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## Managing User's Resistance to Technological Change: A Case of GIS Implementation and its Implications to Malaysian Retailers

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### Abstract

*This paper discusses the contextual nature of user's resistance to technological change as experienced by a British retailer in implementing a GIS to support its day-to-day and strategic business decisions and its implications towards Malaysia, as the country is experiencing a similar pattern of GIS development. An in-depth case study research approach was employed as the research design to encapsulate the phenomenon. This study confirms the findings obtained from previous studies on the key issues surrounding user's resistance to technological change in practice. However, the insights may not simply be generalisable. An in-depth research into "a Malaysian" geographical context is needed to enrich the retail managers' understanding towards successful GIS implementation process.*

**Keywords:** Resistance to change, Managing resistance to change; Malaysian retailers, GIS implementation, British retailers.

### 1. Introduction

Geographical Information Systems (GIS) in itself is a relatively sophisticated technology (Lo and Yeung, 2002). The implementation of GIS is heavily dependent upon the trends of hardware and software evolution in the computer industry. In recent years, growing awareness of the importance of geographic information in corporate information resource management has attracted many mainstream computer companies to the GIS arena. Therefore, it is not surprising that despite the apparent success of GIS as one of the fastest-growing areas of the industry, many issues remain as barriers impeding its acceptance. The underlying causes of these issues are due to several factors, for instance, the complex nature of geographic information; the wide range and scopes of GIS applications, and the inability of many organisations and users to cope with the different working environment using GIS tools which include user's resistance to technological change.

The most common reaction to a technological implementation in organisations is user's resistance to change, no matter where the geographical location of the users is (Nasirin, Birks, and Jones, 2003). To users at work, new technology can spell all kinds of trouble. It can mean loss of jobs, disruption to known procedures, or the need to learn new skills. Nevertheless, it may also enhance the quality of working life, opportunities to become more proficient, etc.

Given the different nature of the resistance, results obtained from previous studies are likely to provide at best a partial picture of the key issues surrounding user's resistance to technological change in practice. Retailers (for instance, in Malaysia) responsible for managing user's resistance cannot assume that the same set of influence faced by British retailers are equally significant for them. Even if one believes that to be so, some of the "common wisdom" about these issues must be confirmed empirically.

This paper discusses the contextual nature of user's resistance to technological change as experienced by a British retailer in implementing a GIS to support its day-to-day and strategic business decisions, and its implications towards Malaysia, as the country is experiencing a similar pattern of GIS development. The paper starts with a review of the literature on user's resistance to technological change in organisations. It then outlined the strategies employed in gathering and analysing the data, in which the in-depth case study of the British retailer was described. Finally, the paper discusses the implications of the findings to Malaysia as the country is experiencing a similar pattern of GIS development.

## 2. Review of the Literature

The first known public reference to research on resistance to change in organisations was by Coch and French (1948). They argued that, "...*resistance to change is a combination of an individual reaction to frustration with strong group-induced forces*". The fundamental principle was to find a strategy in which users can participate. As they further discovered, 1) a strategy in which there is the participation by all those affected leads to much more positive response than a process in which only a few representatives are consulted, 2) participation must be more than symbolic (it must be possible to influence issues that matter to them and to "own" the future system so that it is not perceived as a development imposed from outside) and 3) it must enable an understanding of the implications, appreciate positive opportunities, come to terms with negative aspects and plan their own coping strategies.

In evaluating users' resistance to change, senior managers have noted a variety of responses. It is a complex phenomenon because it often results from a combination of motives. There were a few people who were "obsessed" with the system but resistance was still strong from those people who were unfamiliar with the system. Eason (1988) suggested that the overall system development process have to be user-centred. If resistance to change is to be avoided it is necessary to involve all potential users in the process, not merely a selected few. Only by involving users at all stages of system development can they feel they own the change and want it to occur.

