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Modelling implementation of E-Commerce Strategy

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Abstract

This paper describes a detailed case study of the implementation of and e-Commerce solution using GIS in Tesco, a major retail business organization in the UK. The study showed that whilst the strategy formulated was able to frame the implementation process, the reality of the implementation itself was highly complex and iterative. The decisions made and processes used highlighted the impact of various levels of users and management and reflected the nature of the various stakeholders involved. Their impact was to recontextualise rather than change strategy. They adopted and adapted the policy for their needs and use. This invariably makes the implementation more complex, less able to be rationalized and more uncertain. The paper suggest that more case studies of this nature are needs to enable better modeling of and planning for e-Commerce strategy implementation.

Modelling Implementation of E-Commerce Strategy

Introduction

Previous studies in Information Technology (IT), Information Systems (IS) and e-Commerce implementation suggest that implementation is an evolutionary process that is continuous and iterative. Implementation studies initially emerged from studies, which suggest that, the development, adoption, implementation process is staged and able to be broken down into separate levels of action. This paper reviews previous research and uses case studies in the UK to examine the way implementation is occurring in the acceptance of e-Commerce in business. The paper proposes a model that encapsulates the implementation process, which deals with multiple layers within that process. This begs certain questions that have emerged from studies of implementation in other disciplines. Is the process a politically driven one? How are the iterations used throughout the process? Is there then a suggested process that practitioners can use to better and more effectively implement e-Commerce?

Traditionally implementation has been viewed as beginning after the system and design effort and ending as soon as the system becomes operational and the outputs are produced (Schultz and Slevin 1975). Picket (1978) suggested that implementation success is attained when sufficient effort is made within the organisation and the model is actually integrated into the organisation's decision system. It must be recognised, however, that how efficiently the results provided by a model are used is a function of the user's own decision making ability. With respect to implementation, it is the use of the model to influence the decision making process that constitutes success (Multinovich and Vlahovich 1984; Davies and Olson 1985).

From a technology diffusion perspective, implementation is defined as an organisational effort directed toward diffusing appropriate Information Technology (IT) within user community (Kwon and Zmud, 1987). They propose a stage model of IT implementation activities based on Lewin's (1952) organisational change model, which incorporates six major stages (initiation, adoption, adaptation, acceptance routinisation and infusion). The definitions are by no means unique to the field of EC. In every different area, including those where the body of knowledge is far less developed; there is a significant recognition that there is a common concept in implementation activity. For this study, implementation refers to the on-going process that includes the entire development of the system, from pre-implementation stage (e.g., planning) to post implementation stage (e.g., audit).

Conceptual Framework

E-Commerce implementation takes place in the fluid setting of changing business. Implementation evolves more than through a multistage context (McLaughlin, 1987). It is also an iterative process (Corbitt, 1997). McLaughlin (1987) claims that implementation

success depends critically on two broad factors: local capacity and will. However, there are other factors that play an important role in ensuring success. Belief may also be nurtured from action. Even motivation or will is influenced by factors beyond the reach of implementation: environmental stability, competing centres of authority, contending priorities or pressures and other aspects of the social-political milieu can influence implementor willingness profoundly (Yin, 1981).

Experience (McLaughlin, 1987) has proven that successful implementation generally requires a combination and balance of pressure and support. Pressure by itself may be insufficient when policy objectives contain their own implementation directions (Corbitt, 1997). Pressure per se cannot effect those changes in attitudes, beliefs and routine practices typically assumed by reform policies. Ball (1990) argues that implementation results from the effects of influence, pressure, dogma, expediency, conflict compromise, intransigence, resistance, error, opposition and pragmatism. Communication of ideologies and arguments can be deliberately distorted by misinformation to influence process and gain power (Forester, 1989).

Implementation of business changes such as e-Commerce is essentially political and non-rational (Self, 1981). They are influenced by pluralistic inequality associated with sectional interests, power and factions, often associated with specific stakeholders. In essence, implementation is fractionated by the various stakeholders involved in the e-Commerce processes. Lee, *et al*, (2000) suggest that the stakeholders who create commerce, either actively or passively construct and determine the nature of the commercial relationship, the business expression of implementation. In this process these pluralistic constructions of power and influence interact to impact on the path that implementation follows. This implementation process is influenced by, and influences, human behaviour. Individuals can subvert and/or avoid attempts at regulation and unintended, unanticipated or unacknowledged consequences often result (Wallace, 1991).

