

Using the Delphi Approach to Identify e-Commerce Facilitators: The Case of Uzbekistan

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I. Introduction

There is no doubt that e-commerce has become crucial and inseparable part of the modern economy and one of the most rapidly growing industries in the world. Many businesses now fully acknowledge that e-commerce provides many benefits and opportunities. The diffusion of e-commerce across countries depends on their infrastructures and business organizations. Further, the rate of this diffusion in developed

countries with advanced information technology (IT) infrastructure, such as in the USA and Korea, has been greater than that in developing or underdeveloped countries.

There have been extensive empirical studies discussing importance of facilitators of e-commerce adoption (Al Qirim, 2007; Hafeez et al, 2006; Wong, 2004). These studies are mainly based on the study of e-commerce adoption in developed countries and their implications are

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limited in developing countries. On the other hand, Sarlak and Hastiani (2008) focused on identifying barriers to adoption of e-business in Iran.

Recently, governments and business organizations in developing countries have been making considerable efforts to facilitate e-commerce. For example, the Republic of Uzbekistan, a developing country, has been focusing on creating appropriate environments and rushing to adopt e-commerce, and many businesses have been planning to engage in e-commerce. Because few studies have examined e-commerce in the context of developing countries (e.g., Uzbekistan), governments and enterprises have not been provided with a clear understanding of e-commerce facilitators. Because e-commerce facilitators can help firms and economies achieve greater efficiency and productivity, it is important to analyze the factors that can facilitate e-commerce and stimulate the process of its adoption. Thus, this study is guided by the following research question: "*What are the facilitators of e-commerce in developing countries?*"

The purpose of this research is an attempt to answer the research question, in other words, to identify facilitators of e-commerce in developing countries by using the Delphi method, which has been used to provide a better understanding of the issues and opportunities associated with developing respective forecasts and various avenues of research (정경수 외, 2004; Skulmoski

et al., 2007). Compared with other survey methods, the Delphi method is typically used to collect richer data for a deeper understanding of issues and does not require the experts to meet physically. Thus, the Delphi method represents a highly flexible research approach that can be used to identify e-commerce facilitators from the perspective of e-commerce experts. This study considers Uzbekistan because its government has placed great emphasis on the importance of e-commerce development at the country and industry levels.

Identifying e-commerce facilitators is vital for governments to design policies that are more effective and strengthen positive enablers, and thus, this study provides a better understanding of the current e-commerce environment and the prioritization of projects targeted at the creation of more attractive incentives for individuals and businesses.

II. Literature Review

E-commerce has become one of the main areas of research for scholars and practitioners. A number of studies have examined the adoption and diffusion of e-commerce since the early 1990s. Table 1 provides a summary of previous studies. The most recent studies can be categorized into the following three main groups, which reflect the development of the theoretical framework for e-commerce adoption from

different perspectives (Boateng et al., 2009).

- Studies focusing on the constraints and potential of e-commerce, which represent some of the most important continuing themes, particularly for developing countries (Anckar, 2003; Mann, 2000; Sarlak and Hastiani, 2008; Kshetri, 2007; Keoy et al., 2006).
- Studies focusing on the adoption and diffusion of e-commerce via different theoretical frameworks (Xu et al., 2004; Molla and Licker, 2005; Grandon et al., 2009; Sarkar, 2008; Al Qirim, 2007; Pavlou and Chai, 2002).
- Studies focusing on a range of implementation issues such as strategies, e-commerce development support, and public policies (Ngai and Wat, 2002; Gibbs et al., 2002; Battisti et al., 2009)

The first group is mainly at the operational level, whereas the second and third groups are more at the strategic level. From the economic perspective, the first and second groups address developing economies, whereas the third group focuses on developed countries.

From the business perspective, most of the recent studies have focused on the following

theoretical models:

- Diffusion and innovation (이상근 외, 2005; Efendioglu and Yip, 2004; Sadowski, 2002; Lal, 2005 Sarkar, 2008; Wong, 2003; Kendall et al, 2001)
- Technology organization environment (TOE); (김효정 외, 2008; Lai et al, 2006; Kurnia, 2006; Sarlak and Hastiani, 2008; Al Qirim, 2007; Teo and Ranganathan, 2004 Thatcher, 2006; Wang and Ahmed, 2009)
- Theory of planned behavior (TPB); (Altobello et al., 2007 Grandon et al., 2009; Pavlou and Chai, 2002)
- Perceived e-readiness model (Molla and Licker, 2005; Elahi and Hassanzadeh, 2009; Tan et al., 2007)

The main deficiency of the abovementioned models is that they are designed for developed economies. For instance, B2B e-commerce technologies that Thailand adopted did not lead expected benefits and meet social and cultural expectations because such technologies were designed to meet the needs of Western society, not the commercial environment of Thailand (Vatanasakdakul et al., 2004).

<Table 1> Literature review

COUNTRY	STUDY	MODEL	METHODOLOGY	INFLUENCING FACTORS
CHILE	Grandon et al., 2009	TPB/TRA	Empirical study (210 SME managers)	Attitudes and subjective norms are significant predictors of e-commerce adoption intentions
	Altobella et al., 2008	Theory of planned behavior	Delphi method (212 SME managers/owners)	Subjective norm and attitude constructs are important predictors of e-commerce adoption intention

