

Exploring Determinants of Corporate Adoption and Diffusion of e-marketplace: A Procurement Perspective

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Abstract

Based on the innovation literature, this study has identified nine variables under three categories (technological, environmental, and organizational contexts) and evaluated their influence on e-marketplace adoption and diffusion within organizations. We have also assessed whether level of e-marketplace diffusion is related to the procurement performance of the purchasing organizations.

1. Introduction

The Internet emerges as the most economical business-to-business (B2B) electronic commerce platform for linking companies without additional network implementation. B2B electronic commerce can contribute to lower purchase costs, reduced inventory, enhanced efficiency of logistics, as well as to increased sales and lower marketing costs. Since supply chain management encompasses “the coordination of order generation, order taking, and order fulfillment/distribution of products, services, or information”, the involved companies can be studied from both buyers’ and sellers’ points of view. From the purchasing company’s point of view, B2B electronic commerce facilitates procurement innovations to result in reduced purchase price, reduced cycle time, and improved supplier sourcing. Of the two primary forms of B2B electronic commerce (interorganizational systems based on electronic data interchange, electronic marketplace), this study explores the issues related to electronic marketplace (e-marketplace, hereafter). The objective of this research was to identify the factors that influence e-marketplace adoption and diffusion from

an IT innovation perspective, and to verify if there is a link between e-marketplace diffusion and procurement performance of the purchasing organizations. In the following sections, we review the relevant literature, introduce the research model and hypotheses, describe the research method, and discuss the results and findings of the study.

2. Literature Review

B2B Electronic Commerce and e-marketplace

The Internet and electronic commerce in particular have much to offer in the way of increasing the efficiencies and competitive advantage of procurement. Business-to-business (B2B) electronic commerce constitutes a fundamental shift in the manner by which firms are interacting with buyers and suppliers. Senn explores two forms of B2B electronic commerce: (1) Interorganizational information systems (IOIS), a long-established, but rapidly evolving part of business processes in many firms. These forms of IOIS are commonly referred to as electronic data interchange (EDI) systems; and (2) Electronic markets: a vehicle for expanding the base of buyers and sellers. The public global Internet, and its principle application, the World Wide Web, provide a highly visible platform for electronic markets. In this study, e-marketplace refers to an electronic market in cyberspace with a price-making mechanism such as catalog aggregators, auction, reverse auction or exchange, incorporating all three types of Giunipero and Sawchuk’s typology for e-marketplace; i.e. sell side e-marketplace, buy side e-marketplace, and 3rd party e-marketplace. Throughout this paper the terms “marketplace”, “electronic market”, “e-Market”, and “e-marketplace” all refer to the same entity.

Procurement Performance

The procurement process consists of all those activities necessary to acquire goods and services consistent with user requirements. In this study, we define procurement as “the process of developing and managing qualified suppliers for effective and efficient organizational purchasing”. In this study, procurement performance is treated as a composite construct, encompassing cost, sourcing cycle time, controllability for operations, and creating opportunities for value-added activities. Six dimensions of procurement performance have been compiled from the literature to capture some of the key benefits that are attributable to e-marketplaces and achievable through well executed implementation, diffusion and use. These dimensions are: 1) inventory cost, 2) sourcing cycle times, 3) prices for sourced products, 4) securing time for strategic activities, 5) operational control, and 6) the overall performance of the procurement process.

3. Research Model and Hypotheses

Research Model

There are three elements that influence the process by which innovations are adopted and diffused throughout an organization. They are (1) technological, (2) environmental (or interorganizational), and (3) organizational contexts. Based on the theoretical framework, a research model was built to explore our research questions, as illustrated in Figure 1. The research model addresses the two objectives of this study. It identifies a set of technological, environmental, and organizational factors that are related to e-marketplace adoption and diffusion. Specifically, it proposes that eleven key antecedent variables influence adoption and diffusion of e-marketplace within organizations. The model also examines the relationship between the level of diffusion and procurement performance improvement.