One approach to studies of implementation in IS and e-Commerce has focused on factor studies. The failure of information systems implementation has been linked to the absence of an IS champion or change agent, lack of management support (Ginzberg, 1981; Kydd, 1989; Corbitt 2000), strain on already restricted managerial time (Cragg and King, 1983), poor attitudes towards IS (Corbitt, 1997), absence of education and training (Cragg and King, 1983), organizational problems (Markus, 1984), technical problems (Cragg and King, 1983), and perceived gaps between expectations of IS supporters and those expected to use the system (Nichols, 1981; Kydd, 1989). On the other hand, research has shown that success in implementing IS in business organisations is more common than failure (Kydd, 1989).

Success in implementing intra-organisational IS is attributable to a number of success factors (Grohowski and McGoff, 1990), such as, organizational commitment, the existence of an executive sponsor within the organization (Raymond, 1985), the existence of an operating sponsor within the organization to provide quick feedback across the organization (Montazemi, 1988) and the existence of dedicated facilities within the organization. Cragg and King (1993) suggest that the implementation of IT in small

businesses occurs most successfully where there is demonstrated relative advantage in terms of time saved, benefits accrued or discomfort decreased, and where competitive pressure could be addressed as IT was seen as an enabling technology that could make the firm flexible and profitable. Corbitt (2000) suggests that misguided conceptions that e-Commerce would deliver efficiencies, reduce costs, and improve service delivery all at the same time, was a common mistake. Finally, the central importance of the role of management is supported by Parr, Shanks and Darke (1999) and Duchessi, *et al*, (1989).

Daft and Lengel (1986), Kydd (1989) and Corbitt (1997) suggest that the interaction of equivocality and uncertainty in organisations can provide a useful means of understanding the important role of information in the adoption and implementation of IT. Corbitt, Behrendorff and Brown-Parker (1997) suggest that demonstrated relative advantage in terms of time saved, benefits accrued or discomfort decrease, and where competitive pressure could be addressed by IT, enable implementation. However, such factor studies are not reflective of the process, which occurs through implementation. Implementation is neither driven entirely by factors of success or failure. Rather the implementation process in E-Commerce is more reflective of the stakeholder relationship interactions and the impact of the context, both businesses, organizational, social and cultural, in which the implementation occurs. This paper uses different case studies of implementation to show what is essentially happening in the implementation process. These cases explore the rich textures and contexts of the implementation process and provide the platform to examine the real nature of implementation.

Methodology

One specific case studies is used in this paper to illustrate the nature of the e-Commerce implementation process. We were concerned to map the implementation process and identify the complexity and nature of the tasks undertaken throughout. To enable a comparison with existing notions of implementation the researchers only dealt with the nature of e-Commerce implementation as described by the individuals concerned. The purpose was to seek out commonalities in process and use reference points within the case as a means of developing the proposed model.

The difficulties faced in gaining access into retailers who are employing GIS were one of the key reasons for the employment of case study approach. In addition, the approach will also generate a structuring and contrast in the data collected that enables the capturing of the required GIS implementation process “map” needed by implementation practitioners and researchers.

A grounded theory (Glaser and Strauss, 1967) approach was used affording the researchers the opportunity to characterise the implementation process in context and without any preconceptions about what may and might happen. The use of grounded theory has enabled the researchers to develop the framework of a model which will need to be tested on a broader scale, in both monocultural and cross cultural contexts.

The basis in selecting the informants was based on Glaser and Strauss's concept of theoretical sampling (Glaser and Strauss, 1967, Pandit, 1996). It was employed in fulfilling the primary aim of this study that is to produce the "GIS implementation process map", and to avoid rigidity in sampling that will hinder theory generation. Two retail organisations were deliberately selected in order to serve the required data, reflecting various approaches to GIS implementation process. Table 1 summarises the organisations' profiles involved in the study. The unit of analysis for this study is a series of organisational activities taking place over time that is the entire GIS implementation process. When the system being implemented is complicated, the processes were divided into sub-processes or modules and these modules could be one candidate for an embedded unit of analysis. Choices of informants and interactions were also driven by the intention to expose any of the similarities and dissimilarities, providing the opportunity for contrasting and understanding key relationships in the setting (Miles and Huberman, 1994).

