



# User Satisfaction with EDI: An Empirical Investigation

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*This study was undertaken to identify antecedents of user satisfaction with EDI systems by surveying key end users of EDI in a variety of firms across the United States. Although there is much empirical evidence about factors underlying EDI adoption and implementation, there is little information from the perspective of the end user. The vast majority of what we know about EDI success (or failure) is based on the EDI manager's or IT perspective. However, there is evidence that suggests if users are not satisfied with a system, they will not use it. Thus, a study of user satisfaction with EDI can provide firms seeking to better leverage their EDI investment with a different and useful perspective on factors that underlie EDI. Two findings indicate that the greater the perceived benefits of EDI, the greater the user satisfaction; and the more compatible EDI is with existing organizational practices and systems, the more satisfied the users are with the system. Although EDI managers may have suspected this was true, empirical support of heretofore largely anecdotal evidence has several implications for successfully managing EDI adoption and integration. These implications hold not only for the adopting firm, but also for firms that may require, or are considering requiring, trading partners to implement EDI. Finally, implications for future EDI research are discussed.*

## INTRODUCTION

Corporate use of electronic data interchange (EDI), the computer to computer exchange of business transactions, has grown rapidly over the last several years (Hart and Saunders, 1997; Turbide, 1994). Although many firms are now engaging in web-based electronic commerce, there is significant investment in EDI, and it remains a widely used form of business-to-business electronic commerce (Ramamurthy, Premkumar, and Crum, 1999; Zwass, 1999). For example, approximately 90% of U.S. Fortune 1000 firms have implemented the traditional value added network (VAN) mediated EDI (Austin, 1998), and the number of firms implementing EDI has grown steadily over the past two decades (Hart and Saunders, 1997). Those that have made substantial investments in EDI are still looking for ways to leverage their investments. In addition, many firms that are pursuing electronic commerce with business partners on the world wide web are maintaining existing EDI relationships and using the Web to investigate alternative suppliers or buyers (Carbone, 1999). Others have begun to move away from the traditional VAN-mediated, proprietary EDI framework to use web-

based EDI (Tucker, 1997; Carbone, 1999). However, firms "aren't sure if the Internet will replace EDI. ... many believe they will use both EDI and the Internet as e-commerce tools" (Carbone, 1999, p. 2). Therefore, EDI is still a viable, widely used electronic commerce technology, and research that can help firms better understand the factors that shape their use of EDI is still relevant.

Much of the research that has been done about EDI has focused on the success of EDI from the organization level perspective, and EDI representatives or managers are the primary sources of data collection efforts in these studies (Jelassi and Fignon, 1994; Teo, et al., 1995). However, the users are the ones who determine the extent of use and integration in the firm. Because initial EDI adoption has been widely due to external pressures, its adoption is often mandated (Hart and Saunders, 1997; Wester, 1995). However, EDI integration is often limited after initial implementation (Masseti and Zmud, 1996). For example, on average, firms that have implemented EDI use it for less than half their transactions and do business using EDI with less than half their trading partners (Masseti and Zmud, 1996). Further-

more, private discussions with firms about their suppliers' use of EDI revealed that some suppliers still manually key in data for purchase orders and invoices, although the same suppliers submit them to their trading partners electronically through EDI VANs, thereby nullifying many of the benefits for which EDI was implemented. Although many factors have been identified to underlie this lack of integration (Saunders and Clark, 1992; Scala and McGrath, 1993; Webster, 1995), few have considered the user perspective. However, many EDI managers are not extremely satisfied with the extent to which users have accepted this way of doing business (Arunachalam, 1995). However, without user satisfaction, it is difficult for firms to realize the benefits from an information technology regardless of external pressure to mandate adoption (Barki and Hartwick, 1994; Davis, 1989; Lyytinen, 1987; Rice and Aydin, 1991). "The more receptive an organization is to establishing ... electronic relationships, the more likely that organization is to be successful in adapting and competing within the emerging electronic marketplace," (Massetti and Zmud, p. 337). Thus, user satisfaction with EDI seems critical to a firm's ability to use it to compete effectively in today's marketplace.

