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Critical Success Factors for Electronic Commerce: Comparative Analysis between Korea and U.S.A.

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The three main purposes of this paper are to (1) identify critical success factors (CSF's) for electronic commerce (EC), (2) investigate the explanatory power of these CSF's on firm performance, and (3) compare differences in evaluating CSF's and explaining impact of CSF's on performance between Korean and U.S.A. EC managers. Through a literature review and interviews with managers in EC firms, a list of 16 CSF's consisting of 111 items was compiled. In the second stage, questionnaires were administered to managers of EC companies in Seoul, Korea and Texas, U.S.A. Survey results show that CSF's have very significant explanatory power for firm performance in both Korean and U.S.A. While security, privacy, technical expertise, information about goods/services, and variety of goods/services are the most explanatory CSF's in Korea, evaluation of EC operations, technical expertise, and ease of use show most explanatory power in U.S.A. This analysis confirms the fact that customers use EC if they feel comfortable about navigating EC for information about a variety of goods/services without technical difficulty and in a secure and private way.

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Ⅰ. Introduction

OECD (Organization for Economic Co-Operation and Development) officially acknowledges EC (Electronic Commerce) as a new way of conducting business [1999]. In this report, OECD recognizes that EC has the potential to radically alter economic activities and the social environment. Particularly, the enormous growth of EC along with the rapid development of information technology (IT) is having a profound impact on the world economy. EC allows regional businesses and economies to be less local and more global in keeping with long-term trends toward market liberalization and reduced trade barriers [Brynjolfsson and Kahin, 2000]. Accordingly, EC is considered to be an unavoidable alternative for companies of the 21st century [Adam, *et. al.*, 1999; Westland and Clark, 1999].

According to U.S. Department of Commerce, almost half of the U.S. workforce will be employed by industries that are either major producers or intensive users of information technology products and services by 2006. Internet-related jobs grew 29% between the first quarter of 1999 and the first quarter of 2000 compared to 6.9% growth of non-Internet related jobs during the same period. The Internet economy generated an estimated $830 billion in revenue in 2000, a 58% increase over 1999 (Cisco Systems and the University of Texas at Austin, 2001).

There is a critical question emerging under this explosive EC growth. What is management "best practices" of successful EC firms? In this respect, the primary purpose of this paper is to explore what are the CSF (Critical Success Factor)'s for EC companies. Another related question is the validity of these CSF's. Do CSF's actually impact firm performance? Thus, the secondary purpose is to investigate explanatory power of selective CSF's on firm performance. OECD [1999] report indicates that there is a great difference on the growth of EC and impact of EC over economy and society across the nations in the world. This leads to another academically and practically insightful question. Are there any differences in evaluating CSF's and explaining impact of CSF's on performance across the nations? In this paper, Korea and U.S.A. are selected to perform comparative analyses on theses issues.

The structure of the remainder of the paper is as follows. The following section reviews the literature on CSF's and performance measures. Then the research design section describes operational measures and data collection processes. Next, survey results are presented and important research findings and implications are discussed. Finally, section 5 summarizes findings, draws the conclusions, and provides future research directions.

Ⅱ. Literature Review

The number of U.S. firms engaging in EC has increased from just under 8% in 1999 to over 35% by the end of 2000 [eMarketer, 2000]. But, a key question is how many of these firms grow and prosper? The rapid rise and fall of many dot.com companies indicates that we should look at what factors should be seriously considered to measure EC success.

2.1 Critical Success Factors for Electronic Commerce

There have been few studies explicitly examining CSF's for EC. Rather, most studies implicitly suggest a range of important factors or issues, which may be considered to be CSF's.

Huff *et al.* [2000] emphasize nine CSF's for EC firms: First, add value in terms of convenience, information value, disintermediation, reintermediation, price, and choice; Second, to focus on a niche market and then expand; Third, maintain flexibility; Fourth, segment geographically; Fifth, get the technology right; Sixth, manage critical perceptions; Seventh, provide exceptional customer services; Eighth, create effective connectedness; and ninth, understand the Internet culture. Through case studies, Tabor [1998] suggests that a synergistic relationship between business strategy and strategic fit is the critical factor for EC success. Plant [1999] studies the success factors associated with over 40 organizations in the US and Europe and identifies the following seven CSF's: financial impact, competitive leadership, brand, service, market, technology, and site metrics.