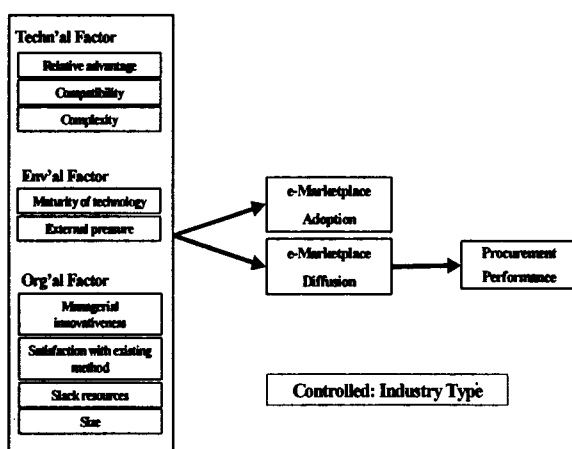


Figure 1 Research Model

Hypotheses

Relative advantage

H1a: Perceived relative advantage will be positively related to e-marketplace adoption.

H1b: Perceived relative advantage will be positively related to e-marketplace diffusion level.

Compatibility

H2a: Perceived compatibility will be positively related to e-marketplace adoption.

H2b: Perceived compatibility will be positively related to e-marketplace diffusion level

Complexity

H3a: Perceived complexity will be negatively related to e-marketplace adoption.

H3b: Perceived complexity will be negatively related to e-marketplace diffusion level

Maturity of technology

H4a: Maturity of technology will be positively related to e-marketplace adoption.

H4b: Maturity of technology will be positively related to e-marketplace diffusion level..

External pressure

H5a: External pressure will be positively related to e-marketplace adoption.

H5b: External pressure will be positively related to e-marketplace diffusion level.

Managerial innovativeness

H6a: Managerial innovativeness will be positively related to e-marketplace adoption.

H6b: Managerial innovativeness will be positively related to e-marketplace diffusion level

Satisfaction with existing method

H7a: Satisfaction with existing method will be negatively related to e-marketplace adoption.

H7b: Satisfaction with existing method will be negatively related to e-marketplace diffusion level.

Slack resources

H8a: Slack resources will be positively related to e-marketplace adoption.

H8b: Slack resources will be positively related to e-marketplace diffusion level.

Size

H9a: Size of organization will be positively related to e-marketplace adoption.

H9b: Size of organization will be positively related to e-marketplace diffusion level.

H10: Procurement performance will be positively related to the level of e-marketplace diffusion.

We decided to treat the industry type of an organization (manufacture or non-manufacture) as a control variable in this study.

4. Research Method

Operational Definitions and Measures

All operational definitions and descriptions of this study's instruments are omitted in this manuscript.

Data Collection and Sample Characteristics

Between April and July, 2002, data collection was made in the form of a field survey. The primary source of the sampling frame was a list of the 1,000 largest firms in Korea based on the reported revenue from the year-end 2000 financial statements. Perceptions of the managers who are in charge of the procurement function were measured. From the initial 1,000 firms, a total of 221 firms participated in the survey representing a response rate of 22 percent. Since fifteen responses were unusable, 206 cases were analyzed for the study. We have summarized the respondent characteristics in Table 1.

Table 1 Profile of the respondent org.

	Items	Fre	Per
Ind.	Manufacturing	122	59
	Banking/Finance/Insurance	15	7
	Distribution	13	6
	Construction	17	8
	Transport/Warehousing	8	4
	Communication	15	7
	Others	16	8
	Total	206	100
	Total sales	Less than \$100 million	17
\$ 100 million to below \$500 million		96	47
\$ 500 million to below \$1 billion		40	19
\$ 1 billion to below \$10 billion		31	15
Above \$10 billion		8	4
Unanswered		14	7
Total		206	100
Adoption	Adoption	108	52
	Non-adoption	98	48
	Total	206	100
Diff. level	0%	98	48
	1% – 20%	58	28
	21% – 40%	16	8
	41% – 60%	15	7
	61% – 80%	7	3
	81% – 100%	9	4
	Unanswered	3	1
Total	206	100	

Validity and Reliability of Instruments

Table 2 Rel. and validity of instruments

Var. (items)	Mean	S.D	Alpha	Factor loading on single factor
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Relative adv. (5)	5.241	0.883	0.743	0.609, 0.761, 0.818, 0.653, 0.682
Comp. (3)	5.251	0.962	0.663	0.826, 0.798, 0.701
Complexity (3)	3.329	1.139	0.846	0.827, 0.870, 0.906
Mat. of Tech. (5)	3.234	1.016	0.827	0.758, 0.782, 0.816, 0.76, 0.698
External pressure (3)	3.157	1.209	0.742	0.772, 0.877, 0.795
Mang'l innov. (4)	4.709	1.208	0.926	0.925, 0.932, 0.919, 0.860
Sat'n with existing method (5)	4.120	1.071	0.890	0.811, 0.852, 0.869, 0.764, 0.875
Slack Res. (4)	4.638	1.286	0.909	0.809, 0.903, 0.886, 0.935
Size (1)	6.98	1.276		N/A
Procur. performan ce (6)	4.425	1.075	0.883	0.688, 0.816, 0.66, 0.849, 0.845, 0.927

* Indep. Var (N=206), Dep. Var (N=99)

5. Results

The results of the hypotheses tests noted above are indicated on the research model as shown in Figure 2.

