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An Examination of Adoption of Electronic Supply Chain Initiatives by U.S. Medical Practices

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ABSTRACT
Since the mid 1990s, the U.S. healthcare industry has been marked by ever increasing numbers of capitated plans, decreases in fees for service plans, declines in the staff-model, reductions in provider reimbursements and growing emphasis on reducing the overall costs of delivering care. During this period the healthcare industry has focused its MIS efforts on Year 2000 compliance and then meeting the 2003 deadline for the standardization mandates of the Health Insurance Portability and Accountability Act, HIPAA. Now U.S. healthcare providers are being forced to increase the level and quality of service afforded to consumers in addition to increasing their own operating efficiencies to achieve cost reductions. This industry is; however, one that has traditionally been slow to adopt technological innovations, particularly by smaller independent providers, who account for significant portions of the market. This report details an adoption research model that includes firm, market, relationship and technological factors. In an ongoing field study of the U.S. healthcare industry, the model is being empirically tested through a survey of medical practice managers, with data collected from over 200 respondents regarding the adoption of electronic healthcare supply chain applications and services. Discriminant analysis is to be employed to examine the factors that distinguish adopters from non-adopters.

Keywords
Healthcare, Adoption, Inter-organizational Relationships, Cooperation, Dependence, Trust, Field Study

INTRODUCTION
The Internet era has seen the proliferation of electronic business initiatives across all industries and within both large and small business segments. Whereas the dot.com failures of the late 1990s have given rise to dramatic declines within the purely consumer based electronic commerce market segment, business to business, or B2B, electronic commerce initiatives continue to see growth as businesses, large and small, attempt to capitalize on technological innovations and stay competitive. Online electronic supply chain applications are proliferating in many industries, including healthcare. In early 1999, it was estimated that some 30 billion transactions were being completed each year utilizing paper, phone and/or facsimile (Egger, 1999), consistent with the contention that the healthcare industry in general has been traditionally slow to adopt technological innovations (Raghupathi, 1997).

Adoption of technological information systems innovations has long been recognized as a construct within the IS community (Cooper and Zmud, 1990; Kwon and Zmud, 1987; Tornatzky and Klein, 1982; Zmud, 1984). Work within the community has focused on computer aided software engineering tools (Orlikowski, 1993; Rai and Patnayakuni, 1996), customer based information systems (Grover, 1993), electronic data interchange (Iacovou, et al., 1995), hospitals systems (Kimberly and Evanisko, 1981), open systems (Chau and Tam, 1997), operational systems (Tristani, 1999), telecommunications (Grover and Goslar, 1992), and so on. Limited work has focused specifically on the healthcare industry and no work to date has specifically examined adoption by individual small business providers within the industry.

Given the historically slow adoption of information system innovations within the healthcare community and the absence of specific research efforts aimed at understanding IS adoption, this study seeks to examine the factors that have influenced the decision to adopt electronic online supply chain applications within small business level medical practices. Of interest are the specific firm, market, relationship and technological factors that might be influencing these businesses to migrate to online applications to fulfill their supply chain needs. The following section briefly reviews U.S. healthcare industry, with a
subsequent review of the adoption factors specific to the model presented, and finally a summary of the current status of this ongoing research project.

BACKGROUND ON THE U.S. HEALTHCARE INDUSTRY

Since the mid 1990s, the U.S. healthcare industry has been marked by ever increasing numbers of capitated plans, decreases in fees for service plans, declines in the staff-model, reductions in provider reimbursements and growing emphasis on reducing the overall costs of delivering care. Moreover, healthcare costs are expected to rise from 14 percent of gross national product to 17 percent, or $2.1 trillion, by 2007 (Duncan and Garets, 1999). Given increasing globalization, all businesses are finding it harder to compete with European firms that are already enjoying significantly lower healthcare costs (Hofflander, 1999). U.S. healthcare providers in general, are being forced to increase the level and quality of service afforded to consumers as well as increase provider operating efficiencies to achieve cost reductions (Duncan and Garets, 1999).

Healthcare organizations are investing heavily in reducing the wait-time for patients, improving billing processes and accuracy, improving scheduling efficiency and trying to demonstrate clinical quality. All of these initiatives are directly aimed at improving the level of service afforded to members, or patients, and have the added benefit of contributing to cost reductions. Managed care organizations grew over the 1990s, achieving dramatic cost efficiencies through tight controls and competitive contracting with providers. Since these organizations are unable to raise prices when faced with ever increasing pressure from both the private and public sectors, the challenge is now to capitalize on the cost-saving potential of industry-wide standardization and increased adoption of electronic initiatives made possible through the proliferation of Internet technologies.

