Analyses of Business Values from E-Commerce Adoption in SMEs : Public and Private Organizations in Tourism Industry

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Abstract

This paper examines the relationship between IT investment and the improvement of efficiency from the perspective of organizational contingency by the type of organizations and their maturity in IT use in terms of their history of e-commerce use. Organizations are divided into private and public in nature, and into experienced and inexperienced in e-commerce. An analysis was performed on data from 286 organizations in tourism industry. Comparison among the four groups showed differences in competitive and operational efficiency.

Keywords : Business Value, IT Investment, E-commerce, SME, Tourism Industry

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1. Introduction

Financial performance is the essential key factor in determining a company's worth in the eyes of shareholders and stakeholders. For this reason, senior managers have to be ever-mindful of the bottom line. Companies strive to show how quality, delivery, and innovation translate into high market share or improved operating margins [Devaraj and Kohli, 2002].

One reaction to this reality was the investment into IT, primarily to automate internal processes such as payroll, accounting, finance, human resource, and manufacturing. Among all, the last decade has witnessed the proliferation hyper growth of Internet and related technologies, which together created a global and cost-effective platform for businesses communication and commerce [Rao, Metts, and Monge, 2003].

Organizational environments around electronic commerce (e-commerce) have been continuously changing toward the realization of industry-wide business value. e-commerce also facilitates changes in organizational structure, the implementation of market-oriented strategies, the extension of online market, and the adoption of creative organizational activities both in private and public sectors.

In tourism and traveling industry, the importance of the roles of small and medium-sized enterprises (SMEs) is well recognized. The local governments also strive to highlight distinctive values based on their regional characteristics and attractions.

This paper focuses on how such private and public organizations use modern electronic technologies. Specifically, we focus on the pay-off from investments into IT and e-commerce in small and medium-sized tourism enterprises (SMTEs) and local governments. We further compare business values created through such investment across public and private organizations as well as across companies with and without experiences in e-commerce.

2. Research on Business Values of IT

There have long been keen scholarly and practical interests in understanding the relationship between IT investments and their outcomes [Kohli and Devaraj, 2004; Dedrick, Gurbaxani, and Kraemer, 2003]. Researchers have emphasized different perspectives related to different theoretical and empirical grounds.

Researchers on the issue of business value from IT hoped to understand how and to what extent the application of IT within a firm leads to improved organizational performance. Researchers used variations of conceptual, theoretical, or analytic models and employed different empirical methodologies with different levels of analysis [Brynjolfsson 1993 : Brynjolfsson and Yang 1996; Dedrick et al. 2003; Wilson 1995] (see <Table 1>).

The role of IT in creating competitive advantages has been the research topic of lasting importance, in this vein, over the last two decades [Bakos, 1991; Clemons and Row, 1989; Christiaanse and Venkatraman, 2002].

〈Table 1〉 Perspectives on the Business Value of IT

Researchers	Viewpoint	IT values
Bakos and kemerer [1992]	IT and organizational Performance	Efficiency and profitability
	Industrial organization	Strategic impacts
	Information Economics	Normative value Realist value Perceived value
Daven and Kauffman [2000]	Ex ante project selection Ex post investment evaluation	Potential value Realized value
Srinivasan, et al. [1994]	Efficiency	Performance Just-in-time (EDI)
Barua, et al. [1995]	Utilization	Capacity utilization Inventory turnover Quality, price, innovation
Kauffman, et al. [2000]	IT investment	Technology-specific value Network-related value
Brynjofsson and Hitt [1998]	Productivity and quality	Cost saving Important in quality, customer service, and new product development
Dewan and Kraemer [2000] Jorgenson and Strioh [2000] Brynjolfsson and Hitt [1996]	Productivity	Economic productivity ◦ country level ◦ Industry level ◦ Firm level
Banker and Kauffman [1991]	Efficiency	competitive efficiency operational efficiency

For example, Riggins [1999] suggests a concept called an E-commerce Value Grid to identify value-adding opportunities from e-commerce investment. The grid is presented in the form of a 5 by 3 grid. The five dimensions of firms' competitiveness are time, geography, relationships, interaction, and product/service. And these dimensions are matched across three payoff criteria; efficiency, effectiveness, and strategic advantage [Devaraj and Kohli, 2002].