CHINA	Tan et al., 2007	Perceived e-readiness model	Delphi method (134 SME's)	Contextual and organizational factors affect B2B e-commerce adoption
	Zhang and Moussi, 2007	Level of IT adoption	Empirical study (141 MBA/executive course participants)	Levels of internet usage: using emails and, buying and selling online
	Lai et al., 2006	TOE	Empirical study (307 trading companies)	Network externalities and enablers of information adoption
	Efendioglu and Yip, 2004	Diffusion innovation	Empirical study (252 consumers)	Infrastructural, social, and economic factors are main facilitators
FINLAND	Anckar, 2003	Rational consumer behavior	Empirical study(479 consumers)	Shopping and distribution efficiency, accessibility and convenience
HOLLAND	Sadowski, 2002	Diffusion innovation	Empirical study (264 Dutch SMEs)	The effects of communication requirements, competitive pressure, and support incentives on internet adoption
INDIA	Lal, 2005	Diffusion innovation	Empirical study (51 companies)	Management entrepreneurship, exports intensity and technology collaboration
INDONESIA	Kumia, 2006	TOE	Exploratory (secondary data)	Government initiatives, economic/political/socio-cultural conditions, technology infrastructure, geographic condition, and public awareness
IRAN	Elahi and Hassanzadeh, 2009	Perceived e-readiness/ TOE	Empirical study (27 companies)	Technical, organizational, and inter-organizational factors
	Sarlak and Hastiani, 2008	TOE	Delphi method (25 panel members)	Negative effects of infrastructure, property rights, trust, the shortage of HR factors on e-commerce adoption
NEPAL	Kshetri, 2007	Diffusion innovation	Case study (Thamel.com)	Effects of economic, socio-political, negative cognitive factors on e-commerce adoption
NEW ZEALAND	Sarkar, 2008	Diffusion innovation	Case study	Effects of organizational, management support, new markets, communication factors on e-commerce adoption
	Al Qirim, 2007	TOE	Empirical study (129 SME's)	Technological, organizational, environmental, and entrepreneurial (management innovativeness and involvement) factors
SINGAPORE	Teo et al., 2009	TOE	Empirical study (141 companies)	B2B firm size, top management support, perceived indirect benefits, and factors influencing business partners
	Teo and Ranganathan, 2004	TOE	Empirical study (108 companies)	Providing management support, improving customer service, enhancing competitive advantage, extending market reach, and providing new services
	Wong, 2003	Technology diffusion	Exploratory (secondary data)	Technology infrastructure and external pressure (global and regional)
	Kendall et al., 2001	Diffusion innovation	Empirical study (58 SMEs)	Perceived characteristics of innovation: competitive advantage, compatibility and trialability factors
	Kowtha and Choon, 2001	Resource based view	Empirical study (135 firms)	Competitive intensity, firm size, and existing competencies
	Teo et al., 1998	Contingency, TOE	Empirical study (188 companies)	Organizational and technological factors
TAIWAN	Thatcher et al., 2006	TOE	Empirical study (20 CEO, MIS managers)	Organizational, industrial, governmental, and cultural factors
UK	Battisti, 2009	Inter- and intra-firm diffusion	Empirical study (6797 enterprises)	Heterogeneity of firms, innovative activities, labor force skills, and market externalities
	Wang and Ahmed, 2009	TOE	Empirical study (88 family businesses)	Factors reflecting external pressure and perceived benefits
USA	Hong and Zhu, 2006	Technology diffusion	Empirical study (1036 firms)	Web functionalities and spending and externally oriented organizational systems
	Grandon and Pearson, 2004	TOE/TAM	Empirical study (128 SME managers)	Organizational readiness, external pressure, the perceived ease of use, and perceived usefulness
USA/CHINA	Pavlou and Chai, 2002	TPB	Empirical study (58 (China), 55 (U.S) e-consumers)	Culture, competitive advantage, the ease of use, compatibility, image, trust, and result demonstrability

Some issues that may be trivial in developed countries (e.g., tolerance of failures, particularly in the area of B2B e-commerce) may play a crucial role in e-commerce adoption in developing countries (Tan et al., 2007). In particular, Molla and Licker's (2005) perceived e-readiness model, which includes organizational e-readiness and perceived external e-readiness, covers a large number of factors that may influence e-commerce adoption in developing economies. They suggested that businesses should identify the factors that could facilitate their successful transformation, and then focus their strategies and resources on those factors (Molla and Licker, 2005).

In addition, several studies examined the key factors of e-commerce adoption, such as various cultures, environments, and policies, by systematically comparing case studies across countries, and proposed that a country's culture influences online purchase intentions (Van Slyke et al., 2010). However, fewer studies have focused on developing countries than on developed countries and empirical evidence has lagged behind theoretical development (Keoy, 2006). In particular, previous studies focusing on Uzbekistan have been limited to general topics such as ICT development trends and the level of internet users. Few studies have considered the effects of current government initiatives and programs on the e-commerce environment.

Recently, the level of interest in developing theories and implications about e-government has

been increasing in the country. Recent studies have typically explored the main obstacles to government development and provided partial implications (Rakhmanov, 2009). Thus, few studies have addressed e-commerce facilitators and enablers as well as current challenges and their implications for Uzbekistan.

III. Research Method and Design

3.1 Research Method

To identify the facilitators of e-commerce diffusion, we used the Delphi method, which was developed by RAND Corporation. The method, which has been used mainly for evaluating national science and technology policies, consists of a survey involving two or more rounds and provides the participants in next round with the results of previous rounds so that they can alter the original assessments as necessary (Cuhls, 2000). Linstone and Turoff (1975) characterized the method as follows:

Method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. To accomplish this "structured communication" there is provided: some feedback of individual contributions of information and knowledge; some assessment of the group judgment or view; some opportunity for individuals to

*revise views; and some degree of anonymity
for the individual responses*

The method, which has been employed mainly for cases in which judgmental information is indispensable, permits the collection of richer data for a deeper understanding of the fundamental research questions and is desirable in that it does not require the experts to meet physically (Okolli and Pawlowski, 2004). The Delphi method can be a flexible research instrument when there is incomplete knowledge about phenomena, and is well-suited for exploring new concepts; increasing the level of awareness of issues and opportunities; developing respective forecasts and validating various research areas (Skulmoski et al., 2007). The Delphi method has been widely used in MIS and IT research, particularly, in e-commerce adoption. Altobella et al. (2000) employed this method to examine and predict e-commerce adoption intentions among 212 managers and owners of SMEs in Chile by using the theory of planned behavior. Tan et al., (2007) examined the contextual and organizational factors influencing B2B e-commerce adoption among 134 Chinese SMEs. Sarlak and Hastiani (2008) used the method with 25 panel members and found that infrastructural and legal issues were the main obstacles to e-commerce adoption in Iran's special economic zones.

