

AN EXPLORATORY STUDY OF FACTORS AFFECTING ADOPTION AND IMPLEMENTATION OF B2B E-COMMERCE IN AUSTRALIAN HEALTH CARE ORGANIZATIONS

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ABSTRACT

For the health care industry, the adoption and implementation of business-to-business (B2B) electronic commerce (e-commerce) systems can lead to many benefits, such as an increased accessibility to providers, reduction in supply chain and inventory costs, and reduced medical errors. However, despite high expectations for realizing the benefits of B2B e-commerce in health care, its adoption remains poorly understood and is a relatively under-researched area. Although B2B e-commerce provides these organizations a wealth of new opportunities and ways of doing business, it also presents a series of challenges. Hence, the case study approach was utilized (1) to identify B2B e-commerce adoption and implementation critical constraint-minimization factors for organizations

within the health care industry; and (2) to develop a framework to manage these critical constraint-minimization factors. A key contribution of the paper is to propose a framework in which critical constraint-minimization factors faced by health care organizations undertaking B2B e-commerce activities can be identified, examined, and managed.

Keywords: B2B E-commerce, health care, constraints, benefits.

1. INTRODUCTION

In Australia, International Data Corporation (IDC) has estimated that information and communication technology (ICT) spending by the health care industry is likely to increase from US\$1.89 billion in 2010 to US\$2.16 billion by 2013.⁶ A large percentage of the ICT spending (US\$603 million in 2010) by Australian health care organizations is likely to be spent on telecommunications (e.g., business-to-business (B2B) electronic commerce (e-commerce)).⁶ In particular, B2B e-commerce technologies have gained growing importance in recent years and have surpassed all other forms of electronic commerce. However, despite the increasing spending on ICT and the high expectations for the benefits from such as B2B e-commerce in the health care industry, its use remains poorly understood.^{2,10} In addition, the industry has not embraced the technology to the same extent as in other industries,⁵ particularly in the adoption of B2B e-commerce in the context of procurement, supply chain, and distribution of goods and services among health care organizations.^{47,39}

Not many B2B e-commerce studies have been conducted in the health care area⁵ and most of these studies have dealt with strategic marketing or customer relationship management and designing of e-fulfillment systems.^{29,32} A review of the relevant literature also revealed that factors contributing to low adoption of B2B e-commerce in other industries often relate to lack of organizational resources, organizational implementation barriers, supply chain problems, lack of knowledge retention initiatives, change management, organizational IT maturity, user participation, and lack of support from management, vendors, and organization as a whole.^{11,18,23,27,28,31,35} Identification of relevant factors that can assist in overcoming and minimizing constraints in the adoption and implementation of B2B e-commerce within the Australian health care industry will assist organizations in improving their organizational performance. Hence, the aim of this paper is to identify critical

constraint-minimization factors faced by health care organizations undertaking B2B e-commerce activities as well as to develop a framework to manage and examine these factors.

2. B2B E-COMMERCE

Similar to general business B2B e-commerce, the use of B2B e-commerce by health care organizations includes online activities such as biotechnology online transactions between health care organizations and their suppliers and the sales of medical products and services via e-marketplace and B2B portals^{36, 45, 48}. It enables health care organizations to minimize their procurement costs and assists their suppliers to sell via an efficient marketing channel.⁴⁸ B2B e-commerce allows health organizations' business partners to access their internal business systems via the Internet. Some of the major benefits of B2B e-commerce specifically to health care organizations involve: (1) assisting health care organizations to get the timely purchases among all available suppliers;³ (2) giving medical suppliers access to huge number of new customers and suppliers;²⁷ (3) reducing health care organizations' costs such as procurement costs, inventory holding, and search costs;² and (4) enabling organizations to streamline stock control, link transactions among suppliers and customers, and improve logistics involved in the ordering and supplying of products and services.⁹

