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An empirical assessment of the antecedents of electronic-business implementation and the resulting organizational performance

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Abstract

Purpose – The purpose of this paper is to propose and empirically test a unified framework that captures the antecedents of e-business implementation, that is; organizational factors which is decomposed into organizational capabilities (training availability, technical expertise, knowledge level), knowledge management capabilities (knowledge acquisition, application, and sharing), adhocracy culture, and top management support, e-business implementation, and organizational performance (efficiency, sales performance, customer satisfaction, relationship development).

Design/methodology/approach – Data from a survey of 258 top managers in Saudi Arabian enterprises were collected to empirically test the proposed research model. Additionally, the statistical techniques employed included a confirmatory factor analysis to examine the reliability and validity of the measurement model, and structural equation modeling using AMOS is utilized to test the hypotheses.

Findings – The findings of this study suggest that organizational factors influence e-business implementation. Moreover, e-business implementation affects organizational performance.

Research limitations/implications – This study did not investigate all organizational factors and knowledge management processes. Future research could assess the influence of additional factors such as technology and environment contexts on e-business implementation.

Practical implications – Owners/managers considering e-business implementation would be best to focus on internal (organizational) factors and their interaction within and beyond the organization, rather than focussing exclusively on technological considerations.

1. Introduction

Within only few years, e-business (electronic business) has considerably emerged as one of the most active research areas in the field of information systems (ISs) (Ghobakhloo and Tang, 2011). E-business is critical to technological innovation strategy, since it integrates internet-based systems with core business potentially affecting the whole business (Kim and Ramkaran, 2004). It enables firms to use the internet to search for and share information, enhance how they purchase or facilitate transactions, improve customer services and strengthen supplier integration (Zhu and Kraemer, 2002; Martin *et al.*, 2011). Hence, e-business can potentially transform a firm into a networked entity with seamless supply chains and value creation processes by helping to build and manage relationships with customers, suppliers, employees, and partners (Lucia-Palacios *et al.*, 2014).

A careful review of the literature indicated that there is a lack of empirical studies that examine the adoption of e-commerce by organizations in the Middle East (Al-Somali *et al.*, 2011). Furthermore, most of these previous studies have not analyzed how contingency factors such as organizational and environmental factors affect technology adoption and moderate the relationship between technology adoption and performance within the context of internet applications.

Part of the organizational factors are organizational capabilities which result from organizational learning culture and knowledge management accumulation within firms, and form what has been described as "absorptive capacity" (Cohen and Levinthal, 1990). Therefore, developing organizational learning and knowledge management strategies has been considered an effective and efficient means of successful IT implementation (Lin and Lee, 2005).

Although past studies tend to look at e-business adoption from the technological, environmental, and organizational factors, there is a lack of study on the impact of knowledge management on the adoption of e-business tools (Chong *et al.*, 2013). Furthermore, the barriers to change from traditional business operations to e-business no longer relates to technological prospect such as availability of suitable ISs; but relies on the appropriate management of business-related knowledge. Nonetheless, studies in the past supported the claims that knowledge management is important for technology innovation in an organization; there is a lack of empirical study on the influence of knowledge management practices on the adoption of e-business (Chong *et al.*, 2013). Therefore, empirical studies have seldom addressed organizational capabilities such as organizational learning capabilities and knowledge management capabilities influencing e-business contribution to organizational performance (Lin, 2013).

According to Senarathna *et al.* (2014), only a few studies focus on the effect of organizational culture on e-commerce adoption (Nickels *et al.*, 2008), despite the fact that several studies have shown that organization culture is an influential factor in determining e-commerce adoption. Nonetheless, no research has been found that directly examines how different types of organizational cultures would have an impact on the e-commerce implementation especially in a developing country such

as Saudi Arabia. While the literature suggests that organizational culture type is pertinent to the adoption of e-commerce, hitherto there is a lack of empirical research on the issue. However, Senarathna *et al.* (2014) found that adhocracy culture in particular influence the level of e-commerce adoption in SMEs in Sri Lanka.

Based on comprehensive review of the literature, few empirical studies conducted to examine the role of the top management support in the e-business implementation. However, recently, Al-Somali *et al.* (2011) found top management support as a key element for the successful adoption and implementation of e-commerce in Saudi Arabia.

Based on the above discussion, the first objective of this study is as follows: to identify a comprehensive set of determinants (particularly organizational factors) of e-business implementation, and posit arguments for learning capabilities and KM capabilities, top management support and adhocracy culture and to empirically examine the influence of these antecedents on e-business implementation.

Mixed results have been obtained about the consequences of e-business on performance. While some authors conclude that there is a positive and direct link between e-business and performance (Wu *et al.*, 2003; Zhu and Kraemer, 2005; Zhu *et al.*, 2004), others suggest that there is no significant direct effect. Although these studies analyze e-business implementation as a whole, little is known about its effect on performance in terms of intra- and inter-organizational business processes (Wu *et al.*, 2003; Zhu and Kraemer, 2005).

It has been found that e-business leads to changes in different business aspects such as corporate strategy, management, and marketing (Bordonaba-Juste *et al.*, 2012). However, what is its final impact on performance? Hence, the second objective of this paper is that the researchers like Lucia-Palacios *et al.* (2014) want to analyze the impact of e-business implementation (in terms of its two dimensions: internal integration and external diffusion) on performance. The research model differs from past studies in two aspects. First, most previous research, has analyzed e-business as a single construct so little attention has been paid to the consequences of each dimension of e-business on performance (Wu *et al.*, 2003). Second, the researchers include measures of non-financial performance variables (relationship development and customer satisfaction) as a result of e-business implementation.

In doing so, the researchers adopted and modified the conceptual framework proposed by Javalgi *et al.* (2004) to empirically examine the effects of organizational factors (learning capabilities, knowledge management capabilities, adhocracy culture, and top management support) on the implementation of e-business. Next, the researchers also empirically test the effects of the implementation of e-business innovations on organizational performance. To achieve this, the researchers examine Wu *et al.*'s (2003) four pillars of performance outcomes (efficiency, sales performance, customer satisfaction, and relationship development).

Figure 1 incorporates the above-mentioned constructs; e-business antecedents, e-business implementation, and organizational performance. Environmental factors such as external market pressure and government regulations and initiatives and technology factors could be investigated in the future research.