Hahn and Noh [2000] use CFF's (Critical Failure Factors) to explore the factors that inhibit the growth of EC. They listed 44 variables and through empirical study categorized them into the following 6 CFF's: lower level of data security, inconvenient use, unstable systems, lack of information mind, dissatisfied purchasing, and social disturbance. Regression analysis on performance variables further indicates that unstable system, unsatisfied purchasing, and lower level of data security affect satisfaction while unstable systems and lower level of data security affect usage. CFF's that affect user's expectation of EC usefulness are unsatisfied purchasing, social disturbance, and inconvenient use.

Hagel and Rayport [1997a and 1997b] discuss the implications of consumers taking control of their own information as a result of EC strategy. Their work suggests the importance of information security and privacy as key EC success factors. E (electronic) - Loyalty is targeted by Reichheld and Schefter [2000] to emphasize the trust of customers to a specific EC company. Manchala [2000] also confirms the importance of trust as a critical factor.

To explore web-based electronic commerce opportunities, Riggins [1999] presents a framework that identifies 15 key ways to add value to an organization's e-commerce strategy. The extent to which each of these is utilized represents critical success factors. Similarly, Barua *et al.* [2000c] suggest eight key drivers for EC operational success: system integration, customer orientation of IT, supply orientation of IT, international operation of IT, customer-related processes, supplier-related processes, customer e-business readiness, and supplier e-business readiness.

A number of studies emphasize the importance of EC strategy [Aldridge, Forcht, and Pierson, 1997; Bennett and Eustis, 1999; Klose and Lechner, 1999; Lincke, 1998; Timmers, 1998; Gebauer and Scharl, 1995; Porra, 2000; Jarvenpaa and Tiller, 1999]. Athey [2000] stresses that EC requires leadership as challenges for the future.

Customer-orientation is another critical factor discussed by Elofson and Robinson [1998], Fulkerson [1997] and Gonsalves, *et al.* [1999].

Hoffman and Novak [1997] suggest a new marketing paradigm for EC and a number of researches explore the importance of marketing including pricing mechanisms [Jahng, Jain, and Ramamurthy, 1999; Lee, Westland, and Hong; 1999~2000; Burn and Barnett, 2000; Manchala, 2000; Roberts, 2000].

Another stream of research is on the issue of evaluation and assessment of EC operations and web sites [Selz and Schuert, 1997 and 1998; Strader and Hendrickson, 1998; Burn and Barnett, 2000; Day, 1997; Gebauer and Scharl, 1995]. These researches suggest that effectiveness of EC operations and web sites should be evaluated as EC is considered a strategic necessity.

In summary, the literature review on CSF's for EC indicates a broad range of issues including security of information and systems, privacy of customer information, stability of systems, cost of operations, metrics for EC operations and web sites, ease of use, proper presentation of information about goods and services, customer orientation, EC strategy, EC expertise in both technical and managerial perspectives, payment, delivery, competitive price, speed, service, variety of goods and services, web design, marketing, trust and loyalty of customers. In total a list of 125 specific items was compiled from the literature review.

2.2 Performance of EC Firms

How to measure the success of EC firms? For example, the most successful online seller, Amazon.com, which had less than $1 billion in revenue in 2000, was worth more than long-stablished corporations including Delta Airlines, Kmart, Apple Computer, and Barnes & Noble [Choi and Whinston, 2000]. And as of 2001, Amazon.com had not produced a profit. Even Andy Grove, Chairman of Intel, once mentioned "What's my ROI on e-commerce? Are you crazy? This is Columbus in the New World. What was his ROI?" But in view of such a broad range of often conflicting perspectives and orientations regarding EC success, it is time for researchers to develop valid and reliable measures to evaluate success of EC firms.

Most studies on EC success have been centered on different levels of analysis: national economy, industry, and web sites [Haltiwanger and Jarmin, 1999; Barua, Whinston, and Yin, 2000a and 2000b; Shaw, 1999; Shaw, *et al.*, 2000; Jutla, Bodorik, and Wang, 1999]. There have been few studies that measure the organizational performance of EC companies as does this research.

