The Factors Affecting on E-procurement Usage: The Moderating Role of Power

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Abstract. The paper evaluates features facilitating or impeding e-procurement utilization among firms in Jordan. E-procurement B2B is an information technology that links a business relationship between two parties. Power is the key determinant in adopting and using such technology. Regrettably, the role of power is almost disregarded in e-procurement utilization literature. By using the integrated template of the Technology-Organization-Environment (TOE) framework and Diffusion of Innovations (DOI) theory with power as a moderator, this paper helps to illustrate e-procurement usage. This argument could enhance e-procurement usage comprehension and help to rectify variability and inconsistency of findings in the literature.

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

1. Introduction

The usage of Information System (IS) among Jordanian firms is comparably low in spite of the immense of Information Technology (IT) being used in their routine business operation when compared with other emerging economies worldwide (Lutfi, Idris, & Mohamad, 2016). Other than limiting the capacity of the firms to completely leverage, the restricted use of IT in routine business operation also hinder the firms to refine their competitiveness in the market (Global Information Technology (GIT) Report, 2012). In addition, due to the low level of IT related solution deployment, Jordanian firms’ capacity is obstructed from sustaining their competitiveness and refining their business productivity (Lutfi, Idris, & Mohamad, 2017).

To improve the firms’ performances, they must consistently enhance their interior procedures and operations. The purchasing process which involves the incursion of enormous administrative expenses between buyers and suppliers is one of the cost-intensive operational chains. To overcome such
predicament and minimize the business cost, many firms have adopted e-procurement to simplify the complication of the procurement process. (Zunk, Marchner, Uitz, Lerch, & Schiele, 2014).

This study examines key elements that facilitate or inhibit the firms to e-procurement usage to improve our comprehension of the current e-procurement usage among Jordanian firms. With the aid of Technology-Organization-Environment framework (TOE), and the role of power as a moderator between TOE factors and e-procurement usage.

Power exercise is one of the most important characteristics of B2B relationship that can affect the usage decision (Alsaad, Mohamad, & Ismail, 2014). In initiating B2B relationships, power is a norm. However, the role of power exercise has been overlooked in e-procurement as not many studies have considered its effect on e-procurement usage (Alsaad et al., 2014; Ke, Liu, Wei, Gu, & Chen, 2009). Previous studies largely investigated elements that facilitate or inhibit e-procurement usage. Hameed and Counsell (2012) argued that the inconsistency in the literature findings gives a narrow vision as to how these factors influence the usage decision.

This study provides some contributions to two groups of people namely researchers and practitioners. For researchers, this study has integrated Diffusion of Innovation (DOI) theory and TOE framework with the role of power as a moderator helps the researchers to comprehend the precursors to the e-procurement usage. In addition, it is proven in the study that the suggested framework in term of e-procurement practices is applicable and suitable for the usage of firms in developing countries. On the other hand, for the practitioners, this study emphasizes on significant factors that advocate greater use of e-procurement, and the results serve both academicians and practitioners especially in the developing countries.

2. Previous Studies on E-Procurement
The traditional ways of handling the purchasing process are much ineffective and inefficient due to the excessive complications when compared to the use of e-procurement. As a result of e-procurement usage in handling the purchasing process, firms can save enormous resources in the context of cost and time (Zunk et al., 2014). E-procurement usage enables the organization to access wider market and streamlining purchasing processes (Daoud & Ibrahim, 2017). Despite According to Presutti (2003), e-procurement is about the efficient purchasing process management by removing paper-based logs and reports and administering the procurement via internet-based communication systems.

Generally, there are two adoption stages namely pre-adoption stage and post-adoption stage (Lin, 2014; Hameed & Counsell, 2012). The post-adoption stage emphasizes on understanding how to put an innovation into use. Such stage involves innovation design and implementation of operations to promote its widespread and quick receipt of the innovation (Lin, 2013; Ramdani & Kawalek, 2007; Rogers, 2003). Sadly, researchers paid less consideration towards issues like pre-adoption of e-procurement which serves as the first step in innovation dissemination rather than innovation usage (Abduljalil & Zainuddin, 2015; Alamin, Yeo, Warren, & Salzman, 2015). Hence, this study focuses on post-adoption stage (e-procurement usage) among firms in Jordan.