2. Research model and hypotheses
This study discusses the organizational factors constructs of the research model in terms of organizational learning capabilities, knowledge management capabilities, adhocracy culture, and top management support. The research model investigated in

Figure 1.
Research model
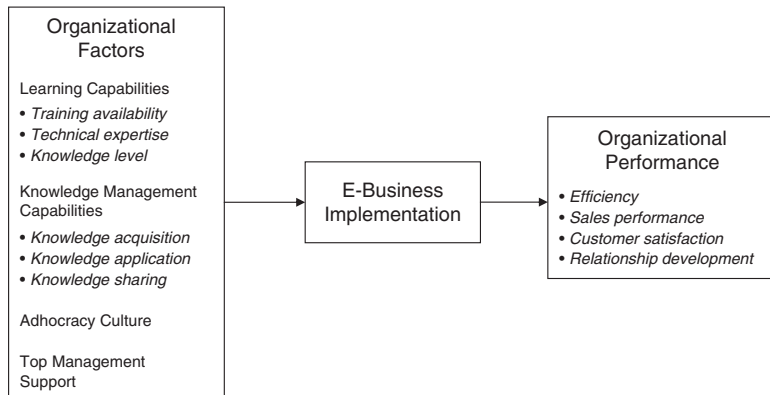
Sources: Adapted and modified from Javalgi *et al*. (2004) and Wu *et al*. (2003)

this study is shown in Figure 1, which hypothesized that each one of these constructs affects e-business implementation which, in turn, affects organizational performance. Each construct involved in the research model and hypotheses are discussed below.

2.1 Organizational factors influencing the implementation of e-business

Successfully adopting IT depends on user acceptance and actual usage of the system (DeLone and McLean, 2003). E-business implementation refers to the application of internet-based computing and communications to manage intra and inter-organizational business processes. It is not only rapidly changing the way that companies buy, sell, and deal with customers, but also becoming a more integral part of its business strategies (Abu-Musa, 2004).

Prior to examining the consequences associated with e-business implementation, it is necessary to explore the factors that have contributed to the move toward e-business. Javalgi *et al*. (2004) made a similar point, arguing that it is imperative to gain a better understanding of the structural factors underlying the diffusion of e-services. Moreover, Ghobakhloo *et al*. (2011) demonstrated that in the adoption of EC, internal (organizational) readiness is significantly influential. The researchers stated that organizational EC readiness can be defined as availability of financial and technological resources, the top management enthusiasm to adopt EC, e-commerce technology infrastructure, compatibility of the firm's EC, and culture and values. However, since e-business can be implemented only in few dimensions of contemporary firms, many of the most innovative internet players are integrating their virtual and physical operations-such as Office Depot and Office Depot.com, KB Toys and KBkids.com, Rite Aid and Drugstore.com – and as a result gaining several advantages (Gulati and Garino, 2000).

Despite a substantial literature on e-commerce and e-business models and frameworks, there is a lack of useful guidelines on how this work can be implemented (Basu and Muylle, 2011). Moreover, there is a paucity of empirical studies that examine the adoption of e-commerce by SMEs in the Middle East (Al-Somali *et al*., 2011). Accordingly, the researchers develop, and subsequently test, a theoretical rationale regarding the effects of the organizational factors incorporated in the research model below and identified as driving e-business implementation.

Organizational factors incorporated in this study are organizational capabilities, adhocracy culture, and top management support. Organizational capabilities construct is composed of organizational learning capabilities (training availability, technical expertise, and knowledge level) and knowledge management capabilities (knowledge acquisition, knowledge application, and knowledge sharing). The following will be a brief discussion of them.

Organizational capabilities are playing important roles in successful customer relationship management implementation (Raman *et al.*, 2006). Organizational capabilities such as IT capability, strategic flexibility, and trust building capability are critical for superior organizational performance in e-commerce (Saini and Johnson, 2005). Knowledge, learning, and social relationships are enablers of organizational capabilities renewal (Wang *et al.*, 2012). Hence, learning capabilities and knowledge management capabilities are incorporated into the research model. Each construct involved in the research model and hypotheses are discussed below.

2.1.1 Learning capabilities. E-business, more than just establishing an internet presence or conducting e-commerce transactions, concerns redefining old business models and maximizing business value (Turban *et al.*, 2012). Evidently, an organization needs to understand a new technology's potential benefits before it can adopt the technology to improve performance (Zhu *et al.*, 2006). Hence, organizations that are open to external input are more likely to develop information sources not only for the availability of new technologies but also for their effective usage (Theodosiou and Katsikea, 2012). For instance, the learning organizations can make use of e-business technologies to provide their customers with important information such as solutions to particular problems, and respond to their questions or requests in an efficient and effective manner (Voola *et al.*, 2012). Therefore, employees and organizations as a whole have to learn how to apply the technology effectively while they are implementing the e-business (Purvis *et al.*, 2001).

A firm with high organizational learning capabilities has been identified as a necessary and essential component of its new technical innovation (Ke and Wei, 2006). Successful implementation of a complex technology requires adjustments in business processes, also requires that the firm modifies and masters the technical aspects of the technology (Attewell, 1992). Training availability and high level of technical expertise have been identified as necessary and essential components that impact the adoption of new technologies (Robey *et al.*, 2002).

2.1.1.1 Training availability. Training availability refers to the quantity of education available to technology adopters or users. Garavan *et al.* (1997) identify training as a planned and systematic effort to modify or develop knowledge, skills, and attitudes through learning experiences, to achieve effective performance in an activity or a range of activities. Previous research showed that education and training are important factors for technology implementation (Bradford and Florin, 2003). Thus, utilizing e-business necessitates investment in IT infrastructure and employee training. Evidently, provision of sufficient training helps companies to obtain the required IT human resources and develop them into superior e-business functionalities to realize the potential e-business value (Zhu and Kraemer, 2005). Therefore, organizations that devote significant training resources to IT are more likely to implement e-business and realize its value successfully.

2.1.1.2 Technical expertise. Technical expertise describes firm level of specialized technical expertise. It refers to the skills to create internet-enabled capabilities, such as

front-office services and back-office systems integration, which determine a firm's overall e-business success (Zhu and Kraemer, 2002). E-business can become an integral part of the value chain only if firms have infrastructures and technical skills (Oliveira and Martins, 2010). The more knowledge an organization has about technological innovations, the more likely it will be to adopt technological innovations (Ifinedo, 2011). Empirical evidence suggests that IS such as e-business is more likely to succeed in organizations where general IT skills and relevant in-house IT expertise exist (Ghobakhloo and Tang, 2011). Firms that have e-business specialists are more likely to adopt IT innovations because they could develop their own website or use specific technologies for a better management of the value chain (Bordonaba-Juste et al., 2012). For example, several ERP studies (e.g. Lee and Lee, 2004) suggest that the knowledge base or expertise of the in-house IT professionals must be adequate to ensure success with ERP implementation. Whether e-business can create value in terms of resources depends heavily on level of expertise in implementing internet technologies, and more importantly, on the ability to use internet technologies successfully (Zhu, 2004). Firms with high levels of technical expertise can be expected to master the technical aspects of e-business and achieve e-business contribution to firm performance more completely than firms with lower levels of technical expertise.

