INFORMATION SYSTEM DIFFUSION IN ORGANIZATIONS – A CONTROL MECHANISM PERSPECTIVE

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Abstract

Research streams emphasize that after the excitement of adopting a new IS innovation, most do not employ the innovation to its full potential thus creating an assimilation gap. The failure of an IS to be fully diffused in an organization are, in most cases, due to employees resisting and not accepting the implemented innovation. The analysis of control mechanisms in IS research has proved to be a valuable approach to elucidate IS implementation and success experienced by organizations. The control mechanisms can be exercised through formal and informal modes. However, control mechanism theory have not yet been adopted to examine the process of IS diffusion in organizations. Therefore, there is a need to study the ways in which implemented control mechanisms impacts on the process of diffusion of a Management Information System (MIS). Cooper and Zmud (1990) six stage IS implementation model will be applied to the research to illustrate and investigate the process of diffusion of the MIS. The research method will be an in-depth case study. It is anticipated that investigating IS diffusion from the perspective of control will considerably provide fresh insights in the understanding process of IS diffusion in organizations.

Keywords: MIS, Diffusion, Control Mechanisms, IS implementation model

1 INTRODUCTION

The implementation of IS in an organization are vital in the new digital economy because as Melville et al. (2004) argues, an organization has to have the correct orientation approach to improve its operational, tactical and strategic processes. This is to enable organization effectively and efficiently manage its stock of information, for quick management decision making. However, for an organization to gain and sustain competitive advantage they have to ensure that the adopted IS innovation is fully integrated into its existing processes (diffusion) (Zmud and Apple 1992). This is when the IS innovation will have a positive impact on the organization's processes (Fichman and Kremer 1999). Organizations incur huge investment costs in the adoption and implementation of IS innovations. However, they may not achieve the expected results and outcomes because the adopted IS is not effectively used i.e. diffused in the organizations (DeLone and McLean 2003, Hirschheim 2007). This poses a challenge to organization in its use of IS to achieve strategic business objectives, because the IS are not fully utilized. This has raised the debate by business executive and academics alike, whether the high investments in IS by organizations are really worth the 'hype' that implementing IS will make organizations more effective, efficient and competitive (Peppard et al 2000, Ward et al 2008). Studies highlight the importance of adequate attention to deploying the right corporate strategies and imperatives (non-technical) such as quality of senior management and effective communication between management and employees for the effectiveness of new IS and the successful bridging of the assimilation gap of IS innovations in organizations (Cabrera et al 2001, Tarafdar and Vaidya 2006). This only suggests that there is a social side in the process of IS adoption and use, which must be given the same attention as the technical aspects.

Control theory is a perspective that has been adopted in organizational research to investigate behavioural patterns of staff in relations to complex and non-routine tasks (Jaworiski 1988). Research stream indicates that top management deploy formal and informal control mechanisms to ensure that staff behaviours and practices are shaped according to company's guidelines, policies and procedures (Henderson and Lee 1992, Kirsch et al 2002, Kirsch 2004). These studies have been able to provide evidence of the importance of behavioural control in the management of complex organizational tasks such as IS. However, as highlighted by (Ravishankar et al 2009) there are no little or no evidence till date, of studies that have empirically examined the role of control mechanisms in the implementation/diffusion of an IS innovation. Adopting control mechanisms as a theoretical lens helps to give a better understanding of the diffusion process of IS innovations in organizations (Ravishankar et al 2009) because it suggests how management enforce and control the behaviour of its staff in relations to achieving organizational objectives. This may be particularly useful because the use of IS in organizations normally face resistance by staff (Cavusoglu et al 2010), because of the complexity of the new innovation. Consequently, top management may deploy control mechanisms to alter the behaviour/attitude of staff in the use of the innovation which may have a corresponding impact on the diffusion process of the adopted IS.

The overall aim of this research is to explore the process of diffusion of a Management Information System (MIS) from the theoretical perspectives of the control mechanisms so as to understand how organizations may ensure the full diffusion of a MIS. Consequently, this study is motivated to answer the following research questions: (1) What control mechanisms are deployed by the organization in the implementation of the MIS? (2) How do the control mechanisms deployed impact on the diffusion process of the MIS? (3) Are there a combinations of controls deployed in the implementation of the MIS? (4) How does the combinations of these control mechanisms impact on the diffusion process of the MIS? (5) How effective are the control mechanisms on the diffusion of the MIS?