Organizational performance is a multi-faced construct that defies measurement by a single item and is also an area where much research work is needed [Delone and McLean, 1992]. Two widely used measures of firm performance are Tobin's q ratio, and ROA [Bharadwaj, Sambamurthy and Zmud, 2000]. IS researchers have utilized a variety of dependent variables to represent firm performance, including perceptual measures such as IT assimilation [Armstrong and Sambamurthy, 1999; Boynton, Zmud, and Jacobs, 1994], and objective measures such as ROA, and Tobin's q [Bharadwaj *et al.* 1999; Hitt and Brynjolfsson 1994]. In this study, objective measures of firm performance will be used. Since measures of CSF's will be gathered through questionnaires from manager's perceptions, an objective measure of firm perfor-

mance eliminates potential concerns about methods bias and provides the basis for a robust test of CSF's on firm performance.

Tobin's q ratio (or simply, the q ratio), which is defined as the capital market value of the firm divided by the replacement value of its assets, represents a market-based measure of firm value that is forward looking, risk adjusted, and less susceptible to changes in accounting practices [Montgomery and Wernerfelt 1988]. The q ratio has been widely used in business, economics, and finance literature as a measure of business performance [c.f: Chen and Lee 1995; Hall 1993; Megna and Clock 1993; Simon and Sullivan 1993]. More recently, the q-ratio has also been used in the IS literature to examine the association between IT and firm performance [c.f: Bharadwaj *et al.* 1999; Hitt and Brynjolfsson 1994]. In this sense, the use of Tobin's q as a performance measure is applicable in this study.

In addition to using a market-based measure, EC CSF's and firm performance will also be assessed through return on assets (ROA), a widely used accounting measure in the IT-business value literature [Attewell, 1993; Brynjolfsson, 1993]. Using both marketing and accounting measures of firm performance we can expect more valid research findings and the comparability of measures.

Ⅲ. Research Methodology

3.1 Two-Staged Data Collection

A two-staged data collection methodology was adopted. In the first stage, in-depth interviews were conducted to verify CSF's extracted from literature review. Twenty high-level EC managers from 20 Korean and multi-national EC companies participated. Using a 7-point Likert scale, the list of 125 items was presented to interviewees to evaluate the importance of each item to EC success. Items that scored lower than 4 were removed from the list. After the evaluation, interviewees were asked to eliminate duplicate or similar items and to integrate them if possible. This process removed 14 items from the original list. Then each of twenty participants was asked to categorize 111 items into a number of groups in terms of their commonality. After this grouping, all twenty participants discussed the categorization for further refinement and generalization. Finally, 16 groups were identified as critical success factors for EC success.

In the second stage, uniform questionnaires were administered to EC companies in Korea and U.S.A. A preliminary version of the questionnaire was pilot-tested for accuracy and reliability. Respondents reviewed the questionnaire in the presence of one of the authors and provided feedback regarding wording, understandability, and applicability of the instrument. The original questionnaire used a 7-point Likert scale. However, respondents at the pilot-test indicated that a 5-point scale was more comfortable to answer since they tended to avoid the extreme points. Thus, the 5-point Likert scale was adopted for the study.

3.2 Sample

This study concerns CSF's on firm performance. Thus organization is the level of analysis. Therefore, top managers who are in charge

of EC business of corporations were the target respondents.

About 400 EC companies were listed at Chamber of Commerce in Korea at the end of December 2000. For the sake of convenience, only EC firms in the metropolitan area of Seoul were targeted. This pre-screen process resulted in a sample of 320 firms. To avoid contaminating the sample, recently established companies (that could not provide Tobin's q and ROA) were eliminated. Two hundred and thirty five EC firms were left and were designated

<Table 1> CSF's and Sample Items

CSF's	No. of Items	Sample Items
Customer Relationship **CUSTOMER**	6	Is Web page customized for each customer? How much sensitive to needs of customers?
Privacy of Information **PRIVACY**	7	Is there any illegal use of customer information? Do you honor privacy rights?
Low cost Operation **LOWCOST**	7	What is cost/revenue ratio? What is overhead cost ratio?
Ease of use **EASE**	8	How EASE to recognize menu? Is web page sequence logical?
EC strategy **STRATEGY**	6	Is there EC strategy? Is strategy integrated with IT strategy?
Technical EC Expertise **EXPERTISE**	6	Do you have EC expert(s) in company? Do you have necessary EC technology?
STABILITY of Systems **STABILITY**	8	How often system is disconnected? How constant system is working?
Security of Systems **SECURITY**	8	Do you have enough protection from hacking? How secure customer information?
Plenty of Information **PLENTY**	8	Is there enough Information about goods/services? Is information relevant?
Variety of Goods/Services **VARIETY**	7	Is there variety of goods/services? Do you carry top - brand goods/services?
Speed of Systems **SPEED**	8	How fast is retrieval time? Is speed fluctuates at peak and off times?
Payment Process **PAYMENT**	6	Is customer payment safe? Do you accept variety of payment?
Services **SERVICES**	8	Do you provide A/S? Do you have technical service hot lines?
Delivery of goods/services **DELIVERY**	8	How accurate your delivery to customers? Are Goods delivered are the same as on the screen?
Low Price of Goods/Services **LOWPRICE**	4	Are your prices of goods/services are competitive? Are Shipping and handling charges are reasonable?
Evaluation of EC Operations **EVALUATION**	6	Do you have metrics for EC? Do you have metrics for web sites?

