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UNDERSTANDING POST-ADOPTIVE USAGE BEHAVIORS: A Two-Dimensional View

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Research in Progress

Abstract

Recent information systems (IS) publications reveal an emerging interest in studying post-adoptive system use behaviors. Compared to the well-established research stream of IS adoption and initial usage, understanding of IS use behaviors after initial implementation stage is still at its early stage. To further develop knowledge about this phenomenon, this study reviews the IS implementation stage model and a variety of post-adoptive usage concepts in extant literature. These usage concepts are classified into three types and are mapped against their corresponding implementation stages. A two dimensional view of these use concepts is then proposed as an alternative perspective to understand these post-adoptive behaviors. Implications are also discussed at the end of this paper.

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Introduction / Motivation

Research in information technology (IT) acceptance represents an important stream in the field of information systems (IS). The IS field has developed a rich body of knowledge about adoption and initial usage of IS (Legris et al. 2003; Venkatesh et al. 2003). However, recently, scholars have urged greater attention toward (Jasperson et al. 2005) and examined (Ahuja and Thatcher 2005; Kim et al. 2005) post-adoptive IS usage behaviors. Such a shift of attention in research is not a surprise, given the maturity of research examining adoption and early usage

behavior (Chin and Marcolin 2001) as well as the unfulfilled potential of complex IS such as Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRP) systems, and Supply Chain Management (SCM) systems (Jasperson et al. 2005).

In practice, the complex IS being implemented across most organizations typically embody industry best practices through the reference models or process templates provided to adopting organizations (Benders et al. 2006). However, the vendor-promised benefits of these IS are equally available to competitors who also adopt the IS., leading to what has been referred to as “strategic convergence” (Porter 1985); that is to say, the competitive advantages emanating from one firm’s strategic decision to implement an IS depreciates as other firms implement the same IS. Routine usage of these systems thus provides little comparative advantage. In this vein, the unique competitive advantages of implementing complex IS can only flow from benefits beyond those originally envisioned by vendors. Extant research on learning curves suggests that, by using technologies, workers often obtain utilities that exceed the maximum capacity indicated by technology providers (Dutton and Thomas 1984). Towards this end, an important way to derive further competitive advantage is to find new ways to creatively use the implemented IS.

From both theoretical and practical points of view, then, it is important to advance our understanding of post-adoptive use behaviors. Researchers have proposed a variety of post-adoptive usage concepts. Nevertheless, as similarities and differences exist among these concepts, clearer conceptual understandings regarding these post-adoptive use concepts should benefit future research. Therefore, this paper reviews existing literature on post-adoptive IS usage behaviors, discusses similarities and differences among these concepts, and develops additional insights regarding these concepts.

The remainder of this paper is organized as follows. The next section proceeds to review the

stage model of IS implementation by Zmud and his colleagues and post-adoptive IS use behaviors proposed in prior literature. These usage concepts are then mapped against the possible stages in which the behaviors may occur. A two-dimensional diagram then illustrates the relationships between these different usage behaviors. Finally, implications are discussed.

The Stage Model of IS Implementation

Organizational adoption of information systems generally experiences two stages: primary adoption by a firm, division, or department and secondary adoption by individual employees. Zmud and his colleagues (Kwon and Zmud 1987; Cooper and Zmud 1990) introduced a six-stage model of the IS implementation process: initiation, adoption, adaptation, acceptance, routinization, and infusion. The last three stages refer to different levels of implementation activities where individual usage behaviors may take place. *Acceptance* reflects users' commitment to use the system. *Routinization* describes the state where system use is no longer perceived as out-of-ordinary but actually becomes part of an individual's behavioral routine. *Infusion* refers to the process of embedding an IT application deeply and comprehensively within an individual's or an organization's work systems (Cooper and Zmud 1990; Saga and Zmud 1994). Through direct experience with an IS and associated learning processes (Jasperson et al. 2005), individuals develop abilities to use the system to its fullest potential at the infusion stage (Cooper and Zmud 1990; Saga and Zmud 1994). It is also noteworthy that Zmud and his colleagues suggested not taking the sequential aspect of the stage model too strictly, "stages can be thought of as activities, some of which may occur in parallel" (Saga and Zmud 1994).

