



The impact of barriers and benefits of e-procurement on its adoption decision: An empirical analysis



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ABSTRACT

The aim of this study is to investigate the effects of the barriers and benefits of e-procurement systems on the e-procurement adoption decision. An empirical analysis is performed for a retail store chain which operates in book and stationery sector in Turkey. Interpretive Structural Modeling (ISM) technique is applied to the selected barriers and benefits to determine their contextual relationships. Inadequate IT infrastructure of suppliers/business partners is found to be the most important barrier in the adoption of e-procurement systems. On the other hand, the most significant benefit is determined as integrated information sharing. The barriers and benefits, which have high driving power and the capability to influence the other drivers, are then integrated into the structural equation model. The results denote that barriers (benefits) of e-procurement systems have negative (positive) effect on the e-procurement adoption decision for the company. In addition, it is found that the effect of benefits on the adoption decision is higher than that of the barriers. Thus, based on this analysis, it would be beneficial for the company to adopt the e-procurement system.

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1. Introduction

Intensifying competition in today's business environment has highlighted the need to optimize the management of supply chains. Developments in the information and communication technology are important tools to manage supply chains effectively. In recent years, an increasing trend has been observed in the adoption of e-procurement systems, which help in the integration of the procurement process throughout the supply chain.

The term e-procurement refers to the integration of procurement process, which includes operations such as negotiation, ordering, receipt, and post-purchase review (Croom and Brandon-Jones, 2007). Morris et al. (2000) define e-procurement as a system that utilizes Internet technologies and services to automate and streamline an organization's processes – from requisition to payment.

E-procurement is not a recently discovered process as there have been many attempts of using electronic systems for developing an automated procurement technology for organizations, such as electronic workflow systems and EDI (Gunasekaran and Ngai, 2008). When the traditional procurement system is analyzed, it can be seen that the process is implemented by using

phone, fax, and other communication channels, showing how the procurement system is developed over time (Hawking et al., 2004).

E-procurement, which has become one of the fundamental elements of a supply chain, is still in the process of development and several studies are performed on this subject. Gunasekaran and Ngai (2008) state that the supply chain of a company cannot be integrated successfully without the adoption of e-procurement systems. The authors conduct a questionnaire based survey in order to understand the adoption process of e-procurement in Hong Kong. Davila et al. (2003) carry out a research on the equilibrium point for the optimum e-procurement system that should be used by companies which have different attitudes towards technology. Panayiotou et al. (2004) work on a case study about the Greek purchasing process and indicate the problems which may occur. The authors also study e-procurement system design. Croom and Brandon-Jones (2007) assess the validity of the forecasts performed by earlier studies which made predictions about the changes and improvements that will be caused by e-procurement systems. Gunasekaran et al. (2009) analyze the current state of e-procurement in SMEs located in the Southcoast of Massachusetts, and they also examine the factors that affect the e-procurement adoption. Nguyen (2013) performs an empirical study for the transport and logistics companies in Australia, and determines the principal components affecting the e-business adoption decision.

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In the light of the previous studies on e-procurement systems, this study focuses on the barriers and benefits of e-procurement systems. Our aim is to investigate the effects of the barriers and benefits on the e-procurement adoption decision. For this purpose, first Interpretive Structural Modeling (ISM) is applied to the barriers and benefits of e-procurement in order to understand the relations within these criteria.

Talib et al. (2011) define ISM as an interpretive model, which defines the relations between variables in complex systems by representing them in a hierarchical configuration. ISM is widely used to specify the interactions between the elements of a system, such as barriers and benefits. Gorvett and Liu (2006) assess the risks in a firm by using ISM and analyze the risk profile of the company. Singh and Kant (2008) use ISM in order to understand the relations between the barriers of knowledge management and specify the driving and dependent barriers. Chandramowli et al. (2011) perform a case study about the barriers of developing landfill sites in order to realize urban planning issues. Luthra et al. (2011) apply ISM to investigate the relations between the barriers of green supply chain management for India's automobile industry. The literature review shows that this is the first study that applies ISM to the barriers and benefits of e-procurement systems.

In the second part of the study, the results of the ISM model are validated by using Structural Equation Modeling (SEM). Another point of interest is to analyze whether the effects of barriers or benefits are higher on the e-procurement adoption decision. For this purpose, we perform an empirical analysis for a retail store chain which operates in book and stationery sector in Turkey. To the best of our knowledge, this is the first study that integrates ISM and SEM techniques.