However, it appears that our current understanding of B2B e-commerce adoption and management processes in health care has little impact on organizational practice, making factors such as power and politics and resource constraints extremely difficult to identify and measure.^{26, 35} Failure to identify and manage critical constraint-minimization factors can have detrimental consequences on health care organizational performance. Some of the major problems associated with B2B e-commerce in health care are: (1) several attempts by governmental and industry organizations to assist the health care industry in improving its supply chain management as well as in setting universal standards and protocols have met with limited success (the Monash Project,²⁰ National Supply Chain Reform Task Force,^{46, 47} and Project Electronic Commerce and Communication (PECC) and the Pharmaceutical Extranet Gateway (PEG);⁴⁴ (2) it is difficult to integrate different databases among different suppliers and buyers in order to create new data resources and to increase productivity and effectiveness;^{9, 48} and (3) health care is different from other industries due to the high level of government regulations and investments. Compared with other industries, the health care industry as a whole generally possesses a relatively

underdeveloped IT infrastructure and expertise such as B2B e-commerce,^{1,24} Thus, business relationships among health care organizations often are subject to a variety of factors.

One of the objectives of the paper is to identify critical constraint-minimization factors (CCF) for successful B2B e-commerce adoption and implementation. The literature has furnished many attempts at critical success factor identification for the successful adoption of IT and/or B2B e-commerce initiatives.^{4,13,21} According to Butler and Fitzgerald,⁴ critical success factors are the functions or areas where things must go right to ensure successful competitive performance for an organization. For example, Eid et al.¹³ list twenty-one and classify them into five categories: marketing strategy, web site, global, internal, and external. Hope et al.²⁵ identify several critical and organizational factors related to B2B e-commerce adoption such as organizational readiness, enterprise culture, marketing strategy, intra-organizational factors, information technology, and governmental support. Lin and Huang³⁴ and Lin et al.³⁵ have identified other organizational factors such as IT evaluation, IT infrastructure, management support, stakeholder involvement, and organizational goal alignment which organizations need to examine in order to minimize B2B e-commerce adoption and implementation constraints. We argue that careful management of both critical success factors (e.g., top management support and stakeholder involvement and participation) and organizational factors such as politics and culture are crucial in minimizing or overcoming B2B e-commerce adoption and implementation constraints. Hence, for the purpose of this research, we define critical constraint-minimization factors (CCF) as factors (both critical success and organizational) that a health care organization needs to manage in a way that they would assist the organization to overcome or minimize B2B e-commerce adoption and implementation constraints.

3. THEORETICAL MODELLING

The Limits-to-Value Model proposed by Chircu and Kauffman⁷ showed that possible IT investment constraints/challenges included valuation constraints (i.e., industry and inter-/intra-organizational) and conversion constraints (i.e., knowledge, and resources) to realize B2B e-commerce benefits (see Figure 1). Many of the elements discussed in the model relate to the organization's ability to use IT effectively, and this can potentially be one important constraint or challenge to B2B e-commerce investments.^{7,27} This is one issue that we seek to examine here. For example, the shortage of IT infrastructures remains to be one of the most critical constraints or challenges to IT investments.⁷ Organizations need to

overcome these constraints or challenges to obtain as much realized B2B e-commerce value from B2B e-commerce investments as possible.³⁵ In addition, organizations need to have sufficient IT infrastructures such as complementary assets to overcome these constraints or challenges to realize the benefits of B2B e-commerce investments.^{7,35} Organizations are often unsuccessful in obtaining full value from their IT investments because they fail to invest sufficient complementary assets.²⁷ The complementary assets include new organizational processes, organizational knowledge, and responsibility structures. B2B e-commerce investment constraints or challenges appear when organizations fail to invest in the requisite complementary assets. This research focuses on how the organizational valuation constraints and conversion constraint affect the realization of B2B e-commerce benefits in Australian health care organizations.

