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Initiation of Information Technology Innovations

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A technological innovation perspective can provide Information Technology (IT) researchers with a useful framework for studying the underlying processes and the influencing factors of IT deployment in organizations (Cooper and Zmud, 1990; Swanson, 1994). While adoption and implementation of IT innovations have attracted significant research efforts, relatively few studies have focused on how IT innovations get initiated in organizations. In the *initiation stage*, innovative ideas are generated, circulated among organization members, and developed into specific IT application proposals. Rapid introduction of new technologies like multi-media, object-oriented databases, etc. have created new opportunities that beg exploitation. On the other hand, changes in the business environment like global competition and mass customization, also have increased the opportunities for innovative applications of IT in business, and demand organizations to be more creative, fast and effective in identifying and exploiting these new IT application opportunities.

This paper presents an early attempt at developing a framework for studying IT innovation initiation in organizations. A model is proposed that is based on research in organizational innovation, organizational creativity, and strategic management. The research will be conducted in three phases (explained later) and this paper only reports the results of phase 1 of the program. Following a brief review of the IT innovation literature, the model is developed and the research program described.

The different stage-models of organizational innovation suggested (cf. Pierce and Delbecq, 1977; Rogers, 1983; Zaltman, Duncan and Holbeck, 1973) have significant overlap, and tend to follow the general pattern of innovation awareness and matching, evaluation and decision to adopt, initial implementation, routinization, and usage to the fullest potential, reflecting the three core stages of *initiation*, *adoption,* and *implementation*. Recently, IT researchers have also developed similar stage-based models to guide the investigation of IT introduction and implementation (cf. Applegate, 1991; Cooper and Zmud, 1990). A review of the IT innovation literature identifies three primary research streams : *a) IT adoption research b) IT implementation research and c) IT innovativeness research.* While IT adoption research (cf. Grover, 1993; Olivia, 1991) and IT implementation research (cf. Cooper and Zmud, 1990) focus on the contextual factors that explain IT adoption and implementation respectively, IT innovativeness research (cf. Larsen, 1993; Yap, 1990) - a relatively new research stream with very little empirical work - attempts to find out the factors that explain (or determine) the propensity of organizations to innovate in IT applications. The literature review shows that the bulk of the research efforts in the IT innovation area have focused on adoption

and implementation issues. Initiation stage has received relatively less attention (Kwon and Zmud, 1987; Swanson, 1994). Further, the few studies that have been done in this area focus on the factors facilitating/inhibiting the general innovativeness of the organization with regard to IT (cf. Keshavamurthy, 1990; Lind and Zmud, 1991), than on the specific processes of IT initiation. In short, we lack an understanding of what processes comprise the innovation initiation stage, how these initiation processes are structured and flow, and what organizational contingencies govern them.

This gap in the research area is also reflective of the traditional perspective with which IT initiation has been viewed. In the IT literature, the only research stream that has addressed, to certain extent, the issues concerned with innovation initiation is the Information Systems (IS) Planning research. However, their focus on strategic IS, and the relative inflexibility and resource demands of the methodologies suggested in this literature, limit their effectiveness in the rapid identification of opportunities for the application of new IT (Boynton and Zmud, 1987). In other words, a more dynamic perspective of IT innovation initiation is called for, one that involves a continuous, rich interaction between various technology providers (both internal and external) and technology users, that would enable envisioning innovative ways of applying new technologies to the dynamic work situations.

The few theories that have been borrowed from the organization literature and extended to explain how IT innovations are initiated (e.g. "push-pull" theory, "garbage-can" theory), have not provided the needed insight into the initiation process that would enable us to be proactive in identifying and deploying IT in organizations (cf. Zmud, 1984). To realize the dynamic perspective of initiation, it is imperative that we gain an understanding of the underlying structure of the initiation phase. The research model suggested in this paper has this objective in view.

While different types of IS innovations can be identified based on their business impact and technological & organizational feature composition, the model suggested here focuses on those IS innovations that integrate IS products and services with core business technology, i.e. type III innovations as per Swanson (1994). Initiation is conceptualized, in this model, as a series of activities (or transactions between the different stakeholders in the innovation process) called *initiation activities*. Examples of such initiation activities include 'an IT vendor demonstrating a new technology to in-house IT people', 'the sales manager of a peer firm providing information on a technology application to the business manager', and 'the audit team identifying a weakness in a business process'. These activities can be categorized based on their common underlying purpose into different generic activities. For example, the first two examples given above involve knowledge sharing. While the different generic activities maybe dispersed in time and space within the organization, they form the building blocks of the initiation stage and as such the focus of this research. In phase 1 of the research program, based on a review of the relevant literatures, four such generic activities have been identified *: technology scanning, opportunity analysis, knowledge sharing,* and *idea assimilation*. The paper defines these generic activities whose reference domains include organizational creativity, organizational communication, and strategic management. These generic

activities will be refined or added to, in phase 2, based on a set of interviews with business and IT managers, and representative case studies of IS innovations.

The paper further argues that the generic initiation activities are governed by organizational contingencies characterized by various variables. Prior research in organizational innovation has identified various contextual variables that affect the initiation stage. These include professionalism, normalization, centralization, environment uncertainty, organization size etc. (cf. Pierce and Delbecq, 1978). However, by and large, this research stream has ignored contextual variables that have been identified in the organizational creativity literature and strategic management literature as having a bearing on innovation initiation (e.g. cognitive abilities/style, group cohesiveness and diversity, role of IT in the resource bundle, etc.) (Woodman et al., 1993; Swanson, 1994). Based on a review of the literature, three sets of contextual variables have been identified :

a) business-IT factors - IT's role in strategic resource bundle, prior related experience with technology, coupling of IS unit with business unit, slack resources, existence of IS application portfolio, etc.

b) cognitive factors - organizational learning abilities, problem solving approaches, etc.

c) communication factors - cohesiveness, diversity, multiplexity of communication linkages, norms, structure, size, etc.

Note that the operative contextual variables would differ between the generic activities. A preliminary set of propositions have also been generated that links the contextual variables with different generic initiation activities.

The research model thus keeps the unit of analysis as the generic initiation activity and attempts to find how the different contextual attributes inhibit or facilitate these activities, and hence IT innovation initiation. The results obtained would be supplemented with the information obtained from case studies of specific type III IS innovations. This should enable us to describe how various initiation activities flow and interact in different situations. In short, by studying initiation activities rather than initiation stage as such, it is hoped that a richer understanding of the processes underlying initiation will be obtained and lead the way for more process-oriented research in the future.

In phase 1 of this research program, the focus has been on building a research model based on the extant literature in the relevant areas. In phase 2, this model will be refined based on interviews and specific case studies of IS innovations. In phase 3, we propose to test the model through a combination of large sample survey and case studies. By acquiring a rich understanding of the different generic initiation activities, their governing contingencies, and their flow, it is hoped that one can create conditions in organizations that stimulate innovative uses of IT.

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