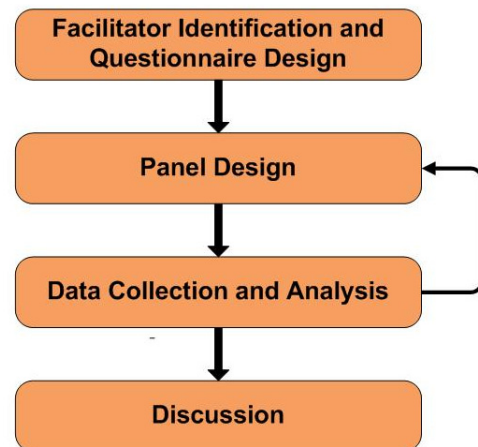
Using the Delphi approach in the initial stage of theory development for e-commerce adoption in

developing countries is valuable in that the method derives information from a panel composed of members, experts with considerable experience and knowledge. In fact, this approach strengthens the grounding of the theory and extends the generalizability of the resulting proposition or theoretical framework (Okolli and Pawlowski, 2004). In the present study, we used a series of questionnaires with panel members as well as controlled opinion feedback.

3.2 Research Design and Data Collection

The survey was composed of four stages: facilitator identification and questionnaire design; panel design data collection and analysis and discussion (Figure 1).

In the initial stage of the survey, the main issues were analyzed, previous research was reviewed, the main objectives and time-periods were set,



<Figure 1> Research procedure with the Delphi method

and the essential aspects and issues were discussed.

Step 1. Facilitator identification and questionnaire design

We constructed a possible list of potential e-commerce facilitators based on the literature review. The initial questionnaire consisted of approximately 40 items. However, after the pilot test and in-depth discussions, the questionnaire items were analyzed and re-arranged into more accurate and easy-to-understand variables. After an extensive review of previous research and another review process, we designed accurate and reasonable questionnaire with 26 items prior to the start of the Delphi rounds. These 26 items were classified into six groups of facilitators influencing e-commerce adoption (Table 2):

1. **Technology Infrastructure:** *Technological factors or determinants such as information and communication infrastructure, hardware*

and software, the Internet, ISPs(internet service providers), and e-commerce technologies.

2. **Legal Environment/Support:** *Environmental and government related facilitators such as the legal framework and government support.*

3. **Industrial Environment:** *Market and industrial service related facilitators such as e-commerce services (e.g., digital signatures and banking services), and the level of awareness of the Internet and e-commerce*

4. **Business Organization:** *Organizational determinants of e-commerce facilitation, such as new businesses or markets, productivity improvements, and relationships with customers and suppliers.*

5. **Economic/Political Environment:** *Economic/ political facilitators such as economic growth and political stability*

6. **Socio-cultural Environment:** *The degree of willingness to transform and trust*

<Table 2> Questionnaire items and related studies

Facilitators	Questionnaire items	Related studies
TECHNOLOGY INFRASTRUCTURE	Increasing the number of users accessing the Internet from various access points	Elahi and Hassanzadeh (2009), Sarkar (2008), Sarlak and Hastiani (2008), Farhoomand et al., (2000),Zhang and Moussi (2007), Kshetri (2007), Al Qirim (2007), Teo et al. (2007), Hong and Zhu (2006), Kurnia (2006), Thatcher et al. (2006), Efendioglu and Yip (2004), Grandon and Pearson (2004), Drew (2003), Anckar (2003), Julta et al. (2002), Kowtha and Choon (2001), Teo et al. (1998)
	Increasing availability of high-speed internet networks	
	Increasing the availability of the Internet by offering a wide range of access points such as residences, organizations, institutions, public internet cafés and mobile phones	
	Increasing the competitiveness of ISP companies and offering reasonable pricing mechanisms (e.g., flat pricing or free trial periods)	
	Building robust ICT infrastructure and developing new technologies related to e-commerce (e.g., mobile and ubiquitous technologies)	
	Increasing the availability of hardware and software for	

