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TIME FOR A CHANGE: AN EXPLORATION OF INFORMATION SYSTEMS DISCONTINUANCE

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Abstract

A substantive body of research has sought to understand the adoption, implementation, and use of information systems. In contrast, the literature offers only limited insight into phenomena related to the end of the information systems lifecycle including decisions to discontinue the use of these systems. Such decisions can have a dramatic impact on firm performance and on measures of system success such as return on investment. Thus, the proposed research seeks to elucidate the factors driving organizational decisions to discontinue their use of information systems. A two phase study is proposed that consists of a series of semi-structured interviews with IS decision makers followed by a survey study.   Interviews are being guided by a research framework that posits a fundamental tension between forces for change that encourage discontinuance and opposing forces of inertia.

Introduction

Considerable research attention has been directed toward understanding the adoption, implementation, and use of information systems (IS) (Boudreau and Robey, 2005). In contrast, the literature offers only limited insight into phenomena related to the end of the IS lifecycle, despite the fact that decisions are eventually made to discontinue the use of most systems (Swanson and Dans, 2000). Discontinuance decisions can have a dramatic impact on both overall firm performance and on measures of system success such as return on investment. While a premature decision to discontinue the use of a system can represent a substantial waste of investment, failure to discontinue the use of a system that is constraining the ability of a firm to respond to market forces can seriously impede future prospects for growth and profitability (Gasser, 1986; Thiétart and Forgues, 1995). Organizations can thus be expected to derive considerable benefit from improved understanding of the nature of discontinuance decisions and the factors that drive information systems discontinuance. Such understanding can increase the effectiveness of the decision making process and help to ensure that maximally beneficial discontinuance decisions are made.

An important distinction is made here between discontinuance and adoption, a distinction that is of potential utility to researchers examining either phenomenon. Although discontinuance decisions can be important antecedents to adoption decisions, discontinuance decisions can also be made in the absence of adoption and they are subject to a wide range of influences not found in the context of new adoptions. These include firmly entrenched user beliefs and attitudes toward an existing system, the potential for significant discrepancies between the capabilities of IS staff pre- and post-discontinuance (Lee et al., 1995), interdependence between discontinued systems and other organizational information systems (Gosain, 2004), and concerns surrounding how to handle what might be vast stores of legacy data (Heminger and Kelley, 2005). These challenges, in conjunction with a wide range of impediments to change that include the organizational routines (Nelson

and Winter, 1982) and entrenched social relations (Granovetter, 1985) that support an existing system, suggest that decision makers will be reluctant to discontinue the use of a system until it is notably impeding organizational objectives.

Reluctance to discontinue the use of an information system is, however, counteracted by the presence of numerous forces for change that can, in some cases, encourage managers to discontinue the use of a system even before the end of its productive life. These forces include mergers and acquisitions (Miller and Friesen, 1980), a desire to remain at the forefront of technological advances (Robertson and Wind, 1980), and institutional pressures to mimic the discontinuance decisions of supply chain partners and competitors (Fiol and O'Connor, 2003; Grandon and Pearson, 2004). Thus, the guiding research question for this thesis is:

RQ: *What factors lead firms to discontinue their use of information systems?*

Discontinuance has generally been conceived of in the information systems literature as being a consequence of some type of information systems failure (Ewusi-Mensah and Przasnyski, 1991; Pan, 2005). Examples of such failures have included systems that do not perform as expected and systems that are proving difficult to implement. Failures of this kind have been widely discussed in the literature related to IS project management (e.g. Keil, 1995; Keil et al., 2000) and are generally seen as leading to discontinuance or project abandonment. This perspective on discontinuance tends, however, to overlook the more innocuous need to discontinue the use of information systems considered successful but now obsolete. Obsolescence assumes unique meaning in relation to information systems since, unlike physical equipment, information systems do not suffer from physical wear and the associated implications for failure. Thus, organizations would appear to have much greater latitude in the timing of the discontinuance decision and, as a result, greater opportunity to maximize the value of IS investments by deferring this decision. Nonetheless, the IS literature offers only limited insight into the myriad factors potentially impacting the decision to discontinue the use of an information system. A review of over 1000 articles published in seven of the leading IS journals identified only four articles giving notable attention to the end of the IS lifecycle. In comparison, 44 articles examined processes such as IS acceptance, continuance, routinization, and infusion and well over 100 articles were identified as focusing on issues related to IS adoption.