Baddoo and Hall (2003) argued that one of the biggest obstacles to introducing any new practice is the unwillingness of practitioners who actually use the practices to take them up. In support of this belief, Hirschheim and Newman (1988,) in their review of the theory and practice of user resistance stated, "*User resistance to the development and implementation of computer-based information systems is legendary and can take many forms. It can range from the physical sabotaging of a new system, as was the case of the US postal workers pouring honey and inserting papers clips into their data entry devices, to the simple non-use of a system, to the more subtle and covert political maneuvering which accompanies a system which is perceived to redistribute organisational power.*"

On the other hand, in a large implementation, it is difficult to involve everybody in the strategic decisions but there are many "local" decisions in which everybody can participate. It is significant to note that involvement of this kind gives people considerable influence over the decisions that affect them personally and it is this kind of example which most successfully encounter feelings of external threat (Wall and Lischeron (1977). Dent and

Golberg (1999) argued that the term 'resistance to change' has gone through a transformation in meaning from a system to a psychological concept. They further noted that recent work in this area seems to be restoring the concept to its root as a system understanding.

In short, much has been written about user's resistance to technological change (e.g., Baddoo and Hall, 2002; Harley, Wright, Hall and Dery, 2006). This is because the answers to these questions help to avoid the array of problems that occur as a consequence of the resistance. Nonetheless, much more research is needed to synthesise previous findings, formulate and empirically test hypotheses regarding the likely determinants of user's resistance management and build a theoretical foundation in this significant area

### **3. Research Methodology**

The chosen design was lead by several ongoing outcomes throughout this research. Firstly, it was due to the exploratory nature of this study. With no prior studies, there was little clarity of the variables to actually measure. Secondly, the literature examining the paradigms and weaknesses of the current approaches of GIS studies showed a less concentration on describing the issues faced throughout the implementation process. Conducting case studies enables the capturing of the required understanding needed by implementation practitioners. It also allows a structuring of the data collected. On the other hand, grounded theory allows an "understanding" rather than "measurement" of the informants, the unanticipated influences and phenomena (what influence their actions and the processes which had taken place), thus leading to the generation of the grounded theories.

The rationale of combining grounded theory and case study research is that there are good reasons for using both methods in the same study. This approach prevents the research becoming method bound; in other words using a variety of approaches allows a flexibility to match the phenomena under investigation. The strength of almost every form of measurement is flawed in some ways or other and therefore research designs can be offset by counterbalancing strengths from one to another.

#### **3.1 Strategies for data collection**

The basis employed in selecting the informants was based upon Glaser and Strauss's (1967) concept of theoretical sampling in which the primary aim of this study is to produce the "GIS implementation process map". The sample is in line with the conceptual requirements of this study (i.e., rigidity in sampling hinders theory generation) while increasing the in-depth of focus rather than be simplified (Martin and Turner, 1986; Orlikowski, 1993). The unit of analysis for this study is a series of organizational activities taking place over a time period that involves an entire GIS implementation process.

Face-to-face in-depth interviews were the most significant source of data in this study. These interviews were used because of the three prime advantages; 1) It allowed 'control' over the questions, 2) It allowed informants the time to reflect, thus furnishing the historical data

needed and 3) The time allocated allowed the informants to describe their experiences and share their insights in their own language, such that, the logic and the flow of ideas that lay behind their actions could be understood. Rapport could therefore be built with the informants, i.e., as a considerable level of empathy was developed. A guide proposed by Patton (1980) was used as guidance for conducting the exercise. The informants were asked about their insights on a number of topics. They were also asked to suggest their opinions about certain events or occurrences. All interviews were tape-recorded and the relevant portion of the tape was transcribed in full.

### **3.2 Strategies for data analysis**

In grounded theory approach to data analysis, where the nature of the study is exploratory, the structure for data analysis is derived from the data. The underlying strategy was to develop a descriptive framework for organizing the theory (Jones, 1987; Easterby-Smith, 1995). The data was most visible in tape recordings of the in-depth interviews. These tape recordings were transcribed and the process of transcribing allowed the data to be rearranged, easing the process of data analysis. Working carefully with interview transcripts and continuous readings of the source materials allowed informants' insights to be captured. For the analysis, two modes used were; 1) within-case analysis (is a descriptive analysis of the particularized experience of the case itself) and 2) cross-case analysis (is a comparative analysis of all cases in the "sample"). Three time stages of GIS implementation activities (i.e., activities prior to the implementation, activities during the implementation and activities after the implementation) were utilised to back up the structure of the case study as well as to answer the proposed research questions. The analysis also employed Miles and Huberman's (1984) method for across site contrast and pattern clustering that involves matrix displays (to contrast key experiences, events and consequences).