Banker and Kauffman [1991] separated between "competitive efficiency" and "operational efficiency" in IT-related performance gains. Competitive efficiency describes the relationship between technology investment and firm-level bottom-line impacts such as revenues, profitability, return on investment (ROI), and return on assets. Operational efficiency describes the impact of IT on intermediate processes.

Information technology is considered to be of particular importance for information workers as the technology helps information workers efficiently search for, retrieve, analyze and store information. However, a more important contribution is its capability to enable new ways to coordinate in modern organizations where the need for communication is increasingly asynchronous and geographically dispersed [Hinds and Kiesler, 2002].

The relationship between IT and economic productivity has been examined empirically at the level of a country [Dewan and Kraemer 2000], an industry [Jorgenson and Stiroh 2000], and a firm [Brynjolfsson and Hitt, 1996; Lee and Kim, 2006]. There is also a minor stream of research focusing at the level of a task looking for evidences on the relationship between IT and productivity [Ichniowski, Shaw and Pernushi, 1997; Barua, Kreibel and Mukhopadhyay, 1994; Mukhopadhyay, 1997; McAfee, 2002].

A number of previous studies have found a positive relationship between IT investment and firm productivity. For example, Brynjolfsson and Hitt [1995, 1996] and Lichtenberg [1995] used production function estimates and found that output elasticities significantly exceed their capital costs. Brynjolfsson and Hitt [1996] suggested that while productivity, consumer value, and business profitability are related, they are ultimately separate questions at the firm-level. Brynjolfsson and Hitt [2003] further investigated the process by which computerization contribute to the growth of multifactor productivity.

Despite a lot of research effort deserted on this topic, findings to date remain mixed. While some studies find a positive relationship between IT investments and firm performance [Banker et al., 1990, Brynjolfsson and Hitt 1995, 1996; Lichtenberg 1995; Dewan and Min 1997; Bharadwaj et al. 1999, Stratopoulos and Dehning 2000; Lee and Kim, 2006], others fail to find a significant relationship.

"IT productivity paradox" stands for such inconclusiveness from existing studies [Strassman, 1990; Loveman, 1994]. In an age where management carefully weighs the costs and benefits of every discretionary investment dollar, finding evidence of the returns on IT investment is critical.

Since it was relatively widely accepted belief that technological innovation triggered increases in productivity [David, 1990], the conflicting results from IT-based innovation created a lot of confusion and curiosity. New information technologies, new ways of working, and the increased availability of information is believed to significantly improve productivity, specifically that of workers in information-intensive industries.

This research focuses on the comparison between private and public sectors. While economic efficiency is the most important criterion in private industries, there are other policy measures in public sectors [Kim and Rim, 1993]. On the other hand, some measures are not quite relevant to local governments, such as the amount of international sales, lock-in, and product innovation and introduction, the number of clicks and click streams. As a common performance measure between private and public organizations we measured the following eight variables;

- Cost savings in management and in the processing of information
- Reduced time in providing travel-related products and services
- Cost saving in document operation
- Improvements in relationship among organizations in tourism industry
- Enhanced customer satisfaction through online services
- Creation of new market opportunities
- Improvements in sharing and communicating tourism information
- Perceived overall business value of IT

3. Adoption of EC in Tourism

According to the literature of technology adoption in information systems [Premkumar and Roberts, 1999; Rogers, 1995; Thong, 1999;

Thong and Yap, 1995, 1996], we can extract the following factors as potential determinants of EC adoption in SMEs : (1) technological factors such as relative advantage, cost, and compatibility, (2) organizational factors such as size and information intensity, (3) individual factors such as top manager's attitude, innovativeness, and IS knowledge, and (4) environmental factors such as competition, support from technology vendors, and pressure from suppliers and buyers.

Beside these factors, Van Beveren and Thomson [2002] emphasize the importance of company size and managers' perception of the roles of EC in pursuing business goals. Kalakota and Robibson [2001] view the adoption of EC as the result of external pressure to satisfy new value propositions : what customers want (object), and when (timing) and how (method) they want it. Daniel and Myers [2000] and Dongen et al. [2002] find that responding to competitors is one important driver toward the adoption of EC.

Timmers [1999] uses Michael Porter's five forces model to argue that EC creates close-to-perfect competition as barriers to entry as well as transaction costs are reduced, customers can better access to information, customer driven pricing is possible with minimal regulation. Low entry costs due to the diffusion of EC also lead to an early return on investment and protect investment [Timmers, 1999]. Daniel and Myers [2000] suggest that overall reasons for the adoption of EC by SMEs include the enhancement of customer relationships either through improving customer services, developing the brand, seeking out new customers or through allowing for discourse with customers.

