The role of formal controls in facilitating information system diffusion

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ABSTRACT

Information system (IS) studies highlight that IS usage, a pre-requisite for IS diffusion, may be difficult to attain when usage is voluntary because users can resist using the system. User resistance may be overcome through the application of organizational controls. Control theory explains how users' actions and practices are shaped in line with organizational guidelines and procedures. This paper reports on a qualitative case study and shows how formal control mechanisms (behavior and outcome controls) can have a positive and conclusive impact on IS diffusion. The paper makes three contributions to knowledge. First, it explains how the application of outcome control mechanisms can lead to IS diffusion despite user resistance. Second, it suggests that IS diffusion paths are iterative rather than smooth and linear. Finally, the paper demonstrates that in some contexts, despite a lack of reward expectancy, sanction expectancy can be an effective force during the IS diffusion process.

1. Introduction

Many organizations fail to make a return on the major investments that they make in information system (IS) implementations [1,17]. This is typically because employees do not use ISs in a sufficiently enhanced manner to increase the effectiveness and efficiency and improve the productivity of the adopting unit [45]. Thus, employees prevent the diffusion of such systems into the organizational setting [1,2]. It is difficult to attain enhanced IS usage in voluntary settings because users have the option to resist using the system [17,51] and, thereby, only superficially engage with it. User resistance has been identified in the literature as a key reason why companies struggle to attain successful IS diffusion [49]. This has led IS scholars such as Williams et al. [52] to argue that there is still much to learn about IS diffusion. It also begs the question of how user resistance can be overcome in order to attain successful IS diffusion. The answer to this question may lie in an examination of organizational controls, which are applied to overcome the strong user resistance that sabotages IS implementation attempts and, thereby, inhibits IS diffusion [17,53].

IS studies have drawn on control theory to demonstrate the importance of applying formal control mechanisms in the management of IS projects [8,20,21] and in the development of such projects in custom and outsourced contexts [7]. Nonetheless, to date, no research has explicitly studied how formal controls can facilitate the successful diffusion of a complex IS. In this paper, we use behavior and outcome controls as lenses through which to conceptualize formal controls [7,23]. Through these lenses, we develop insights into how organizations can overcome users' rejections of ISs and achieve conclusive and positive IS diffusion via the application of formal controls, which, in turn, increase the likelihood of getting a good return from IS investments. We make three main contributions to research. First, we explain how the application of formal controls can lead to successful IS diffusion despite user resistance. Second, we suggest that IS diffusion paths are iterative and non-linear, which contradicts existing studies that highlight diffusion as a linear and sequential process (e.g., [10,39]). Third, we demonstrate how in some contexts, despite the lack of reward expectancy, sanction expectancy can be effective in the application of controls during the IS diffusion process. This extends existing research on controls, which suggests that to ensure the effectiveness of applied controls, reward–sanction mechanisms should be utilized in tandem [22,25].

We adopted the qualitative case study method to understand how senior management's application of formal control mechanisms in a Nigerian multinational bank influenced employees engagement with an IS and, thus, impacted IS diffusion. Specifically,

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the study aimed to answer the following research questions: (1) How and when are formal controls applied during the organizational diffusion of an IS? (2) What are the consequences of applying formal controls to the process of IS diffusion? To answer these questions we drew on Cooper and Zmud's [10] six-stage IS implementation model, a model that describes the different stages that come into play during attempts to diffuse a complex IS into an organization. The following section discusses the theoretical foundation of the paper. Subsequently, we describe the research methods and outline our findings. Finally, the discussion and conclusions are presented.

2. Theoretical foundation

In this section, we review and synthesize (1) IS diffusion theories and related streams of technology acceptance and IS success research and (2) formal control modes and mechanisms and their application in IS research.

2.1. IS diffusion

Existing studies on IS diffusion have suggested that the diffusion process consists of a series of stages and that during each stage, a sequence of events and activities unfold [38]. Several theoretical models have been proposed in the IS literature to explain the diffusion patterns of IS implementations (see [10,12,38,46]). One of the most frequently cited models is the Cooper and Zmud [10] IS implementation model. Cooper and Zmud's [10] model suggests that in the process of achieving diffusion, IS implementations typically progress through six stages: initiation, adoption, adaptation, acceptance, routinization, and infusion (see Fig. 1). Initiation refers to organizations' launching of technological innovations to solve problems or respond to opportunities. Adoption highlights the rational and political negotiations required to ensure that top IS and business executives agree to invest in an IT system and the required resources to accommodate the new system. Adaptation refers to the development, installation and maintenance of the adopted IS. Acceptance is a critical stage because it is the phase when employees are expected to employ the IT artifact in their work. In many ways, this stage will determine whether the system is likely to be accepted or rejected. Routinization refers to the stage when the use of the IS becomes a normal and routine activity in the organization. Finally, infusion is concerned with the increased organizational effectiveness obtained from utilizing the implemented IT system to its full potential in a more comprehensive and integrated manner.

