Innovation Adoption of EDI

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Innovation has become not only the domain of a few progressive enterprises but the key to survival and success of the many. Innovative changes in management practices can assist in ensuring survival in an increasingly competitive world. The management systems in place are critical to exploiting technological, process, and product innovations. This empirical study of 379 organizations compares organizations in various stages of adoption. An administrative innovation approach is used in order to examine the internal effects of adoption. Specific issues evaluated are the effects on users regarding satisfaction with training, involvement and participation and the MIS/User interface. Non-adopters are found to lack accurate information regarding the costs and standards of EDI. Management attitude is found to increase in importance across the adoption stages. In comparing early and late adopters, significant differences are found particularly regarding information output, participation and involvement. Timing difficulties are found not to relate to product factors but to user issues. The study provides recommendations for overcoming these difficulties and evaluates the administrative innovation approach to investigating systems adoption.

The tendency to view innovation as something that is socially good has inspired considerable interest and vast research in many disciplines, both at an individual and organizational level. Zaltman, Duncan, and Holbeck (1973) define innovation as an idea, practice, or material artifact perceived to be new by the relevant unit of adoption. Emphasis on economics has tended to focus attention primarily on product, process and technological innovations in achieving competitive advantage (Porter and Millar, 1985). Increasingly, it has been recognized that changes in management practices can assist in exploiting the competitive advantages of these types of innovations (Washburn, 1990). Better management has always been the focus of research effort. Some researchers have found evidence that changes in management techniques and organizational structures may be directly related, and even perhaps precede successful technological innovations (Damanpour et al., 1989). Increasingly, this fourth type of innovation, referred to as administrative innovation, has received attention as the object of investigation (Brown, 1991).

A wide variety of management practices, procedures, and structures have been examined from the perspective of administrative innovation adoption. For example, Mahajan et al. (1988) studied the adoption of the M-form organization structure. Zajac et al. (1991) investigated the adoption of internal joint ventures. Lonen and Larcker (1992) examined executive compensation contract adoptions and Griffen and Harrell (1991), the implementation of Just-In-Time inventory management practices in the United States. Kimberly and Evanisko (1981) studied hospital technology and administrative systems. Within the systems literature, Horner and Benbasat (1990) examined the factors influencing the adoption of customer based strategic systems.

The focus of this paper is the adoption (or non-adoption)
of an administrative innovation, Electronic Data Interchange (EDI). EDI is the movement of business documents electronically between or within firms (including their agents or intermediaries) in a structured, machine-retrievable, data format that permits data to be transferred, without rekeying, from a business application in one location to a business application in another location (Hansen and Hill, 1989). Although EDI has seen a surge of use in recent years, it has been under active development for almost three decades.

This study differs from past research in two important respects. First, rather than inferring characteristics of adopters, we test our results by comparing EDI adopters and non-adopters (Kavan and Van Over, 1990; Saunders and Clark, 1991). Second, the primary emphasis in prior research has been on the external pressures or individual characteristics of EDI (Preece, 1991; Hansen and Hill, 1989). In contrast, the attention in this study is on the internal environment of the organization.

The format of this paper is as follows. In Section 2, the past findings regarding administrative innovations will be used in order to develop hypotheses regarding EDI adoption. Questionnaire data were obtained from 379 companies in various stages of adoption. Section 3 will contain the sample characteristics and our analytical tests. The final section, 4, will review our results, together with their implications for practice and research on systems adoption.

**Administrative Innovation Adoption**

An administrative innovation is an improvement in the techniques of management or the organization of economic activity (Teece, 1980). Technological, process, and product innovation adoptions have been extensively investigated based upon the paradigm of imitation. As more firms adopt an innovation, their superior performance is expected to encourage other firms to imitate their behaviour. There is evidence, however, to suggest that the adoption of administrative innovations may not follow the ‘imitation’ hypothesis. Implementation of administrative innovations may involve a substantial change in internal functions, tasks, responsibilities, systems, and culture of the organization. Since administrative innovations cannot be adopted on a partial basis, implementation risks associated with the adoption may be unique to the firm (Teece, 1980). Further, a certain amount of invention is typically required in order to adapt an administrative innovation to the individual firm (Lippman and Rumelt, 1982). Pressures such as sunk costs, political coalitions, and the tendency to consider precedents as normative standards restrain the ability of organizations to make necessary changes. Damanpour et al., (1989) found that administrative innovation adoption in libraries caused social structure changes which occurred over consecutive time periods. Systems changes can also affect the internal cost structure which changes the balance of power (Cash and Konsynski, 1985; McFarlan, 1984, Petre, 1985). Dunk (1989), in studying internal accounting systems adoptions, found that administrative adoptions are affected by perceived greater complexity, and lesser relative advantage, compatibility, and trialability.

The information systems research literature suggests numerous incentives for organizations to initiate or participate in external systems. Porter and Millar (1985) argue that a company can create competitive advantage by coordinating the linkages to outside firms. Business processes of independent organizations can be integrated through the exploitation of the capabilities of information and communication technologies (Venkatraman and Zaheer, 1990). Integration would streamline the inter-company exchange process and thus reduce the costs of communication between sellers and buyers (Malone et al., 1987).

Past studies have revealed many reasons why an organization should adopt EDI including improved customer service, improved control of data, reducing clerical errors, decreased administrative cost, decreased inventory cost, increased sales, and decreased manufacturing cost (Hansen and Hill, 1989; Stern and Kaufman, 1985). While there are substantive reasons why organizations should adopt EDI, they do not explain why some organizations adopt earlier than others, and why others may never adopt the innovation. Adoption research focuses on understanding the conditions under which an organization responds to changes in its environment in adopting or not adopting an innovation, even after a considerable period of time. Although EDI market growth is respectable, it is more modest than originally predicted (McClelland, 1993). Understanding why organizations are reluctant to adopt administrative innovations is critical to management achieving competitive advantages in information technologies.

The case to be examined is the adoption of EDI systems which, from a rational expectations viewpoint, is projected to be successful to adopting organizations. The act of adopting or not adopting is directed towards actual behaviour and not behavioural intentions (Ajzen and Fishbein, 1980; Charkin and Stanger, 1987). The research issue focuses on the effect of attitudes (Festinger, 1957) on behaviour (adoption or non-adoption). This may be particularly important in the case of EDI to the extent that use may not be entirely voluntary. Understanding the internal effects may be of considerable importance in interpreting resistance to change and correctly evaluating the merits of post implementation strategies to reduce resistance (Howland, Janis, and Kelley, 1953 and Jones, Hendrick and Epstein, 1979).

From its introduction, the EDI landscape has changed. The costs of implementing EDI has decreased, while the knowledge and skills needed to implement EDI have increased (Hornback, 1994). This makes internal factors important in the adoption process for EDI. In particular, Senn (1987) and Lawrence and Low (1993) emphasize the relationship between satisfaction and the adoption. These studies recognized the
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