Although there are many studies being conducted by the researchers worldwide on the factors that effect on e-procurement, a few studies in the middle east especially in Jordan. This paper serves to eliminate the research gap by investigating the factors that affect the usage of e-procurement among Jordanian firms.

3. Theoretical Framework
There are most popular theories applicable in illustrating the e-procurement usage which is the DOI Theory and TOE framework (Sila, 2013; Zhu, Kraemer, & Xu, 2006). These theories focus on the function of technological, organizational, and environmental determinants and how do these determinants impact
the e-procurement usage. Thus, in this study, the two significant theories are used to illustrate the conceptual research model.

Rogers (1995) proposed that the DOI theory assesses an innovation based on five innovation characteristics known as innovation attributes, namely, relative advantage, compatibility, complexity, observability, and trialability. However, previous studies show that three out of five attributes namely relative advantage, compatibility, and complexity, are always related to the usage of technology (Tornatzky & Klein 1982; Wu, Zsidisin, & Ross, 2007). Therefore, these three key attributes are used in this paper.

In contrast, TOE model addresses three contextual factors, comprising of technological, organizational, and environmental factors that can affect the e-procurement innovation usage among the firms. In brief, TOE is the main framework that motivated almost all the prior studies in explaining the antecedents of e-procurement usage (Hassan, Tretiakov, & Whiddett, 2017).

4. Conceptual framework and hypotheses

This paper helps to evaluate the factors that facilitating or inhibiting e-procurement usage among Jordanian firms. Figure 1 exhibits a research framework, identifying the association between the independent variables and the dependent variable with the role of power as a moderator between TOE factors and e-procurement usage. The three main attributes that influence on e-procurement usage are examined from the contexts of technology, organization, and environment. The hypotheses of the study play a major role in completing the research model.

![Proposed framework](image)

Figure 1: Proposed framework
4.1 Technological Factors
The perceived relative advantage is defined as the degree to which an innovation is recognized as more sophisticated than its substitute (Rogers, 2003). Many empirical studies found significant effects of the relative advantage on the use of IT/IS innovation (Ali, Rahman, & Ismail, 2012; Zhu et al., 2006). On the contrary, a few studies discovered the insignificant role of relative advantage to explain use of IT-related innovations (Lutfi et al., 2017; Yoon & George, 2013).
Relative advantage is considered the most important factor in IS usage (Garg, & Choeu, 2015; Rahayu, & Day, 2015). It is argued that organizations that do not perceive the benefits of e-procurement usage to be significant would consider the implementation of the system to be unnecessary (Hassan, Tretiakov, & Whiddett, 2011). Thus, this study hypothesizes the following:

**H1: Relative advantage has a positive influence on e-procurement usage.**

According to Moore and Benbasat (1991), compatibility is explained as “the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters” (p. 195). Compatibility is one of the greatest driving force in the use of technology in a firm when compared with other innovation attributes (Grandon & Pearson, 2004; Zhu et al., 2006). This implies that the higher the innovation’s compatibility, the higher the degree of adoption and usage. Hence, this paper hypothesizes the following:

**H2: Compatibility has a positive influence on e-procurement usage**

Rogers (2003) describes complexity as “The degree to which an innovation is perceived as difficult to understand and to use” (p. 257). In addition to that, Al-Hudhaif and Alkubeyyer (2011) believe that the increasing innovation’s complexity will decline the degree of IT adoption and usage. Hence, this paper hypothesizes the following:

**H3: Complexity has a negative influence on e-procurement usage.**

4.2 Organizational Factors
Organizational factors refer to the features and attributes of a firm that affect the adoption and usage of technology (Maryeni, Govindaraju, Prihartono, & Sudirman, 2014). The capacity of a firm in acquiring new technology is defined as the organizational readiness. Prior studies which are focusing on the role of organizational readiness in technology innovation usage predominantly acknowledge its significant impact on the usage of technology (Lutfi et al., 2017; Zhu & Kraemer, 2005). Hence, this implies that the increasing organizational readiness will increase the likelihood of a firm to use e-procurement. This is represented by the following hypothesis:

**H4: Organizational readiness has a positive influence on e-procurement usage.**

Top management support is defined as the level of the effort and resource support for innovation given by the top management (Premkumar, 2003). In forecasting organizational acceptance of technological innovations, top management support is determined as one of the best variables (Jeyaraj, Rottman, & Lacity., 2006). Prior study has proved that the top management support generally provides a positive indicator for the adoption of organizational technology innovations (Al-Qirim, 2007; Alsaad, Mohamad, & Ismail, 2017; Ifinedo, 2011). According to Ifinedo (2011), the organization inclines to ignore the adoption of new technology innovation especially when the top management gives little or no support and this will eventually generate adverse outcomes. Hence, this paper hypothesizes the following:
**H5: Top management support has a positive influence on e-procurement usage.**

### 4.3 Environmental factors

Environmental factors can be defined as exterior elements that are out of the firm’s top management control (Jeyaraj et al., 2006). According to Hassan et al. (2011), competition pressure is the degree to which the effort of a firm in use e-procurement innovation is affected by any other firms or business allies in the market. The intense competition pressure will push organizations to provide quicker responses to customers’ needs, reduce lead times and provide better customization (Zhu & Kraemer, 2005). Prior studies have concluded that the competitive pressure is significant influencing on IT/IS usage (Alsaad et al., 2017; Lutfi et al., 2016; Teo, Lin, & Lai, 2009). Lutfi et al. (2016) also believed that competition pressure serves as one of the prominent factors for technology adoption and usage. Hence, this paper hypothesizes the following:

**H6: Competition pressure has a positive influence on e-procurement usage.**

### 4.4 The Moderating Effect of Power

Power is defined as the capacity of an organization to influence another organization to behave in a certain pattern (Ratnasingham, 2000). The firm which has power over another firm owns the capability to influence that firm’s actions and decisions. According to Alsaad et al. (2014), the authorized power from business partners is anticipated to be one of the most prominent determinants of IT/IS adoption and usage. To enhance firm’s competency, dominant actors can invest in technology innovation, where the advantage from such IT cannot be exploited without the alliance of its business partners (Alsaad et al., 2014). If such situation arises, the dominant actors will manipulate their power ability to affect organizations that rely on it to invest in comparable technologies (Al-Hakim, Abdullah, & Ng, 2012; Chan, Chong, & Zhou, 2012; Chong, Chan, Goh, & Tiwari, 2013; Hertwig, 2012). Characteristics of innovation may play an insignificant role in innovation usage decision if the firm recognizes hostile power. On the contrary, the firm will assess the innovation attributes in making innovation usage decision when the firm recognizes a non-coercive power (Alsaad et al., 2014). Thus, innovation attributes will play a key function in influencing the decision of innovation usage in the firm. Hence, this paper hypothesizes the following:

**H7(A): Power moderates the relationship between the Relative Advantages and e-procurement usage positively.**

**H7(B): Power moderates the relationship between the compatibility and e-procurement usage positively.**

**H7(C): Power moderates the relationship between the Complexity and e-procurement usage positively.**

**H7(D): Power moderates the relationship between the organization readiness and e-procurement usage positively.**

**H7(E): Power moderates the relationship between the top management support and e-procurement usage positively.**

**H7(F): Power moderates the relationship between the competition pressure and e-procurement usage positively.**

5. Conclusion
This paper examines the significance of power in e-procurement usage decision and discusses the usage of various influence strategy may have an impact on the role of other factors on e-procurement usage. Top management can exploit the results of this study to have a better comprehension on the determinants that facilitate the e-procurement usage. Moreover, the results of this paper allow the top management to handle the impacts of these factors in a more effective way. One of the significant contributions of this paper to the accounting and IS field is the investigation of the association between technological advancement and e-procurement usage. This paper also serves as an imperative base for the ultimate evolution of successful IT strategies.