Yoo and Han [2003] found that the adoption of EC contribute to the performance of travel agencies significantly. The adoption of EC also found to help provide high quality products and customer services.

While most EC research focus on its effects in private sector, local governments are also expanding their roles in support of tourism industry as intermediaries. The local governmental portal sites support the local private travel businesses.

〈Figure 1〉 E-commerce in public sector

The local governments perceive that the use of government-supported B2B2C in regional tourism and travel market can contribute to the reduction of process-related costs and increase the quality of the tourists' experiences. Information on regional tourist attraction and resources produced by local governments tend to increase the richness and quality of travel.

Sokchotour.com operated by Sokcho city in Gangwon Province and a shopping mall Tyeshop.com operated by Tongyeong city in Gyeongnam province, Korea are some of the typical examples. These sites are also linked to official websites of the cities. According to Van Beveren and Thomson [2002], the adoption of EC by SMEs in tourism and travel industry is related to their matured use of IT. SMEs in tourism and travel industry tend to be run as a family-oriented business with limited financial resources.

4. Research Model and Methodology

The model explores the relationships between the types of organizations and EC adoption. We designed the sampling so that the samples belong to one of the four groups : public sector without EC (G1), public sector with EC (G2), private sector without EC (G3), and private sector with EC (G4). The dependent variable, IT payoff, is measured by way of using perceived business value created by the adoption of EC.

Our premises in this research are as follows;
Q1 : e-commerce adoption by SMTEs' affects more to competitive values than to operational values.
Q2 : business value created through IT use in private sector SMTEs is higher than those in public sector in SMTEs.

〈Table 2〉 Four groups in research

	Without EC	With EC
Public sector	G1	G2
Private sector	G3	G4

A survey was conducted using data collected through a central governmental research institute. Sample companies were selected based on Business Survey Index published by Korea Culture and Tourism Institute. A total of 286 questionnaires were collected out of 314 travel agencies and governments listed. Variables were measured as shown in Table 3 using Likert-type five point scale; (1) being strongly disagree and (5) being strongly agree. Analysis of data was performed using SPSS 10.0 to produce descriptive statistics, factor analysis, reliability scores and correlation analysis results.

As shown in <Table 4>, G1 includes 156 local tourism-related government organizations without EC experience (54.6%). G2 includes 55 local tourism-related government organizations with EC (19.2%). G3 is the sector without EC experience. 43 small and medium size tourism-related enterprises (SMTEs) participated in this research (15.0%). Finally, G4, the private sector with EC experience, includes 32 SMTEs (11.2%). Overall 73.8% of the sample belongs to public sector, and 30.4% of the

sample has experiences with EC.

〈Table 3〉 Definition of Variables

Variable	Researchers
V1 : Less time in travel service V2 : Cost savings in document operation V3 : Cost savings in Information processing and management V4 : Improved sharing and communication of tourism information V5 : Enhanced customer satisfaction through online services V6 : Improvement in making relationships among tourism organizations V7 : Creating market opportunities for the future V8 : Perceived Business Value of IT	Danziger [1977] Rivard and Huff [1984] Oh [2000] Lee and Hong [2007] Banker and Kauffman [1991] Kang, etc. [2005] Lee, Hong and Chang [2007] Banker and Kauffman [1991] Devaraj and Kohli [2000] Van Beveren and Thomson [2002] Daniel and Myers [2000]

〈Table 4〉 Sample distribution of survey respondent

	Without EC	With EC
Public sector	G1 : 156 (54.6%)	G2 : 55 (19.2%)
Private sector	G3 : 43 (15.0%)	G4 : 32 (11.2%)

5. Results and Findings of the Research

<Table 5> summarizes means and standard deviations (S.D.) of eight dimensions of IT investment value. The public sector organizations, i.e. tourism-related departments of local governments tend to focus on customer satisfaction through online services (3.756, 4.000). On the other hand the private sector organizations such as tourism-related firms, travel agencies, hotels, rental car companies focused on business value of IT (3.813).

Within each sector, public or private, organizations with EC showed consistently higher total score compared to those without EC experiences.