Post-Adoptive Usage Behaviors

The complexity and the malleability of today's organizational information systems allow

individual users to use these systems at different levels of sophistication (Moore 2002). Although individuals may be mandated to use an installed system, their post-adoptive usage behaviors are largely voluntary as the individual decides the extent of this usage as well as the effort invested in learning about the installed IS and its relationships to business processes and the individual's role regarding these processes. In other words, individual users can apply the functionality inherent to the IS narrowly to just meet the mandate or broadly to expand the capacities of the technologies (Carlson and Zmud 1999); and either shallowly or deeply, in ways that go beyond the requirements of work tasks prescribed by management (Chin and Marcolin 2001).

Researchers have proposed a variety of concepts to depict post-adoptive usage behaviors. Sage and Zmud (1994) proposed that, after initial acceptance, the implementation stage progresses towards **routinization**, in which individual technology use becomes repetitive. Arguing that the ultimate success of IS derives from sustained use, Bhattacharjee (2001) emphasized the importance of continuance over initial acceptance. Specifically, Bhattacharjee examined individual **continuance intention**, or a state of active cognitions regarding the intention to continue using an IS. Jasperson et al. (2005) raised the notion that when post-adoptive behaviors enter a state of **routinized/habitual use**, active cognition ceases and usage behaviors is more spontaneous than reflective. Such a position seems to be supported in recent findings by Kim et al. (2005) that reveal the intention-use link is stronger among light users as compared to heavier users. Jasperson et al. (2005) subsequently argue that interventions must occur to move users out of such a state of routinized behavior.

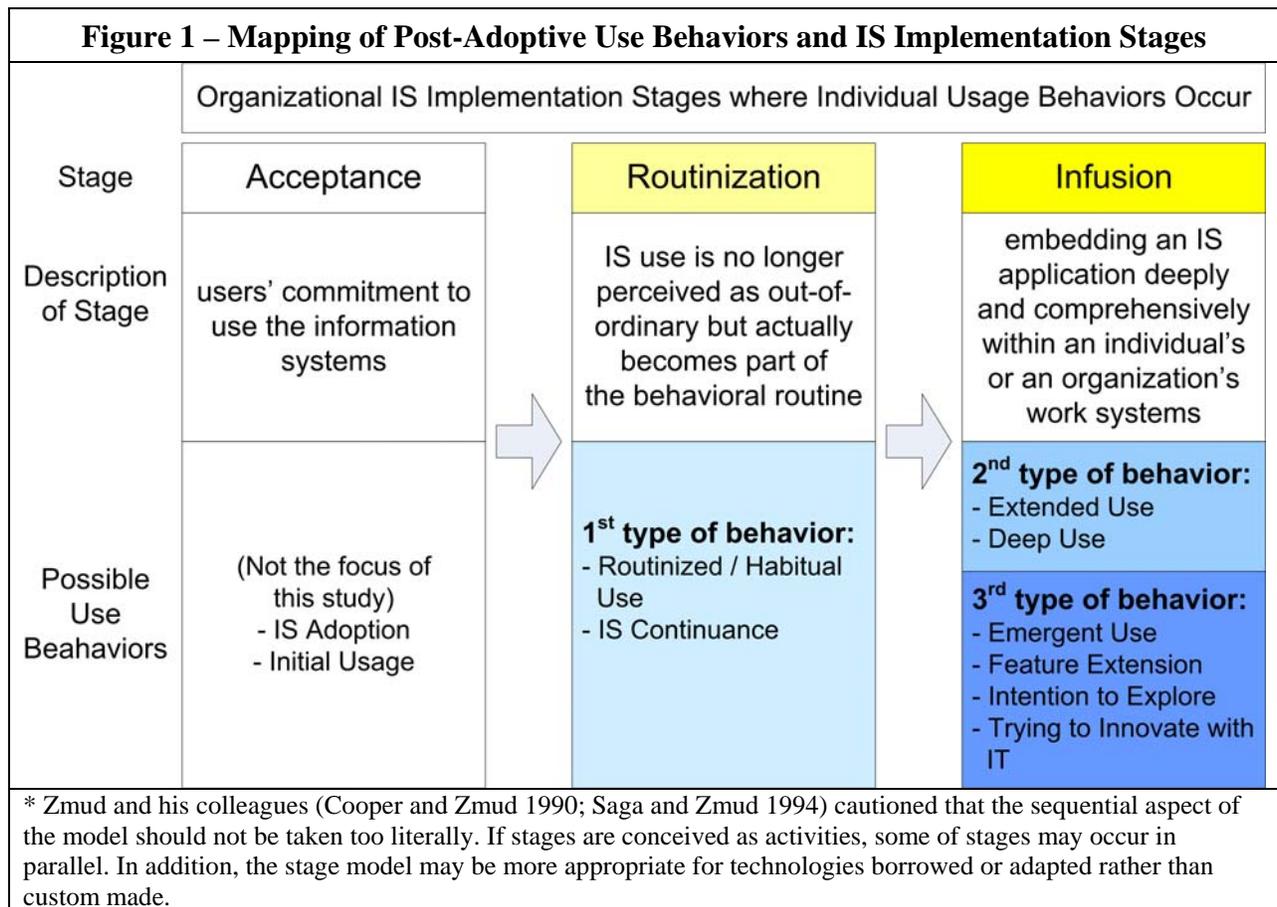
Beyond routinization, Saga and Zmud (1994) argue that it is through direct experience with an IS and associated learning processes that individuals gain the capability to use an IS to its full potential, i.e., the infusion stage. Different behaviors have been suggested to capture such usage

