A conceptual model of factors affecting e-procurement usage among Jordanian firms

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ABSTRACT

E-procurement is an organizational application of IT used in setting up agreements, facilitating the Business to Business (B2B) procuring transactions for goods and services, and requesting price quotations. This study explains a plan examining the organizational level e-procurement practice from two perspectives- information and transaction. This study also investigates the TOE determinants that influence e-procurement applications in Jordanian firms and the financial performance of such applications. Even though e-procurement offers significant advantages, Jordanian firms with e-procurement capability are not applying e-procurement for a substantial percentage of their transactions. Using the Technology, Organization, and Environment (TOE) framework, the Diffusion of Innovations (DOI) theory, and the Resource-based view (RBV) theory, an integrated model is formed. The e-procurement application is assumed to be affected by the technological context (relative advantage, compatibility, and complexity), organizational context (organizational readiness, top management support and information system committee), and environmental context (competition pressure and rules and regulations).

Keywords: E-procurement usage, Diffusion of Innovations (DOI) theory, Technology–Organization–Environment (TOE) Framework, Resource-based view (RBV), Jordan.

Introduction

Firms receive assorted opportunities due to the Internet and the revolution of technology. Firms utilizing this revolution are able to expand business globally, enhance customer services, improve competitive advantage, boost sales, reduce operational costs, enhance productivity and establish new business (Ghobakhloo, Arias-Aranda, & Benitez-Amado, 2011; Teknologi, Hussein, & Enegbuma, 2013).

According to Almajali, Mansour, Masa, and Maqableh (2016), firms experience extraordinary performance in commercial operations when they apply e-commerce as a business model and use electronic supply chain management operations. The application of e-commerce is considered as a catalyst for business process advancements, and such application has become a significant concern for firms today (Khan, Liang, & Shahzad, 2014; Tarhini, Arachchilage, Masa'deh, & Abbasi, 2015).

There are three categories of e-commerce, namely, 1) e-distribution led by sellers, 2) e-marketplace led by a third party, and 3) e-procurement led by buyers (Chang & Wong, 2010). According to David, Philip, and Edith (2003), e-commerce happens in business-to-business (B2B) and business-to-consumer (B2C) environments. Nonetheless, Teo, Lin, and Lai (2009) stated that e-procurement generally is a B2B applications system.

In the past decade, the value of e-procurement worldwide has increased rapidly. According to the United Nations Conference on Trade and Development (UNCTAD), the estimated volume of e-procurement worldwide in 2013 was more than $15 trillion. More 33% of the total volume was

generated by the United States, the People's Republic of China, Japan, and the United Kingdom (UNCTAD, 2015). Based on these figures, the growth of e-procurement is accelerating in the developed countries rather than the developing countries.

This paper investigates whether the types of perspective (information and transaction) influence financial performance differently. By using the Diffusion of Innovations (DOI) theory and Technology-Organization-Environment (TOE) framework, this paper aims to understand the technological, organizational and environmental determinants of e-procurement application. Previous research has applied the integrated model of the DOI theory and the TOE framework (Alsaad, Mohamad, & Ismail, 2017; Hassan, Tretiakov, & Whiddett, 2011; Lutfi, Idris, & Mohamad, 2016; Lutfi, Idris, & Mohamad, 2017).

By integrating DOI theory, TOE framework, and Resource-based View (RBV) theory, this paper seeks to explain the precursors to e-procurement application and their potential influence on financial performance. This paper is divided into three parts. Part one comprises the literature review while the part two comprises the proposed model and a list of research hypotheses built using the theories explained in previous section. Lastly, part three contains the conclusion and the discussion on the implications of this paper.

Literature Review

Traditional procurement is fundamentally a method of off-contract buying and purchasing in a hardcopy form, which is restricted in the management of spending. E-procurement merges and

streamlines the entire supply chain process in a continuous, synchronized and smooth mode (Chang & Wong, 2010; Eadie, Perera, & Heaney, 2010; Teo et al., 2009).