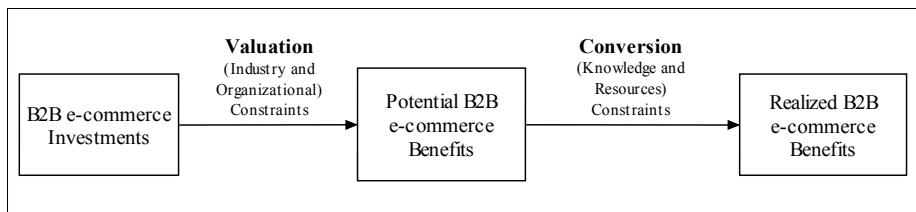


Figure 1: The Limits-to-Value Model for B2B e-commerce
(Adapted from⁷)

4. RESEARCH OBJECTIVES AND METHODOLOGIES

Despite the growing popularity of e-commerce and its numerous benefits in health care, there is a paucity of published literature on the critical constraint-minimization factors for B2B e-commerce adoption and implementation in health care organizations.⁵ Hence, the case study approach was utilized (1) to identify B2B e-commerce adoption and implementation critical constraint-minimization factors for organizations within the health care industry; and (2) to develop a framework for managing B2B e-commerce adoption and implementation critical constraint-minimization factors for health care organizations. In an attempt to answer the above two research objectives, case studies were conducted with participants (i.e., IT managers, IT procurement managers, supply chain managers or CIOs) from 26 Australian organizations (hospitals, health care product firms, medical products distributors, pharmaceuticals manufacturers, biotechnology firms) within the health care industry. In addition, ten system users from these health care organizations were interviewed.

The questions asked related to their B2B e-commerce investments, B2B e-commerce adoption and implementation constraints, and B2B e-commerce adoption and implementation critical success/organizational factors in the context of procurement, supply chain, and distribution of goods and services. Multiple data sources were used and included company documents and annual reports. Extensive notes were taken during the interviews and they were later coded and analyzed. These provided a form of data triangulation and validity in that strategies and key issues identified formally in reports and internal documents could be compared with the responses from interview participants.⁴⁹ Qualitative content analysis by Miles and Huberman⁴¹ was used to analyze the data from the case study. The analysis of the case study results was conducted in a cyclical manner and the results were checked by other experts in the field. The external experts were asked to trace the logical flow of the research study, research questions, case findings and analysis, and identification of constructs, and thereby identify any gaps in the chain of evidence.^{14,30} Finally, two of the researchers evaluated the responses from the interviews and classified them according to the identified research themes. Cohen's Kappa statistic was used to analyze the level of correspondence between the researchers and was well above the 61% level that is suggested to have substantial strength of agreement.¹⁶

5. RESEARCH FINDINGS

A number of critical constraint-minimization factors (CCF) arose from the analysis of case study data and they are presented below.

5.1 Industry constraints & CCFs

Government regulations and standardized B2B e-commerce protocol

The health care industry often is subject to government regulations with regard to the adoption of the innovative B2B e-commerce technologies. As revealed by the case study participants, the health care industry had been subject to the pressures exerted by the government. The pharmaceutical companies, in particular, had to comply with both national and international regulations (e.g., bar coding, Sarbanes-Oxley Act). However, standards alone do not necessarily translate into ongoing improved performance. For example, while it was mandatory for some products to have bar codes, some medical products did not require bar codes. This had caused a bit of confusion among health care organizations, many of which stated that they need to work toward standardization of a universal product numbering system and for data exchange and information

flows in order to facilitate B2B e-commerce. This is vital given that the transactions among health care organizations spans many parties and geographical dimensions. This is one important factor influencing the adoption of B2B e-commerce for these organizations in the health care industry.