as the target sample. The questionnaire was administered to top EC managers at 235 EC companies from January 15, 2001 to January 19, 2001 by one nationwide Korean newspaper agency. To secure high response rate, newspaper agency reporters visited each EC firm and solicited participation. Out of 203 questionnaires returned, 7 were unusable. Therefore, the final response rate was 83.40% (196 questionnaires). Demographic analysis (comparison of size and sales between respondent and non-respondent companies) did not reveal any significance to suspect sample bias.

In the U.S.A., the State of Texas was selected as the sample frame. This is because one of the authors was participating state-wide EC surveys conducted by the University of Texas at Austin and Great Austin Chamber of Commerce. The University of Texas at Austin and Great Austin Chamber of Commerce designated 358 companies as target sample after careful pre-screening process. The questionnaire was distributed to EC managers at 358 EC companies from October 1 October 31, 2001. One hundred and fifty two questionnaires were returned and 15 were unusable. Therefore, the final response rate was 38.27% (137 questionnaires). Even though this response rate is not quite high compared to Korean sample, it surpasses Brown's [1983] suggested level of 20% in social studies. Again demographic analysis was performed and analysis did not reveal any significance to suspect sample bias.

3.3 Measures

From the first stage of data collection, 16 factors that consist of 111 items were identified.

<Table 2> Descriptive Statistics of Research Variables

CSF's	No. of Items	Korea (n = 196)			U.S.A. (n = 137)		
		Mean	Std. Dev.	Cronbachs	Mean	Std. Dev.	Cronbachs
CUSTOMER	6	3.5459	1.0874	0.8543	3.6326	0.7934	0.7893
PRIVACY	7	3.1046	0.7346	0.7872	3.6423	0.9605	0.8188
LOWCOST	7	3.1565	0.5256	0.8320	3.1004	0.7015	0.8345
EASE	8	3.5595	0.8299	0.8122	3.2044	0.8237	0.7764
STRATEGY	6	2.8699	0.7677	0.7145	2.9343	0.7446	0.7583
EXPERTISE	6	3.1837	0.8394	0.7630	2.9781	0.7851	0.8225
STABILITY	8	2.9311	0.9096	0.8088	2.5000	0.7351	0.8456
SECURITY	8	2.7577	0.7783	0.7753	3.4988	0.8344	0.8312
PLENTY	8	2.9473	0.7867	0.8289	4.0620	0.6737	0.7976
VARIETY	7	3.2449	0.8667	0.8091	3.2409	0.7304	0.7245
SPEED	8	3.6173	0.8132	0.8345	2.8358	0.7744	0.7749
PAYMENT	6	3.1888	0.7746	0.7360	3.1655	0.5334	0.8192
SERVICES	8	2.4362	0.7389	0.7874	2.9854	0.9234	0.8425
DELIVERY	8	4.0663	0.7076	0.7582	3.3577	0.6309	0.7891
LOWPRICE	4	3.3810	0.6572	0.8481	3.1727	0.8246	0.7423
EVALUATION	6	2.8087	0.7564	0.7230	2.7536	0.8067	0.7667
Tobins *q*	N/A	1.1227	0.2546	N/A	1.3228	0.2573	N/A
ROA		20.0125	4.2467		15.0213	4.2880	

Table 1 shows the 16 CSF's as well as a number of items and sample items for each CSF. There were between 4 and 8 items for each factor.

As discussed in literature section, two performance measures of firm performance are employed: Tobin's q as a market-based measures and ROA as an accounting measure. The mean firm q ratio of about 1.12 is comparable to the average q-values reported in other studies [c.f. Bharadwaj *et al.* 1999]. Summary statistics for all research variables are displayed in <Table 2>.