Researchers have defined e-procurement in several ways. Some studies explain e-procurement as a purchasing system that offers electronic purchase, processes orders and provides sophisticated administrative functions for both buyers and sellers through an Internet-based form (Panayiotou, Gayialis, & Tatsiopoulos, 2004). E-procurement can also be defined as a method of sourcing goods and services through the Internet by using electronic devices (Schoenherr &Tummala, 2007). Regardless of what it has been described as, e-procurement is a process of purchase that uses Internet-based technology to operate (De Boer, Harink, & Heijboer, 2002).

This paper defines e-procurement as an organizational application of IT in setting up agreements, facilitating the Business to Business (B2B) procuring transactions for goods and services, and requesting price quotations (Abu-ELSamen, Chakraborty, & Warren, 2010; Garrido, Gutierrez, & San Jose, 2008; Gunasekaran & Ngai, 2008; Wu, Zsidisin, & Ross, 2007).

There are various existing e-procurement software packages that offer several functions and skills. The perspective of e-procurement can be categorized into two forms – information and transactions (Hassan, Tretiakov, Whiddett, & Adon, 2014). The information perspective covers e-sourcing, e-informing and e-collaboration. IntraOS, InterOS, e-reverse auction, e-tendering and e-catalogue fall under the transaction perspective.

Firms can choose to implement all systems or parts of the systems that are associated with their business objectives and needs. Most research in e-procurement pays attention to the comparison of the adopters and non-adopters using a binary variable, namely, a firm chooses to either adopt or not to adopt. However, researchers disapprove of the binary method due its simplicity because the method does not include prominent variations in organizational behavior related to IT in its metric (Ramamurthy, Premkumar, & Crum, 1999; Tornatzky & Klein, 1982). Hence, this paper covered two perspectives of e-procurement application proposed by Hassan et al. (2014) (information and transaction) and sought to provide explanations on the application of e-procurement in the firms beyond the binary method. The information perspective explains that the buyers use IT to collect and exchange information with their sellers. The use of IT by buyers in executing transactions is covered in the transaction perspective.

Previous research on e-procurement has applied the TOE framework to investigate the application determinants in business corporate settings in various nations and regions such as Europe (e.g., Harrigan, Boyd, Ramsey, Ibbotson, & Bright, 2008), the Asia-Pacific (e.g., Gunasekaran & Ngai, 2008; Teo et al., 2009), the United States (e.g., Gunasekaran, McGaughey, Ngai, & Rai, 2009) and New Zealand (e.g., Hassan et al., 2014). Nonetheless, research in the Middle East region is limited, especially for Jordan. This present paper fills the research gap by examining the determinants that influence e-procurement application in Jordan and its financial performance. The results will provide beneficial insights in understanding whether the findings in developed countries are germane to the developing countries.

Theoretical Foundation

This present paper investigates the application of e-procurement (post-adoption stages) and its financial performance in terms of an organizational viewpoint. Previous studies have applied two approaches to investigate the issue. The first approach covers the variables that affect the decisions of innovation application. The second approach studies the precursors and the effect of innovation application.

Most influencing determinants come from two distinct perspectives. Alsaad, Mohamad, and Ismail (2014) suggested that the first perspective covers the intra-organizational determinants while the second perspective studies the institutional perspective that influences the decision of application.

According to Alsaad et al. (2014), intra-organizational studies investigate the determinants that influence the assessment of organizational capability and innovation desirability. By assessing the characteristics of an innovation, Khalifa and Davison (2016) argued that prospective adopters establish awareness that the organization can obtain a competitive advantage and new values through e-business. Meta-analysis research has shown that the assessment of innovation is greatly influenced by relative advantage that an innovation can offer to prospective adopters, the compatibility of innovation with adopter values and conditions, and the degree of innovation complexity(Jeyaraj, Rottman, & Lacity, 2006; Tornatzky & Klenin, 1982). The efficiency of an innovation as an option is also heavily influenced by organizational characteristics. These determinants help to assess the ability of an organization in successfully adopting any kind of innovation (Chwelos, Benbasat, & Dexter, 2001; Khalifa & Davison, 2006). This idea is strongly associated with organizational readiness.