### **3.3. Measuring the quality of the data**

Two common tests were used to examine the quality of the data; internal and external validity. To regard the research as valid, informant's feedback was used in which they were required to comment on the findings or on the case as a whole (as the concern over internal validity may be extended to the broader problem of making inferences). Nonetheless, the delicate issue is that of introducing bias (researcher's bias). Feeding back findings in the course of a research may change informants' behavior (they are no longer comfortable discussing the issues in the next visit or react oppositely).

This study also used theoretical rather than probability sampling. This does not mean that qualitative case studies are never generalisable beyond the setting or individuals studied. As Yin (1994) has noted, external validity is based not on explicit sampling of a defined population to which the results can be extended but on the development of theory to which the results can be extended to other cases.

## **4. Case Description: User's Resistance to Technological Change (Geographical Information Systems) at Retailer Z**

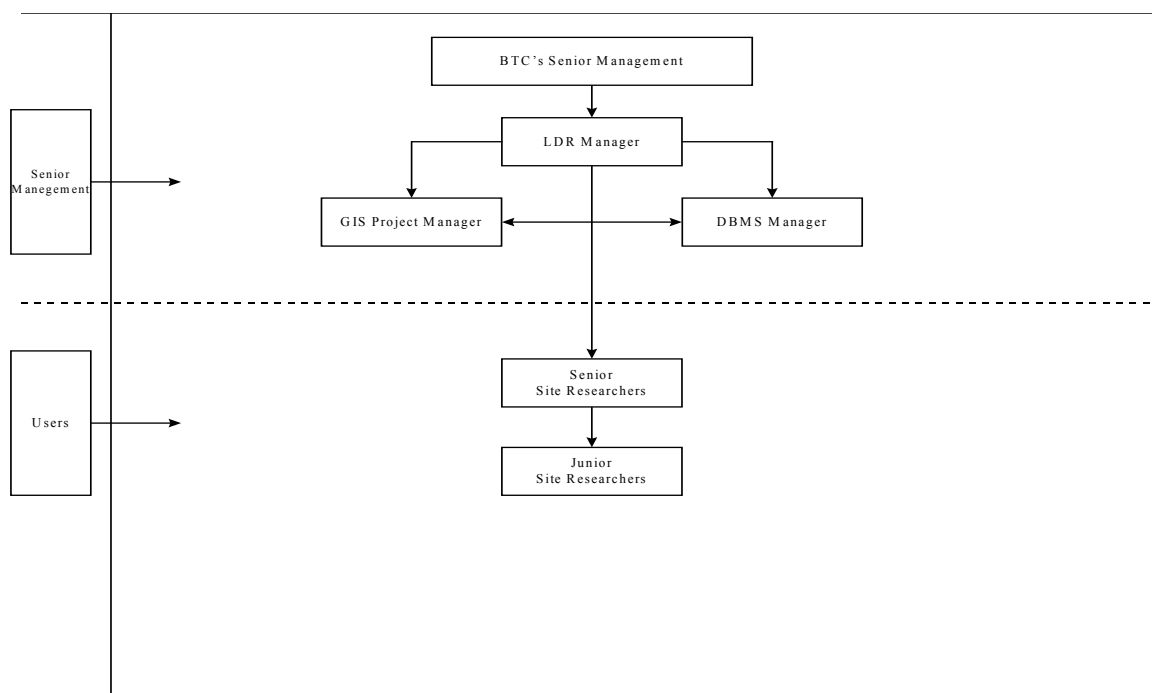
### **4.1 Background of the company**

Retailer Z is a leading health and beauty retailer with stores throughout the UK, ranging from small community stores to city centre departmental stores. The company was successful in leading the health and beauty market with its own brands through the manufacturing abilities of its sister company that facilitated the introduction of numerous own brands. Retailer Z has the largest Electronic Point of Sale (EPoS) network across Europe and more than 1,200 of its stores were linked through the electronic business communication network. At the time of the study, the company's sales (over-the-counter) accounted for a quarter of the sales (over-the-counter) of medicines market. There were about 3,600 pharmacists working at the company, providing day-to-day consultation to its customers.

In short, Retailer Z is a market leader in virtually all health and beauty product categories. They have maintained this position in the face of heavy price competition that has intensified among health and beauty retailers. Major health and beauty retailers make up the bulk of Retailer Z's competitors. The company leads the health and beauty market by showing a steady growth in its profits and turnover since early 1990s. Retailer Z believes that in the next decade they will be confronted with tough challenges from its competitors and GIS was viewed as the means to attain and increase its competitive advantage.