Among all, the score of V5 (customer satisfaction) is highest in public sector without EC (3.756) and public sector with EC (4.000). The score of V7 (creation of future market opportunities) was highest in private sector without EC (3.605). And the score of V8 (per-

〈Table 5〉 Result of mean and standard deviation by groups

		V1	V2	V3	V4	V5	V6	V7	V8	TOT
G1	Mean	3.545	3.308	3.519	3.603	**3.756**	3.628	3.462	3.647	3.558
	S.D.	0.845	0.792	0.783	0.716	0.694	0.747	0.722	0.833	0.496
G2	Mean	3.836	3.655	3.673	3.891	**4.000**	3.691	3.564	3.564	**3.734**
	S.D.	0.714	0.645	0.579	0.599	0.694	0.635	0.739	0.739	0.407
G3	Mean	3.581	3.465	3.419	3.488	3.419	3.535	**3.605**	3.581	3.512
	S.D.	0.731	0.767	0.823	0.703	0.763	0.797	0.791	0.906	0.575
G4	Mean	3.719	3.438	3.531	3.563	3.656	3.438	3.781	**3.813**	3.617
	S.D.	0.772	0.759	0.718	0.716	0.701	0.669	0.832	0.780	0.476
Total	Mean	3.626	3.413	3.535	3.636	**3.741**	3.605	3.538	3.640	3.592
	S.D.	0.801	0.766	0.747	0.701	0.723	0.726	0.752	0.821	0.494

Note) S. D. is Standard Deviation.

〈Table 6〉 Result of correlation analysis

	V1	V2	V3	V4	V5	V6	V7
V2	.532**						
V3	.376**	.391**					
V4	.413**	.378**	.446**				
V5	.329**	.206**	.316**	.451**			
V6	.402**	.262**	.339**	.413**	.480**		
V7	.260**	.283**	.379**	.313**	.328**	.468**	
V8	.301**	.131*	.264**	.345**	.322**	.278**	.361**

Note) ** Correlation is significant at the 0.01 level and * 0.05 level.

ceived business value of IT) was highest in private sector with EC (3.813). Overall, G2's perceived value of IT is higher than others (3.734).

As can be seen from <Table 6>, all the correlations among the value items are statistically significant.

〈Table 7〉 Result of factor analysis and reliability

Variables	Factor	
	Factor1 (Operational efficiency) (α = .747) a	Factor2 (Competitive efficiency) (α = .697) a
V5	.711	
V8	.692	
V6	.687	
V7	.671	
V4	.520	
V2		.881
V1		.756
V3		.584
Eigenvalues	3.461	1.038
Percent of variance	43.264	12.977
Cumulative percentage	43.264	56.242

Note) [a] Cronbach's alpha for factors.

The principle component analysis method with orthogonal (Varimax) rotation was used to verify variable structure. Result of the analysis is summarized in <Table 7>. The factor analysis shows that that the two factors – operational efficiency and competitive efficiency – have eigen values greater than one. To examine the reliability of variable measurement we used Cronbach's α. As <Table 7> shows all Cronbach's alpha value are above 0.697, confirming reliability of the measure.

〈Table 8〉 Competitive and operational efficiency by e-commerce adoption

	E-Commerce	Mean	S.D.	F	T-value
CEF	With	3.663	0.537	4.480	2.564*
	Without	3.464	0.630		
OEF	With	3.708	0.472	0.245	1.618
	Without	3.599	0.546		

* $p < 0.05$.
Note) CEF(Competitive Efficiency Factor).
OEF(Operational Efficiency Factor).

- **Q1 : SMTEs' e-commerce affects more competitive value than operational value.**

As <Table 8> indicates, the result of t-test

between with-EC group and without-EC group in Competitive Efficiency Factor (CEF) is significant ($p < 0.05$). Competitive efficiency of organizations with EC (3.663) is higher that of organization without EC (3.464) in time and cost saving.

However, in case of OEF, the result is not statistically significant. The operational efficiency of SMTE with EC (3.708) is slightly higher than that of SMTE without EC (3.599).

In itemized analysis to compare the effects of EC adoption, significant differences were found on V1, time reduction in travel product/service (V1) and V3, cost saving of information processing and management ($p < 0.05$). However, other remaining variables did not show statistically significant differences. The result implies that time savings in travel product/services and cost savings in information processing and management is the key value with regard to the increase of competitive efficiency in organization with EC.