On the other hand, the second perspective or the institutional perspective considers that organizational behavior is influenced by the social context in which the organization operates. Various studies pay attention to the impacts of environmental (institutional) determinants on the decisions of innovation application (Lutfi et al., 2016). Studies have confirmed the determinants such as competitive pressures that greatly explain the decision of innovation application (Grover & Saeed, 2007; Teo, Wei, & Benbasat, 2003).

The Diffusion of Innovations theory that Rogers (1995) proposed evaluates an innovation by using five characteristics known as innovation attributes, namely, relative advantage, compatibility, complexity, observability, and trialability. Nonetheless, studies show that three determinants, relative advantage, compatibility and complexity, are consistently associated with technology application (Tornatzky & Klein 1982; Wu et al., 2007). Hence, these determinants were used in this paper.

The Technology-Organization-Environment (TOE) framework considers three contextual determinants including technological, organizational, and environmental that could impact the management's decision on innovation adoption in terms of e-procurement. Nonetheless, not much of attention is paid to this matter. Therefore, this paper focuses on the application and financial performance of e-procurement in Jordan. Hassan et al. (2014) stated that the TOE serves as the fundamental framework that enthused most previous research in the explanation of precursors of e-procurement application. In the meantime, the outcomes of IS application in previous research were supported by the RBV.

Conceptual Framework and Hypotheses

The conceptual framework of this paper incorporates the most recognized theories (the TOE framework and RBV theory) within the IT domain. Figure 1 shows the research model and the hypotheses of this paper. Three key determinants that influence e-procurement application are analyzed from the contexts of technology, organization and environment.

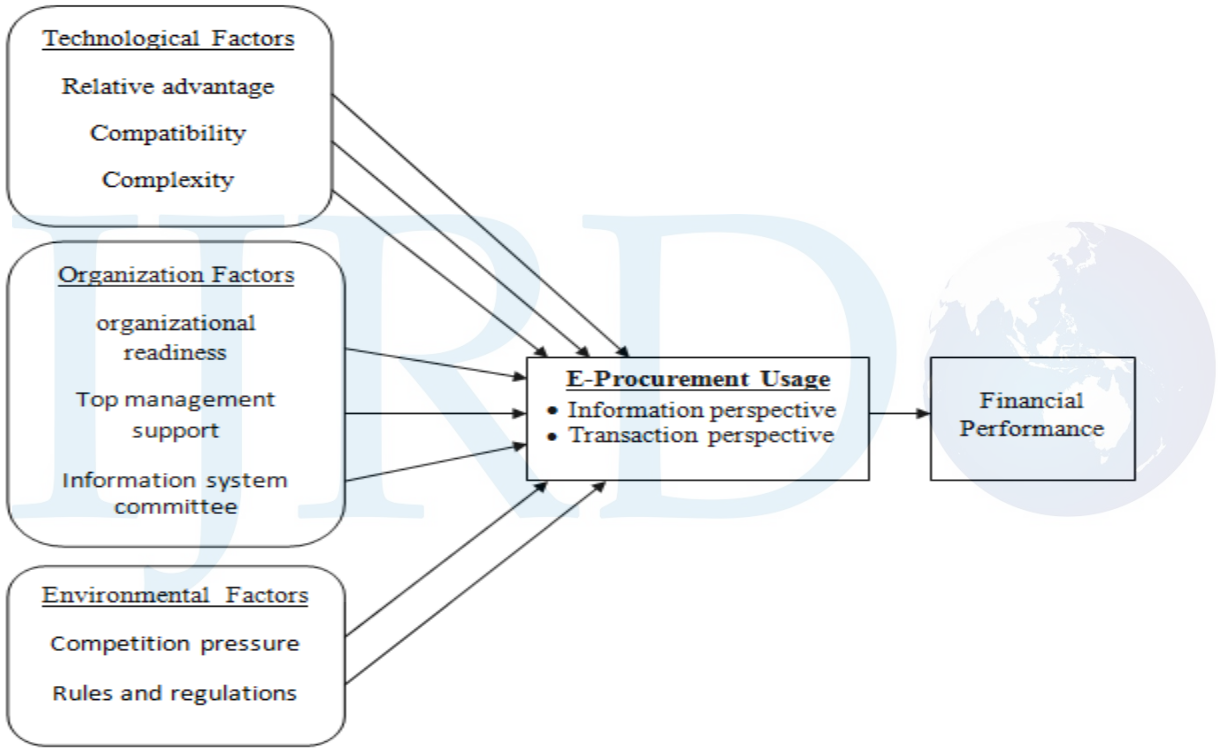

Figure 1: Framework of the study.