### **4.2 GIS implementation process at Retailer Z**

The key business objective of the Locations and Development Research Department (LDR) was to advise Retailer Z on where it should profitably invest in new sites (new store openings). There were about 15 site researchers working with the department. They also provided advice to Retailer Z's senior managers in their attempt to acquire independent pharmacists into their existing chains. At the time of the study, LDR was monitoring more than 1200 Retailer Z stores throughout the UK. Figure 1 further illustrates the LDR's organisational structure. GIS was employed by LDR in predicting consumer expenditures and sales volume for new sites and to determine the appropriate size.



**Figure 1 - LDR's Organisational Structure**

The ideas behind GIS were first introduced by LDR during the early 1990s in identifying new sites after a period of dissatisfaction and unhappiness with 'traditional' site selection decisions approach (i.e., hard copies of maps were "unable" to satisfy the department accelerating pace of development). This idea was also in line with Retailer Z's aim of consolidating the market position through the acquisition and opening of new stores. The situation was further described by the GIS Project Manager as, *"We were in the position of knowing lots about town centres and lots about chemists' business but we know nothing about out-of-town retail. So we started to look around for tools that would help in our decision- making process."*

Initially, site researchers at LDR were using different colour pins on paper-based maps to represent their current and proposed locales as well as competitors' sites (typically they also had to do their own data collection and analyses). In 1995, a PC-based GIS (stand-alone) was introduced by LDR in selecting Retailer Z's new sites, especially in developing sales forecasting models (e.g., gravity models). The system was chosen as it was "stand alone" which gave the key benefits of helping them to develop their understanding of a GIS without disrupting other DSS and data.

This system revealed a new era of GIS technology to Retailer Z. The process of implementation took place in a series of many parallel operations, which occurred simultaneously. Based on the presentation made by the champions, e.g., GIS Project Manager, a large amount of funding was secured by LDR to purchase a GIS. The project was jointly managed by LDR and Information Technology Department (ITD). ITD played its role by offering its technical expertise, i.e., ITD representatives worked alongside LDR site researchers in developing the system throughout the implementation.

The first stage of the implementation started with the modelling process of the entire framework of the implementation management. Their vision was to bring all the sub-

components under one system as “corporate tool” for all Retailer Z’s subsidiaries. The planned GIS were to have a profound impact upon how they viewed their markets and how they developed their business based on those views of the market. Initially, though, it was not perceived as having a major influence on Retailer Z’s information technology planning.

Once the system was in hand, many development activities commenced in parallel within a short space of time. By this stage, users were experiencing a period of ‘system crashing’. Part of this was due to user discomfort in using the technology. This may be considered as natural in any systems implementation. Users with “faith” in the technology kept coming back to scrutinise the system. It was revealed in the interviews that users’ familiarisation period was dependent upon the level of their experience in GIS and their efforts in scrutinising the system (e.g., an average user will take about 4-6 months in familiarising themselves with the system).

Meanwhile, the implementation of the system was aided by the siting of both LDR and ITD at the same location - the corporate headquarters that is in Nottingham. As a result, exchange of data and communication were effective and rapid, which may contrast with organisations that have a decentralised ITD away from their corporate headquarters. At the point of this study, there were about ten site researchers working in the department. The relatively small departmental size facilitated effective formal and informal communication amongst its members.

## **User responses and expectations**

Users who were somewhat uncomfortable in using the technology provided the most resistance but as the implementation activities proceeded, resistance was slowly being overcome by users themselves, through the support provided by their senior managers. In encountering these resistances, the GIS Project Manager described his approach as, *“There has been resistance and it’s a bit like sort of rugby playing. All you can do is just bend down your head and keep going.”*

In facilitating user involvement, regular team meetings were conducted by LDR senior managers to further understand user characteristics. In these meetings, users were encouraged to share their insights on the system. As one of the users described, *“We all say what we wanted GIS to do and everyone could give their ideas.”* These meetings were beneficial in developing the system based on user responses and expectations. Although users were fundamentally involved to participate in the implementation process, there were still some “uncomfortable” users. There were users who were somewhat “negative” particularly during the introductory stage of the system. This situation was described by one of the users as, *“There is a lot of resentment if you introduce a system and don’t train people on it. They get annoyed because they can’t use it and they feel that they should go for some formal training as well.”*

She further added, *“Everyone is getting a bit angry. They were just trying to do the work and the old system has been out. Instead, we have this new system and we don’t know how to use it. So for a few weeks there is a quite a lot of people using the old system rather than the new system”*.