Role of Medicare Australia

Medicare Australia is a statutory agency that provides public-funded universal health care system in Australia. At the moment, it is developing the Unique Health Care Identifier service to the National E-Health Transition Authority, which will be used to uniquely identify individuals as well as health care providers.⁴⁰ This will have an impact on how health care organizations adopt and implement their B2B e-commerce systems. Therefore, it is not difficult to see that just about every health care organization has a connection with Medicare Australia. All of these health care organizations' procurement, supply chain, and distribution of goods and services, as well as other non-procurement e-functions such as electronic claim lodgement and online claiming, have to take into account the requirements and role of Medicare Australia. For example, whether or not a particular medical item is covered under the Pharmaceutical Benefits Scheme has a great impact on its sales as well as the design and the transaction procedures of the B2B e-commerce systems. One IT procurement manager of a pharmaceutical company said: "*Medicare Australia has an important role to play in our B2B systems ... The policy of Medicare Australia has a significant impact on our sales.*"

5.2 Organizational constraints & CCFs

Appreciation of B2B e-commerce as a central strategic issue for the business

Alignment with stated organizational goals has a key bearing on how investment is organized and conducted, and the priorities that are assigned to different IT investment proposals.^{42, 43} There appeared to be a lack of obvious linkage between stated organizational goals the expected outcomes of business objectives for B2B e-commerce. Business objectives for adopting and implementing B2B e-commerce systems by organizations varied greatly. The objectives mentioned by most health care organizations were related to the improved supply chain process, cost reduction, decreased administrative errors, and improved work efficiency. Other e-commerce studies conducted in other countries^{15,33,38} suggested that many organizations simply failed to establish a linkage between the reasons for adopting an e-commerce system and their organizational goals.

These systems were often installed without linking the benefits to their organizational goals. In addition, many organizations failed to make the objectives of the new B2B e-commerce systems clear at the beginning of the project. For example, the IT manager of a hospital said: *“From the hospital’s perspective, the system is not critical to our business. The hospital can really go without them ... I don’t think the adoption and implementation of the system was linked to our business objectives.”*

Soliciting top management support

Obtaining top management commitment throughout the implementation stage was found to be critical to the success of the IT investments in e-commerce.^{34,35} Most organizations interviewed indicated that their senior executives had provided sufficient management leadership as well as obtained necessary organizational commitment towards the adoption and implementation of B2B e-commerce within their organizations. Most senior managers were very enthusiastic about their investments in B2B e-commerce during the initial adoption and implementation stages. For instance, the procurement manager of a medical supply company stated: *“Our senior executives gave 110% support of the B2B system ... Our department had received quite a substantial funding increase for the development of the system in the first three years ... Some of the senior executives had held several meetings with us about the system.”* However, most health care organizations also indicated that while senior managers had signed off on the B2B e-commerce projects, there was then little in the way of follow-up support. They perceived it simply as an IT-enabled cost-cutting mechanism rather than as a central strategic issue for their business.

Business process change management

One of the most important criteria in managing changes is to have an effective communication strategy to deal with the uncertainty.⁸ The single most often mentioned reason for business process and change management failures is difficulty in communicating with affected stakeholders. Other reasons included user resistance, lack of proper user consultation process, employee/user transition process, systems usability issues, and business operational issues. One user from the hospital revealed: *“...the system was implemented without much consultation and no training was provided ... the B2B procurement system was not reliable ... some users refused to use it and they used the manual system instead.”* Moreover, health care organizations have to ensure that stakeholders are properly consulted prior to the adoption and implementation of B2B e-commerce systems. Furthermore, senior

management need to spend more time getting user requirements before adopting and implementing B2B e-commerce systems, instead of simply forcing stakeholders to use the systems.

Level of organizational IT maturity

Organizational IT maturity refers to an organization's capability to utilize its existing IT processes and investments to obtain business value.¹⁷ An analysis was performed by plotting the seven elements in Galliers and Sutherland's model¹⁷ against the responses from health care organizations. The findings revealed that there appeared to be a strong connection between the level of organizational IT maturity and the effective adoption and implementation of B2B e-commerce systems by health care organizations interviewed. Those organizations that had higher levels of organizational IT maturity generally were more successful and also had fewer problems in adopting and implementing their B2B e-commerce investments than those that had lower levels of organizational IT maturity. For example, one supply chain manager of a biotechnology firm revealed: *"I know we have received quite a number of complains from the user about the B2B e-commerce system ... we only have a limited IT budget ...the system does not work well with other IT systems ..."*