Management Information Systems are examples of complex and sophisticated IS that can support different interpretations and levels of utilization (Orlikowski 1993). These different interpretations by users may need to be managed by deployment of control mechanisms to achieve the objective of diffusion of IS. Therefore, an MIS provides a useful subject to examine the impact of control mechanisms on the process of IS diffusion.

Following the introduction, this paper is presented as follows: firstly, the conceptual model section, this indicates the theoretical framework that underpins the development of the proposed theoretical model of the research, which is the overall framework, adopted to collect data and investigate the research problem. The section is also based on the review of existing academic literature on Information Systems (IS) with primary focus on diffusion and control mechanisms. Secondly, is the section that discusses the research method adopted. The final section highlights the likely contribution to knowledge.

2 CONCEPTUAL MODEL

Based on Cooper and Zmud (1990) diffusion model and control mechanisms theory a comprehensive and integrative theoretical framework is proposed. See figure 1 below. The posited model is what we believe best shows how the study is going to emerge in the attempt to understand how diffusion process IS may be explored from the control mechanisms perspectives.

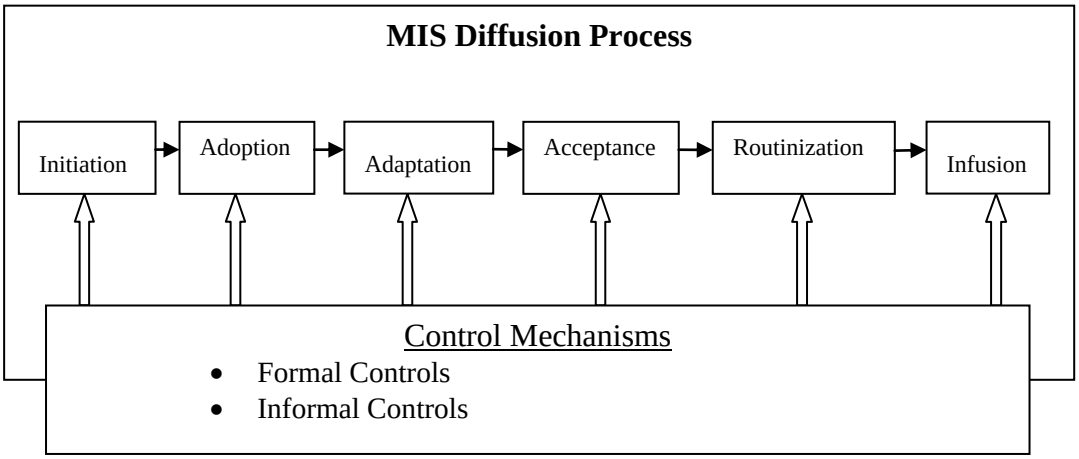

Figure 1. Proposed Conceptual Model for IS Diffusion

2.1 IS Diffusion

Previous research that explored IS implementation suggests, organizations cannot just expect the adoption of IS alone, to make them more effective and efficient (Lee and Bose 2002, Peppard and Ward 2004). The organization must ensure that adopted IS align with procedures and guidelines of the organization. This can only be realized if senior management and users of the system are empowered to understand, accept and use the system. These arguments can only suggest that for an IS to achieve its set benefits, it must be fully implemented/diffused into the organizational settings (Huang et al 2003, Zhu et al 2006). Drawing from organizational change, innovation and technological diffusion literatures, Cooper and Zmud (1990) proposed an IT implementation model to help the better understanding of IS diffusion in organizations. This is because most IS implementations will entail some changes in the organization. The model highlights IS diffusion process in an organization goes through six stages - Initiation, Adoption, Adaptation, Acceptance, Routinization, and Infusion. The initiation stage looks at how the organizations view IS innovations to help solve organizational problems/opportunities which may be due to pressure that results from either organizational need (market pull) or technological innovation (push), or both. The adoption stage highlights factors that are considered by top IS and Business executives to agree to invest in the IS. The adaptation stage occurs when the adopted IS application is developed, installed, and maintained. When the IT is employed in organizational processes and organizational staff are encouraged to use the innovation, highlights the acceptance stage. Routinization stage is when the use of the IS applications has become a normal activity in the organization and it is no longer viewed as extraordinary, which is as a result of the organization's governance systems being attuned to account for the IS application. Finally, the Infusion stage, is concerned with the increased organizational effectiveness obtained from utilising the adopted IS to its full potential in a more comprehensive and integrated manner to support higher level of operational activities in the organization (Zhu et al 2006).