Users expected senior managers to continuously inform them about the developments of the system especially in events such as a system's crash. This expectation was described by one of the users as, *"If you tell people why it is crashing or why it is slowing, everybody is a lot happier."*

Nevertheless, a user "negative" characteristic does not always hinder implementation process. It was also revealed that there were also some advantages of having a group of system "sceptics". The characteristics of these sceptics were described by the GIS Project Manager as, *"I think sceptics have a really useful role to play because as someone who are supporting it tend to get enthusiastic but sceptics will say, "Hang on! How's it again to do that, all that?" I think that's very valuable to keep some sceptics in the team."*

The implementation process forced LDR senior managers and users to work closer with each other, i.e., discussing new procedures of using the system. GIS implementation was smoothly completed by LDR due to the high level of commitment within the department together with a close support provided by the ITD. The ability of senior managers to determine whether the information to be presented in the system outcomes was perceived as useful or significant to the success of the system. Successful implementation involved the development of a strategy for controlling the implementation process.

They analysed user characteristics and the environment of those characteristics to determine the felt need for the proposed GIS. User suggestions generally were elicited and considered for applicability. One of the major obstacles to user involvement, was fear. Fear caused by imagined threats (fear of the unknown). Fear was seen to be reduced by well developed and thought out indoctrination and training programmes. In short, user input was essential to reduce fear and to benefit from their suggestions throughout the implementation process.

## **User training**

At Retailer Z, to minimise user resistance, an emphasis was placed on training its site researchers. At the initial stage of the implementation, users were somewhat annoyed with the sophistication of the system. The situation was described by one of the users as, *"They get annoyed because they cannot use it [GIS] and they feel that they should go for some formal training."* She further added by describing, *"The utilisation of the technology was considered as a big jump by most of the users at LDR. Most users have not had any experience. I sort of went into Retailer Z with no experience at all."*

They ensured that anyone whose work was affected by the system was properly trained. The emphasis of the training was on familiarisation with the system. For instance, users were exposed and trained in the same manner as senior managers including specific knowledge on;

- The underlying concepts of GIS and site selection decision models
- Functional components of GIS and how the system will work e.g., specific tasks which have to be performed

*In addition, continuous informal training was given by those who participated in the training courses conducted by the vendors and in-house trainers. These sessions include both lectures and hands-on training in a focused environment. Those users, who were left out for the training courses, were found to be somewhat uncomfortable with the system. Senior managers were aware of these dissatisfactions. As result, they played their own role in convincing users about the "irrelevancy" of general training courses conducted by the vendors. The approach conducted by the vendors was described by one of the champions as, "They [vendor] will be telling you lots of thing which retail companies don't really need to know. It was not really "angled" towards our needs."*

## **Management support and GIS champions**

Management commitment and support were critical and essential for successful implementation of the system. Maintaining support for a GIS implementation required a deliberate balance between enthusiasm and reality. As a result of a series of successful presentations to senior managers and users by the champions, GIS was well received and was consequently given a priority for implementation. Continuous management communications (e.g., electronic-mail announcements, regular departmental meetings) were perceived as essential in smoothing the implementation process as well as clearing the "doubtful thoughts" possessed by senior managers and users. As one of the users described, *"I think management has a very big role to play in helping and guiding you and we know it will take longer to use initially because you are not use to using this. It's quite a radical change in how do you work."*

Most users at Retailer Z were "sold" by their superiors on the features of the system in performing their tasks (due to the small number of staff members within LDR, face-to-face communication was used as a major mode of discussion). Various types of support could be seen at Retailer Z, e.g., GIS literature (circulars, magazines and manuals), were made available by senior managers to help users further understand the technology. In the meantime, senior managers were also aware of the increasing difficulties in managing the system (e.g., resulting from the increasing amount of data). They believed that the team working spirit was high within their department, which in turn has smoothed the implementation process.