2.1.1.3 Knowledge level. Knowledge level refers to the familiarity of firm employee with technology. If firm's employees are knowledgeable regarding a new technology, they are likely to be better capable of dealing with technology adoption (Ghobakhloo and Tang, 2011). Moreover, they are likely to be able to interact with their customers and business partners and conduct business over the internet (Zhu and Kraemer, 2002). Additionally, McGowan and Madey (1998) found that the level of EDI knowledge positively influences the extent of EDI implementation. Finally, e-business know-how provides the business and management skills to use e-business successfully (Gibbs and Kraemer, 2004). Consequently, a firm with employees who understand e-business is likely to realize the most success in e-business implementation.

Based on the above discussion, this study introduces the first hypothesis to test the relationship between organizational learning capabilities and firm performance:

H1. Learning capabilities have a positive structural effect on e-business implementation.

In investigating the structural effect of antecedents and consequence of e-business implementation, it is also relevant to determine the structural loadings of each variable. Hence, the researchers will examine the contribution of each variable of the organizational learning capabilities. Thus, the following sub-hypotheses are formulated:

H1a. Training availability has a positive structural loading on learning capabilities.

H1b. Technical expertise has a positive structural loading on learning capabilities.

H1c. Knowledge level has a positive structural loading on learning capabilities.

2.1.2 Knowledge management capabilities. E-business widens the breadth of solutions availability to consumers in almost every industry in the sense that purchasers can now compare and contrast the offerings of providers worldwide. Consequently, there arise several e-business issues which in turn require firms to generate distinct knowledge in order to face the challenges and decision in relation to e-business adoption in supply chain activities (Chong et al., 2014).

The main elements of technological capabilities development consist of knowledge transfer, knowledge sharing, and practical application of from the technological perception (Ho and Kuo, 2013).

Hence, knowledge management capabilities focus on the importance of setup of knowledge repositories and building a knowledge sharing environment for increased awareness and diffusion of e-business (Lin, 2013). For example, absorptive capacity has been shown to be a critical component in understanding IT management practice and IT use, as well as enhancing the ability to effectively implement new IT (Harrington and Guimaraes, 2005). Absorptive capacity represents a set of organizational routines and processes involved in acquiring, applying, and sharing knowledge to produce dynamic organizational capabilities. In this context, Yeh *et al.* (2012) suggested that knowledge acquisition and knowledge dissemination significantly influence e-business implementation success. Theodosiou and Katsikea (2012) concluded that the intensity of e-business adoption is greater in organizations that encourage the acquisition and distribution of knowledge than in those that do not. Finally, Chong *et al.* (2014) showed that knowledge management processes such as knowledge acquisition and knowledge application are significant in affecting Malaysian SMEs' decision to adopt e-business in their supply chain. Therefore, efficient knowledge management processes, such as knowledge acquisition, application, and sharing, are important for e-business implementation success.

2.1.2.1 Knowledge acquisition. Knowledge acquisition is defined as the business processes that use existing knowledge and capture new knowledge. Firms with high ability to acquire valuable knowledge are more likely to implement e-business and realize its benefits (Lin, 2008). Therefore, e-business development requires concerted effort and experience in recognizing and capturing new knowledge (Etemad, 2004). E-business needs the creation and control of both internal and external routines for both current and future operations (Argote *et al.*, 2003). This entails identifying knowledge in the external environment and transferring it so that it can be used subsequently within the organization. Generally, organizations have to acquire know-what, know-how, and know-why to assimilate any complex technology successfully (Attewell, 1992). Know-what is factual knowledge about a technological innovation and its features, know-how is knowledge about how to apply a technological innovation in an organization, and know-why is knowledge required to meaningfully measure the cost, benefits, and risks of applying a technological innovation (Ravichandran, 2005). E-business infrastructure involves not only e-commerce initiatives but also is driven by acquisition knowledge and skills (Moodley, 2003). Finally, Chong *et al.* (2012) found a linkage between knowledge acquisition and the adoption of supply chain technology such as collaborative commerce. Hence, relationships between knowledge acquisitions capabilities are expected to be positively related to e-business implementation.

2.1.2.2 Knowledge application. Knowledge application includes the absorption of the knowledge generated in the acquisition and sharing phases, so it could be applied to what has already been learnt in those phases to businesses and its own activities. In this regard, absorptive capacity is defined as a firm's ability to recognize the value of new, external knowledge, assimilate it, and apply it to commercial ends (Cohen and Levinthal, 1990). In this study, knowledge application is defined as the business processes through which effective storage and retrieval mechanisms enable a firm to access knowledge easily. Based on Chong *et al.* (2007) research, analytical results revealed firms that are more tempted to implement e-business systems are firms that

continuous improve their organizational knowledge application. Consequently, firms that are more likely to adopt new technology are those that continuously improve their organizational application of knowledge, inclusive of the internet-enabled business opportunities (Chong *et al.*, 2014). Therefore, firms that stimulate and improve organizational application of knowledge are more likely to achieve successful e-business implementation.

2.1.2.3 *Knowledge sharing*. E-business is about creating an electronic internet-based platform to allow customers, suppliers, and employees to collaborate with one another through the sharing of data, information, and knowledge (Plessis and Boon, 2004). Knowledge sharing is defined as the business processes that distribute knowledge among all individuals participating in process activities. In this process, the distribution of the knowledge around the company facilitates the flow of knowledge between the groups, maybe in different business units, or in different geographical locations, or in different organizations where supply chain integrating is taken place (Plessis and Boon, 2004). Chan *et al.* (2012) in studying the diffusion of e-collaboration tools in the supply chain found that the sharing of information between supply chain members can result in long-term routinization of e-collaboration tools. However, a problem associated with e-business is the lack of a common language to help employees efficiently execute transactions over the internet (Rodgers *et al.*, 2002). Moreover, the literature on the organizational effectiveness of IS emphasizes that a knowledge sharing culture is the main organizational condition for successful knowledge management and exploitation (Damodaran and Olpher, 2000). Therefore, knowledge sharing is important in innovation processes in the e-business context (Liebowitz, 2002). According to Lin and Lee (2005), one of the factors to improve the e-business performance is through knowledge sharing. Hence, knowledge sharing capabilities are expected to be positively associated with e-business implementation. Based on the above discussion, the following hypothesis is presented:

H2. Knowledge management capabilities have a positive structural effect on e-business implementation.