Cooper and Zmud highlight the rational and political negotiations that occur among top IS and Business executives in their attempt to agree to invest in an IS and the required resources to accommodate the new technology. These rational and political negotiations are necessary because of the high level of uncertainty and ambiguity that ensues when the organization tries to infuse the adopted IS into its processes. Cooper and Zmud's model builds on other models developed by Pierce and Delbecq 1977 and Rogers 1983 but adds the social element that is vital in the process of IS diffusion in an organization. In other words, Cooper and Zmud's model considers how the operational

processes of the adopted IS will be encouraged so as to be accepted and fully used by the organizational staff as highlighted by in the acceptance and routinization stages of the model.

Users of IS may face complications in the use of a sophisticated system because the implementation of such system may appear radical/shock like (Thong 1999), thus affecting the acceptance to use the IS. The use of an IS innovation in an organization often leads to user resistance to the IS, which stops or slows down the diffusion process of the adopting innovation (Cavusoglu et al 2010). The struggle to understand the diffusion process of IS in organizations may be due to the different interpretations by staff in the use of the complex IS artefact, the different interpretations will suggest that staff will behave differently to the use of the system, which will in turn affect the overall diffusion process of the IS in the organization. Drawing from the control literature; control mechanisms deployed by an organization may alter the different behaviours present in the organization, in the aim to ensure the compliance of employees to the acceptance and usage of the IS. Previous models and studies have not considered this perspective and so our research builds on Cooper and Zmud's diffusion model and enhances it by adding control mechanisms to better understand the process of IS diffusion.

2.2 Control Mechanisms

Control mechanisms in organizations are important because of behaviours of staff that may exist in organizations do not align with overall organizational culture (OC). This is because group of staff challenge, resist and modify the overall organizational culture (Ravishankar et al 2009). Top management may shape the different behaviours of staff to suit the overall OC (Kappos and Rivard 2008). This is achieved by top management consciously controlling staff to produce required patterns of behaviour and practices through recruitment process, policy formulation, rules and guidelines enforced in the organization (Schein 2004). These forms of control mechanisms by top management are to ensure that there are common and shared values amongst the staff in the compliance to the use of the technological innovation. A failure to match control deployed to context may lead to organizational decline in the long term as argued by Ouchi (1979); it also leads to staff responding to controls in subtle ways such as increased job tension, mistrust, and job turnover as highlighted by Jaworski (1998) in the review of studies by (Hopwood 1972, Likert 1967). These organizational problems highlighted may also include the firm not achieving the objective of the diffusion of the IS. The control theory have been applied in different contexts by researcher in IS studies. A review of the literature highlights research work undertaken by Choudhury and Sabherwal (2003), Nidumolu and Subramani (2004), Tiwana and Keil (2009). The common argument that emerges from these works is the choice of control mechanisms deployed by organizations to achieve their goals and objectives in the management of various software development tasks in organization. Control mechanisms are broadly classified into formal and informal controls.

2.2.1 Formal Controls

Formal controls mechanisms are when the controller ensures that there is a strict adherence to performance standards and or prescribed processes by the controllee (Choudhury and Sabherwal 2003, Kirsch 1997). Formal control mechanisms such as company policies, guidelines rules and procedures are deployed in organizations by top management. This is in an attempt to ensure that staff working on organizational projects acts according to the deployed control mechanisms so as to achieve the desired strategic objectives (Jaworiski 1988, Rustagi et al 2008). Kirsch (1996) views formal control in a behavioural sense, because the controller exercises control over a controllee, by taking some action in order to regulate or influence the behaviour of the controllee. Kirsch et al (2002) also highlighted that outcome control as a mode of formal control which involves the controller defining specific desired task outputs and setting appropriate targets and permitting controllees to choose on how they meet the output targets. The controller normally evaluates performance of the controllee by examining the degree to which targets set are met, and not necessarily on the processes used to achieve the targets. Kirsch et al (2002) further suggested the differences in form of formal modes of controls - behaviour and outcome controls share a common essential assumption that the controllers and controllees have

contrasting goals, and they both align goals by providing appropriate incentives to the employees. Kirsch (1997) study highlights that desired goals were achieved in organizations that deploy formal controls to align the concerns of all stakeholders during the implementations of IS. Some of these concerns may be aligned when the controllers introduce performance evaluation schemes that acknowledge, reward autonomy and self-management (Kirsch et al 2002).