behaviors. Saga and Zmud (1994) offered the concept of **extended use**, which refers to how users apply more of the technology's features in order to accommodate a more comprehensive set of work tasks. Schwarz (2003) later proposed a related concept, **deep usage**, which is defined as the extent of use of different features of the technology. In essence, the above two notions center on using more features of an IS to support a more complete array of tasks. Saga and Zmud (1994) also proposed the notion of **emergent use**, which refers to using the technology in ways not recognized prior to its implementation within the work context or not feasible until after enhanced functionalities are identified and developed. Jasperson et al. (2005) proposed a similar concept of **feature extension**, where users discover ways to apply features that go beyond the uses delineated by the application's designers or implementers. Meanwhile, Nambisan et al. (1999) and Agarwal (2000) introduce the significance of a user's **intention to explore**; that is, a user's willingness and determination to find new ways of applying IT to work tasks. Ahuja and Thatcher (2005) more recently have introduced a related concept, "trying to innovate with IT," as a means to examine post-adoptive IS behaviors that are novel or innovative in the immediate work environment. These four concepts generally concern using an IS to support a wider range of tasks, including tasks not recognized by the developers or implementers of the IS.

Mapping of IS Implementation Stages and Post-Adoptive Usage Behaviors

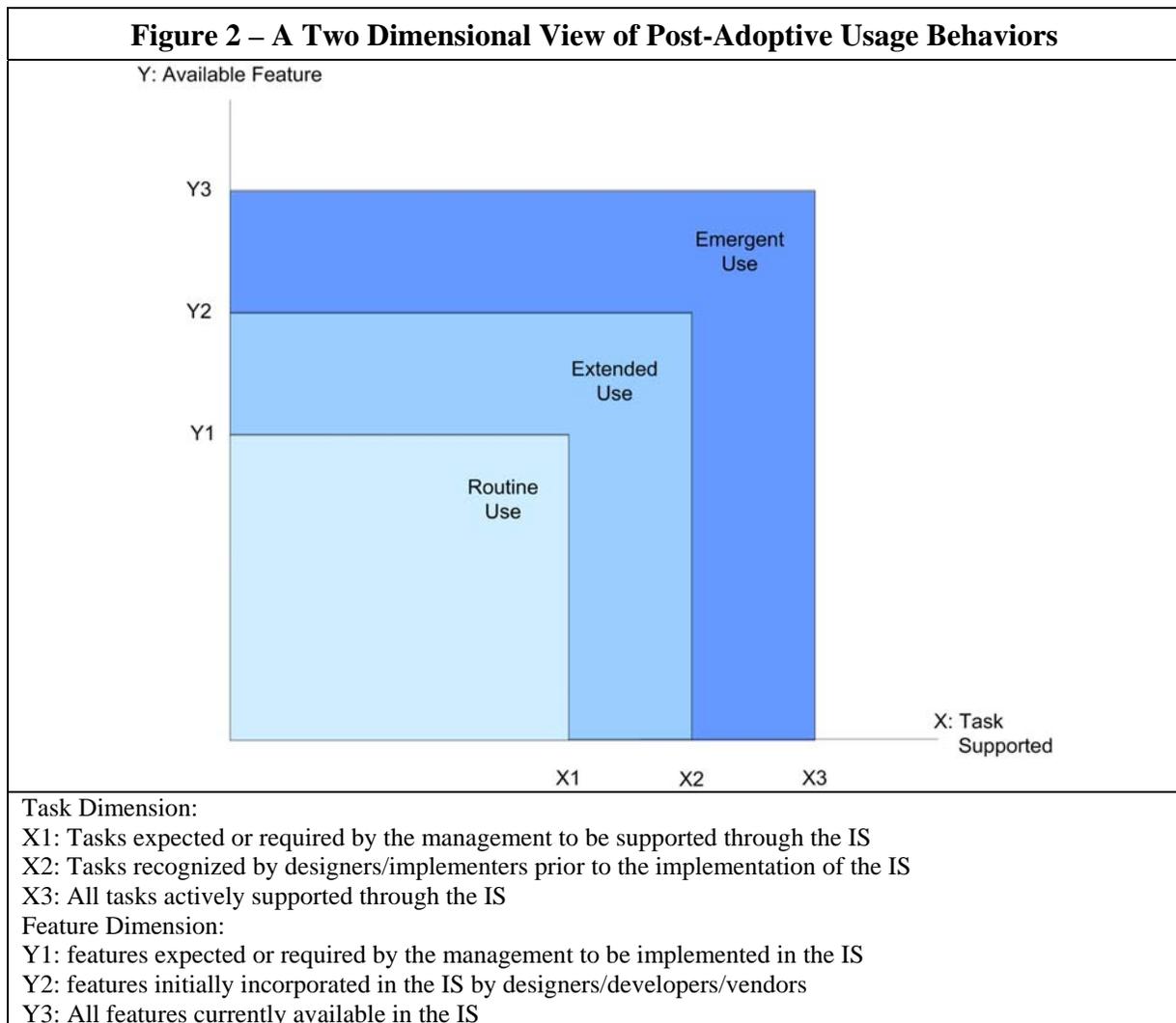
Conceptually speaking, the aforementioned concepts can be categorized into three types: (1) repetitive and routinized use, (2) use that aims at using more features to support more tasks, and (3) use that is novel in nature and can support tasks that were not recognized prior to the