Since it is pertinent to determine the structural loadings of each variable, the researchers will examine the contribution of each of the knowledge management capabilities variables. Thus, the following sub-hypotheses are formulated:

H2a. Training availability has a positive structural loading on knowledge management capabilities.

H2b. Technical expertise has a positive structural loading on knowledge management capabilities.

H2c. Knowledge level has a positive structural loading on knowledge management capabilities.

2.1.3 Organizational culture. Although organizational culture has received heightened research attention, very little research has empirically examined the relationship between organizational culture and e-business adoption (Theodosiou and Katsikea, 2012). However, Annamalai and Ramayah (2013) found that the organizational culture acts as the moderator toward the implementation success of ERP projects in India.

A thorough review of the characteristics of the four cultural types of Deshpande *et al.*'s (1993), indicated that adhocracy culture is the most relevant for explaining the intensity of e-business adoption. Adhocracy culture values flexibility and competitive

position in the marketplace and emphasizes entrepreneurship, creativity, and adaptability (Theodosiou and Katsikea, 2012). Moreover, Senarathna *et al.* (2014) stated that adhocracy culture implies that the company is a dynamic, entrepreneurial, and risk-taking workplace which encourages experimentation and innovation and enables the early stage adoption of e-commerce. Thus, adhocracy culture fosters innovation and risk taking. Additionally, Moon and Norris (2005) observed that organizational support for risk taking and experimentation, and incentives for new ideas hastens the process of adoption of new IT and Mayer-Guell (2001) argued that e-commerce will not reach its full potential if the organization's staff cannot adapt to the changes in process caused by e-commerce. Consequently, cultivating an organizational culture that supports the implementation of technological advances is an important consideration for firms when implementing e-business applications (Theodosiou and Katsikea, 2012). Finally, Senarathna *et al.* (2014) found that those firms with adhocracy cultural characteristics are more likely to adopt e-commerce. Therefore, the following hypothesis is presented:

   H3. An organizational culture open to e-business (adhocracy culture) is positively associated with e-business implementation.

2.1.4 Top management support. Top management support refers to the involvement, enthusiasm, motivation, and encouragement provided by management toward the acceptance of IS innovations, including e-business. Top management support is an important aspect of organizational readiness and leads to higher IT adoption (Lauren and Igbaria, 2001). Moreover, top management support is essential for defining the role of IT in the organization and it also is required for IT planning (Payton, 2000). Top managers have the authority to allocate the required financial and other resources for the IS projects (Theodosiou and Katsikea, 2012) and it can modify prevailing structures, introduce complementary structures to facilitate technology use, and reinforce norms that value the use of the technology (Hossain *et al.*, 2011). Hence, top management support is expected to be significant in the implementation of e-business initiatives. Therefore, the following hypothesis is presented:

   H4. Top management support is positively associated with e-business implementation.

2.2 E-business and organizational performance
Today, companies increasingly join networks of suppliers, customers, and even competitors to generate e-business value. Sometimes, e-business payoff to a firm is dependent upon investments made by customer or supplier organizations. In other words, an organization could be involved in e-business without making an investment as long as it is part of the strategy to create strategic advantage resulting from linking its IT to other firms using, for example, the world wide web (Kohli *et al.*, 2003). A practical example is Cisco Systems, which believes that investments in IT help companies reduce costs, improve productivity and profitability, and increase customer satisfaction. However, according to Effah (2014), one phenomenal aspect of the internet revolution in the developed world was the dot-com boom and bust, which occurred from the late 1990s to early 2000s. This episode according to Thornton and Marche (2003) involved sudden rise and widespread fall of online firms across the developed world.

Given the scale of investment in e-business and the claims of its ability to radically transform business processes, it is surprising to discover that a little research seems to have been published on the topic of performance measurement in e-business (Barnes and Hinton, 2012). The need for such research has certainly been recognized. Amoroso (2001) found a set of corporate performance factors that small organizations need to consider and eventually quantify with respect to e-business. Corporate performance factors found in previous research were: customer-focussed factors; corporate-financial factors; and business process factors.

Customer-focussed factors include those attributes of success that enhance a customer's attraction to conduct e-business with the organization, a customer's retention to conduct business in the future, and a customer's satisfaction with current e-business products and services. Corporate-financial factors include those factors related to the incremental revenue growth provided by e-business applications, lower cost of sales to conduct business on the internet, a tighter of cost control, and potentially increased market share due to e-business. Business process factors are related to streamlining organizational processes and decreased cycle time (Amoroso, 2001). Furthermore, e-business innovation influences customer relationship performance and sales growth (Rapp *et al.*, 2008). Hence, improvements in organizational performance can be achieved when IT resources are implemented within the appropriate business processes and improvements in these processes are realized (Sila and Dobni, 2012).

According to Garrity and Sanders (1998), EC application success can be measured under a three-level analysis framework. At the organization level of the framework, EC application success is measured using metrics related to organizational performance, such as, how an application contributes to profitability. At the process or function level, EC application is measured in terms of efficient use. At the individual level of analysis, it can be measured using the customers' perception of utility and satisfaction.

According to Lucia-Palacios *et al.* (2014), e-business implementation has an impact on performance across the entire span of the organization's structure (from the procurement department to the field sales force) and across a range of its business processes (from internal administration to supply chain coordination). Therefore, based on the preceding discussion, this study adopts the four pillars used by Wu *et al.* (2003) to measure e-business impact on business performance. Thus, the following will be a brief discussion of efficiency, sales performance, customer satisfaction, and relationship development.

2.2.1 Efficiency. E-business can improve business efficiency and staff productivity within organizations when complementary resources exist (Chircu and Kauffman, 2000). According to Abebe (2014), studies show that e-commerce adoption affects the overall performance of SMEs primarily by providing a more efficient and streamlined internal business processes that in turn translate into significant cost-saving and profitability. Hence, efficiency refers to increasing employee productivity, by reducing or streamlining internal processes (Zhu *et al.*, 2004). E-business can be used to increase efficiency and reduce costs for both buyers and suppliers (Hertwig, 2012). For instance, transaction costs include the searching, negotiating, settlement, monitoring, and mandatory costs that incur when exchange between two parties has taken place (Lee, 2001). Moreover, efficiency enhancement can be realized by removing barriers to information flow via connecting previously unconnected parties and reducing information asymmetries through the availability of more accurate and timely information. The added availability of information can, in turn, reduce future sales

transaction times, allow for more reliable and responsive decision making, and reduce the likelihood of mistakes (Zhu *et al.*, 2004). Indeed, efficiency can continuously support superior organizational performance, if it is used for expanding and deepening interorganizational interdependence and coordination (Wu *et al.*, 2011).