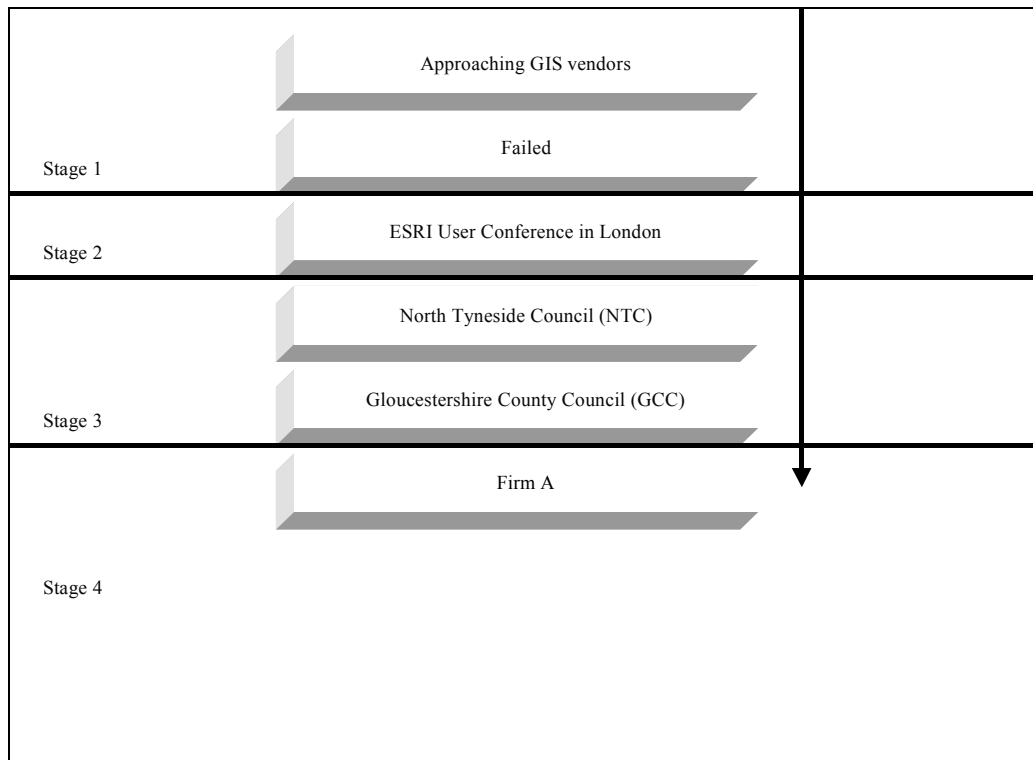
Table 1: Profiles of the organisations involved in the study

Category	Sub-category	Firm A	Firm B
Organisational context	Nature of business	Food retailing	Food retailing
	Rank in industry (market share)	1 st	6 th
Store development context	Number of stores*	870	615
	Number of site researchers	25	5
GIS used	Site selection approach prior to GIS	Manual evaluation of potential sites and their catchments by pasting different colour pins on papers-based maps	Manual evaluation of potential sites and their catchments by pasting different colour pins on papers-based maps
	Current GIS used	Network-based (Unix) PC based GIS	Stand-alone PC based GIS

* As of 1998

It was also vital that when access was gained, it was not wasted by having an approach that did not work, as there were so few retailers with whom case studies could be developed. Pilot interviews were conducted with key GIS specialists from two local councils in the UK. Figure 2 illustrates the sampling process.

Figure 1: Sampling process



A case study on the implementation of an e-Commerce solution using Geographical Information Systems (GIS) within Tesco Stores Limited

Tesco is one of the UK’s largest retailing chains. This study was undertaken looking at the implementation of e-Commerce using GIS into their business strategy. Prior to the implementation of GIS, a lot of time was spent by Site Research Department (SRD) senior managers, manually evaluating Tesco’s potential sites and their catchments through the overlaying of the available spatial information, i.e., Ordnance Survey maps. SRD also relied on its UNIX-based programming to further simulate its models¹. This “traditional” approach to site selection decisions inherited three significant problems;

¹ UNIX-based programming was well entrenched in the department, in use in its site research and sales forecasting models.