〈Table 9〉 Business value by e-commerce adoption

	E-Commerce	Mean	S.D.	F	T-value
V1	With	3.793	0.734	7.198	**2.352****
	Without	3.553	0.820		
V2	With	3.575	0.693	1.641	2.385
	Without	3.342	0.787		
V3	With	3.621	0.633	5.797	**1.284***
	Without	3.497	0.791		
V4	With	3.770	0.659	0.054	2.146
	Without	3.578	0.713		
V5	With	3.874	0.712	0.223	2.059
	Without	3.683	0.721		
V6	With	3.598	0.655	0.190	-0.111
	Without	3.608	0.757		
V7	With	3.644	0.777	0.687	1.569
	Without	3.492	0.738		
V8	With	3.655	0.760	0.325	0.208
	Without	3.633	0.848		

Note) ** $p < 0.01$, * $p < 0.05$.

- **Q2 : IT business value of Private sector is higher than public sector in SMTEs.**

<Table 10> indicates that the differences between private and public organizations were not significant both in competitive and operational efficiency. Both private and public sector pursue similar goals and realize similar level of efficiency in tourism and traveling industry.

〈Table 10〉 Competitive and operational efficiency by private and public sector

	Organization	Mean	S.D.	F	T-value
CEF	Public	3.526	0.606	0.341	0.074
	Private	3.520	0.623		
OEF	Public	3.651	0.513	1.153	1.026
	Private	3.579	0.560		

Note) CEF(Competitive Efficiency Factor).
OEF(Operational Efficiency Factor).

As shown in <Table 11>, itemized analyses of each variable show that a statistically significant difference exists between private and public sector ($p < 0.05$) in the level of customer satisfaction through online service (V5). All other variables not being significant, the importance of customer satisfaction through online services is highlighted.

This result reflects recent emphasis on customer satisfaction in public as well as private sectors.

〈Table 11〉 Business value by public and private sector

	Org.	Mean	S.D.	F	T-value
V1	Public	3.621	0.821	0.518	-0.177
	Private	3.640	0.747		
V2	Public	3.398	0.770	0.003	-0.536
	Private	3.453	0.759		
V3	Public	3.559	0.737	0.618	0.921
	Private	3.467	0.777		
V4	Public	3.678	0.697	0.850	1.678
	Private	3.520	0.704		
V5	Public	3.820	0.701	4.265	**3.134***
	Private	3.520	0.742		
V6	Public	3.645	0.718	1.037	1.552
	Private	3.493	0.742		
V7	Public	3.488	0.726	1.324	-1.907
	Private	3.680	0.808		
V8	Public	3.626	0.809	0.169	-0.493
	Private	3.680	0.857		

Note) * $p < 0.05$.

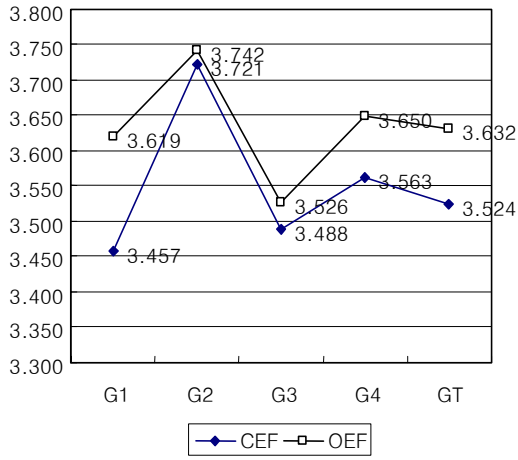
〈Table 12〉 Kruskal-Wallis Test by four groups

	Group	Mean ranking	Chi-square	DOF
CEF	G1	135.311	**8.218***	3
	G2	169.455		
	G3	133.547		
	G4	152.188		
OEF	G1	142.785	4.881	3
	G2	160.227		
	G3	123.465		
	G4	145.156		

Note) * $p < 0.05$.

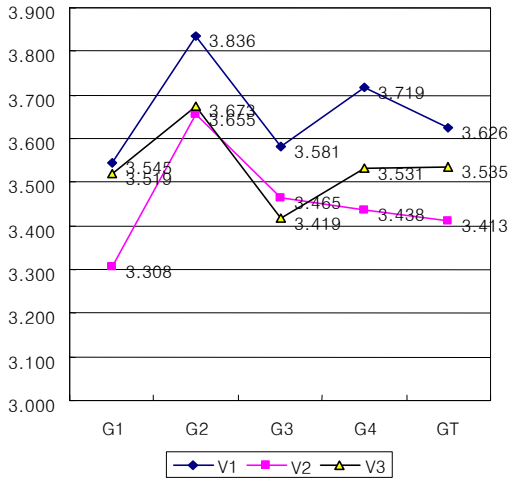
We then used nonparametric tests to check the difference of mean by organizational type. As <Table 12> shows a significant difference in CEF ($p < 0.05$) and lack of significant difference in OEF is observed. Competitive efficiency of G2, the public sector with EC, shows highest score followed by private sector with EC (G4), public sector without EC (G1) and private sector without EC (G3).

