the three planning directors interviewed. The results and analysis of the management officers suggest that the uses of GIS are dependants on the organisational and individual characteristics of planning departments. Organisational factors are shown to have a significant influence on the nature of the information systems developed, while individual characteristics and the relationship between GIS and users are found to be more important aspects.

7.2 Factors That Encourage the Use of GIS in the DUP and MPD

The management officers agreed that GIS plays a major role in planning processes. They suggested that GIS is the right tool for urban planning activities such as storing data, keying-in data, retrieving data, sharing data and processing planning applications. A Planning Director (PD2) states:

"Town planning by profession or nature of work is a multi-disciplinary activity; it is not a specialised job like engineering. To carry out town planning, you have to accommodate all disciplines in order to obtain the end-results. So, we often need to refer to other agencies just to come out with a decision on how to advise somebody. We need data from other agencies, and that is where we become dependent on other agencies' technology. If other agencies are using IT, we need to use technology (GIS) also; otherwise we cannot obtain the data (from other agencies)." PD2

PD2 further comments about the need of GIS in planning activities:

"...Basically it is a natural move from the ways of doing jobs manually to the digital approaches...so you know that...I do not have to get into details...because you know the benefits of digital technology...we are now in the IT era, so it is not a question of to consider or not to consider...it is just a natural step from preparing plans manually with the introduction of computer...so you obviously exploit this technology...and you exploit the technology of IT." PD2

The management officers believed that moral support obtained from the management level is a very important aspect that influences the utilisation of GIS in planning departments. The

use of technology is strongly influenced by users' understandings of the properties and functionality of a technology [8]. This view has been strongly supported by the encouragement and support from officers within the departments. When questioned whether the mayor supports the application of GIS at the DUP, a Deputy Director from the department made a similar comment:

"...our director shows us the benefits of GIS for our planning activities." PDD1

Another senior town planning officer (STP2) made a similar comment:

"We have support from the top-management to use GIS." STP2

According to STP2 (a Senior Town Planning Officer), the supports that they had received are mainly from the planning director and the mayor. He adds that their Planning Director is aware of the importance of GIS for the planning works, especially in plan making. Meanwhile, the Mayor is aware of the use of GIS in order to help the government to have good governance over local authorities. In terms of budget and financial support, the management officers of the DUP and MPD indicate that there have been no financial constraints for planning departments at the KLCH. The financial aspects include purchasing the hardware and GIS software and sending planning staff to attend GIS training and courses.

7.3 Perceived Benefits of Using GIS

This section identifies the opinions of the management officers on the perceived benefits of using GIS in planning departments. With more than ten years in implementing and adopting GIS in the planning departments, the staff at the DUP, KLCH can eventually see the benefits of GIS. All the management officers indicated six main benefits of using GIS in the planning departments. They are time saving, ease of use, using GIS in decision-making processes, improved data management, improved data sharing and data standardisation and centralisation. The results presented here are in line with results of the questionnaire survey discussed above and studies by researchers on this subject [1], [5], [22], [23]. All the management officers agreed that GIS has helped them to save time in processing planning applications, preparing and printing maps and plans, producing reports, colouring plans and checking plans. A Planning Director (PD1) certainly agreed that GIS has helped planning staff to save time, for example, on the use of GIS to print plans. According to PD1:

"...definitely it (GIS) will save time" PD1

PD2, a Planning Director, made a similar comment which specifically mentions that GIS has helped the planning staff in processing planning applications. He adds that, with the use of GIS, it can save time and speed up the process of planning applications. PD2 states:

"...it is faster to process planning application...save time" PD2

Other than GIS as a planning tool, most of the management officers agreed that GIS has assisted planning decision-making processes because of the quality of GIS data: it is accurate, useful, complete, reliable and current. Up-to-date and reliable information are needed by planners in the processes of making decisions as well as for policy planning and plan

implementations [24]. The use of updated and current information allows automatic linking between statistical and mapping information [22], [25]. These processes allow large quantities of data to be processed quickly and combined in many ways. According to PD1:

"GIS is a tool that contributes to decision planning processes". PD1

Another Planning Director (PD2) and Senior Town Planning Officer (STP3) made similar comments:

"GIS is the ideal tool to assist decision-making".
STP3 & PD2

In many respect, data are crucial resources and are very expensive to collect, store and manipulate because large volumes are normally required in solving substantive geographical problems. The use of GIS helps to improve data management. According to PD2:

"We are dealing with a large volume of data, and this situation can be improved by using GIS to handle the processing and management of data." PD2

This response emphasizes the management of digital data through the use of GIS. A Deputy Planning Director (PDD1) also made similar comments but highlighted the contribution of the system in avoiding the repetition of data:

"We can easily update the data and detect any new information of certain areas. So, GIS helps us to avoid a repetition of data." PDD1

7.4 Problems of Using GIS

Although GIS can be beneficial, its implementation can also bring about problems. The management officers indicated that the perceived problems of using GIS in planning departments are shaped by five ongoing issues. There are the level of GIS adoption, staffing/personnel issues, equipment and data issues, IT/GIS skills, and workload and financial rewards for GIS skills. A Planning Director (PD2) from the Federal Department of Town and Country Planning (FDTCP) made a comment when asked about the difficulties faced in using GIS. PD2 agreed that GIS is difficult to understand and it is challenging for the planning staff, especially the technicians and the draughtsmen, to use GIS. He suggested that these groups of staff need to be guided by the planning officers in order to ensure the understanding of the IT/GIS language and commands.

"It is complex to understand; not an easy subject. The more complicated the tool, the more powerful the tool, the more complex it becomes". PD2

The management officers indicated at the beginning of the GIS implementation that there were some planning staff who refused to change from manual to computer-based systems applications (GIS). According to PDD1:

"Especially for senior technical staff with more than 15 years working experience with us...it is difficult for them to accept new technology" PDD1

The above responses highlight that the senior technical staff of the DUP, KLCH refused to use GIS. According to PDD1, these senior technical staff preferred to use the manual technique as their planning tool because they were more familiar with the drafting boards and the use of technical pens. Another Deputy

Planning Director (PDD2) emphasized the same view:

"They (planning staff) have a slow momentum to change. They prefer to use the manual method. The drawing board and the technical pen are very important to them". PDD2

In terms of staffing issues, the management officers indicated three aspects of GIS utilisation in planning departments. They include a lack of technical specialists, a lack of experience, and scope of work. A lack of technical specialists is an important issue in the use of GIS in planning department. A response by the Deputy Planning Director (PDD2) made comments focusing on the number of staff involved in GIS. According to him, the department lacked staff who could concentrate on managing and maintaining the database. He states:

"We have only a small number of staff that are involved in GIS". PDD2

A Senior Town Planning Officer (STP4) mentioned that senior staff with 20 years of using drawing boards had given many reasons for refraining from using GIS. According to STP4, these senior staff always said that they have regular jobs (using manual), and provided reasons such as "I cannot", and "I do not have time". As Deputy Planning Director (PDD1) comments:

"At one point, some of the planning staff took GIS for granted and, because of this, they could not fully concentrate on adopting and using GIS." PDD1

A Planning Director (PD2) focused on the standardisation of the database which in turn corresponds to findings by Batty [1], Yeh [5] and Campbell [18]. They state that the standardisation of the database is important in order to share the data within the planning department and with other departments at the same local authority. According to PD2:

"The existing database is not standardised and not uniform in structure." PD2

Some of the management officers indicated that one distinctive aspect to proclaiming knowledge of GIS is that it will lead to extra work. A Deputy Planning Director (PDD1) and a Planning Officer (PO5) state:

"Some of them (planning staff) know how to use GIS but refuse to publicise this fact for fear of added workload. This is despite the fact that several senior planning staff have attended at least one GIS course and are able to use the technology. For them (planning staff), new technology equates greater workload". PDD1

"They (planning staff) simply refused to show that they actually know how to use GIS...they thought that it will burden them, more work to do and the workload will increase." PO5

8 DISCUSSION

The relationship between individual planning staff and GIS suggests that all socio-technical relationships are products of both users and technology. The planning staff is able to interpret the software while GIS is able to display functionality. These relationships suggest a more subtle analysis of the ways in which users and GIS are distributed. It appears that