2.2.2 Sales performance. Information flows facilitated by e-business can help increase the sales volume by reaching customers directly and promptly whenever a new product is introduced and by tapping into markets that were hitherto inaccessible on account of distribution or other infrastructural constraints (Sun, 2012). Furthermore, online order taking functionalities can improve sales performance by allowing customers to easily access offered products and services in an intermediary-free environment. Customers can track and inquire their orders electronically and can shop without the conventional restraints of time and/or place associated with non-virtual market settings.

E-business strategy embodying customer service would not only contribute to higher sales growth but also may result in cost savings. Evidently, e-business strategy to improve purchasing management would also improve the company's profitability as a result of the cost savings associated with more efficient supplier search, purchase transaction, and inventory management processes (Fellenstein and Wood, 2000).

2.2.3 Customer satisfaction. Both researchers and practitioners give more weightage to customer satisfaction, because, a high degree of customer satisfaction can lead to customer retention and increased market share (Subramanian *et al.*, 2014). For instance, customer satisfaction is particularly important to the success of online stores as it is posited as a major driver of post-purchase phenomena, such as repurchase intentions (Fang *et al.*, 2011). Moreover, satisfied customers are more likely to use repeatedly the same services and thus, exhibit loyalty (Kirakosyan and Danaiata, 2014). E-business can enhance customer satisfaction by enabling firms to better respond to customer demand (Wu *et al.*, 2012). According to Liebana-Cabanillas *et al.* (2013), within the context of e-banking Mattila (2001) conceded that customer satisfaction is a key to success in internet banking and banks use different media to customize products and service to fit customers' needs. Using e-business applications, firms can provide more information about products and deliver better customer service online. Furthermore, interested consumers who were not a part of the business unit's active customer set can invoke a relationship with the unit on their own accord.

Marketers can benefit from creating and using network effects to build a customer base. For instance, personalization is a general strategy followed by companies to increase customer satisfaction. New technologies are instruments or interface systems that allow firms to get information from customers, to offer personalized products and to implement one-to-one marketing (Bordonaba-Juste *et al.*, 2012).

The application of e-business initiatives to internal administration tasks can affect customer satisfaction in multiple ways (Wu *et al.*, 2003): first, such application has the potential to indirectly influence customer satisfaction by providing employees with a comfortable, supportive, and efficient working environment to better deal with customer needs. Additionally, a major task for any business in information-intensive environments is the collection and coordination of various pieces of information related to each customer. Such initiatives related to the customer interface can provide customers with the reassuring signal that the business is indeed at the cutting edge of technology and will likely lead to more satisfied customers.

2.2.4 Relationship development. Several studies suggested that IT adoption might help firms to increase, improve, and manage successful relationships and alliances with their customers, suppliers, employees, and partners (Lucia-Palacios *et al.*, 2014). Online communications can help a business increase the intensity of, and enrich the quality of, its interactions with partners and suppliers. By developing customer awareness for the online firm and providing reliable service and support, firms can cultivate positive relationships with their customers (Coyles and Gokey, 2005). Positive relationships between the firm and their customers increase the customer's repurchase intention (Sigala, 2007). Furthermore, if the relationship is enhanced technologically, this would provide a relatively high level of mutual knowledge, technical efficiency, less problems, and less delay in the interaction (Ritter and Walter, 2006). For instance, when the business unit's systems and online information repositories are integrated with those of its partners and suppliers, these parties are likely to exhibit a greater commitment to their mutual relationships (Wu *et al.*, 2003). Important product planning and inventory information can be shared on a regular, or even real-time, basis, leading to implementing accounting/financial management practices that enable quicker, more transparent transactions and more productivity. Therefore, companies can take advantages of e-business attributes and of some ICTs to build long-term relationships based on loyalty (Lee, 2001).

Based on the above discussion, in order to have an in-depth understanding of the correlation between e-business implementation and firm performance, the current study introduced the following hypothesis:

H5. E-business implementation has a positive structural effect on organizational performance.

3. Research methodology
3.1 Sample and data collection
Study population comprised IS executives in Saudi organizations. Heijden (2001) use IS executives as informants because of their ability to answer questions related to e-business implementation. A draft questionnaire was pilot tested by two MIS professors to ensure that the content and wording were free of problems. Then, 15 IS executives examined the revised questionnaire. They were given the questionnaire and asked to examine it for meaningfulness, relevance, and clarity (the last version of the questionnaire is presented in the Appendix). The final questionnaires were mailed to 475 IS executives (in the years 2013 and 2014), the researchers followed Frohlich's (2002) suggestion to improve the response rate by calling all 475 respondents before sending out the questionnaire. The questionnaire was then sent out back in two phases. In the first phase, 197 responses were received. Phone calls were then made to targeted respondents who did not respond. Consequently, the researchers received 103 additional responses in the second phase. In total, 42 returned questionnaires were discarded due to incomplete responses. In total, 258 usable responses represent a response rate of 54.3 percent obtained which is close to the recommended number for empirical studies in IS.

3.2 Non-response bias
A comparative analysis between the early and late respondents was conducted to assess non-response bias. The test (mean score) indicated no significant differences between the two groups based on study major variables, a result of analysis of variance ($p > 0.05$) suggests no evidence of non-response bias in the data (Perols *et al.*, 2013).

3.3 Scale development-measures
The development of the measures used in this study began with an extensive review of
the relevant literature. All variables were measured with Likert scales multi-item, most
of which were adapted from previous research. Likert scale items were anchored at 1
(strongly disagree) to 5 (strongly agree).

Organizational learning capabilities and knowledge management capabilities
measures adapted from Lee *et al.* (2007). Organizational learning capability construct
was measured by measuring its three variables: training availability and technical
expertise were measured by using two items for each one; while knowledge level was
measured by utilizing three items.

Knowledge management capabilities construct was also measured by measuring its
three variables; knowledge acquisition and knowledge sharing were measured by
using four items for each; while knowledge application was measured by utilizing five
items. Adhocracy culture was measured via five items adapted and modified from
Ifinedo (2007). Top management support was measured via six items adapted from
Wu *et al.* (2003). E-business implementation was measured via four items adapted and
modified from Srinivasan *et al.* (2002). Organizational performance construct was
measured via 15 items adapted from Wu *et al.* (2003). Efficiency and sales performance
were measured by utilizing five items for each one; customer satisfaction and
relationship development were measured by three items and two items, respectively.