3.4 Reliability and Validity

Reliability refers to the stability of measures over a variety of conditions [Nunally, 1978]. The amount of error made by any measure is determined by Cronbach's alpha test applied to inter-item scores and to the overall measures. The results of reliability test on CSF's measures are shown in <Table 2>. There is no absolute standard for interpreting Cronbach's alpha. Brown [1983] recommends the minimum value of 0.80 for tests measuring attitudes or values. More generally, Nunally [1978] argues that the satisfactory level of exploratory study is 0.7 or above. Cronbach's alphas (α) are on the far right column of <Table 2> and all variables suffice the Nunally's standard and close to Brown's recommendation. Therefore, reliability of measures is concluded to be satisfactory.

To verify the validity of measures, factor analysis was performed. As <Table 3> shows, all 16 CSF's has high loadings (above 0.5000) on one of 4 components. Thus, validity of CSF's measures is generally supported.

To further examine the validity of CSF's measures, correlation analysis of CSF's on two performance measures was performed (<Table 4>).

<Table 3> Factor Analysis on Research Variables

CSF's	Components			
	1	2	3	4
PLENTY	**0.6857**	0.3798	0.1872	0.0646
PAYMENT	**0.7058**	0.2626	0.0467	0.1747
VARIETY	**0.7005**	0.2498	-0.1982	0.3077
LOWPRICE	**0.5543**	-0.1791	0.2529	0.3154
SERVICES	**0.6178**	-0.1779	0.3045	-0.0273
DELIVERY	**0.5066**	0.0687	0.3061	0.1837
SECURITY	-0.0211	**0.5545**	0.0170	0.2278
STABILITY	0.3710	**0.6911**	0.1271	0.0056
EVALUATION	0.3799	**0.5281**	0.3873	0.0195
EXPERTISE	0.1595	**0.6491**	0.1617	-0.0301
SPEED	0.1029	**0.6628**	0.0978	0.1614
CUSTOMER	0.1756	0.0364	**0.7062**	-0.1190
STRATEGY	0.3679	0.2450	**0.6336**	0.0802
PRIVACY	0.0162	0.1733	0.1345	**0.8091**
LOWCOST	0.0306	0.2237	0.3863	**0.6904**
EASE	0.2254	0.2686	-0.0023	**0.6523**
Variance Explained	**2.9009**	**2.3109**	**1.8274**	**1.7618**

<Table 4> Correlation Analysis on Critical Success Factors

CSF's	Tobins q		ROA	
	Korea	U.S.A	Korea	U.S.A.
PLENTTY	0.5010***	0.0920	0.5231***	0.0661
PAYMENT	0.4223***	0.2740***	0.3922***	0.3192***
VARIETY	0.3998***	0.3988***	0.3979***	0.3620***
LOWPRICE	0.2182***	0.4296***	0.1842***	0.3604***
SERVICES	0.1800***	0.5138***	0.2009***	0.5134***
DELIVERY	0.1549**	0.1566*	0.1361*	0.0958
SECURITY	0.3826***	0.3420***	0.4340***	0.3236***
STABILITY	0.4719***	0.1756**	0.4889***	0.1517*
EVALUATION	0.4035***	0.3507***	0.3640***	0.3859***
EXPERTISE	0.4785***	0.4997***	0.4569***	0.5255***
SPEED	0.4192***	0.4113***	0.4156***	0.3499***
PRIVACY	0.3261***	0.1554*	0.3034***	0.2344***
LOWCOST	0.2861***	0.3019***	0.3372***	0.2863***
EASE	0.3142***	0.4992***	0.3265***	0.5014***
CUSTOMER	0.1741**	0.3802***	0.2511***	0.3592***
STRATEGY	0.3218***	0.3049***	0.3986***	0.3626***

Note) *, **, and *** denote coefficients are statistically significant at the levels of 0.10, 0.05, and 0.01, respectively

In the case of Tobin's *q*, correlation coefficients of 14 CSF's are statistically significant at the alpha level of 0.01. The remaining two CSF's are statistically significant at the alpha level of 0.05. In terms of ROA, correlation coefficients of 15 CSF's are statistically significant at the alpha level of 0.01. The remaining CSF is statistically significant at the alpha level of 0.10. Correlation analysis indicates that CSF's have considerable association with performance measures. Therefore, the CSF's measures are considered to be statistically valid.