the interactions with GIS and the mediating position of GIS seem such a potent one. This is because, although the planning departments are implicit in the functionality of GIS, it is so dispersed that the technology becomes the central focus of activity. As it generates products such as complex overlays and paperwork, which will not have been possible without it, GIS emerges as an agent, and the technology becomes more animated than the individual human agents associated with it [26]. The findings indicate that all planning staff at the MPD and the DUP view GIS as a means to accomplish tasks more quickly and easily, improve data management, improve data sharing, standardise and centralise data, save time, increase productivity effectiveness, improve decision-makings, reduce workloads, improve job performances and derive personal benefits in terms of improved professional performances and prestige. The findings show that users' satisfaction is somewhat different for direct and indirect GIS users. Indirect users are those who make use of the technology by relying on other members in the department. For direct GIS users, ease of use, time saving, exploitation of technology, data sharing, data management, improved decision-makings, trainings and documentations are all important for achieving satisfaction. As suggested by Nedovic-Budic [4] and Gill *et al.*, [27], regardless of the type of GIS use, quality, timeliness, accuracy, format, reliability, and completeness of the GIS products are of central concern in evaluating user satisfaction. The findings of the interviews indicate that the planning staff at the MPD and the DUP is more likely to regard GIS as a positive aid for their planning activities and processes. The notion of 'GIS as a tool' has been repeatedly invoked by the respondents. It has been usually accompanied by the assumption that, as a spatial data handling tool, GIS will be a useful tool for planning processes. The term 'tool' is readily adopted by the planning staff and GIS has been constructed as a flexible piece of technology that will facilitate efficient working practice. Its usefulness has been reflected by respondents who referred to a number of tasks which they considered would have been more efficiently performed using GIS. These tasks include keying-in data, retrieving data, printing plans, processing planning applications, performing mappings, performing analyses, printing reports, conducting presentations, running models, and operating the system management. The notion that GIS incorporates a range of functionality that enables spatial data to be handled effectively is therefore utilised by respondents in order to support their understanding of GIS as a 'tool'. Most of the staff whose interest in technology is related to their work are not naturally eager about GIS; however, they perceive that knowledge of IT may be advantageous to the departments and the organisations as well as to their individual career advancements. However, there is also a minority of the planning staff who has avoided using GIS and has shown little willingness in learning how to use it. The results of the interview suggest that the Planning Director has made a highly significant contribution in obtaining the resources necessary for the development of computer-based information systems in the MPD and the DUP. A primary function of this leadership role is to set clear goals and objectives, to win acceptance among end users for such goals and objectives, and to provide the commitment which enables these goals and objectives to be realised in the utilisation process. The role of the Planning Director can be made easier if he/she receives support from the middle management. In addition, it is often found that the technical skills and interests of the Planning Director play an important role in en-

couraging the use of GIS among planning staff [2], [5], [18]. As GIS is rather new in the planning departments of the KLCH, the planning heads and officers need to gain more skills before they can provide leadership in promoting the use of GIS in their departments. They also need to have a generally good comprehension and appreciation of computer applications. The emphasis that the Planning Director places on the role of GIS/information system in strategic planning processes is also significant. As a result, an information management strategy (the Development Control System within the DUP) has been developed which gives consideration to data accessibility and associated issues such as staff training. This in turn has encouraged the adoption of a centralised approach in the use of GIS in planning departments. Consequently, these findings suggest that the activities of the Planning Director and supported by the Mayor, the Planning Officers, and all planning staff have been responsible for the creation of a favourable internal organisational context in which to utilise GIS in planning departments. This study has revealed the relationship between the planning staff and GIS as mutually productive, where GIS will not only affect the working practices of the planning departments but where its adoption will impact upon GIS itself. It has been frequently argued that, as GIS becomes embedded in current practice, greater numbers of potential users will become more aware of it and its use will therefore become more widespread. Concurrently, this will promote investments and developments of the software and, as systems become refined and standardised as good practice, it will be increasingly difficult for users to circumvent the system.

9 CONCLUSION

The development of GIS has progressed dramatically in recent years and its use has proliferated in government planning departments. The findings of this study have profound implication for the designs, implementations and organisations of information systems. This study has identified that there is a strong contribution of the socio-technical factors to an understanding of GIS usage in the DUP and the MPD, KLCH between organisational contexts, people and technology. It has been proven that the manner in which these factors interact with GIS determines the processes which affect the utilisation process of automated systems. This study has demonstrated that a situation of mutual dependency between individual planning staff which influence the translation of computing technology and, at the same time the technology, has various impacts (benefits and problems) on planning departments and staff involved. Thus, the identification of the pertinent factors and the manner in which they interact enable greater understanding of the processes affecting the effective use of GIS in the DUP and the MPD, KLCH.

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