3.4 Evaluation of model fit
Table I shows the results of the evaluation of model's fitness. The χ^2/df value of 2.874
which is below the threshold level of significance 0.05, which suggests the differences
in predicted and actual matrices were insignificant and demonstrates strong indication
of the model's. Also values of the two indices adjusted goodness-of-fit index (AGFI) and
goodness-of-fit index (GFI) should be greater than 0.9 and comparative fit index (CFI)
(0.983) value is considered close to the recommended values. Furthermore, the smaller
the root-mean-square residual (RMR) is, the better the fit of the model. A value of less
than 0.05 indicates a close fit. Root mean square error of approximation (RMEA) shows
that the model meets a reasonable error of approximation with a cut-off of 0.08.

4. Results
4.1 Descriptive statistics
Table II shows the means, standard deviations, and correlations of all variables. There
are two implications regarding Table II: first: there is a positive relationship between
all the study variables and e-business implementation ($r = 0.145$ to $r = 0.635$), second
there is a strong relationship between e-business implementation and organization

Fit statistics	Conceptual model	Criterion
χ^2/df	2.874	$\leqslant 3$
GFI	0.934	> 0.9
AGFI	0.901	> 0.9
CFI	0.984	> 0.95
RMR	0.044	< 0.05
RMSEA	0.075	< 0.08
Source: Hair *et al.* (2006)		

Table I.
Evaluation of
model fit

Table II.
Mean, standard deviation, Cronbach's α correlation between antecedents and consequences of e-business implementation

Variable	Mean	SD	α	1	2	3	4	5	6	7	8	11	12	13	14
Training availability	3.51	1.013	0.722												
Technical expertise	3.66	0.849	0.751	0.382**											
Knowledge level	3.44	0.959	0.761	0.419**	0.441**										
Knowledge application	3.19	1.135	0.789	0.027	0.064	0.152*									
Knowledge acquisition	2.97	1.153	0.811	0.109	0.064	0.275**	0.256**								
Knowledge sharing	3.57	0.932	0.771	0.204**	0.254**	0.193**	0.233**	0.242**							
Culture	3.58	0.978	0.881	0.262**	0.416**	0.381**	0.144*	0.180**	0.519**						
Top management support	3.49	0.865	0.873	0.141*	0.208**	0.269**	0.162**	0.064	0.384**	0.400**					
E-business implementation	3.48	0.974	0.895	0.361**	0.398**	0.369**	0.246**	0.145*	0.507**	0.635**	0.539**				
Efficiency	3.43	0.981	0.817	0.295**	0.352**	0.218**	0.262**	0.018	0.415**	0.445**	0.354**	0.573**			
Customer satisfaction	3.47	0.926	0.807	0.270**	0.313**	0.175**	0.140*	0.100	0.410**	0.459**	0.336**	0.507**	0.656**		
Relationship development	3.43	0.963	0.762	0.294**	0.399**	0.175**	0.049	0.008	0.293**	0.385**	0.250**	0.393**	0.551**	0.558**	
Sales performance	3.42	1.020	0.749	0.281**	0.387**	0.294**	0.121*	0.045	0.326**	0.484**	0.306**	0.528**	0.639**	0.659**	0.628**

Notes: *Sig. < 0.05; ** < 0.01

performance (efficiency $r = 0.573$, customer satisfaction $r = 0.507$, relationship development $r = 0.393$, and sales performance $r = 0.528$).

4.2 Results of the hypotheses testing

We tested the proposed model by performing structural equation modeling using AMOS 16.0. Figure 2 presents the results of the structural model tested and Table III provides a summary of hypothesis test results for the structural model.

4.2.1 Organizational factors and e-business implementation. The results of analysis showed there is a positive significant impact of organizational learning on e-business implementation supporting *H1* ($\beta = 0.270$, < 0.05). They also indicate that organizational learning construct is robust since all three observed variables are strongly loaded to the latent variable. Therefore, the researchers accept *H1a-H1c*. Adhocracy culture is found to significantly influence e-business implementation. Thus, the proposed positive effect (*H2*) ($\beta = 0.225$, $p < 0.001$) is supported. Top management support is found to significantly affect e-business implementation ($\beta = 0.239$, $p < 0.05$). Finally, as predicted, knowledge management capabilities have positive effects on e-business implementation where ($\beta = 0.262$, $p < 0.001$). The results also indicate that knowledge management capabilities construct is robust since all three observed variables are strongly loaded to the latent variable, hence, the researchers accept *H4a*, *H4b*, and *H4c*.

In addition, each of the organizational factors; learning capabilities, knowledge management capabilities, adhocracy culture and top management support explained a variance of 18 percent in e-business implementation.

4.2.2 E-business implementation and organizational performance. E-business implementation do substantially and positively relate to firm performance ($\beta = 0.646$, $p < 0.05$). Therefore, *H5* is supported, since e-business implementation has explained a total variance of 41.7 percent in organizational performance.
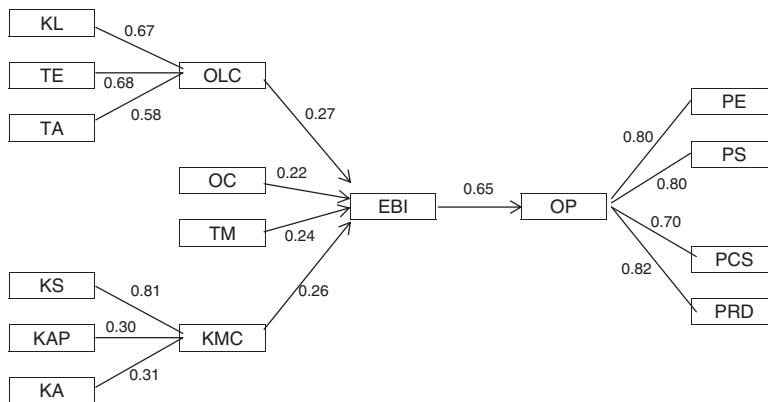
Notes: OLC, organizational learning capabilities; TA, training availability; TE, technical expertise; KL, knowledge level; KMC, knowledge management capabilities; KA, knowledge acquisition; KAP, knowledge application; KS, knowledge sharing; OC, organizational (adhocracy) culture; TM, top management support; EBI, e-business implementation; OP, organizational performance; PE, efficiency; SP, sales performance; PCS, customer satisfaction; PRD, relationship development