Relative Advantage

Rogers (2003) defines perceived relative advantage as the degree to which an innovation is acknowledged as more advanced than its successor. Relative advantage and adoption/application behaviors are found to be positively related (Ali, Abd Rahman, & Wan Ismail, 2012; Zhu, Kraemer, & Xu, 2006). The argument is that if a firm perceives that e-procurement brings little

benefit, then implementation of such a system would be pointless. There, the following hypothesis is posited:

H1: Relative advantage will positively influence e-procurement usage.

Compatibility

Moore and Benbasat (1991) define compatibility as the "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters" (p. 195). In comparison with other innovation characteristics, compatibility is considered as the greatest impetus in technology adoption/application (Grandon & Pearson, 2004; Zhu et al., 2006). This means that, if the innovation is highly compatible with the present situation and the current needs of a prospective adopter, the degree of adoption would be higher. Hence, this paper hypothesizes the following:

H2: Compatibility will positively influence e-procurement usage.

Complexity

Rogers (2003) defines complexity as "the degree to which an innovation is perceived as difficult to understand and to use" (p. 257). Al-Hudhaif and Alkubeyyer (2011) argued that, when the complexity of an innovation increases, the rate of IT application decreases. Hence, this paper hypothesizes the following:

H3: Complexity will negatively influence e-procurement usage.

Organizational Readiness

Organizational readiness refers to the capability of an organization in adopting new technology. The key barriers to e-procurement systems adoption are the inability to obtain skills and talents in new technologies and inadequate training and education (Chircu & Kauffman, 2000). Thus, the argument is that an organization has a higher tendency in applying e-procurement if it has greater readiness. Hence, this paper hypothesizes the following:

H4: Organizational readiness will positively influence e-procurement usage.

Top Management Support

Premkumar (2003) defines top management support as the degree of the commitment and resource support for innovation provided by the top management. In predicting organizational adoption/application of IS innovations, top management support is one of the best variables (Jeyaraj et al., 2006).Previous research has shown that management support usually gives a good indication for the acceptance of technological innovations in organizations (Al-Qirim, 2007; Alsaad et al., 2017; Ifinedo, 2011).Top managers are more likely to influence other members in the organization to accept an e-procurement application if the managers understand the importance of such an application. On the other hand, Ifinedo (2011) suggested that, when management provides little or no support, the organization tends to neglect technology acceptance and adoption/application as top priorities, and this will ultimately cause unfavorable results. Hence, this paper hypothesizes the following:

H5: Top management support will positively influence e-procurement usage.

Information System Committee

An information system committee is described as a group of IT specialists in a business who comprehend and are devoted to the vision and mission as well as strategic planning of the business (Marhaiza, 2012). Reinig (2003) stated the information system committee is responsible for determining the decisions and processes of the collaborative technologies adoption and the sustainability of such application. The impacts of the social dimension of alignment should be taken into consideration by the information system committee given their importance in the organizational application of e-procurement (Panda & Sahu, 2011; Reinig, 2003). Marhaiza (2012) suggested that strategic planning by information system committee should be parallel with top management strategy in applying an e-procurement system. Hence, this paper hypothesizes the following:

H6: Information system committee will positively influence e-procurement usage.

Competition Pressure

Hassan et al. (2011) define competition pressure as the extent to which an organization's actions in applying e-procurement are influenced by other organizations and trading partners in the market. Zhu and Kraemer (2005) reported that competition pressure will push organizations to provide quicker responses to customers' needs, shorten lead times and offer a better level of customization. Previous research has found that competition pressure is statistically significant in affecting technology adoption(Alsaad et al., 2017; Lutfi et al., 2016; Teo et al., 2009). Lutfi et al. (2016)

argued that competition pressure is also a key determinant for IT application. Hence, this paper hypothesizes the following:

H7: Competition pressure will positively influence e-procurement usage.