5.3 Human resource constraints & CCFs

Stakeholder motivation and management

It is important for organizations to manage the needs of their internal stakeholders before they can satisfy the needs of its external customers.¹⁹ It appeared that most health care organizations' top management was not aware that there was some dissatisfaction and resistance among their stakeholders regarding implementation of their B2B e-commerce projects. Although most senior managers knew good user resistance management was a critical part of successful adoption of IT projects, no obvious user resistance management plan was put in place by most of the organizations interviewed, and dissatisfied stakeholders were blamed for any problems encountered during the adoption and implementation of their B2B e-commerce projects. Very few organizations had taken steps to alleviate user resistance during the adoption and implementation stage, for example, by involving affected stakeholders early in the planning stage or by communicating on the technology adoption progress with affected users during and after implementation. Both positive and negative aspects of the projects must be communicated effectively to the affected stakeholders. The supply chain manager of a pharmaceutical company said: *"We are sort of told by the senior management to adopt the system ..."*

The system is not working too well and many users are still not familiar with it at the moment ... Yes, users were surprised to be asked to use the system." When asked about whether or not any change management was implemented before the adoption of its B2B e-commerce system, the supply chain manager responded by saying, "No." Moreover, several participating IT and procurement managers revealed that it was critical to report outcome measures to affect stakeholders during and after B2B e-commerce project implementation in order to solicit stakeholder buy-in.

Stakeholder involvement /participation

The relevant literature has stressed that there is a direct relationship between stakeholder involvement and success of any IT systems.^{11,37} Increasingly, health care stakeholders such as ICT users and clinicians, for example, are involved in the designing and procurement of ICT systems in health care.²² However, the adoption and use of the B2B e-commerce systems by the health care organizations interviewed were generally forced upon the stakeholders by the senior management. Data collected from the case study indicated that stakeholders, particularly users of B2B e-commerce systems, were not consulted extensively beforehand and were not involved in the designing, development, and adoption of these systems. Those organizations that kept their stakeholders in the dark tended to have lower usage for their systems. There appeared to be a direct relationship between the amount of stakeholder buy-in and user participation in the design and development of B2B e-commerce projects. Moreover, many benefits expected from the adoption of these systems were tailored mainly for senior managers, not lower ranked users or stakeholders.

Politics and Cultures

Intra-organizational differences among health care organizations and departmental differences within an organization have been recognized by the case study participants as political barriers to implementing effective B2B e-commerce. For example, IT managers did not like the involvement of sales people in B2B e-commerce systems. Similarly, business managers had regarded the IT department as highly technical and insufficiently business focused. For example, one procurement manager of a health care services organization commented: *"We all have different needs, cultures, and agendas ...it is just not possible to incorporate all of the vastly different requirements from different departments into the B2B system ...power and politics come into play with regard to the designing, implementation, and use of the B2B system ..."*

5.4 Knowledge and resources constraints & CCFs

Failure to retain knowledge

A lack of corporate memory retention had adversely affected some of these health care organizations' ability to adopt and manage B2B e-commerce systems. This is due mainly to the fact that many of the affected stakeholders were not involved in the early stages of the purchase decision and adoption of B2B e-commerce systems. Another reason was the high turnover rate of skilled B2B e-commerce operators. For example, one CIO revealed that: *"Yes, two different groups of IT personnel were involved for the designing and implementation stages"* Without sufficient corporate memory, it was difficult for some of the health care organizations interviewed to operate their B2B e-commerce effectively. Corporate memory often is developed from previous business experiences, successes, and failures. Health care organizations need to retain enough corporate memory to effectively manage their IT systems. These organizations should develop a robust and practical mechanism for the capture, sharing, and application of corporate memory.