Relation		Coefficients	CR	Support/non-support
Path				
OL	EBI	0.270	3.636	Support
OL	TA	0.583	A	Support
OL	TE	0.675	7.015	Support
OL	KL	0.670	6.998	Support
KMC	EBI	0.262	2.461	Support
KMC	KS	0.813	3.964	Support
KMC	KA	0.313	6.998	Support
KMC	KSP	0.298	3.138	Support
OC	EBI	0.225	2.849	Support
TMS	EBI	0.239	4.416	Support
EBI	OP	0.646	10.673	Support
PE	OP	0.804	A	Support
PCS	OP	0.705	11.676	Support
PRD	OP	0.825	14.028	Support
PSP	OP	0.801	13.597	Support
Explained variance proportion R^2 of EBI			0.592	
Explained variance proportion R^2 of organizational performance			0.417	

Notes: Critical ratio (CR) 1.96; using a significant level of 0.05, critical ratios that exceed 1.96 would be considered significant. A: the parameter compared by others is set as 1; therefore, there is no CR. It is determined as significant 3. The coefficients are standardized value

Table III.
Path analysis for
the constructs
of the study

5. Discussion and implications

5.1 Discussion

E-business implementation is a major undertaking that transforms existing business models, organizational structures, and processes as well as inter-firm relationships with customers, suppliers, and other business partners (Chatterjee *et al.*, 2002). Understanding the factors that facilitate e-business implementation and providing clear evidence regarding its impact on operational efficiency, competitive agility, and organizational performance are critically important (Zhu *et al.*, 2006). Therefore, this study contributes to the existing literature by developing and empirically testing an integrative model of the antecedents and performance consequences of e-business implementation.

The findings provide further support for the strategic role of organizational learning in contemporary organizations by indicating a significant, positive relationship between organizational learning capabilities (training availability, technical expertise, and knowledge level) and e-business implementation. Training could be an alternative that might help the organization to create and develop an e-business culture. Because of the inherent complexity of e-business systems, training methods must potentially enable employees to scale initial hurdles to acceptance and usage, realizing more from e-business (Lee *et al.*, 2007). Hence, organizations that provide e-business training are more likely to realize the potential e-business contribution to organization performance.

Organizations with strong technical expertise and e-business knowledge are most likely to realize e-business implementation success. According to Lin and Lee (2005), organizations that afford to hire e-business specialists and maintain significant technical expertise are better positioned than other organizations to facilitate value creation in e-business. Specialized employees know the importance and benefits of

conducting e-business, so they are less reluctant to implement the technologies and to conduct online business processes. Furthermore, organizations that increase their knowledge of e-business are better able than other organizations to use e-business (Lee *et al.*, 2007). Hence, adequate technical and e-business knowledge is a necessary first step toward e-business implementation.

Furthermore, the results of this study stress the paramount role of knowledge management processes in contemporary organizations by indicating a significant, positive relationship between knowledge management capabilities (knowledge acquisition, application, and sharing) and e-business implementation. Knowledge accumulation enables employees to both use existing knowledge and create new knowledge, both of which are crucial for e-business implementation (Lin and Lee, 2005). According to Lee *et al.* (2007), knowledge sharing enables employees to understand integration and management of intra- and inter-organizational business processes, and develop novel solutions to problems that significantly improve on current practices. Additionally, the researchers stated that knowledge management can find critical information more efficiently, utilize staff more effectively, organize knowledge for rapid retrieval and reuse, and improve interactions with trading partners. Therefore, successful e-business implementation increasingly depends on the ability to acquire, develop, and share knowledge.

Cultivating an organizational culture that supports the implementation of technological advances is an important consideration for organizations when implementing e-business applications. Hence, the results of this study indicate that adhocracy culture has a significant positive influence on e-business implementation.

Top management support also emerged as a significant determinant of e-business implementation. E-business is a radical technology that alters existing business models and processes (Theodosiou and Katsikea, 2012). Consequently, decisions regarding the magnitude, the domain, and the speed of a company's response to this technology should be made at the top management level (Lee and Grewal, 2004).

Finally, consistent with previous literature (e.g. Voola *et al.*, 2012), the results indicate a significant, positive influence of e-business implementation and organizational performance. Especially, when e-business implemented successfully, it can offer organizations significant benefits in terms of efficiency, sales performance, customer satisfaction, and relationship development.

5.2 Theoretical implications

Past studies have mainly focussed on studying technology adoption using variables such as environmental, organization attributes as well as innovation's attributes. This study offered empirical evidence to confirm the validity of the research model which focusses on organizational factors (learning capabilities and KM capabilities, top management support and adhocracy culture), and also contributed to the growing literature on rapidly changing technology adoption.

Outcomes from this study insinuated that learning capabilities and KM capabilities as well as top management support and adhocracy culture have significant impact in explaining e-business implementation in the Saudi Arabia organizations.

The primary contributions of this research are numerous. First, this study contributes to the e-business literature by building a theoretical model to understand what factors influence e-business implementation. To the researchers' knowledge, this is the first study to theoretically specify or empirically test the role of learning capabilities (e.g. training availability, technical expertise, and knowledge level),

KM capabilities (e.g. knowledge acquisition, knowledge sharing, and knowledge application), adhocracy culture and top management support in the e-business implementation. Second, the result support the knowledge-based view of the firm, so that KM capability and learning capability can be regarded as an independent managerial practices, as well as central mechanisms that facilitate the wider evolution of e-business. KM capabilities and learning capabilities serve as key leverage points within the e-business context. That is, if organizational KM capabilities highlight the importance of a knowledge sharing culture, firms are more likely to achieve success in e-business implementation. Moreover, this research supplements the existing body of literature on organization culture, top management support, and e-commerce implementation. The research suggests that those firms with adhocracy cultural characteristics are more likely to implement e-business. Lastly, the research indicates that organizations with top management that promotes the use of technology and understands its value are more likely to succeed in the implementation of e-business.

Finally, this paper analyzed the impact of e-business implementation (in terms of its two dimensions: internal integration and external diffusion) on performance. The analysis of the two separate dimensions of e-business implementation allows us to provide a deeper understanding of the effect of each of them on selected aspects of organizational performance excellence.