	e-commerce and reducing costs	
LEGAL ENVIRONMENT/ SUPPORT	Adopting legal frameworks for encouraging electronic payment and credit/debit card services	Al Qirim (2007), Kshetri (2007), Tan et al. (2007), Keoy et al. (2006), Thatcher et al. (2006), Thatcher et al. (2006), Kurnia (2006), Grandon and Pearson (2004), Wagner et al. (2003), Wong (2003), Oxley and Yeung (2001), Farhoomand et al. (2000), Jutla et al. (1999), Gibbs et al. (2002)
	Adopting legal frameworks for regulating e-commerce activities and providing copyright protection	
	Providing legal frameworks or guidelines for protecting privacy and resolving disputes in e-commerce	
	Adopting legal frameworks for prosecuting e-commerce related crimes	
	Providing business incentives to promote e-commerce such as simplified business registration procedures and favorable tax and credit policies	
	Offering government supported programs to promote e-commerce such as e-government and customer/ business education centers	
INDUSTRIAL ENVIRONMENT	Promoting and encouraging digital signature and certification services via institution-based parties (e.g., certification authority) and establishing centers for promoting e-commerce	Elahi and Hassanzadeh (2009), Wang and Ahmed (2009), Sarkar (2008), Kshetri (2007), Al Qirim (2007), Teo et al. (2007), Hafeez et al. (2006), Lai et al. (2006), Kurnia (2006), Molla and Licker (2005), Teo and Ranganathan (2004), Wong (2003), Black et al. (2001), Winer (2001)
	Transforming and improving the logistics industry to make it more suitable to e-commerce	
	Increasing the number of debit/credit card users and establishing of electronic payment and banking services	
	Improving knowledge about the Internet and e-commerce	
BUSINESS ORGANIZATION	Providing opportunities for reaching new local and global markets and offering a full range of product/service information	Sarkar (2008), Teo et al. (2007), Tan et al. (2007), Al Qirim (2007), Rivard et al. (2006), Keoy et al. (2006), Molla and Licker (2005), Teo and Ranganathan (2004), Grandon and Pearson (2004), Wong (2003), Jutla et al. (2002), Kowtha and Choon (2001), Teo et al. (1998)
	Providing opportunities for developing new business models and creating new revenue sources	
	Improving efficiency (e.g., reducing the amount of the time and costs related to marketing through e-commerce)	
	Increasing e-commerce knowledge and awareness among management and staff members	
	Increasing the number of experts in software/hardware related to ICT and e-commerce technologies	
	Improving the relationship with customers and suppliers through transaction efficiency, the ease of communication, better information flow and the ease of selling and buying products or services	
ECONOMIC/ POLITICAL ENVIRONMENT	Improving economic indicators such as increasing GDP, reducing the level of unemployment, and increasing the level of income	Kshetri (2007), Kurnia (2006), Wong (2003), Pavlou and Chai (2002), Gibbs et al. (2002), Kendall et al. (2001)
	Providing long-term political stability and security	
SOCIO-CULTURAL ENVIRONMENT	I think that the desire or willingness to transform traditional commerce into an online one is very high in the country	Wang and Ahmed (2009), Kshetri (2007), Thatcher et al. (2006), Kurnia (2006), Siyal, et al. (2006), Yap et al. (2006), Van Slyke et al. (2005), Brown et al. (2004), Grandon and Mykytyn (2004), Efendioglu and Yip (2004), Teo et al. (1998), Pavlou and Chai (2002)
	I think that the level of trust between business partners is very high	

<Table 3> Panel of Experts

Panel Members	Number of Experts
University Scholars/Professors	9
Managers in business Organizations	8
Uzbekistan ICA staff members	4
UNDP ICT EP experts	2
Doctoral candidates in IT	2
TOTAL	25

The 24 items related to the technology infrastructure, legal environment/support, industrial environment, business organization, and economic/political environment groups were measured by using a seven-point of Likert scales (1: absolutely unimportant 4: neutral 7: absolutely important). The remaining two items (related to the socio-cultural environment group) were measured by using a seven-point of Likert scales (1: absolutely disagree 4: neutral 7: absolutely agree).

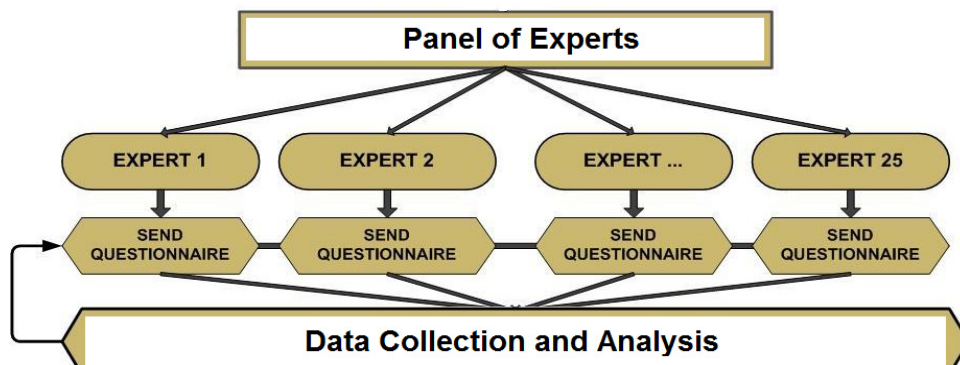
professionals, experts and scholars in areas relevant to e-commerce in Uzbekistan. We prepared a list of 35 experts and contacted them by email or telephone. Only 25 agreed to participate in the panel. As shown in Table 3, the participants were scholars in universities in Uzbekistan (9) managers in business organizations (8), staff members of the Information and Communication Agency of the Republic of Uzbekistan (4), UNDP ICT and e-commerce project experts (2), and doctoral candidates in IT(2).

Step 2: Panel design

The application of the Delphi method involved the creation of a Delphi panel composed of

Step 3: Data collection and analysis

The questionnaire, together with a description of the study and a set of instructions, was e-mailed



<Figure 2> Data Collection, Analysis, and Feedback

to the 25 panel members.

The Delphi method consisted of four rounds. The data collected from each round were analyzed, and the results including the average and standard deviation for each item, were sent to each panel members. The Delphi method requires a rule for terminating the survey round. We ended the round when the standard deviation became stable. The panel members were encouraged to provide comments on the items and add any items they considered to be facilitating variables.

Step 4: Discussion and conclusion

The data collected from the final round were analyzed and used to test the hypotheses. The results have important implications for government, businesses, and researchers respectively.

IV. Analysis, Hypothesis, and Test

2.1 Analysis

Of 25 members, 16 responded to the questionnaire survey in the first round (64% response rate). In the second round, 19 participated (76% response rate). Because the standard deviation did not stabilize after these two rounds, we decided on additional rounds. In both the third and fourth rounds, 18 participated (72%

response rate).

We terminated the survey after the fourth round because there was almost no variation in the standard deviation between the third to fourth rounds (Table 4). After the first round, the two items related to socio-cultural environment were omitted from the list because they measured the attitude or willingness to transform traditional commerce into e-commerce and the level of trust between partners (4.03 mean; 1.15 standard deviation).