There were also a few expert users who were "wandering" around the department to help other users with their queries about the system. In addition, after exposing the system to other influential senior managers (perceived to be potential champions), more discussions were held by the GIS Project Manager to promote GIS further. On the other hand, the adoption of the technology in Retailer Z was driven by a group of GIS enthusiastic senior managers and users. This approach was described by the GIS Project Manager as, *"So it's striking a balance between making people feel involved or not."*

## **5. Conclusions and Implications of the Study to Malaysian Retailers**

Technologically-based implementation project managers throughout the globe may realistically experience resistance from users who are uncomfortable with the new system. To overcome these negative feelings, project managers should make the users feel that they "own" the system and that they are active involvers in its creation and growth. Users should be made involved in the innovation and implementation process on an on-going basis as the systems are developed. In addition, there are several things that senior managers can do to reduce users' resistance to change, for example, through promoting user's active acquisition

of skills and involvement in the performance of design and development tasks. They should strive to give users a chance to feel ownership over the particular system being implemented.

Meanwhile, the market leaders in British retailing are making great strides through the technological abilities of GIS, not just in site selection activities but also in other marketing mix activities. Loyalty card schemes have been launched in conjunction with the system to encapsulate the consumer and competitor buying patterns. Press releases have indicated that Tesco and Boots have moved to the Far Eastern markets for new business development programmes, i.e., by acquiring local retail chains and have started to gain popularity. These retail giants have the ability to implement their own GIS by employing their own internally-generated data in implementing their GIS abroad.

Thus, Malaysian retailers have to prepare themselves to compete with these retail giants through the development of GIS. They will need GIS for similar reasons such as in site selection decisions and all other marketing mix decisions. GIS will enable them to make a more “objective” decisions in their attempt to better understand their consumer and competitors activities. In implementing the system, Malaysian retailers will have to face and solve the same pattern of issues faced by the British retailers, and the lessons emerge from this study can be employed as a guidance by Malaysian retailers in their attempt to develop GIS in their organisations. Experience and insights shared with a leading British retailer revealed that these are the minimum requirements needed for successful GIS implementation.

In order to achieve a high level of effectiveness in implementing the system, a GIS should be tailored to its user’s expectations as the most common reaction to GIS implementation is their resistance. To users at work, new technology such as GIS can spell all kinds of disruption of known procedures. However, thorough implementation planning should be able to reduce the level of resistance faced. Besides thorough implementation planning, user-training can also minimised resistance. Users should have sufficient provision of hardware and software skills to enable effective interaction with GIS under consideration. In particular, a champion can be one of the significant determinants of successful implementation process. She is a key individual in the process and their significant roles should not be neglected by the Malaysian retailers in their attempt to implement GIS.

It can be argued that searching for a potential champion was generally seen to be vital to initiate GIS implementation. If no one was found to champion the system, senior managers should consider either abandoning the implementation or making it more attractive to a potential champion. In other words, if no one of high status in the organisation had any interest in pushing the system, its chances of success were probably quite low. In Malaysia, this champion would most likely be an outside consultant, given the lack of qualified personnel within the organisations. Seeking help from an experienced and qualified consultant is a logical way to fill the change agent role, i.e., initial implementation success of GIS generally instills confidence in users.

On the other hand, senior management support is crucial in system implementation process, not just in providing adequate funds but also in facilitating all the activities within the process. They should also be able to sustain sufficient support throughout the process. The existence of both GIS champions and senior management support should result in a better

implementation planning. Of course, one has to consider the different planning processes that exists for Malaysian retailers (i.e., different individual decision making processes and styles owing to cultural variations should be considered and incorporated in the implementation process such as individual differences, for example, “dogmatism” (the extent to which a senior manager is positive about his beliefs and opinions) and “risk taking propensity” characteristics which may also play a significant role in the process. Nonetheless, this discussion is beyond the scope of our paper. One can expect the technology to become a common component of modern Malaysian retail organisations as were the case of the retailers in the UK, although the development of GIS may still be regarded as a leading-edge practice of Malaysian retailing. They will consequently have to go through the system implementation process and therefore benefit from knowledge about the process.

This study confirms the findings obtained from previous studies on the key issues surrounding user’s resistance to technological change in practice. Nevertheless, the insights from the UK geographical settings may be somewhat generalisable but an in-depth research into “a Malaysian” geographical context is needed to enrich the retail managers’ understanding towards successful GIS implementation process. Malaysian retailers responsible for managing user’s resistance cannot assume that the same set of influence faced by British retailers are equally significant for them.

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