5.3 Practical implications

As e-business implementation is becoming increasingly commonplace, it is important that its associated challenges and structural factors be considered. Therefore, organizations considering e-business implementation successfully should pay close attention to the internal as well as external factors driving this strategic decision. For instance, in this study, the learning process is a desirable capacity that business units must develop to implement e-business. This is consistent with Fahey *et al.* (2001) findings which state that organizational learning applications provide a strong foundation for organizations that contribute significantly to understanding and facilitating the e-business transformation. Furthermore, findings of this research is in agreement with the researchers conclusions that knowledge management applications provide a novel architecture for organizations that contribute significantly to understanding and facilitating the e-business transformation of operational processes. In particular, managers should emphasize the acquisition of knowledge regarding relevant technological innovations, the dissemination of this knowledge within the organization, and its meaningful utilization in transforming business processes (Theodosiou and Katsikea, 2012). Hence, organizations need to have well-designed knowledge management infrastructure to create and maintain the e-business knowledge required to improve back-office efficiency, customer intimacy and efficiency of coordination with business partners (Lee *et al.*, 2007).

Moreover, training level has a significant positive influence on e-business implementation, therefore, organization of training seminars should be considered as an effective method for knowledge diffusion within a company. Evidently, companies that provide e-business training for their employees and increase their knowledge of e-business can expect to achieve higher levels of e-business implementation success (Lee *et al.*, 2007).

In this research, adhocracy culture has a significant positive influence on e-business implementation. This is consistent with Senarathna *et al.* (2014), which indicated that there is a positive correlation between adhocracy culture and e-commerce adoption.

Therefore, the concept of developing an organizational culture to support technology and e-business is important (Rapp *et al.*, 2008). Furthermore, the findings of this research is in agreement with the researchers who indicate that basic management principles declare that top management support, creating e-business champions, and fashioning a culture in which all organizational levels embrace e-business technology and understand its value are fundamental. Hence, top managers need to promote an organizational culture that values change, creativity, and innovation.

Top managers' support is critical for the success of e-business implementation. Since substantial investment in technology infrastructure and upgrades to keep pace with technological developments, top management requires solid evidence regarding the contribution of e-business to the performance of the organization in order to be eager to allocate the required resources.

Finally, e-business implementation has a significant positive impact on the organizational performance; a performance measurement system for e-business activities must be established. Moreover, managers must take good care of the business customers and partners and develop their relationships with them which could contribute to more efficiency and sales growth.

5.4 Limitations and future research
The subjects of investigation in this study were located in Saudi Arabia. Whether or not the conclusions reached in this study could be applied to business in other countries or cultures remains to be seen. Furthermore, this study did not test environmental factors and technological factors nor it did test all organizational factors and focussed particularly on learning capabilities, knowledge management capabilities, adhocracy culture, and top management support. Hence, to gain a more in-depth understanding of the factors that influence e-business implementation, future studies should shed the light on the role of environmental and technological factors, and additional organizational factors. For instance, knowledge asset must be rare and inimitable to become a source of competitive advantage. Without secure processes, knowledge loses the key qualities of being rare and inimitable (Gold *et al.*, 2001). Therefore, future study could assess the impact of knowledge protection processes on e-business implementation.

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Appendix. Survey

**Learning Capabilities:

Training availability

TA1: My organization views employees training as an investment, not an expense.

TA2: My organization provided extensive training in e-business systems.

Technical expertise

TE1: Information systems employees are generally very knowledgeable regarding technical matters.

TE2: My organization contains considerable technical expertise.

Knowledge level

KL1: The organization contains a high level of e-business knowledge.

KL2: The organization hires highly specialized or knowledgeable personnel for e-business systems.

KL3: My organization is dedicated to ensuring that employees are very familiar with e-business systems.

**Knowledge Management Capabilities

Knowledge acquisition

My organization …

KA1: has processes for acquiring supplier knowledge.

KA2: has processes for generating new knowledge based on existing knowledge.

KA3: has processes for acquiring customer knowledge.

KA4: has processes for acquiring knowledge on developing new products/services.

Knowledge application

My organization …

KAP1: has processes for integrating different sources and types of knowledge.

KAP2: has processes for transferring organizational knowledge to employees.

KAP3: has processes for filtering knowledge.

KAP4: has processes for applying experiential knowledge.

KAP5: has processes for applying knowledge to solve new problems.

Knowledge Sharing

My organization …

KS1: has processes for distributing knowledge throughout the organization.

KS2: has processes for distributing knowledge among our business partners.

KS3: has a standardized reward system for sharing knowledge.

KS4: designs processes to facilitate knowledge sharing a cross functional boundaries.

**Organizational (Adhocracy) Culture

OC1: My organization has clear norms and values that promote innovation such as risk taking, experimentation, and incentives for new ideas.

OC2: Employees of my organization are happy with changes decide on e-business.

OC3: My organization has change agents such as opinion leaders and technology champions who articulate the positive impact of e-business.

OC4: My organization has a proactive business strategy necessary for a successful e-business implementation.

OC5: Employees of my organization work in collaboration with others.

**Top management Support

In my organization …

TM1: top managers continuously emphasize that we must adapt to the internet-related market trends.

TM2: top managers often advise employees to be sensitive to competitors' initiatives with regard to e-business.

TM3: top managers keep telling people that they must bring more of their business practices online in order to meet customers' future needs.

TM4: top managers are willing to try to provide the necessary resources for implementing e-business practices.

TM5: top managers often advise employees to keep track of the latest developments in internet technology and Internet-related business practices.

**E-Business Implementation

EBI1: We have implemented e-business in all our business processes.

EBI2: E-business has had a great impact on our business operations.

EBI3: Relative to the potential of e-business for our business, our e-business implementation is extensive.

EBI4: E-business has substantially changed our business processes.

**Organizational Performance

Efficiency

In my organization …

PE1: the costs of production and transaction (e.g. raw material, order processing, warehousing, and scheduling costs) have been substantially reduced.

PE2: the costs of general management activities (e.g. planning and accounting costs) have been substantially reduced.

PE3: the costs of coordinating with suppliers, customers, and business partners have been substantially reduced.

PE4: the costs of marketing the product (e.g. advertising and promotion costs) have been substantially reduced.

PE5: the costs of acquiring new customers have been substantially reduced.

Sales performance

In my organization …

SP1: the market share of our products has increased.

SP2: the sales volume of our products has increased.

SP3: the prices of our products have changed.

SP4: the number of new customers that we are able to acquire has increased.

SP5: the number of existing customers that we are able to retain has increased.

Customer satisfaction

PCS1: overall, our customers are more satisfied with our organization.

PCS1: our customers encourage other people to do business with our organization.

PCS1: our customers are more loyal to us than before.

Relationship development

PRD1: our organization has been able to strengthen its existing business relationships with partners and suppliers.

PRD2: the relationships between our organization and its suppliers and business partners are likely to last longer.

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