In the first round, the average of the highest-ranking item was 6.37 and its standard deviation was 0.957 the average of the lowest-ranking item was 5.44 and its standard deviation was 1.861. The average of all items was 5.79 and the standard deviation was 1.376 (Table 4). In the second round, the average of the highest-ranking item was 6.56 and its standard deviation was 0.511; the average of the lowest-ranking item was 5.67 and its standard deviation was 0.686. The average of all items was 6.15 and the standard deviation was 0.681. Third round provided the same results as the second round for the highest-ranking item. The average of the lowest item was 5.61 and its standard deviation was 0.608. The fourth round provided slightly different results. The average of the highest-ranking item was 6.50 and its standard deviation was 0.514. The average of the lowest-ranking item and its standard deviation were the same as those of the second round. The standard deviation for the importance of the

<Table 4> Analytical Results by Survey Rounds

No.	ITEM	1st ROUND		2nd ROUND		3rd ROUND		4th ROUND	
		AVG*	(SD)**	AVG	(SD)	AVG	(SD)	AVG	(SD)
1	Increasing the number of users accessing the Internet from various access points	5.68	(1.302)	6.56	(0.511)	6.56	(0.511)	6.50	(0.514)
2	Increasing the availability of high speed internet networks	5.93	(1.389)	6.56	(0.616)	6.50	(0.514)	6.44	(0.511)
3	Increasing the number of experts in software/hardware related to ICT and e-commerce technologies	6.00	(1.366)	6.56	(0.707)	6.44	(0.616)	6.44	(0.616)
4	Adopting legal frameworks for encouraging electronic payment and credit/debit card services	6.06	(1.063)	6.28	(0.669)	6.39	(0.502)	6.39	(0.502)
5	Increasing the number of debit/credit card users and establishing electronic payment and banking services	6.06	(0.998)	6.28	(0.752)	6.33	(0.686)	6.33	(0.686)
6	Building robust ICT infrastructure and developing new technologies related to e-commerce (e.g., mobile and ubiquitous technologies)	6.37	(0.957)	6.33	(0.686)	6.33	(0.686)	6.33	(0.686)
7	Adopting legal frameworks for regulating e-commerce activities and providing copyright protection	6.06	(0.929)	6.28	(0.669)	6.28	(0.575)	6.28	(0.575)
8	Providing legal framework or guidelines for protecting privacy and resolving disputes in e-commerce	6.06	(1.181)	6.28	(0.669)	6.28	(0.669)	6.28	(0.575)
9	Improving the relationship with customers and or suppliers through transaction efficiency, the ease of communication, better information flow, and the ease of selling and buying products or services	5.68	(1.250)	6.22	(0.647)	6.28	(0.575)	6.28	(0.669)
10	Providing opportunities for reaching new local and global markets and offering full range of products/service information	6.06	(1.124)	6.28	(0.461)	6.22	(0.428)	6.28	(0.461)
11	Increasing the availability of hardware and software for of e-commerce and reducing costs	5.81	(1.109)	6.22	(0.647)	6.22	(0.647)	6.22	(0.428)
12	Adopting legal frameworks for prosecuting e-commerce related crimes	5.62	(1.708)	6.17	(0.514)	6.22	(0.428)	6.22	(0.647)
13	Providing business incentives to promote e-commerce, such as simplified business registration procedures, favorable tax and credit policies	5.75	(1.291)	6.17	(0.707)	6.17	(0.618)	6.22	(0.647)
14	Improving knowledge about the Internet and e-commerce	5.87	(1.147)	6.22	(0.732)	6.17	(0.618)	6.17	(0.618)
15	Transforming and improving the logistics industry to make it more suitable to e-commerce	5.94	(1.692)	6.11	(0.583)	6.11	(0.583)	6.11	(0.583)
16	Offering government-supported programs to promote e-commerce, such as e-government and costumer/business education centers	5.44	(1.861)	6.00	(0.686)	6.06	(0.639)	6.06	(0.639)
17	Increasing the availability of the Internet availability by offering a wider range of access points such as residences, organizations, institutions, public internet cafés, and mobile phones	5.62	(1.088)	6.06	(0.539)	6.06	(0.539)	6.00	(0.594)
18	Increasing the competitiveness ISP companies and offering reasonable pricing mechanisms (e.g., flat pricing or free trial periods)	5.62	(2.125)	6.00	(0.767)	6.00	(0.686)	6.00	(0.686)
19	Promoting and encouraging digital signature and certification services via institution-based parties (e.g., certification authority) and promoting e-commerce centers	5.56	(1.548)	5.94	(0.802)	5.94	(0.802)	5.94	(0.639)

20	Improving economic indicators, such as increasing GDP, reducing the level of unemployment, and increasing the level of income	5.56	(1.590)	5.94	(0.639)	5.94	(0.639)	5.94	(0.802)
21	Increasing e-commerce knowledge and awareness among management and staff members	5.62	(1.408)	5.89	(0.676)	5.89	(0.583)	5.89	(0.583)
22	Opening opportunity for developing new business models and creating new revenue sources	5.44	(1.094)	5.94	(0.639)	5.89	(0.583)	5.89	(0.583)
23	Improving efficiency (e.g., reducing the amount of time and costs related to marketing through e-commerce)	5.56	(1.750)	5.78	(0.732)	5.83	(0.618)	5.83	(0.618)
24	Providing long-term political stability and security	5.56	(1.711)	5.67	(0.686)	5.61	(0.608)	5.61	(0.608)
TOTAL AVG (SD)		5.79	(1.376)	6.15	(0.681)	6.16	(0.629)	6.15	(0.632)

* AVG: Average;

** SD: Standard deviation

facilitating factors decreased from 1.376 in the first round to 0.632 in the fourth round, whereas it increased by 0.361 from 5.792 to 6.153.

Based on the analysis of data and careful review of previous research, we classified the items into 15 facilitators, which were further

classified into five facilitating factors: the technology infrastructure, legal environment/support, industrial environment, business organization, and economic/political environment factors (Table 5).