SEM can be used for multivariate data as it is appropriate for illustrating the relations between exogenous and endogenous latent variables in one model (Kline, 1998; Aibinu and Al-Lawati, 2010). SEM is a widely used tool especially for psychology, sociology, and econometrics (Golob, 2003) and there are several studies applying SEM in the literature. Thus, we only mention the studies in a related field. Madeja and Schoder (2003) examine the impacts of e-procurement adoption process on e-business success. Ho et al. (2004) investigate the direct and performance impacts of e-procurement on supply chain orientation from the buyer–seller perspective. Lee and Quaddus (2006) conduct a study in Singapore about the impacts of buyer–supplier relationship on e-purchasing adoption decision. Vaidyanathan and Devaraj (2008) study the impacts of the quality of the information flow process and the quality of logistics fulfillment on the satisfaction of e-procurement performance. Konradt et al. (2012) analyze the effects of organizational and technical antecedence on usability and commercial transactions in B2B e-commerce. Finally, Devaraj et al. (2012) investigate the effects of mixing flexibilities and purchase volumes on e-procurement performance.

The rest of the paper is organized as follows. The research background and hypotheses are given in Section 2. The methodology used in this study is explained in Section 3. Section 4 presents the data analysis and results of the ISM model, measurement model, and structural model. Finally, concluding remarks are given in Section 5.

2. Theoretical background and research hypotheses

2.1. Theoretical background

Procurement is a vital issue in the retail sector and basic supply chain activities start with procurement. Hence, procurement directly affects the performance and efficiency of the supply chain. In this study, we consider a retail store chain which operates in

book and stationery sector in Turkey. The company has an annual procurement volume of approximately 100 million USD, which covers its demand for more than 20,000 different stock keeping units provided by 185 suppliers. Currently, this company uses traditional procurement methods, but the senior management wants to decide whether to adopt an e-procurement system or not. As one would expect, there are some barriers to switching to an electronic procurement system for the company. On the other hand, the company will experience some benefits from the e-procurement system when compared with the traditional procurement methods. The literature reviews on the barriers and benefits of the e-procurement systems are given in Tables 1 and 2, respectively. Based on the literature review, 20 barriers and 20 benefits are determined. Then, these barriers and benefits are discussed with eight top managers of the company and their numbers are decreased to 14 barriers and 15 benefits. The barriers and benefits used in this study and their explanations are given below.

2.1.1. Barriers of e-procurement systems

Although it is known that e-procurement systems have several benefits for the company, the company would also face some barriers while switching to an e-procurement system. The barriers of e-procurement systems taken into consideration in this study are given below:

2.1.1.1. Bureaucratic disfunctionalities in practice. There are a number of specific regulations and standards that have been developed for e-procurement applications which require that a bureaucratic procedure to be followed due to the nature of the legal institutions involved and embraces audit, accountability and compliance standards with national and international rules to ensure supply competition and transparency in the awarding of contracts.

2.1.1.2. Cost/benefit concern. Emerges where the expenses outweigh the benefits of moving to electronic procurement.

2.1.1.3. External (supply chain/business partners) incompatibility. Suppliers' strategies and willingness are not sufficient to take on new technologies such as e-procurement. There is a lack of readiness by external parties to engage in electronic interactions.

2.1.1.4. High investment cost of IT infrastructure/software. The company cannot afford too high investment cost on a new IT infrastructure and software which are necessary for e-procurement adoption.

2.1.1.5. Inadequate business processes to support e-procurement. Specified aims, goals and context of the e-procurement application are not aligned with other organizational and managerial choices and not integrated with the organization's processes.

2.1.1.6. Inadequate IT infrastructure of suppliers/business partners. The external parties of the supply chain do not have adequate IT infrastructure compatible with the e-procurement system.

2.1.1.7. Incompliance with company culture. Cultural issues such as absence of a clear corporate policy, lack of a widely accepted solution, lack of leadership, lack of flexible centralized control, resistance to change, and lack of information quality, produce a slowdown in adoption of e-procurement.

2.1.1.8. Inter-operability concerns with other systems used. It is a technical issue related to lack of compatibility and interface with other internal systems, mainly due to the fact that software companies have sought to make their product unique. In doing

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