Research Framework

A broad assumption exists that organizations will seek to maximize the value that they obtain from their information systems investments and this objective can be supported by efforts to defer the discontinuance decision. The use of this tactic is, however, limited by the frequency and scope of change in the business context within which these systems must function (Mathieson, 1991). Thus, firms are faced with a constant tension between the need to maximize the value extracted from existing systems and the need to introduce new systems that are better suited to current business requirements and competitive circumstances. The research framework presented in Figure 1 highlights this tension, suggesting four broad forces that can impact organizational decisions to discontinue the use of information systems. These forces are referred to as organizational initiative, discontinuance inertia, mimetic isomorphism, and stakeholder support. Organizational initiative is seen as creating pressures for change that lie in constant opposition to the resistance presented by forces of discontinuance inertia. Mimetic isomorphism and stakeholder support are seen as acting to either oppose or encourage discontinuance depending upon such factors as the relative power of relevant stakeholders and the salience of actions taken by competitors and other legitimating institutions. Each of these four forces is elaborated upon in the following discussion, commencing with organizational initiative.

A wide range of organizational initiatives can be identified as potentially creating pressure for change in an organization's information systems. Since organizational initiative need not be specifically related to any information system and can exist in the absence of information systems, the salient dimensions of organizational initiative offered here have largely been drawn from the wider organizational literature. Organizational initiatives that have been identified in this literature as being critical triggers of change include changes in strategic plans, replacement of key executives, pursuit of new product or market opportunities, the construction of new facilities, the introduction of dramatically different production technology, changes in organizational structure, and involvement in merger and acquisition activity (Greenwood and Suddaby, 2006; Miller and Friesen, 1980; Oliver, 1992; Tushman and Romanelli, 1985). These initiatives can render information systems less suited to current needs and are thus seen to drive a firm to discontinue the use of such systems.

Opposing the numerous forces driving discontinuance decisions are the forces of discontinuance inertia. Improved understanding of the nature and origins of such inertia can be derived from an examination of the processes surrounding the broader information systems lifecycle. IS lifecycle models such as that of Cooper and Zmud (1990) generally characterize information systems as moving in stages from adoption and implementation toward routinization and infusion. The result of this process is a system that becomes an integral part of the organization, used largely without question. Over much of the IS lifecycle, emphasis is therefore placed upon institutionalizing the system (DiMaggio and Powell, 1983) and this emphasis is reflected in the vast body of IS research seeking to understand such things as the factors driving system use (e.g. Davis et al., 1989) and the sources of resistance to system use (e.g. Lapointe and Rivard, 2005). As a system nears the end of its useful life, the effort expended to encourage institutionalization creates discontinuance inertia that can undermine organizational objectives and powerfully impact the discontinuance decision. Factors that potentially contribute to discontinuance inertia include investments in the system (Arkes and Blumer, 1985; Hannan and Freeman, 1977), organizational routines surrounding the system (Nelson and Winter, 1982), and the extent to which IT governance has been centralized in the organization. There is also some indication that the past success of a system can impact the level of discontinuance inertia (Miller and Chen, 1994).
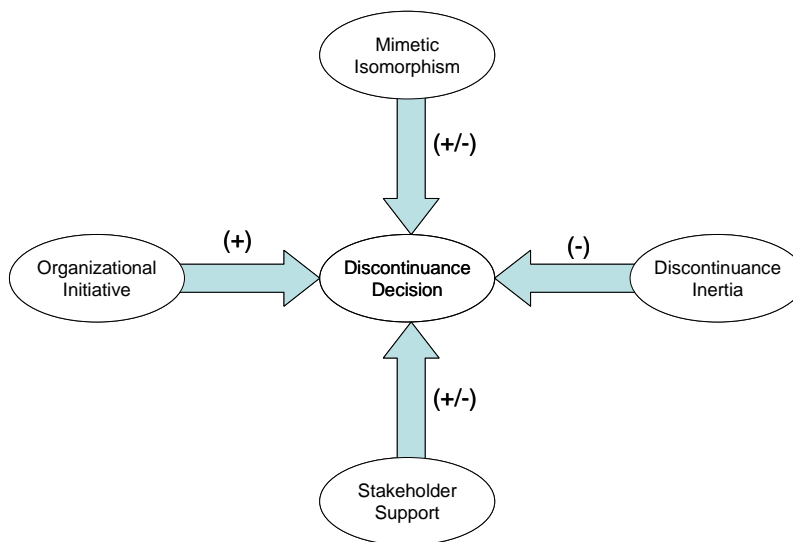

Figure 1. Research framework

Mimetic isomorphism, which is the tendency of firms to mimic or copy the actions of other organizations perceived to have high levels of legitimacy, is the third force identified as potentially impacting the discontinuance decision (DiMaggio and Powell, 1983). The need to ensure accountability and legitimacy with key stakeholders can lead firms to continue using information systems because of the legitimacy that they confer and to discontinue the use of systems that are hampering organizational legitimacy (Zucker, 1987). Such mimetic behavior need not be construed negatively. It can, for instance, be the optimal choice when an organization is seeking to avoid risk since mimetic behavior essentially represents a decision to follow a course of action that has proven successful (Abrahamson and Rosenkopf, 1997; Kondra and Hinings, 1998). Levitt and March (1988) further suggest that pioneers tend to specialize in inferior technologies such that organizations who copy these pioneers often derive greater benefit from their technology investments than do the pioneers. Thus, mimetic isomorphism is posited as having potentially positive and negative influences on IS discontinuance decisions.