- the external (e.g., National Shoppers' Survey) and internal (e.g., EPOS) data sets were somewhat in disarray (as the amount of both sources data increased, so did the difficulties of storing and analyzing the data);
- site selection models were getting more sophisticated, as the number of variables needed to be considered was significantly increasing. In the race for sites that were available, site selection decisions had to be made more quickly²;
- the internal pressure to lead the market (one of the company's aims) forced SRD to shorten the site selection process (the traditional approach of site selection decision process was somewhat very deliberate), thus increasing the overall SRD's working efficiency.

Meanwhile, an increasing number of retailers were turning their attention towards GIS in their trading area analyses to help cope with intensifying competition. The proliferation of GIS (which were indicated by the large number of vendors available, for example, CACI, CCN Marketing, Pinpoint to name some but a few, also contributed to a decision to acquire a GIS.

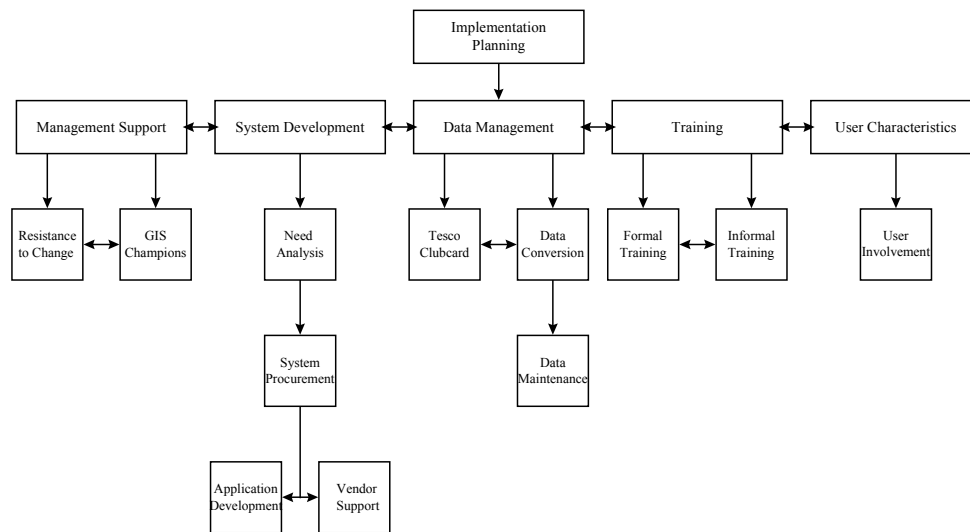
As a result, SRD decided to concentrate on installing a GIS, the latest developed system in spatial analysis. The idea to install GIS for site research and sales forecasting modelling originated in 1980. The system was first applied by SRD as a means of taking some of the risk out of major investment decisions as the company sought growth through new stores. A GIS implementation "vision" was also established prior to the implementation of the system. A series of GIS implementation discussions were conducted with GIS specialists in non competing organisations outside Tesco examining how they implemented GIS in their organisations (e.g., discussions on the issues faced like senior management support) in order to have an idea on how successful the implementation would be. SRD senior managers also believed that throughout the world (especially in the USA) there was enough evidence of retailers who had been successful in implementing GIS in their companies. More responsibilities were taken by senior managers in running the implementation activities, for example, lobbying Tesco's key board members who were the Information Systems (IS) approving committee to sponsor the implementation project.

After a series of discussions, SRD senior managers decided to purchase their GIS from Smallworld (as a base system). It was purchased due to its ability to accommodate Tesco's present and future GIS needs through its customisation flexibility, for example, in developing the applications. The purchase of Smallworld GIS was made with the permission from the IS approving committee³. Tesco's objective of implementation planning was to produce a more cost effective system and to establish a management framework within which implementation occurred to ensure that implementation was efficient and caused the least disruption. Figure 1 summarises the activities that occurred during the implementation of the system.

² Tesco only allow itself five working days to produce a sales forecast model for a new site.

³ Smallworld GIS was installed with the help from the IS Department.

Figure 2: Activities during GIS implementation process



Implementation planning proceeded in parallel with implementation activities, once implementation had begun (as activities proceeded, more details became known, permitting more detailed planning). SRD organised its GIS implementation on a “phased introduction” basis with most development and implementation activities being conducted by a GIS Project Manager. Through effective planning, it was contended that the scope of GIS benefits could be broadened and benefits could continue for a longer period with less organisational trauma. The advantage of implementation planning was that less was left to chance.