application of the technology to a focal work system. Furthermore, based on the stage model of IS implementation discussed earlier, the first type of behavior is supposed to take place in the Routinization stage, while the second and third types of behaviors are supposed to occur in the infusion stage. Figure 1 illustrates the mapping of different behavior types into their corresponding stages.



A Two-Dimensional View of Post-Adoptive IT Usage

In addition to the three identified types of behaviors, the aforementioned usage concepts can also be considered from the perspective of IS features and work tasks. Figure 2 depicts a mapping of these concepts along these dimensions of features and tasks, organized into routinized, extended and emergent use as described above.



Routinized/habitual use typically falls within the range of features and tasks that are expected, required, or even mandated by the management (points X1 and Y1). During the

infusion stage, extended use can occur in which individuals use more of the features to support a more comprehensive set of tasks. However, these features and tasks are shown as within the scope of the IS initially conceived by designers and implementers (points X2 and Y2) but that go beyond what was expected or required by management. Emergent use may also occur, where users innovatively use the IS to perform tasks that were not recognized prior to the implementation of the IS within the work context. These emergent uses may apply already existing features in novel ways or may require new features to be developed.

Extended use is suggested to positively affect emergent use, as more knowledge about technology features provides a richer foundation for further innovation (Saga and Zmud 1994). Similarly, compared to the initial acceptance stage, individuals can learn about the technology in the process of attaining routine use; however, while such learning experience may facilitate reaching higher levels of use (Dutton and Thomas 1984), a state of entrenched routine use can stifle further learning (Jasperson et al. 2005). Clearly, further research is needed to demystify the complex relationships between these different types of post-adoptive use behaviors and the various interventions that stimulate user cognitions about the IS and the role of the IS in supporting work tasks.

Implications

As the IS field has accumulated a rich body of knowledge about adoption and initial acceptance of information technologies, there is an increasing interest in investigating post-adoption technology usage behaviors. This study reviews the stage model of IS implementation and a variety of post-adoptive usage concepts in extant literature, maps these behaviors against their corresponding stages, and proposes a two dimensional view of these use concepts. This paper echoes the view of prior research that post-adoptive behaviors are indeed complex and

sophisticated. Complementary to extant knowledge of post-adoptive usage, this paper offers additional insights into this phenomenon by discussing the similarities and differences between different post-adoptive use concepts and by categorizing them into three major types that are differentiated by the nature of the features on an IS and the work tasks supported by the IS. Researchers interested in this area should, therefore, carefully consider and delineate specific behavior(s) of interest.