Financial and managerial resources

Responses from the case study participants revealed that there was a general lack of financial and managerial resources in adopting and implementing B2B e-commerce. Although almost all of the interviewees agreed that further adoption of B2B e-commerce systems would be an important factor for the future success of their organizations, and several participants indicated that on many occasions they had used the tried and true processes (i.e., e-mails and/or phones) to communicate with their customers and suppliers to undertake business transactions. More than half of these organizations failed to utilize their B2B e-commerce systems to conduct business effectively with their customers and suppliers. Many organizations indicated that they did not have sufficient financial and managerial resources to adopt, implement, and maintain their B2B e-commerce systems in order to conduct their business transactions online effectively. For example, one supply chain managers stated: *"We just do not have the sufficient financial resources and manpower to effectively maintain and manage our B2B system ... we need more training and workshop sessions to inform users and stakeholders the importance of the system."*

Organizational IT infrastructure and capabilities

IT infrastructure such as reliable, accessible, and high-speed telecommunication infrastructure, networks, and Internet services are

essential ingredients for organizations in the health care industry to undertake B2B e-commerce initiatives. They also serve as vital components of the business strategies for these organizations to compete. Those health care organizations that did not possess appropriate IT infrastructure and capabilities had found that investing in B2B e-commerce systems alone could not solve their problems since they are an inextricable part of the organization processes and structures. Those organizations that had higher levels of IT infrastructure and capabilities tended to encounter fewer problems with their B2B e-commerce systems. Most of their IT infrastructure and capabilities were funded by top management as a long-range capital investment in line with business objectives and strategies. In addition, those health care organizations that had higher levels of IT infrastructure and capabilities were able to retain the critical corporate memory since the beginning of the designing and/or procurement of their B2B e-commerce systems. One IT manager of a hospital revealed that: *“I think our B2B e-commerce system is more effective than similar systems in other hospitals I know ... we did not have a high turnover rate of IT personnel because we had done everything we could to retain our experienced IT personnel ... to ensure smooth running of the system.”*

5.5 Supply chain constraints & CCFs

Effective supply chain management

Several health care organizations interviewed raised concerns about whether the B2B e-commerce investments would bring about equitable benefits for all stakeholders. Several participants complained about issues such as lack of training on the use of the new systems, fear of job losses, and the loss of interpersonal relationships with suppliers and customers via the use of B2B e-commerce systems. Therefore, those organizations that had fewer problems in adopting and implementing B2B e-commerce systems were those that had better communication with key stakeholders throughout the entire supply chain and had listened to their concerns. Another issue mentioned by some participating health care organizations related to disaster recovery and security. They emphasized the importance of having a backup/alternative B2B e-commerce system and IT disaster recovery and data security contingency plans in case of system failure or other security issues. Several interview participants also mentioned that having effective supply chain management in their organizations was not good enough. Benefits only would come about if these management processes could be extended into other organizations. Benefits mentioned by the participants included cost reduction in business transactions,

reduced errors, reduced inventory level, better traceability, better budget planning, and patient care.

Interoperability problems

The problem of interoperability is one of the most cited issues for B2B e-commerce by interview participants. Such problems reduce organizations' IT systems' ability to exchange information. Several participating health care organizations had some difficulties or simply failed to integrate their B2B e-commerce system with other functions throughout the supply chain. Most did not have an IT strategy to integrate their B2B e-commerce with other systems. For example, many health care organizations, such as hospitals and pharmaceutical companies, had purchased their own IT/B2B e-commerce systems; therefore, it was not surprising to see that their IT/B2B e-commerce systems within the same organizations were unable to communicate, let alone between hospitals or different health care organizations across the entire supply chain. For example, the IT manager of a hospital revealed: *"Yes, our B2B e-commerce system is not entirely compatible with several of our suppliers' ... yes, we still have not resolved some of the issues between the B2B system and other IT systems in the hospital ...yes, we were surprised by this."*

Vendor/supplier support

Vendor/supplier support also can play a critical role in successful adoption and implementation of B2B e-commerce systems for health care organizations. Case study results revealed that while B2B e-commerce systems' vendors/suppliers were closely involved in the decisions leading to funding of the project, there was a general lack of interest from the vendor once the systems were purchased and implemented. For example, a significant number of organizations mentioned that it often was difficult to get the various B2B e-commerce software and hardware vendors/suppliers and external consultants to resolve software problems. Effective coordination and communication among health care organizations, various vendors/suppliers, and external consultants is essential.