Responsiveness and support from senior management for initiating the technology was high. Implementation of the system proceeded at an accelerated pace with continuous commitment and support from senior management. Although senior managers’ commitment and support were present throughout this period, political support was never explicitly sought from them, for a comprehensive approach to incorporate the technology. Nevertheless, throughout the 5-year period of implementation (1992-1997), management support can be seen through notable progress in terms of upgrading of the equipment. In evaluating users’ resistance to change, senior managers noted a variety of responses. 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 (not everyone sees GIS as beneficial). One of the approaches used to reduce resistance was to concentrate on the implementation activities such as training. It was believed to be significant in developing users ‘faith’ in the system.

Meanwhile, an extreme level of enthusiasm was shown by some of the users, which was used to counter the fear among other users. The fear was caused by the daily “tough” site selection decisions faced in the department (the nature of their working condition). It was the users personal interest that kept them coming back and continuing to work with the system. In addition, to reduce users’ resistance to change, regular meetings were conducted by the GIS Project Manager to demonstrate and discuss the latest

developments of the system as well as the problems encountered by users whilst using the system. In this meeting, users had the opportunity to share their thoughts on one system with the GIS Project Manager and other system developers. This familiarisation of the system was an evolutionary process.

The respondents accepted that GIS implementation in Tesco was headed by a group of GIS champions. They played their roles by providing the support needed by working together as a team (where such energy and commitment were derived from). They also tirelessly pursued the aim of the implementation by continuously selling the idea to other senior managers and users, for example, the SRD Director, portrayed endless enthusiasm towards the system. The high level of enthusiasm shown by the SRD senior managers reduced users negative perceptions about the system. They kept the GIS “alive” by portraying their continuous commitment in confronting the implementation difficulties. In addition, SRD senior managers actively persuaded Tesco senior management to commit to the idea of implementing GIS within the entire organization. A needs analysis (data needs and user needs) procedure was also used to understand the process of deriving the system requirements, where an observation was made of the existing system followed by a series of discussions with users. In Tesco, the GIS implementation process was based on the premise that senior managers had to first define the users needs where every effort was directed to understand these needs. Nevertheless, senior managers were aware of the users’ frustrations that existed in the department.

In response to understanding the site selection decisions faced by Tesco and the strategies that emerge from such strategies, SRD senior managers initiated the purchasing process by purchasing an “incomplete”⁴ GIS by Smallworld. The purchase of the system was in line with SRD’s general expansion strategy (Smallworld GIS allowed its system to be configured accordingly by SRD). The selection criterion used in buying the appropriate hardware and software were determined from design specifications (a “tool kit” which was suitable for site selection decision activities), in line with the in-house needs which necessitated SRD to have remarkable system flexibility. Such a strategy allowed SRD to capitalise on its accumulated experience in the development of its applications. In addition, it was also due to the fact that SRD was more knowledgeable than anybody in its organisation, and in its daily activities. As a result, SRD senior managers were concerned to reflect their knowledge in the applications. Smallworld provided continuous product support via its regular visits. In addition, during the initial stage of the implementation, Smallworld also developed several “introductory” GIS applications for the SRD in running the system (on top of the software licenses) that facilitated a more speedy learning process in the users. Perhaps “data issues” were the most critical technical issues in the implementation of the GIS project. One of the data issues that SRD faced was the problem of the system’s base maps, where the accuracy was a critical factor.

Most of the internally generated data were stored in mainframes, resulting in minimal problems of data conversion. The external data were bought from data vendors and were also stored in mainframes (common GIS data needed by most of users were stored in a

⁴ “Incomplete” system is referred to GIS software without any data attached to it.

central position while individual or other data were kept by users themselves). There was a continuing attempt to keep both internal and external data together in one place. Further, in transferring the data throughout the department, SRD used Local Area Networks (LAN). The critical issues faced at this stage was the “downloading” of huge bytes of map files which were required in almost all the applications.

As retail trading in the UK becomes more competitive, retailers are showing signs of turning to long term loyalty schemes as a means of enhancing the overall quality of their trading offer, in an attempt to retain as high a proportion of existing customer’s expenditure as possible. In basic terms, loyalty schemes are meant to induce repeat visits. Tesco also believed that a loyalty card was one way to show their appreciation to loyal customers and a means to create loyalty to their store brands. The card was launched nationally in 1995 after Tesco experimented with a series of pilot studies in 14 outlets throughout the country (after having GIS in house). The key benefit of launching the card from a market analysis perspective was to understand customer buying behaviour (for example, who are shopping where, where are they shopping, what are they shopping and how much they are spending). Many categories of customers data were secured from the scheme (in meaningful format), for example, customer’s name, address, postcode, age, sex, marital status, income, length of residence and telephone number, providing most of the data SRD needs⁵.