Ⅳ. Results and Discussions

Korean respondents rate DELIVERY (of goods /services)[1] as the most critical success factor, followed by SPEED (of systems), EASE (of use), CUSTOMER (orientation), and LOWCOST (operation). On the other hand, SERVICES is evaluated as the least critical factor, followed by SECURITY (of systems), EVALUATION (of EC operations), (EC) STRATEGY, and STABILITY (of systems) (refer to <Table 5>).

In contrast to Korean respondents, U.S.A. respondents evaluate PLENTY (of information) as the most critical success factor, followed by PRIVACY (of information), CUSTOMER (orientation), SECURITY (of systems), and DELIVERY (of goods/services). STABILITY (of systems) is rated as the least critical factor, followed by EVALUATION (of EC operations), SPEED (of systems), (EC) STRATEGY, and (technical EC) EXPERTISE.

Both Korean and U.S.A. respondents rate as CUSTOMER (orientation) and DELIVERY (of goods/services) in the top five of CSF's. Inter-

1) For the detailed discussion of each CSF, please refer to <Table 1>.

<Table 5> Rank Order of CSF's between Korea and U.S.A.

Rank	Korea		U.S.A.	
1	DELIVERY	4.0663	PLENTY	4.0620
2	SPEED	3.6173	PRIVACY	3.6423
3	EASE	3.5595	CUSTOMER	3.6326
4	CUSTOMER	3.5459	SECURITY	3.4988
5	LOWPRICE	3.3810	DELIVERY	3.3577
6	VARIETY	3.2449	VARIETY	3.2409
7	PAYMENT	3.1888	EASE	3.2044
8	EXPERTISE	3.1837	LOWPRICE	3.1727
9	LOWCOST	3.1565	PAYMENT	3.1655
10	PRIVACY	3.1046	LOWCOST	3.1004
11	PLENTY	2.9473	SERVICES	2.9854
12	STABILITY	2.9311	EXPERTISE	2.9781
13	STRATEGY	2.8699	STRATEGY	2.9343
14	EVALUATION	2.8087	SPEED	2.8358
15	SECURITY	2.7577	EVALUATION	2.7536
16	SERVICES	2.4362	STABILITY	2.5000

estingly, Korean respondents evaluate SPEED (of systems) as very critical while U.S.A. respondents rate otherwise. SECURITY (of systems) is rated very highly by U.S.A. respondents, but very low by Korean respondents.

To further investigate whether there are statistically significant differences in recognizing CSF's between Korean and U.S.A. respondents, t-test was performed (refer to <Table 6>). T-test indicates that Korean respondents rate EASE

<Table 6> T-test Results on CSF between Korea and U.S.A.

CSF's	Korea	U.S.A	t-stat	Probability
PLENTY	2.9473	**4.0620**	-13.86	0.0001
PAYMENT	3.1888	3.1655	0.33	0.7451
VARIETY	3.2449	3.2409	0.05	0.9635
LOWPRICE	**3.3810**	3.1727	2.46	0.0146
SERVICES	2.4362	**2.9854**	-5.79	0.0001
DELIVERY	**4.0663**	3.3577	9.40	0.0001
SECURITY	2.7577	**3.4988**	-8.30	0.0001
STABILITY	**2.9311**	2.5000	4.77	0.0001
EVALUATION	2.8087	2.7536	0.64	0.5255
EXPERTISE	**3.1837**	2.9781	2.26	0.0246
SPEED	**3.6173**	2.8358	8.80	0.0001
PRIVACY	3.1046	**3.6423**	-5.52	0.0001
LOWCOST	3.1565	3.1004	0.79	0.4285
EASE	**3.5595**	3.2044	3.85	0.0001
CUSTOMER	3.5459	3.6326	-0.84	0.4010
STRATEGY	2.8699	2.9343	-0.76	0.4462
Tobins *q*	1.1227	1.3228	-7.03	0.0001
ROA	20.012	15.021	10.51	0.0001

(of use), (technical EC) EXPERTISE, STABLILITY (of systems), SPEED (of systems), DELIVERY (of goods/services), and LOWPRICE (of goods /services) statistically significantly higher than U.S.A. respondents. On the other hand, U.S.A. respondents evaluate PRIVACY (of information), SECURITY (of systems), PLENTY (of information), and SERVICES statistically significantly higher than Korean respondents.