Rules and Regulations

Marhaiza (2012) defines rules and regulations as the acts and laws enforced by the government to manage e-procurement applications in business. Previous research has shown that rules and regulations, assistance and incentives can support the application of innovations (Hameed &Counsell, 2012; Marhaiza, 2012; Zhu & Kraemer, 2005). Thus, it is suggested that rules and regulations are critical in supporting e-procurement, promoting its application and managing several limitations that inhibit its application in organizations. Hence, this paper hypothesizes the following:

H8: Rules and regulations will positively influence e-procurement usage.

Financial Performance

Instead of being the ends, Internet-based applications are the methods to improve business efficiency. Therefore, Ifinedo (2008) pointed out that the employment of Internet-based applications should be lined up with an organization's objectives to make sure the optimum advantages of e-procurement to such organization. Zhu and Kraemer (2002) suggested that the scope of e-procurement application varies across organization. Therefore, organizations that have

their e-procurement capabilities highly in line with their most fundamental functions are more likely to enjoy better e-procurement effects than those who do not.

Previous research has shown that an e-procurement application is highly linked with organizational performance (Marhaiza, 2012; Teo & Lai, 2009). Therefore, understanding the benefits of an IT application in supply chain management is important as these benefits of e-procurement application can influence financial performance (Subramani, 2004). Hence, this paper hypothesizes the following:

H9: E-procurement usage will positively influence financial performance.

Research Method

This paper studies whether the types of perspective (information and transaction) give different impacts on financial performance and investigates the TOE determinants that influence e-procurement application in Jordanian firms. The research population covers the companies listed with Jordanian Companies Control Department (CCD) with large registered capital. The reason for this is that e-procurement system technologies are sophisticated so that significant technical and financial resources are needed to adopt such technologies (Hassan et al., 2014; Venkatesh & Bala, 2012).A correlation has been found between e-procurement system application and high transaction volumes (Grover & Saeed, 2007; Liu, Sia, &Wei, 2008). These parameters tend to occur in companies with sufficient resources, and there is a higher chance that such companies have a large amount of registered capital (Alsaad et al., 2017; Akintoye, Mcintosh, & Fitzgerald, 2000; USAID, 2007).

The Jordanian CCD's database served as the source of sample list in this paper. This directory comprises about 176,000 companies and divides the companies in terms of the size of capital used. Alsaad et al (2017) recommended that to obtain a suitable sampling frame while making sure there are large-scale supply chain activities in the potential companies, the sample should be restricted to companies with registered capital equal to or more than JD 5,000,000. Therefore, the final sample comprised 566 companies. In this study, the entire population is included as the sample. In other words, the sample size is equal to the population size. This method was used due to the small population size (566 companies) and the generally low response rate in Jordanian context where the response rate typically falls between 30% and 43% (Alsaad, 2015; Al-Zu'bi, 2012). Based on the literature of e-procurement, this study will assess the mangers of these firms.

Conclusion

This paper investigates whether the types of perspective (information and transaction) influence financial performance differently. This study also investigates the TOE determinants that influence e-procurement application in Jordanian firms. Research in the Jordanian context is yet to reach a consensus on the application of e-procurement. This encourages further research in the topic. Even though research has consistently shown the significance of technological, organizational, and environmental determinants in influencing e-procurement application, the diffusion literature does not produce consistent conclusions in terms of e-procurement application.

Currently, several organizations consider the e-procurement application initiatives with the objective of enhancing financial performance. The results of this paper should allow managers to manage the impacts of these determinants in a more effective way. This concept paper

recommends and urges further research to investigate the role of top management support strategy as a moderator in discussing the e-procurement application decision. This is because the top management support strategy plays a role in deciding the application, either to accept or reject. Besides, such strategy can give potential influence on other determinants.

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