<Table 5> Analysis Summary

FACILITATING FACTORS		ITEM*	AVERAGE (SD)	AVERAGE (SD)
TECHNOLOGY INFRASTRUCTURE (Y1)	THE INTERNET	1, 2, 17, 18	6.250 (.383)	6.264 (.318)
	ICT INFRASTRUCTURE	6, 11	6.278 (.352)	
LEGAL ENVIRONMENT AND SUPPORT (Y2)	LEGAL FRAMEWORK	4, 7, 8, 12	6.292 (.376)	6.201 (.327)
	GOVERNMENT SUPPORT	13, 16	6.111 (.583)	
INDUSTRIAL ENVIRONMENT (Y3)	DIGITAL CERTIFICATION SERVICES	19	5.944 (.639)	6.139 (.323)
	LOGISTICS SERVICES	15	6.111 (.583)	
	BANKING SERVICES	5	6.333 (.686)	
	USER'S KNOWLEDGE	14	6.167 (.618)	
BUSINESS ORGANIZATION (Y4)	NEW MARKET AND REVENUE SOURCES	10, 22	6.083 (.393)	6.102 (.303)
	IMPROVING EFFICIENCY	23	5.833 (.618)	
	MANAGEMENT	21	5.889 (.583)	
	HUMAN RESOURCES	3	6.444 (.616)	
ECONOMIC/POLITICAL ENVIRONMENT (Y5)	CUSTOMERS/SUPPLIERS	9	6.278 (.669)	5.778 (.392)
	ECONOMIC DEVELOPMENT	20	5.944 (.802)	
	POLITICAL STABILITY	24	5.611 (.608)	

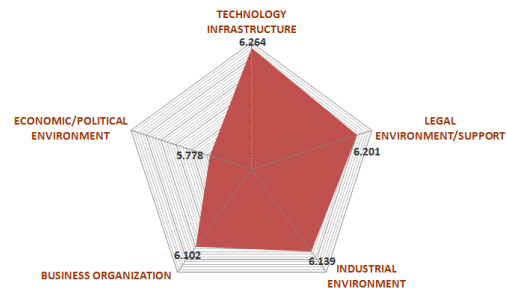
* The item number is from Table 4

First, the 24 items were classified into 15 facilitators (Table 5). For example, because Item 1 in the Table 4 is related to the number of internet users, Item 2 is related to the speed of the Internet, Item 17 is related to the availability of the Internet, and Item 18 is related to the internet service provider, we categorized these items as the Internet. Items 6 and 11 were related to advanced ICT, and thus, we categorized these items as ICT infrastructure.

Second, we classified these 15 facilitators into five facilitating factors (Table 5). We classified the facilitators "the Internet" and "ICT infrastructure" into the technology infrastructure factor and the facilitators "legal framework" and "government support" into the legal environment/support factor. Services such as digital certification, logistics, and banking, and the user's knowledge of e-commerce depend on industry, and thus, we classified these into the industrial environment factor. New markets/revenue resources, efficiency improvements, human resource management, and relationships with customers and suppliers are associated with business organizations, and thus, we classified these four facilitators into the business organization. Similarly, we classified economic development (e.g., increasing GDP and income level; reduced unemployment) and political stability into the economic/political environment factor.

As shown in Table 5, the average importance of technology infrastructure (reflecting the Internet

and ICT infrastructure) in facilitating e-commerce was 6.264 and its standard deviation was 0.318, The average importance of the economic/political environment factor was 5.778, and its standard deviation was 0.392. Figure 3, using a radar chart, shows the importance of the five facilitating factors. Technology infrastructure was the most important factor in diffusing e-commerce in Uzbekistan, and it was followed by legal environment/government support, industrial environment, business organization, and economic/ political factors, in that order.



<Figure 3> The Importance of Facilitating Factors

4.2 Hypothesis and Test

The following 10 hypotheses, derived from results shown in Table 5, address the difference in the importance of five facilitating factors.

H₁: There is a difference in the importance of the technology infrastructure and legal environment/support factors

H₂: There is a difference in the importance of the technology infrastructure and industrial environment factors

H₃: There is a difference in the importance of the

technology infrastructure and business organization factors

H₄: *There is a difference in the importance of the technology infrastructure and economic/political environment factors*

H₅: *There is a difference in the importance of the legal environment/support and industrial environment factors*

H₆: *There is a difference in the importance of the legal environment/support and business organization factors*

H₇: *There is a difference in the importance of the legal environment/support and economic/political environment factor*

H₈: *There is a difference in the importance of the industrial environment and business organization factors*

H₉: *There is a difference in the importance of the industrial environment and economic/political environment factors*

H₁₀: *There is a difference in the importance of the business organization and economic/political environment factors*

We conducted a one-way ANOVA to test 10 hypotheses. Prior to their test, Levene's test was used to assess the equality of variances indifferent samples. Levene statistic was 0.662 and the observed significance level is 0.620 which is greater than 0.05. The null hypothesis that the population variances are equal is acceptable. Thus, the homogeneity of variance is confirmed. The level of significance was 0.000 and the F ratio was 5.744. Table 6 shows the results.

V. Discussion and Implications

5.1 Discussion

The mean for the importance of facilitators increased from 5.792 in the first round to 6.153 in

<Table 6> Hypothesis Test

Hypothesis	Mean Difference (I-J)	The level of Significance	Results
H1 Y1-Y2	.625	.989	Not Supported
H2 Y1-Y3	.125	.867	Not Supported
H3 Y1-Y4	.162	.714	Not Supported
H4 Y1-Y5	.486	.002*	Supported
H5 Y2-Y3	.625	.989	Not Supported
H6 Y2-Y4	.099	.938	Not Supported
H7 Y2-Y5	.424	.009*	Supported
H8 Y3-Y4	.037	.998	Not Supported
H9 Y3-Y5	.361	.040**	Supported
H10 Y4-Y5	.324	.086	Not Supported

*P <= 0.01.