A feature of Cooper and Zmud's [10] six-stage model is that it considers the continued organizational use of an IS after it goes live through the acceptance, routinization and infusion stages [45]. Key IS exploitation activities are likely to occur in these last three stages, enabling an organization to use the IS to its full potential and attain greater performance [18]. However, IS diffusion may be difficult to achieve in these post-adoption stages because of the need to overcome barriers to users' assimilation of new work processes and designs [37]. Furthermore, previously silent users, who are now required to engage with the system in their everyday work, may voice their dissatisfaction with the IS, and there may be calls for modifications to the system [48]. Although strategies have been proposed to overcome these barriers, such as increased training for users [37] and increased user participation [48], these actions are more commonly performed as pre-implementation activities, along with IS configurations and customizations. Unfortunately, the post-adoption stages are often devoid of the

organizational resources that are necessary to facilitate IS diffusion [37,48]. For example, project teams are likely to have disbanded, external consultant contracts to have ended, and senior managers' focus and attention to have moved to the next business challenge. Thus, achieving successful IS diffusion in organizations at the first attempt remains a significant challenge.

A further obstacle to IS diffusion stems from the possible misalignment of technology with organizational culture or the weak alignment of the extant organizational culture with the requirements of technology [5]. Much of the existing IS literature has assumed that culture is homogenous within and across all subgroups and has not specifically considered the effects of competing sub-cultures and the resulting conflicts and opposition to IT outcomes that may occur between organizational subgroups. When subgroup interests conflict during the implementation of a new IT system, user resistance may occur [1]. For example, Ravishankar et al. [36] demonstrate that different subcultures can influence the alignment of an IS with organizational strategy. In their case study of the implementation of a knowledge management system, the 'enhancing' subculture highlighted a subgroup that strongly empathized with the strategic initiatives advocated by the senior management. By contrast, the 'countercultural' subgroup obstructed the senior management's initiative to align the implemented IS with organizational strategy. Cavusoglu et al. [6] provide related findings. They studied three groups of actors: 'influentials', 'opponents' and 'imitators'. The behavior of the opponent group (resisting IS usage) created significant anti-diffusion forces. The opponent group's resistance to the IS stifled the positive behavior that the influential group exhibited toward the IS. This prompted the imitators to copy the behavior of the opponent group, which further hindered the diffusion process. To overcome such problems, an organization might consider applying formal control mechanisms to align different subgroup interests.

There are a number of alternative streams of literature that seek to explain successful IS diffusion. For example, Venkatesh et al. [46] developed the Unified Theory of Acceptance and Use of Technology (UTAUT) to explain individuals' adoption and acceptance of IS. The UTAUT presents four critical determinants of user acceptance and usage behavior: performance expectancy, effort expectancy, social influence and facilitating conditions [47]. The effect of these determinants on behavioral intention was moderated to varying degrees by four factors: age, gender, voluntariness, and experience. For example, performance expectancy, the extent that an individual perceives that using an IS will increase his/her productivity, was found to have a stronger influence on behavioral intention among men and younger workers [46]. Thus, it would appear that individual intention to use an IS can vary across different user groups within an organization, such as women, older workers and those with limited experience. While these predictive insights are valuable at an individual use level, the UTAUT model does not provide guidance on how to plan interventions at an organizational level. In this respect, the usefulness of UTAUT is limited when examining mechanisms to promote the continued use and success of an implemented IS [3].

Researchers have developed several models for examining IS success, the most frequently cited are the IS success model and IS-impact model [13,15]. Although these models have provided valuable guidance for understanding IS project success, they have typically been applied to explain success in voluntary IS use situations. In many organizations, the use of IS at the enterprise-level systems is often mandatory rather than voluntary. Under

| Initiation | → | Adoption | → | Adaptation | → | Acceptance | → | Routinization | → | Infusion |

Fig. 1. Cooper and Zmud's [10] IS implementation model.