6. Conclusions

This study, based on prior research in innovation theory, has identified nine variables under three broad categories (technological, environmental, and organizational contexts) and evaluated their influence on e-marketplace adoption and diffusion within organizations. We have also assessed whether extensive diffusion would result in improved procurement performance for a given organization. A multi-item instrument was developed to measure these variables and data were collected from 221 organizations using a mail survey. The results of this study provide significant support to past findings in innovation and IS literature. Seven factors, compatibility, complexity, maturity of technology, external pressure, managerial innovativeness, satisfaction with existing method and slack resources, were found to influence e-marketplace adoption. Among these factors, maturity of technology, external pressure and satisfaction with existing method were also found to influence the extent of diffusion of e-marketplace. The study also clearly highlights that firms adopting e-marketplace need to actively engage in more extensive diffusion of the e-marketplace if they are to exploit the operational and strategic benefits for procurement.

There are several contributions of this study. First, we have provided a theoretical framework for

e-marketplace adoption and diffusion from a buying firms' internet-based procurement perspective based on innovation theory. Hence, this study contributes to the literature by providing empirical evidence that highlights the significant roles played by the technological, environmental and organizational factors in adoption and diffusion of IT innovation, especially e-marketplaces. Unlike the prior studies that focused on the adoption or diffusion phase only, this study considered a set of determinants as antecedents to e-marketplace adoption and diffusion simultaneously. We found that a set of determinants was divided into two groups, among which one group affected only adoption and the other both adoption and diffusion

and diffusion simultaneously. Second, one of the major concerns in this study was the relationship between the extent of e-marketplace diffusion and improved procurement performance. Thus far, most past research has failed to notice this relationship because they tried to relate determinants of IT adoption and diffusion to broad organizational performance. However, we identified procurement performance improvement as a dependent variable to study the impact of e-marketplace diffusion and developed the measurement for the construct for future studies.

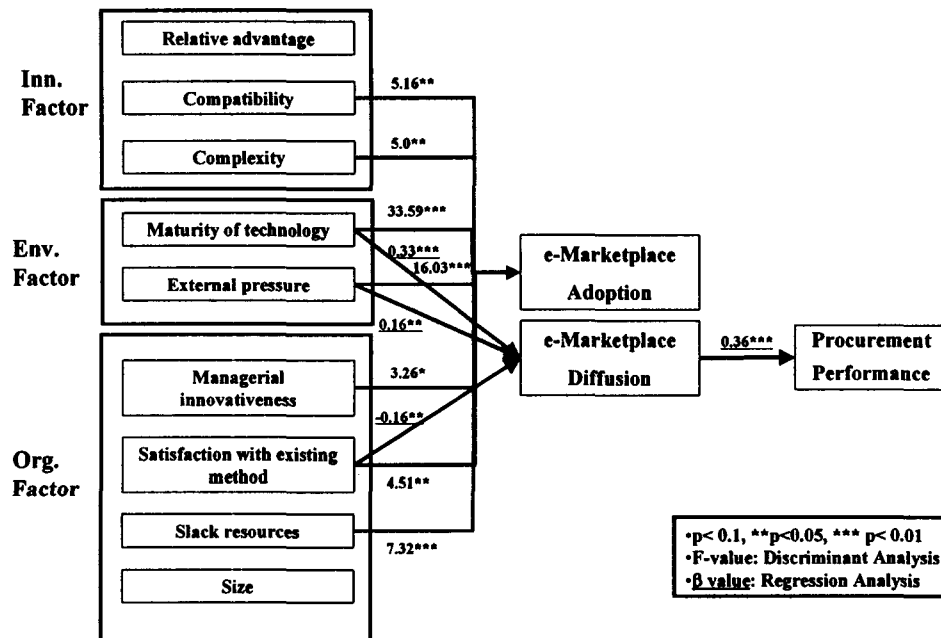


Figure 2 The results of hypothesis test