** P<=0.50.

the fourth round, while the standard deviation decreased from 1.376 to 0.632. This indicates that the panel members were in general agreement in the fourth round.

The most important facilitator of e-commerce was technology infrastructure (average: 6.264 SD: 0.318), which was followed by the legal environment/support (average: 6.201 SD: 0.327), industrial environment (average: 6.139 SD: 0.323), business organization (average: 6.102 SD: 0.303), and economic/political environment (average: 5.778, SD: 0.392) factors, in that order

Of the 24 items, the top 5 were

- *1 Increasing the number of users accessing the Internet from various access points*
- *1 Increasing the number experts in software/hardware related to ICT and e-commerce technologies*
- *1 Adopting legal frameworks for encouraging electronic payment and credit/debit card services*
- *1 Increasing the number of debit/credit card users and establishing electronic payment and banking services*
- *1 Increasing the availability of high-speed internet networks*

As shown in Table 6, H1, H2, H3, H5, H6, H8 and H10 were not supported, whereas H₄ and H₇ were supported at the 1% level of significance. H₉ was supported at the 5% level of significance. The results indicate that there were no significant differences between the technology infrastructure, legal environment/support, industrial environment, and business organization factors. The technology

infrastructure, legal environment/support, and industrial environment factors were considered to be more important in facilitating e-commerce than the economic/political environment factor.

According to the market-based view (Porter, 2001), competitive advantage depends on the industrial environment and the market. On the other hand, organizational competence, including resources and skills, plays a critical role in competitive advantage from the perspective of the resource-based view (Barney et al., 1991; Zhuang and Lederer, 2006). This study considers the technology infrastructure, legal environment/support, and industrial environment factors to be associated with the market-based view and business organization factor to be associated with the resource-based view. The present results imply that efforts and motives of business organizations are just as important as those of governments and industries. Thus, the results provide support for both the market- and resource-based views.

5.2 Implications

The results have several important implications for governments, practitioners and researcher. The results suggest that the governments in developing countries should focus on providing better ICT environments for businesses and implementing more focused and better designed policies to more effectively facilitate e-commerce.

First, Uzbekistan should expand the number of internet users in the country through better ICT infrastructure and increased internet availability by developing and implementing policies that would support the following activities:

- Building robust ICT infrastructure such as high-speed communication lines and networks
- Increasing fast and convenient internet availability for organizations and users
- Encouraging competitive ISPs
- Supporting the development of e-commerce tools

Second, governments in developing countries should provide comprehensive legal frameworks promoting the vitalization of e-commerce and eliminating its impediments, and offer support and incentive including the following:

- Reforming laws and institutions to encourage e-payment and credit/debit card services
- Building trust through copyright protection, protecting privacy, resolving disputes, etc.
- Supporting e-commerce projects and sponsorship programs for e-commerce organizations and establishing e-commerce promotion centers

The results indicate that e-transformation and progress in industrial sectors such as banking and

logistics have a positive effect on the diffusion of e-commerce. An appropriate level of government support must be in place for facilitating e-commerce adoption among organizations and encouraging interested parties. Thus, providing appropriate business incentives such as more favorable tax and credit policies are important in effectively implementing various e-commerce initiatives.

Third, governments should encourage and initiate e-commerce adoption by promoting or forcing to some extent the implementation of advanced technologies for e-commerce, and increase the level of awareness of e-commerce benefits. Governments should also develop and implement attractive credit and investment plans for firms that lack financial resources but are willing to participate in and take advantage of e-commerce.

Finally, the overall economic growth and political stability of the country would ensure stable business development and the steady growth of national and household income. This can in turn make business organizations to be more confident in their adoption of e-commerce and increase the willingness of consumers to experience new types of shopping trends.

Enterprises must recognize the strategic benefits of e-commerce such as cost savings, increased revenues, good relationships with customers and suppliers, and new business opportunities. In the era of globalization, e-commerce is necessary, not optional. E-commerce

is inevitable to keep competitiveness in the long-run (Teo et al., 2009). Thus, the devotion, support, and initiative of the management are critical in the initial stage of e-commerce adoption. Those companies considering new types of business models in Uzbekistan are more likely to have more opportunities and advantages than traditional firms. Thus, business organizations should increase their awareness and knowledge of e-commerce by closely interacting and communicating with e-commerce experts. According to Nambisan and Wang (2000), the higher the barriers to knowledge, the later the adoption of web technology is.

In terms of implications for researchers, all the items and factors identified as facilitators of e-commerce adoption can be a theoretical foundation for empirical research. The technology infrastructure and legal environment/support factors are associated with technology push, whereas the business organization factor reflects demand pull. The industrial environment factor is related to both. From the perspective of industrial infrastructure for e-commerce, technologies related to e-commerce such as digital certification and signature, logistics, and online banking systems are critical areas that need to be developed. The industrial environment factor also reflects demand pull because digital certification, logistics, and online banking services provide a wide range of opportunities to new businesses. Practitioners can use all the items and factors in the present study as a guideline for

evaluating e-commerce adoption.

VI. Conclusions

It is difficult for governments and firms in recently developing or transition economies (e.g., Uzbekistan) to adopt e-commerce and use new business methods to gain competitive advantage. The present study explores the factors that may facilitate and enable the adoption of e-commerce in Uzbekistan by applying the Delphi method. The Delphi method is a good approach for identifying e-commerce facilitators in developing countries such as Uzbekistan. The results suggest that the technology infrastructure, legal environment/support, industrial environment, business organization, and economic/political environment factors can positively facilitate e-commerce adoption. As shown in Table 7, Al Qirim (2007) proposed technological, organizational, and environmental factors as facilitators of e-commerce in New Zealand through an empirical study. Our research stresses the importance of technology infrastructure and government's roles when compared with previous studies.