6. References

[1] Abduljalil, K., & Zainuddin, Y. (2015). Intrinsic and extrinsic motivation as attitude factors towards adoption of accounting information system (AIS) in Libyan SMEs. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 5*(1), 161-170.

[2] Alamin, A., Yeoh, W., Warren, M., & Salzman, S. (2015). An empirical study of factors influencing accounting information systems adoption. In *Proceedings of the Twenty-Third European Conference on Information Systems* (pp. 1-11). ECIS.

[3] Al-Hakim, L., Abdullah, N. A. H. N., & Ng, E. (2012). The effect of inter-organization trust and dependency on e-procurement adoption: a case of Malaysian manufacturers. *Journal of Electronic Commerce in Organizations (JECO), 10*(2), 40-60.

[4] Al-Hudhaif, S. A., & Alkubeyyer, A. (2011). E-commerce adoption factors in Saudi Arabia. *International Journal of Business and Management, 6*(9), 122-133

[5] ALIa, A. Z. W. A. D. I., Rahman, M. S. A., & Ismail, W. N. S. W. (2012). Predicting continuance intention to use accounting information systems among SMEs in Terengganu, Malaysia. *International Journal of Economics and Management, 6*(2), 295-320.

[6] Al-Qirim, N. (2007). The adoption and diffusion of e-commerce in developing countries: The case of an NGO in Jordan. *Information Technology for Development, 13*(2), 107-131.

[7] Alsaad, A. K., Mohamad, R., & Ismail, N. A. (2014). The moderating role of power exercise in B2B E-commerce adoption decision. *Procedia-Social and Behavioral Sciences, 130*, 515-523.

[8] Alsaad, A., Mohamad, R., & Ismail, N. A. (2017). The moderating role of trust in business to business electronic commerce (B2B EC) adoption. *Computers in Human Behavior, 68*, 157-169.

[9] ASE. (2017). listed companies, https://www.ase.com.jo/

[10] Basu, V., Hartono, E., Lederer, A. L., & Sethi, V. (2002). The impact of organizational commitment, senior management involvement, and team involvement on strategic information systems planning. *Information & Management, 39*(6), 513-524.

[11] Chan, F. T., Chong, A. Y. L., & Zhou, L. (2012). An empirical investigation of factors affecting e-collaboration diffusion in SMEs. *International Journal of Production Economics, 138*(2), 329-344.

[12] Chong, A. Y. L., Chan, F. T., Goh, M., & Tiwari, M. K. (2013). Do interorganisational relationships and knowledge-management practices enhance collaborative commerce adoption? *International Journal of Production Research, 51*(7), 2006-2018.
[13] Daoud, L., & Ibrahim, M. (2017). Akademia Baru. Journal of Advanced Research in Business and Management Studies, 9(1), 36-44.

[14] Garg, A., & Choeu, T. (2015). The Adoption of Electronic Commerce by Small and Medium Enterprises in Pretoria East. The Electronic Journal of Information Systems in Developing Countries, 68, 1-23.

[15] Global Information Technology Report, (GITR). (2012). Available from: http://www3.weforum.org/docs/Global_IT_Report_2012.

[16] Grandon, E. E., & Pearson, J. M. (2004). Electronic commerce adoption: an empirical study of small and medium US businesses. Information & management, 42(1), 197-216.

[17] Hameed, M. A., Counsell, S., & Swift, S. (2012). A meta-analysis of relationships between organizational characteristics and IT innovation adoption in organizations. Information & management, 49(5), 218-232.

[18] Hassan, H., Tretiakov, A., & Whiddett, D. (2011). Extent of e-procurement usage: An empirical study of small and medium sized New Zealand manufacturing businesses. In Proceedings of the American Conference on Information Systems (AMCIS).

[19] Hassan, H., Tretiakov, A., & Whiddett, D. (2017). Factors affecting the breadth and depth of e-procurement use in small and medium enterprises. Journal of Organizational Computing and Electronic Commerce, (just-accepted).

[20] Hertwig, M. (2012). Institutional effects in the adoption of e-business-technology: evidence from the German automotive supplier industry. Information and Organization, 22(4), 252-272.