This knowledge was believed to be critical for the site researchers in performing their site selection decision models (to precisely understand the customer’s buying behaviour and the likelihood of target customers being neglected is thus reduced). It was also used to focus marketing mix activities (e.g., experimenting the correlation between a new merchandise promotion and the resultant customer buying behaviour) and thereby creating the ability to target products and services more accurately towards customers through the existing Tesco stores. The benefits could also be seen not just from the cost reduction but also as a significant way to reduce the department’s dependence on external data. The scheme also increased the quality of the internal data. Ultimately this was the means to integrate GIS with other operationalised IS in a seamless environment.

SRD senior managers believed that there was a need to create within the users an appreciation of the organisational issues so that successful implementation could proceed. If the users were to possess such knowledge, this could facilitate the changes necessary to take advantage of the new system. Providing users with a broader training perspective of the system (e.g., additional training on other relevant areas of the system such as database management and not just on system applications) helped to avoid implementation problems. SRD senior managers provided various modes of training as part of the development and implementation of the system. They paid careful attention to the training of new recruits in the SRD. This was because site research was now seen as one of Tesco’s core functions. GIS also significantly changed the emphasis of the training and development of SRD’s staff. Two types of training were used. First, formal training which included introductory and monthly training, and secondly, informal training which

⁵ The data will thus add a useful dimension to the customer’s profile of Tesco current databases by creating a bank of information.

was an on-job-training mode and was designed for those site researchers who were not familiar with the applications. The approach was believed to have kept users up-to-date as implementation developed. In some cases, training was conducted on a step-by-step basis, for example, in the earlier stages, the emphasis was on building general system familiarisation and in later stages, the emphasis was on building detailed system and to also have them trained on the system.

In conjunction with Smallworld, the IS Department provided technical training to system developers. Such training was conducted in stages, to permit a sufficiently long familiarisation period prior to proceeding to more advanced applications. As implementation developed, training documents were developed and compiled for the next training sessions (as a result of the exposures to the system). User training progressed on an ongoing basis throughout all implementation activities. Long-term training plans for site researchers were developed for those who operate and maintain the system. The emphasis was on functional components of the system and how the system worked.

The importance of understanding user characteristics of the system was clear. SRD senior managers and system developers believed that without a clear definition of how users expect to use the system, it would be difficult, if not impossible to form the basis for determining system design (e.g., database development). Improving business processes using GIS mean changing that process and overcoming the inertia⁶ of current ways of doing things. The importance of user's involvement was clear in recognition to the fact that user involvement enhanced the chances of implementation success⁷. In Tesco, users were invited and taught to be involved with the implementation process. They were told how they would fit into the process and what would be expected of them, for example, holding primary responsibility in developing the applications and in controlling the quality of data. In essence they were part of an evolving, iterative and complex implementation process.

Discussion

The story of e-Commerce/GIS implementation at Tesco demonstrates the nature of implementation, which was referred to in the framework discussion earlier in this paper. The process was complex. It involved multiple locations, distributed databases, multiple user and managerial levels. Approval committees, company-wide strategy, an external provider, training etc. the process was iterative. The notion of a process of strategy formulation, need analysis, requirements gathering, systems design, planning and then implementation and evaluation was not followed. The iterations reflected the various components. Strategy framed the entire implementation process but within that users and managers altered and manipulated the outcomes and use of the system. This complexity and manipulation supports other research that has shown that whilst strategy at the top

⁶ The tendency for the department to continue doing things in the same way and thus, to resist change.