Table 8 shows the finding of Sarlak and Hastiani (2008)'s study with that of our study. Our study suggests facilitators of e-commerce while Sarlak and Hastiani (2008) refer to barriers to e-commerce. Technology infrastructure and legal environment/government support play important

<Table 7> Comparison of Study Results

Our Study <i>Uzbekistan</i>		Al Qirim, (2007) <i>New Zealand</i>	
TECHNOLOGY INFRASTRUCTURE	THE INTERNET	TECHNOLOGICAL	RELATIVE ADVANTAGE
	ICT INFRASTRUCTURE		COMPATIBILITY
LEGAL ENVIRONMENT AND SUPPORT	LEGAL FRAMEWORK		COMPLEXITY
	GOVERNMENT SUPPORT	ORGANIZATIONAL	TOP MANAGEMENT SUPPORT
BUSINESS ORGANIZATION	NEW MARKET AND REVENUE SOURCES		ORGANIZATIONAL READINESS
	IMPROVING EFFICIENCY		INFORMATION INTENSITY
	MANAGEMENT		MANAGERIAL TIME
	HUMAN RESOURCES	ENVIRONMENTAL	INDUSTRY PRESSURE
CUSTOMERS SUPPLIERS	GOVERNMENT PRESSURE		
INDUSTRIAL ENVIRONMENT	DIGITAL CERTIFICATION SERVICES		CONSUMER READINESS
	LOGISTICS SERVICES		SUPPORT FROM TECHNOLOGY VENDORS
	BANKING SERVICES		
	USER'S KNOWLEDGE		
ECONOMIC/ POLITICAL ENVIRONMENT	ECONOMIC DEVELOPMENT		
	POLITICAL STABILITY		

roles as facilitators of e-commerce as well as inhibitors. Our study suggested industrial environment and business organization factors as facilitators, whereas Sarlak and Hastiani (2008)

presented mistrust of e-payments and financial barriers as inhibitors.

<Table 8 > Comparison of Study Findings

Our Study	Sarlak and Hastiani (2008)
<i>Facilitators of E-commerce in Uzbekistan</i>	<i>Inhibitors of E-commerce in Iran</i>
TECHNOLOGY INFRASTRUCTURE	TECHNOLOGY INFRASTRUCTURE
LEGAL ENVIRONMENT AND SUPPORT	LEGAL ENVIRONMENT AND SUPPORT
INDUSTRIAL ENVIRONMENT	MISTRUST OF E-PAYMENTS
BUSINESS ORGANIZATION	FINANCIAL BARRIERS
ECONOMIC/ POLITICAL ENVIRONMENT	SHORTAGE OF IT SKILLS

Thus, future research should investigate not only facilitators, but also barriers to or non-adopters of e-commerce, which should provide a better understanding of the overall e-commerce environment. In addition, comparative studies of countries with highly effective policies and environments would be beneficial. Because e-commerce in Uzbekistan is currently in its initial stage, such comparative studies would be valuable in designing effective and constructive e-commerce adoption models and frameworks for the country.

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현재 동국대학교(경주캠퍼스) 경영·관광대학 정보경영학과 교수로 재직 중이다. 부산대학교에서 경영학박사 학위를 취득하였다. 주요 관심분야는 전자상거래와 e-비즈니스 전략/모형/개발방법론, 시맨틱 웹, 상황 인지 및 유비쿼터스 응용, 지식경영, 웹기반 DSS 등이다. 경영학연구, 경영정보학연구, 한국경영과학회지, International Journal of Computer-Human Studies, Journal of Sustainable Tourism, Decision Support Systems, Information Systems Management, International Journal of Industrial Engineering, Expert Systems with Applications, Journal of Computer Information Systems 등에 다수의 논문을 게재하였다.

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<Abstract>

Using the Delphi Approach to Identify e-Commerce Facilitators: The Case of Uzbekistan

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E-commerce is a relatively new but rapidly developing industry and global phenomenon. Uzbekistan, as developing country, has recognized that strong economic development is associated with the adoption and development of e-commerce industry. In this regard, the present study identifies the main facilitators of e-commerce in a developing country and provides some important implications. Four rounds of the Delphi method conducted for a survey involving a panel of experts from various organizations associated with e-commerce, indicate a total of 24 items representing five facilitating factors. The results indicate no significant differences among factors reflecting technology infrastructure, the legal environment/support, the industry environment, and business organizations and suggest that technology infrastructure, the legal environment/support, and the industry environment are more important facilitators of e-commerce than the economic and political environment. The results have important practical and theoretical implications.

Keywords: E-commerce, E-commerce Adoption, Delphi Method, Facilitator

<국문초록>

델파이 기법을 활용한 전자상거래 촉진요인 분석: 우즈베키스탄의 사례

주재훈 · 이스마틸라 노르마토프

우즈베키스탄과 같은 개발 도상국에서 전자상거래란 비교적 새롭고 경제 발전에 기여할 수 있는 산업이다. 이러한 관점에서 개발도상국에 적합한 전자상거래 촉진 요인을 연구하여 그 함축적 의미를 제공할 필요가 있다. 본 연구는 전자상거래 촉진요인을 파악하는데 델파이 기법을 적용하였다. 전자상거래 관련 전문가 패널을 구성하여 4차례의 조사를 통해 전자상거래를 촉진하는 24개 변수를 식별하였다. 이들 24개 변수는 기술 인프라, 법률 환경과 지원, 산업 환경, 조직, 경제와 정치적 환경이라는 5개의 촉진요인으로 분류되었다. 기술 인프라, 법률 환경과 지원, 산업 환경, 조직 요인은 경제와 정치적 요인보다 중요한 것으로 파악되었다. 본 연구는 개발도상국에서 전자상거래를 촉진하기 위해 필요한 함축적 의미를 정부기관, 연구자, 기업의 실무자 관점에서 제안하였다.

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