The above analysis shows that Korean EC managers are more concerned about smooth and efficient operations while U.S.A. EC managers are more interested in ethical and legal issues of EC. This may be contributing to the fact that Korean EC market is in the beginning stage and will face these ethical and legal issues in the near future. Also these gaps in evaluating CSF's may stem from differences in cultural background of the two nations. Koreans are well known for their collectivism, which dictates standardized products with uniform services. Also Koreans would like to have fast services. These may be the reason why Korean EC managers feel that SPEED (of systems) and DELIVERY (of goods and services) are more important than others. On the other hand, Americans emphasize individualism. They respect individual ability and personal taste. In this sense, it is not surprising to see that PRIVACY (of information) and SECURITY (of systems) are more important.

To investigate the importance of each individual CSF's on firm performance, regression analysis was performed (<Table 7>). The CSF's in total have very significant explanatory power for firm performance in Korean and U.S.A.

<Table 7> Regression Analysis of CSFs on Performance

CSF's	Tobins q				ROA			
	Korea		U.S.A.		Korea		U.S.A.	
PLENTY	0.0574	2.26**	0.0237	0.90	1.0640	2.55**	0.1638	0.38
PAYMENT	-0.0249	1.04	-0.0047	-0.13	-0.1750	0.45	0.2096	0.35
VARIETY	0.0427	1.93*	-0.0035	-0.11	0.6769	1.87*	-0.0816	-0.16
LOWPRICE	0.0044	0.18	0.0382	1.22	-0.2123	-0.54	-0.1117	-0.22
SERVICES	0.0016	0.08	0.0317	1.31	0.1164	0.34	0.6533	1.63
DELIVERY	0.0083	0.41	0.0114	0.39	0.0864	0.26	-0.1198	-0.25
SECURITY	0.0725	3.70***	-0.0228	-0.77	1.4129	4.41***	-0.2029	-0.42
STABILITY	0.0240	1.21	0.0179	0.69	0.5448	1.68*	0.2259	0.53
EVALUATION	0.0389	1.77*	0.0827	3.68***	0.1486	0.41	1.5205	4.10***
EXPERTISE	0.0712	3.87***	0.0989	3.18***	0.9979	3.31***	2.1312	4.15***
SPEED	0.0285	1.46	0.0423	1.65	0.4279	1.34	0.2298	0.54
PRIVACY	0.0522	2.35**	0.0055	0.30	0.7042	1.94*	0.3950	1.33
LOWCOST	0.0161	0.52	0.0430	1.54	0.6594	1.31	0.5867	1.27
EASE	0.0355	1.51	0.1096	4.89***	0.5141	1.33	1.8081	4.89***
CUSTOMER	0.0061	0.44	-0.0001	-0.01	0.3495	1.55	-0.2063	-0.50
STRATEGY	-0.0258	-1.07	-0.0643	-2.14**	-0.0062	-0.02	-0.6711	-1.35
R-Square	51.01%		54.89%		52.75%		55.72%	
F-Statistics	11.65		9.13		12.49		9.44	
Pr < F	0.0001		0.0001		0.0001		0.0001	

Note) *, **, and *** denote coefficients are statistically significant at the levels of 0.10, 0.05, and 0.01, respectively

sample. (over 51% for all four analyses and statistically significant at the alpha level of 0.05).

In the analysis of Korean sample, SECURITY (of systems), PRIVACY (of information), (technical EC) (technical EC) EXTERTISE, PLENTY (of information on goods/services), VARIETY (of goods/services), EVALUATION (of EC operations) are statistically significant in explaining firm performance measured by Tobin's q. In terms of ROA, PLENTY (of information and goods/services), SECURITY (of systems), VARIETY (of goods/services), PRIVACY (of information), (technical EC) EXPERTISE, and STABILITY (of the systems) are CSF's that contribute to firm performance. Whether Tobin's q or ROA is used, SECURITY (of systems), PRIVACY (of information), (technical EC) EXPERTISE, PLENTY (of information about goods/services), and VARIETY (of goods/services) are the most explanatory CSF's on firm performance. This analysis can be interpreted to mean that customers would use EC if they felt comfortable about navigating EC for plenty of information about and a variety of goods/services without technical difficulty in a secure and private way.

In the U.S.A. sample, EVALUATION (of EC operations), (technical EC) EXPERTISE, EASE (of use), and (EC) STRATEGY are statistically significant in explaining firm performance measured by Tobin's q. In terms of ROA, EVALUATION (of EC operations), (technical EC) EXPERTISE, and EASE (of use) are CSF's that contribute to firm performance. Whether Tobin's q or ROA is used, EVALUATION (of EC operations), (technical EC) EXPERTISE, and EASE (of use) are the most explanatory CSF's on firm performance. U.S.A. sample shows quite consistency in explaining contribution of CSF's on firm performance either measured by Tobin's q or ROA.