<Figure 2> highlights the comparison of CEF and OEF values across the four groups. G2 has the highest values G3 has the lowest values among four groups. Overall the mean value of OEF (3.632) is higher than that of CEF (3.524). The result shows that while SM TEs emphasize the importance of customer satisfactions, tight partner relationships, better opportunities, and high business values formally and ideally, they may mind more about time/cost savings in practice.

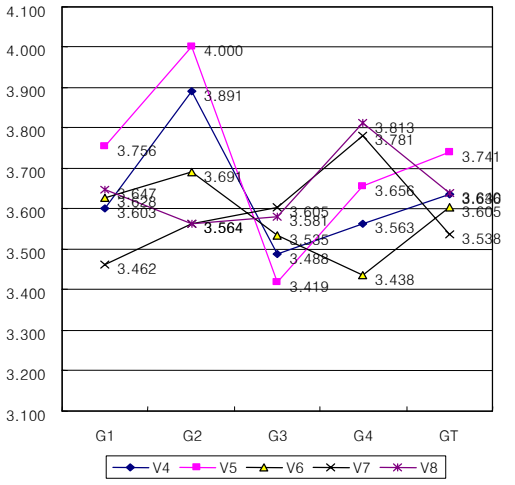


〈Figure 2〉 Mean CEF and OEF factor values

<Figure 3> shows itemized CEF variable values. The mean of V1 is the highest in the all groups and V2 is the lowest in G1 (3.308), G2 (3.655) and G4 (3.438). <Figure 4> shows itemized OEF variable values. V5 is the highest in G1 and G2 and V7 is the lowest in G1 and G2. In case of G4, V6 is the lowest value and V8 is the highest value.



〈Figure 3〉 CEF item values across the four groups



〈Figure 4〉 OEF item values across the four groups

6. Implications and Conclusions

This research suggests that there are several important relationships between business value and organization's characteristics such as their governance style and experience with EC use.

First, small and medium-size organizations enjoy business value from EC. SMEs tend to have systematic barrier towards the adoption of e-commerce. Such barriers are related to the size, perception of the importance of business value, business environments, expectations from customers and the nature of competitive environment (Van Beveren and Thomson, 2002; Kalakota and Robibson, 2001; Daniel and Myers, 2000; Dongen et al., 2002]. Despite such barriers, evidences accrue that SMTEs expand its adoption of EC and start to benefit from EC investments.

Second, both public and private organizations today are better informed and require increased use of EC. Their perception of the importance of IT business value has improved especially focusing around the concept of efficiency. However, their perception on business value of IT and EC differ across the characteristics of organizations.

Third, our findings suggest that business value from IT is related to organizational efficiency and customer relationships both in public and private organizations. This effect is especially important to SMTEs because market oriented relationships toward the provision of travel information to consumers and tourists are closely related to such companies. The result confirms the importance of IT investment as the driver business activities and the need to incorporate such investment with regard to competitive and operational efficiency.

Fourth, this study highlighted the effect of the type of organizations. Local governments and SMTEs with EC enjoyed high compe-

titive efficiency. Furthermore, a matured experience with EC is related to the cost and process-oriented value from EC adoption.

Organizations that use EC tend to have different view on EC from those that do not. Part of the differences seems to be related to the typical barriers to EC adoption by SMTEs such as the complexity of EC implementation, small businesses' needs for short-term ROI, resistance to change among employees, employees' lack of technical skills and IT knowledge, lack of specialized staff, lack of awareness about business advantage/opportunities, concern about security of electronic transaction, and insufficiency of EC standards. The gap between experienced organizations and those who lack EC experience can be widen without an appropriate measure.

In the future research, organizations' IT business values in SMTEs can further be analyzed from the perspective of competitive and operational efficiency with a more detailed types of public and private organizations. A more normative approache to fix the gap between leaders and laggards in using EC can also be taken to improve the competitiveness and value of the whole industry and, thus, national competitiveness.

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