5.6 The B2B E-commerce Critical Constraint-minimization Factors Framework

A framework has been developed from literature review and case study results (Figure 2) that consists of various major constraints that Australian health care organizations need to overcome in order to realize B2B e-commerce benefits. The Australian health care organizations should

manage and pay attention to these critical constraint-minimization factors in order to overcome the B2B e-commerce valuation and conversion constraints (see Figure 1). The five main categories of critical constraint-minimization factors identified in this research study are industry, organizational, supply chain, knowledge and resources, and human resources. Industry critical constraint-minimization factors include government regulation and standardized B2B e-commerce protocol and the key role played by governmental organization – Medicare. Organizational critical constraint-minimization factors consist of alignment of organizational goals with business objectives, top management support, business process change management, and organizational IT maturity. Supply chain critical constraint-minimization factors comprise supply chain management, interoperability issue, and vendor and supplier support to B2B e-commerce systems. Knowledge critical constraint-minimization factors are knowledge retention, financial and managerial resources, and organizational IT infrastructure, whereas human resources critical constraint-minimization factors are stakeholder motivation and management, stakeholder involvement and participation, and politics and culture. The importance and relevance of these critical constraint-minimization factors are described earlier in the research findings section.

6. CONCLUSION AND IMPLICATIONS

Case studies were conducted in 26 health care organizations that had adopted and implemented B2B e-commerce systems. Several major B2B e-commerce adoption and implementation critical constraint-minimization factors (industry, organizational supply chain, knowledge and resources, and human resources) were identified and discussed for the health care organizations. The findings have the potential to assist health care organizations in understanding their B2B e-commerce adoption and implementation critical constraint-minimization factors. One key contribution of the research is the development of the B2B E-Commerce Critical Constraint-minimization Factors Framework for health care organizations. The framework suggests that the five main critical constraint-minimization factors should be considered by health care organizations in the process of overcoming their valuation and conversion constraints. Paying close attention to these critical constraint-minimization factors will enable health care organizations to reap benefits from their B2B e-commerce investments.

The framework proposed for health care organizations in this paper should form part of an overall organizational strategy to guide health care

organizations toward a balanced approach to manage their IT/B2B e-commerce investments adoption and implementation processes. The framework highlights a cycle of continuous improvement which a health care organization should make an effort to achieve. From a practical standpoint, understanding the reactions of their stakeholders toward the newly acquired B2B e-commerce systems and their subsequent behavior can help health care organizations devise appropriate intervention strategies and programs to maximize their use and their effects on the organizations. For example, when a B2B e-commerce system is being developed, the health care organizations should place more emphasis on participation from the key stakeholders, as well as communication among these stakeholders, system developers, and the management to facilitate the successful adoption and implementation of the system, as well as knowledge sharing.

This is important, given that most health care firms, from our own observation, still pay little attention to the effective utilization of any IT, including B2B e-commerce. According to Davidson and Heineke,¹² stakes are too high to be content with gradual diffusion of the health care IT, and therefore, deliberate steps must be identified to achieve desirable outcomes and increase the pace of dissemination. One way of doing it is to identify the relevant opinion leaders who can serve to reduce the uncertainty of others in adopting new IT resources. Finally, despite large investments in B2B e-commerce over many years, it has been difficult for health care organizations to determine where benefits have occurred, if indeed there have been any. Little work has been published regarding adoption and implementation of B2B e-commerce in the health care industry, and hence there still is a lot to be learned in the area.