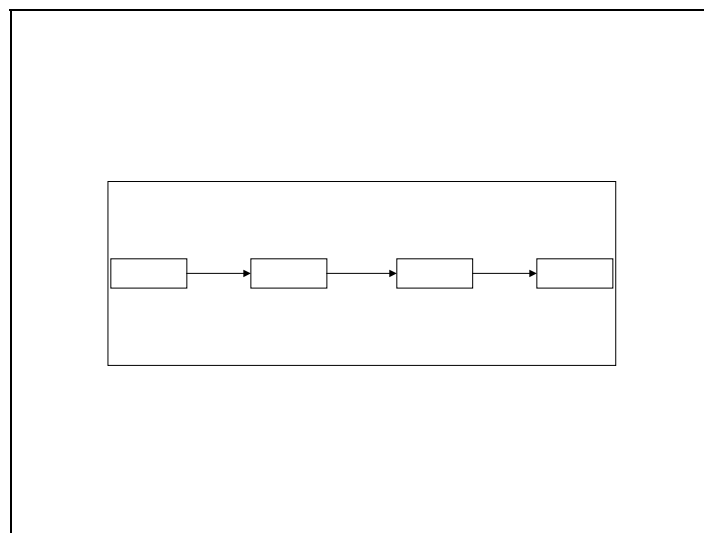
⁷ The likelihood of success drops if this process (implementation) cannot overcome the inertia of current business processes (or if the implementation itself causes resistance).

can be strong and well defined it is often changed and recontextualised by the users and managers of that strategy (Ball 1990, Corbitt, 1997).

In the case of Tesco, the tasks created in the implementation process constituted the various levels of interaction and training needed to introduce the new strategy. As Figure 1 shows, the levels of implementation are both horizontal across task needs and vertical according to decisions made. There is no real order to the process. It is a reflection of iterations and accumulations of decisions made that creates the implementation process. In essence it is an iterative, cyclic process where there are multiple layers of cognitive action happening. The strategy in this case frames those actions and creates the cognition parameters of the actors involved. However, the real context of those using the new systems and those designated to manage it reflects the way that it can and will be used, it reflects the extent and nature of the training, it reflects the existing organizational culture, it reflects the impact of the distributed system it works within and it reflects the perceived outcomes of the system, differentiated by the various stakeholders which form the recontextualisation of Tesco created by the strategy to implement an e-Commerce solution using GIS.

The implementation process identifies the various levels of equivocality and uncertainty and demonstrates the impact of stakeholder differentiation in the impact of the new strategy. The politics of alternative choice and the politics implicit within decision are clear. The result is a less ordered and more complex implementation process. This suggests that any real understanding of implementation must reflect not an ordered model of implementation where one stage leads to another, where one decision creates a set of ordered outcomes and where the traceability of the process is clear (Figure 2):

Figure 3: A rational view of process



Rather, this case study suggests that the implementation of e-Commerce reflects more complexity and iteration than rationalist explanation would suggest. The process described in this paper could propose some hypotheses that the levels of anxiety in the

implementation of an e-Commerce strategy is highly complex, is constantly recontextualised by the various layers of users and managers and is more akin to a non-ordered, non-rational process set within an apparent ordered framework of the strategy itself. The vertical *and* horizontal nature of the tasks described in Figure 1 reflects some of that complexity. However, there is a need to develop a series of case studies from various companies across the business world to develop a clearer understanding of the intricacies and detail of the implementation process and use those case to begin more detailed mapping and modeling of the implementation process to enable larger scale research on the nature of the relationships involved in the implementation of strategy in e-Commerce.

It is now recognised that e-Commerce implementation is an organisational process. The findings of this study indicate that implementation issues change throughout an implementation life cycle, initially centring on technical issues such as software and hardware problems, and then progressing to data problems such as data collection, conversion and standardisation issues. As progress continues, the issues become more organisational in nature, revolving around difficulties concerning the ownership of the system.

It is a highly resource-intensive process often involving senior managers and users possessing scarce talents and whose is over committed. It does seem that the earliest activities, e.g., those related to implementation planning, gaining management support and user involvement are generally more significant for e-Commerce implementation success (Kivijarvi and Zmud, 1993). The outcomes had also shown why e-Commerce implementation processes only succeeded when retailers were able to restructure its implementation process framework and not just to overlay the new e-Commerce on the old e-Commerce. By emphasising the problems associated with the introduction of e-Commerce where there is a strong professional lobbying, this research further confirms the increasing significance of organisational issues and the need to explicitly address them in future e-Commerce implementation process research. Moreover, this framework can be of value to other researchers in general, as a basis for further investigation. It is also significant to recognise that these case studies involved British retail organisations across two key sectors (food retailing sector and health and beauty retailing sectors). Therefore, replications within other sectors or countries are desirable.

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