Meanwhile, studies of IS acceptance have consistently pointed out the critical role of the “stage” of an implementation initiative. Empirical evidences suggest that factors which drive IS innovation vary across different implementation stages and the magnitude of influence of the same factor may also change over time (e.g. Karahanna et al. 1999; Bhatacherjee and Prekumar 2004). Most importantly, theories that account for IS usage behaviors at one stage may not appropriately explain those at other stages (Bhattacharjee 2001). A clear conceptualization of the behaviors that occur within and across these stages offers potentially valuable insight for theory development.

REFERENCES

- Agarwal, R. "Individual Acceptance of Information Technologies," in *Framing the Domains of IT Management: Projecting the Future...Through the Past*, R.W. Zmud (ed.), Pinnaflex Educational Resources, Cincinnati, OH, 2000, pp. 85-104.
- Ahuja, M.K., and Thatcher, J.B. "Moving Beyond Intentions and toward the Theory of Trying: Effects of Work Environment and Gender on Post-Adoption Information Technology Use," *MIS Quarterly* (29:3), 2005, pp 427-459.
- Bhattacharjee, A. "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly* (25:3), 2001, pp 351-370.
- Benders, J., Batenburg, R., and van der Blonk, H. "Sticking to Standards; Technical and Other Isomorphic Pressures in Deploying ERP-Systems," *Information & Management* (43:2), 2006, pp 194-203.
- Bhattacharjee, A., and Premkumar, G. "Understanding Changes in Belief and Attitude toward Information Technology Usage: A Theoretical Model and Longitudinal Test," *MIS Quarterly* (28:2), 2004, pp 229-254.
- Carlson, J.R., and Zmud, R.W. "Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions," *Academy of Management Journal* (42:2), 1999, pp 153-170.
- Chin, W.W., and Marcolin, B.L. "The Future of Diffusion Research," *The DATA BASE for Advances in Information Systems* (32:3), 2001, pp 8-12.
- Cooper, R.B., and Zmud, R.W. "Information Technology Implementation Research: A Technology Diffusion Approach," *Management Science* (36:2), 1990, pp 123-139.
- Dutton, J.M., and Thomas, A. "Treating Progress Functions as a Managerial Opportunity," *Academy of Management Review* (9:2), 1984, pp 235-247.
- Jasperson, J.S., Carter, P.E., and Zmud, R.W. "A Comprehensive Conceptualization of Post-Adoptive Behaviors Associated with Information Technology Enabled Work Systems," *MIS Quarterly* (29:3), 2005, pp 525-557.
- Karahanna, E. "Symbolic Adoption of Information Technology," Proceedings of Decision Sciences International Conference, Athens, Greece, 1999.
- Kim, S.S., Malhotra, N.K., and Narasimhan, S. "Two Competing Perspectives on Automatic Use: A Theoretical and Empirical Comparison," *Information Systems Research* (16:4), 2005, pp.418-432.
- Kwon, T.H., and Zmud, R.W. "Unifying the Fragmented Models of Information Systems Implementation," in: *Critical Issues in Information Systems Research* R.J. Boland, Jr. and R.A. Hirsch (Eds.), Wiley, New York, 1987.
- Legris, P., Ingham, J., and Collette, P. "Why Do People Use Information Technology? A Critical Review of the Technology Acceptance Model," *Information & Management* (40:3) 2003, pp. 191-204.
- Moore, J.B.I. "Information Technology Infusion: A Motivation Approach," unpublished doctoral dissertation, Department of Information and Management Sciences, The Florida State University, 2002.
- Nambisan, S., Agarwal, R., and Tanniru, M. "Organizational Mechanisms for Enhancing User Innovation in Information Technology," *MIS Quarterly* (23:3), 1999, pp 365-395.
- Porter, M.E. *Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York, 1985.

- Saga, V.L., and Zmud, R.W. "The Nature and Determinants of IT Acceptance, Routinization, and Infusion," in *Diffusion, transfer and implementation of information technology*, L. Levine (ed.), North-Holland, Amsterdam, 1994, pp. 67-86.
- Schwarz, A. "Defining Information Technology Acceptance: A Human-Centered, Management-Oriented Perspective," unpublished doctoral dissertation, University of Houston-University Park, 2003.
- Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* (27:3) 2003, pp. 425-478.