[21] Ifinedo, P. (2011). An empirical analysis of factors influencing Internet/E-business technologies adoption by Smes in Canada. International Journal of Information Technology & Decision Making, 10(4), 731–766.

[22] Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. Journal of Information Technology, 21(1), 1–23.

[23] Ke, W., Liu, H., Wei, K. K., Gu, J., & Chen, H. (2009). How do mediated and non-mediated power affect electronic supply chain management system adoption? The mediating effects of trust and institutional pressures. Decision Support Systems, 46(4), 839-851.

[24] Lin, H. F. (2013). Examining the factors influencing knowledge management system adoption and continuance intention. Knowledge Management Research & Practice, 11(4), 389-404.

[25] Lin, H. F. (2014). Understanding the determinants of electronic supply chain management system adoption: Using the technology–organization–environment framework. Technological Forecasting and Social Change, 86, 80-92.

[26] Lutfi, A. A., Idris, K., & Mohamad, R. (2016). The influence of technological, organizational and environmental factors on accounting information system usage among Jordanian small and medium-sized enterprises. International Journal of Economics and Financial Issues, 6(s7), 240–248.

[27] Lutfi, A. A., Idris, K., & Mohamad, R. (2017). AIS usage factors and impact among Jordanian SMEs: The moderating effect of environmental uncertainty, Akademia Baru Journal of Advanced Research in Business, 6(1), 24–38.
[28] Maryeni, Y. Y., Govindaraju, R., Prihartono, B., & Sudirman, I. (2014). E-commerce adoption by Indonesian SMEs. *Australian Journal of Basic and Applied Sciences, 8*(14), 45-9.

[29] Moore, G., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*(3), 193-222.

[30] Premkumar, G. (2003). A meta-analysis of research on information technology implementation in small business. *Journal of Organizational Computing and Electronic Commerce, 13*(2), 91-121.

[31] Presutti, W. D. (2003). Supply management and e-procurement: creating value added in the supply chain. *Industrial marketing management, 32*(3), 219-226.

[32] Rahayu, R., & Day, J. (2015). Determinant factors of e-commerce adoption by SMEs in developing country: evidence from Indonesia. *Procedia-Social and Behavioral Sciences, 195*, 142-150.

[33] Ramdani, B., & Kawalek, P. (2007). SMEs & IS innovations adoption: a review & assessment of previous research. *Academia. Revista Latinoamericana de Administración, (39)*, 47-70.

[34] Ratnasingam, P. (2000). The influence of power on trading partner trust in electronic commerce. *Internet Research, 10*(1), 56-63.

[35] Rogers, E. (1995). Diffusion of innovations, (4th ed). New York: Free Press.

[36] Rogers, E. M. (2003). Diffusion of innovations (5th ed.). New York: Free Press.

[37] Sila, I. (2013). Factors affecting the adoption of B2B e-commerce technologies. *Electronic commerce research, 13*(2), 199-236.

[38] Teo, T. S., Lin, S., & Lai, K. H. (2009). Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega, 37*(5), 972-987.

[39] Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on engineering management, 1*(1), 28-45.

[40] Wu, F., Zsidisin, G., & Ross, A. (2007). Antecedents and outcomes of e-procurement adoption: an integrative model. *IEEE Transactions on Engineering Management, 54*(3), 576-587.

[41] Yoon, T. E., & George, J. F. (2013). Why aren’t organizations adopting virtual worlds? *Computers in Human Behavior, 29*(3), 772-790.

[42] Zhu, K., & Kraemer, K. L. (2005). Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry. *Information Systems Research, 16*(1), 61–84.

[43] Zhu, K., Kraemer, K. L., & Xu, S. (2006). The process of innovation assimilation by firms in different countries: a technology diffusion perspective on e-business. *Management science, 52*(10), 1557-1576.

[44] Zunk, B., Marchner, M., Uitz, I., Lerch, C., & Schiele, H. (2014). The role of E-procurement in the Austrian construction industry: Adoption rate, benefits and barriers. *International journal of industrial engineering and management, 5*(1), 13-21.