As the MIS focus in the healthcare industry has shifted away from Year 2000 compliance and meeting the 2003 mandates set forth in the Health Insurance Portability and Accountability Act, HIPAA, new mandates for businesses in this field have emerged. In many ways, these mandates will be the impetuous for change in an industry that has been traditionally slow to adopt technological innovations (Raghupathi, 1997). Opportunities for information systems providers in the healthcare industry are tremendous, with the electronic business initiatives at the forefront, to include supply chain functions.

RESEARCH MODEL

The proposed model considers traditional diffusion of innovation variables integrated with relationship variables from the management literature. Adoption studies within the IS community have examined the constructs set forth in diffusion of innovation theory (Rogers, 1995; Tornatzky and Klein, 1982). The current study, consistent with the relational view of the firm set forth by Dyer (1998), examines online electronic supply chain applications, where adopting technology is linked to a persistent business relationship with a given provider. The model, depicted in Figure 1, considers four different factor categories influencing the decision to adopt online electronic supply chain applications, specifically firm, market, relationship, and technological factors.

Firm factors, specifically championship, relative advantage and top management support, were initially identified as important constructs by Rogers (1995; 1971) with Tornatzky and Klein (1982) examining relative advantage in their meta-analysis. Premkumar (1995) developed the notion of internal integration while examining the adoption of interorganizational systems. Championship, top management support and relative advantage measures were adopted from Grover (1993) and internal integration was adopted from Premkumar (1995).

Market factors examined in this study include competitive pressure and vertical coordination. Competitive pressure, again identified by Rogers (1995) and studied by Tornatzky and Klein (1982), was adopted from measures used by Premkumar (1995). Vertical coordination was initially developed by Grover (1993) while examining customer-based interorganizational systems and adopted in the current study.

Recent works within the strategic management community have drawn attention to the importance of cooperation within business relationships (Bensaou, 1997; Combs and Ketchen, 1999; Gulati and Singh, 1998; Krus and Bronisz, 2000; Lado, et al., 1997; Sainty, 1999; Straub, et al., 2004; Tullock, 1999), and cooperation is theorized to be a significant construct when considering interorganizational issues (Dyer, 2000; Dyer and Singh, 1998). Cooperation measures were adopted from Heide and Miner (1992). Dependence has long been recognized as important construct within the IS community (Thompson, 1967) with items adopted from Straub, Rai and Klein (2004). Additionally, given the nature of the online service offerings being made by many existing supply chain vendors, the tenure of the relationship, a traditional control variable, is examined. Finally, trust has long been recognized and well studied within the management community (Jones and George, 1998; McKnight, et al., 2002; McKnight, et al., 1998) and measures were adopted from McKnight, Cummings and Chervany (1998).
Finally, technological factors include variables identified by Rogers (1995) and studied by Tomatzky and Klein (1982), specifically compatibility, complexity, divisibility and trialability. A fourth construct, IS infrastructure, was developed by Premkumar (1995) with items integrated into the current study. Measures for compatibility and complexity were adopted from measures used by Grover (1993) and independent items for divisibility and trialability were developed for the study.

RESEARCH METHODOLOGY AND DESIGN

In an effort to understand the adoption of online supply chain applications within the U.S. healthcare industry, this study was conducted in two parts, an exploratory and subsequent confirmatory phase. During the exploratory phase, providers were examined in an effort to generate qualitative data and develop the survey instrument to be used in the subsequent phase of the research (Creswell, 1994; Kaplan and Duchon, 1988; Mason, 1996; Stone, 1978). The methodology employed in the initial phase was case study (Yin, 1994). The second, confirmatory phase examined more closely healthcare practice adoption of online applications. A field study was adopted using a survey technique (Creswell, 1994; Kaplan and Duchon, 1988).

The variables selected in each category within the model are reflective of a two-phase process that involved an examination of the existing literature in addition to the case-based field study examination of a healthcare supply chain vendor and independent medical practices. Given the diverse and substantial work in innovation, the case study phase focused on identification and development of industry, i.e. healthcare, and market segment, i.e. independent providers, relevant constructs. The instrument was developed with the input of an electronic healthcare supplier and independent medical practice managers, providing for the inclusion and exclusion of relevant constructs detailed in the specified model.

CONCLUSIONS AND STATUS OF RESEARCH

In February of 2004, the survey was administered to over 200 medical practice managers from the southeastern U.S., who attended a meeting jointly sponsored by insurance providers and a professional medical association. Data is currently being coded and analyzed.

REFERENCES