2.2.2 Informal Controls

Informal controls are when the controller relies on social or norm-emphasizing strategies to ensure the objectives set are met by the controllee (Choudhury and Sabherwal 2003, Kirsch 1997). The clan control is an example of an informal control; this control mechanism tends to lessen the potential differences between the controller and controllee's goals by transmitting an integrative culture among the controllee so they can all have the same beliefs, values and have the same behaviour (Choudhury and Sabherwal 2003 and Kirsch 1997). Ravishankar et al (2009) in their study highlighted the positive impact of informal control mechanisms such as common cultural beliefs among user groups and self-managed individuals on the implementation process of IS. Self-Control is another example of informal control mechanisms which refers to a relational form of control that does not require any form of formal control by the controller but based on controllee's driven measures that are in align with the controller's goals and objectives as argued by Choudhury and Sabherwal (2003) and Kirsch (1997).

2.3 Research Gap

The aforementioned empirical work on control highlights the antecedents of the various modes of control on the development and alignment of IS use for organizational goals (Kirsch 1996, Kirsch et al. 2002). Also, study of (Henderson and Lee 1992), which investigated the impact of various control measures on performance outcomes in managing IS design teams. However, there is limited IS research to date that have adopted the control mechanism perspective to investigate IS diffusion (Ravishankar et al 2009). This underscores the limited knowledge on how and why the control mechanism perspective may impact on the diffusion of IS within an organization. Building on this concept of formal and informal controls, we argue that these control mechanisms may impact the way IS are used by staff in organization. Consequently, it may worth the while, to explore which and how the control mechanisms deployed by organizations may alter the resistance behaviour of staff in the adoption of a new technological innovation. This is important because it may illuminate how the various and combination of the control mechanisms may impact on the stages of implementation of the IS, resulting to the full diffusion of the IS.

3 RESEARCH METHODS

Data Collection for this research was just concluded at the time of submission of the paper. The data collection started early December 2010 and it was concluded by the end of March 2011. The study adopted a detailed in-depth case study approach using semi-structured interviews. The case study is a Nigerian Bank and examines the diffusion of a MIS within the bank. The research is exploratory and interpretivist in nature so as to provide the flexibility to start the research at a broad level by asking relevant semi-structured questions to allow some unexpected findings and analysis to emerge from the data. The duration of the interviews conducted was between 35 - 70 minutes, which were tape-recorded with respondent's permission. The interviews provided an opportunity to observe participants, follow up statements and place individuals and their accounts in the social and political processes of the organization. A total of forty seven face to face interviews were conducted, the interviews were supplemented with the request of formal documentations on policies on the use of the MIS. This is to triangulate the data collected from the interviews.

The theoretical sampling technique as suggested by Walliman (2008) is followed and senior representatives of the bank at strategic, tactical and operational levels were selected for interview within the IT, Finance, Risk, Operations, E-Products, Audit, and Performance Management units. The respondents at each of these levels will be able to provide the most valuable insights on the subject matter. This method will ensure validity of generated data because they are being collected from the most knowledgeable respondents in the banks. The transcription of data is ongoing, while initial data analysis will follow immediately after that. It is anticipated at the time of presenting this paper preliminary analysis will be available to examine how different control mechanisms may impact on the diffusion process of IS in organizations.

4 ANTICIPATED CONTRIBUTION TO KNOWLEDGE

The study will provide important new contributions in the use of control mechanisms in the IS diffusion process. Adopting control mechanisms as a theoretical lens will shed light on how the various combination of control measures deployed by organizations during the implementation of IS and their impact on the process of diffusion. The control mechanisms and its role in IS diffusion has not being examined empirically and this research will help fill this gap. The findings from the research will also facilitate a better understanding of how managers can successfully use controls to proactively understand the potential conflicts that may arise in the use and diffusion of the IS. The understanding of this problem will enable adopting organizations more effective and efficient in applying the technology into their business operations so as to deliver superior services for their customers and clients. These insights should help organizations predict how the control mechanisms may impact on the use of an adopted IS. Consequently providing a better chance of getting the best return from the huge investments made in IS.

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