The research framework identifies the level of stakeholder support for the continued use of a system as the final force impacting IS discontinuance decisions. Incorporation of stakeholder support into the framework serves to recognize that the continued use of an information system is predicated on the presence of a viable coalition of support for this use (Pfeffer and Salancik, 1978). The emergence and dissolution of such coalitions can be impacted by a wide range of factors. A decision to discontinue the use of a system might, for instance, be made when declining reliability undermines management and user satisfaction with the system or when a system vendor withdraws product support. The notion of a viable coalition of support

further suggests that the use of a system can continue in the absence of universal support or be discontinued despite the presence of some support for its continued use. Political influences can be expected to have at least some impact on the emergence and dissolution of supporting coalitions (Pfeffer, 1981).

Methodology

The level of analysis for this research is the individual information system and the research framework presented in Figure 1 is being used to provide initial guidance in a two phase research initiative. During the first phase of this initiative semi-structured interviews are being conducted to identify the most salient factors driving IS discontinuance decisions. Insights derived from this phase of the study will then be used to formulate a more refined research model and to guide the operationalization of the constructs included in the refined model. The final model will be empirically tested during the second phase of the study which involves surveying a wide range of organizations. A multi-method approach such as the one proposed here helps to ensure that the findings are not simple artifacts of the method used and is also considered valuable when there is a need to investigate competing theories (Jick, 1979). Thus, the first phase of the research will serve to identify which of the many theoretical explanations for change and stability are most salient to IS discontinuance decisions while the second phase will seek to establish the wider generalizability of these findings.

Semi-structured interviews are being conducted using an interview guide that has been constructed to permit thorough exploration of the factors related to information systems discontinuance decisions. A semi-structured approach permits the exploration of issues raised by each informant while reducing unneeded focus on issues found to be less relevant to IS discontinuance. Although organizational discontinuance decisions can be impacted by numerous stakeholders and are made by various organizational members, it is expected that senior information systems executives will be sufficiently apprized of these decisions to act as key informants during the interview phase of the study. Snowball sampling (Paré, 2004) will, however, be used to identify additional informants when discussions with a key informant reveal a need to interview others involved in discontinuance decisions. Focal organizations are being selected in order to maximize variance by industry, organizational size, and organizational age to enhance the generalizability of the results and to help ensure that the resulting model and its associated survey instrument will be applicable to the diverse sample frame that will be used in the second phase of the study.

Interview data will be analyzed using a grounded theory approach (Strauss and Corbin, 1998). Analysis will begin with an impressionistic reading of the transcripts to identify recurrent themes and this reading will then be followed by open coding to elucidate the key factors related to discontinuance decisions. Subsequent axial coding will be used to establish the dimensions associated with each factor. The factors and dimensions thus identified will be tested via a review of the interview transcripts and then validated and refined through the use of selective coding and cross case comparison. The salient constructs and relationships identified through this process will be used to construct a research model for the second phase of the study. Constructs will be operationalized and a draft of the phase two survey instrument prepared for presentation to the phase one participations along with a summary of phase one research findings. Their feedback will be sought as a check on the validity of the phase one findings and to obtain preliminary feedback on the proposed survey measure.

The research model that results from phase one will be tested using a cross-sectional survey. Surveys will be sent to senior information systems executives randomly selected from the Directory of Top Computer Executives - Combined Eastern US, Western US, and Canadian Edition (Applied Computer Research). This directory identifies top ranking IS executives at over 25,000 organizations and has been used in the past by a number IS researchers (e.g. Ewusi-Mensah and Przasnyski, 1991; Somers and Nelson, 2004; Ravichandran and Rai, 2000). Respondents will be asked to select one information system being used by their organization and to complete the survey for that system. The IS discontinuance decision will be operationalized on this survey as the respondent's estimate of how much longer the system will be used by the organization. In the future this initial study will be extended longitudinally via short follow-up surveys distributed periodically to all respondents to determine whether the system remains in use.

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