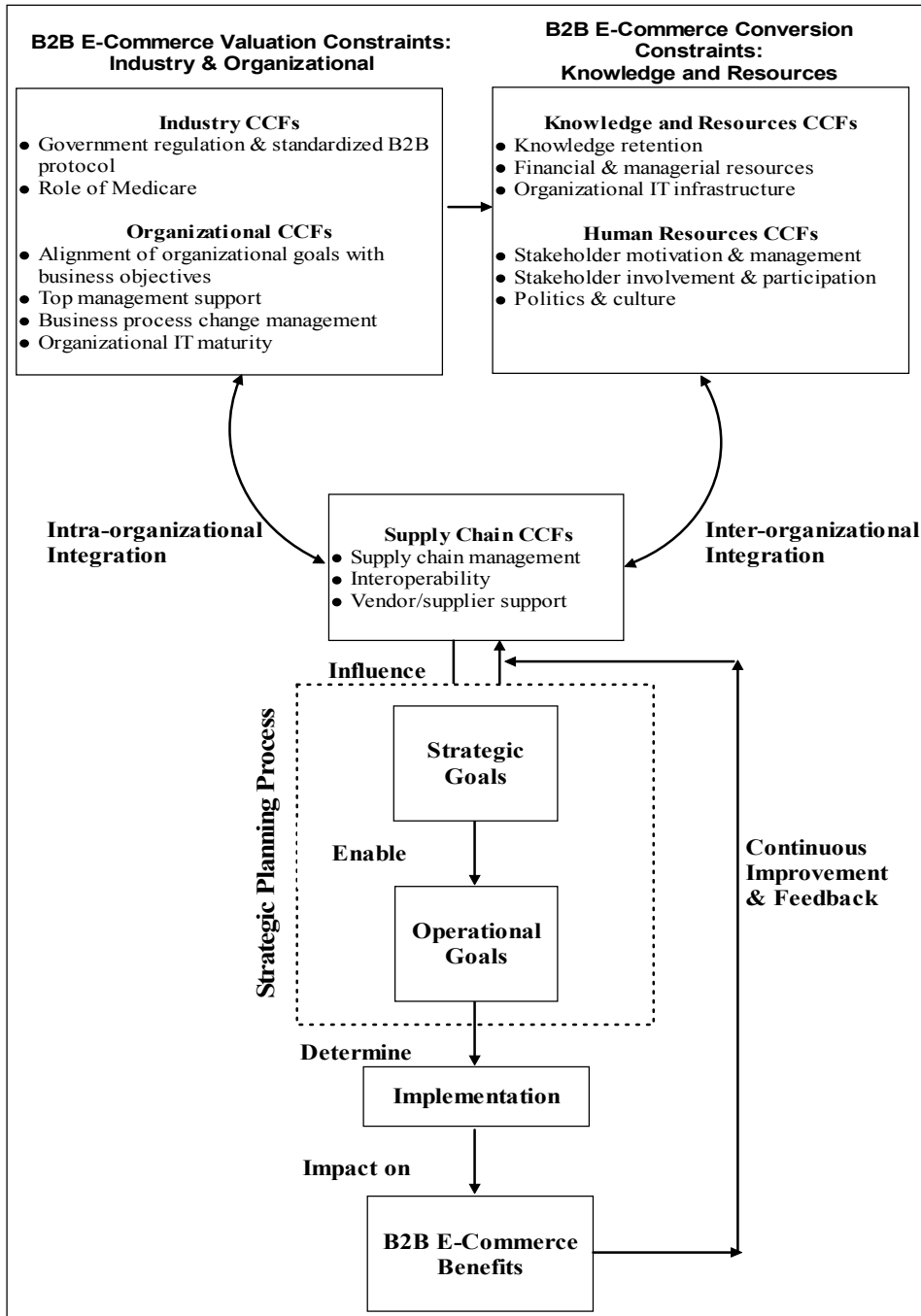


Figure 2: The B2B E-Commerce Critical Constraint-minimization Factors Framework for Health care Organizations

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