Therefore, this study was undertaken to identify possible antecedents to this satisfaction. Because the unit of analysis is the individual user, the aspects of EDI with which the user most directly interacts are examined. Thus, the study focuses on factors that may influence satisfaction with the ease of use of the interface and with the quality of the output. "The measurement of how satisfied a user is with his or her information system ... has become a pervasive measure of the success or effectiveness of an information system" (Baroudi and Orlikowski, 1988, pp. 44-45). In situations where use is mandatory, satisfaction is thought to be a better surrogate for success than actual use (Ives, et al., 1983). Thus, it seems appropriate to examine user satisfaction with EDI; to use satisfaction as a surrogate for EDI success; and thus, to conclude that influences on user satisfaction may also influence EDI success.

## USER SATISFACTION

Although user satisfaction has been the subject of much research, there is little convergence in the field about how to properly operationalize or measure the construct (e.g., Delone and McLean, 1992; Ives, et al., 1983; Klenke, 1992). Measures tend to focus either on general satisfaction or on satisfaction with a specific application (Doll and Torkzadeh, 1988; Omar and Lascu, 1993). One of the most widely used measures of general satisfaction is the Ives, et al. (1983) modification of the Bailey and Pearson (1983) scale (Baroudi and Orlikowski, 1988). However, because these scales are designed to measure general satisfaction, they tend to ignore environments in which end users have less direct interaction with the information systems staff. Doll and Torkzadeh (1988) argue that in situations where users have limited

interaction with the information systems staff, general satisfaction measures are not appropriate. Given that the users probably had little input into the process of determining whether they would use EDI (Morrell, et al., 1995), a measure of satisfaction with a specific application seems most appropriate.

Doll and Torkzadeh proposed one of the first instruments containing a set of items to measure end user satisfaction with a specific application, defining end user computing satisfaction as "attitudes towards a specific computer application by someone who interacts with the application directly" (Doll and Torkzadeh, 1988, p. 261). This instrument captures satisfaction with the content, accuracy, format, and timeliness of the information (output) and with the ease of use of the system (interface); all of which are characteristics of an application rather than the general computing process. One fairly comprehensive assessment of user satisfaction measures found Doll and Torkzadeh's scale to be one of only three such measures to demonstrate adequate measurement properties (Zmud and Boynton, 1991). A second study by its developers also demonstrated the scale to have strong measurement properties including high internal consistency for each dimension as well as the overall scale (Torkzadeh and Doll, 1991). Although there have been some discrepancies in results obtained in attempting to replicate Doll and Torkzadeh's findings (e.g., Chin and Newsted, 1995; Etezadi-Amoli and Farhoomand, 1991; Seddon and Yip, 1992), studies that have used the scale indicate that it has value as a measure of end-user satisfaction.

## ANTECEDENTS OF USER SATISFACTION

User satisfaction is affected by a variety of factors, including organizational, system, and application variables. Although it can be argued that there are many constructs that may adequately explain user satisfaction with EDI, it is also argued that parsimony in models improves theory building and evaluation (Bacharach, 1989). Applying a manageable chunk of an existing model or models in a new context is deemed more useful at this early stage of exploration; leaving room to expand the boundaries of inquiry in future research (McGrath, 1975). Therefore, upon examining theory about satisfaction with products in general and about user satisfaction with information systems specifically, three constructs that seem to most directly apply to user satisfaction with EDI were chosen for inclusion in the model. These are perceived benefits of EDI, organizational compatibility of EDI, and impact of EDI on the user's job (Banerjee and Gohlar, 1994; Cragg and King, 1993; Iacouvou, et al., 1995; O'Callaghan, et al., 1992).

### Perceived Benefits

Usefulness of a system has been linked to user satisfaction with the information obtained from the system (O'Reilly,

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