It is very surprising to see that most explanatory CSF's on firm performance in both Korean and U.S.A. samples are not included in the top 5 CSF list which was rated by EC managers. These ratings of CSF's are perceptional and relative since EC managers evaluate each CSF based on their prior experience. Thus these individual judgments may not accurately reflect the objective contribution of CSF on firm performance. Also this irony may contribute to the fact that firm performance is measured by ROA and Tobin's q. EC managers rate CSF's in terms of overall operation, not particularly paying attention to ROA or Tobin's q. To EC managers, ROA or Tobin's q may just be one aspect of firm performance. Thus ROA or Tobin's q may be a good surrogate measure for firm performance, but is not a perfect measure and this is reason why many academicians point out that more refined organizational performance measured is expected (Delone and McLean, 1992).

V. Summary and Conclusions

The three main purposes of this paper are to (1) identify critical success factors (CSF's) for EC companies, (2) investigate explanatory power of these CSF's on firm performance, and (3) compare differences in CSF's and impact of CSF's on performance between Korea and U.S.A.

Through the literature review and interviews, a list of 16 CSF's that consist of 111 items was complied. Questionnaires were administered to EC managers at 235 Korean EC companies and 358 U.S.A. EC companies in Texas. The final

response rate was 83.40% (196 questionnaires) for Korean sample and 38.27% (137 questionnaires) for U.S.A. sample.

While Korean respondents rate DELIVERY (of goods/services) as the most critical success factor, followed by SPEED (of systems), EASE (of use), CUSTOMER (orientation), and LOW-COST (operation), U.S.A. respondents evaluate PLENTY (of information) as the most critical success factor, followed by PRIVACY (of information), CUSTOMER (orientation), SECURITY (of systems), and DELIVERY (of goods/services). Both Korean and U.S.A. respondents rate as CUSTOMER (orientation) and DELIVERY (of goods/services) in the top five of CSF's. Interestingly, Korean respondents evaluate SPEED (of systems) as very critical while U.S.A. respondents rate otherwise. SECURITY (of systems) is rated very highly by U.S.A. respondents, but very low by Korean respondents.

Survey results show that CSF's have significant explanatory power on firm performance in both Korean and U.S.A. samples. Whether Tobin's q or ROA is used, SECURITY (of systems), PRIVACY (of information), (technical EC) EXPERTISE, PLENTY (of information about goods/services), and VARIETY (of goods/services) are the most explanatory CSF's on firm performance in Korean sample and EVALUATION (of EC operations), (technical EC) EXPERTISE, and EASE (of use) in U.S.A. sample.

This research has several limitations. First, the research setting is limited to metropolitan area of Seoul in Korea and state of Texas in the U.S.A. Also the sample sizes (N = 196 and 137) may not be large enough to carefully examine all CSF's and their relationships with firm performance. Second, there may be more important CSF's that this study does not accommodate. Third, two firm performance measures (objective, marketing measure and traditional, accounting measure) may not adequately represent corporate performance. As Delone and McLean [1992] point out, organizational level performance measures need to be refined.

There are several directions in which this research can be extended. One is to replicate this research with a larger population setting including EC companies in other countries. The second is to comprehensively include more CSF's for further investigation and empirically and carefully validate CSF's. The third research direction concerns the dependent variable. More reliable and valid organizational level performance measures should be devised and empirically tested.

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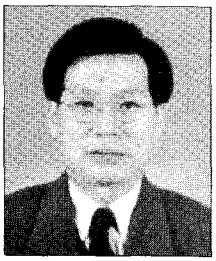
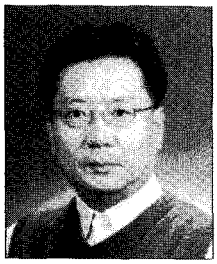
◆ 저자소개 ◆



성태경 (Sung, Tae Kyung)
경기대학교 경영정보학과 교수로 재직 중이며, 현재 The University of Texas at Austin 부설 IC2 Institute 에서 Research Fellow로 활동하고 있다. 성균관대학교 경영학과(1982)를 졸업하고, The University of Texas at Austin, Department of MSIS 에서 경영정보학 전공으로 경영학박사(1988)를 취득하였다. 2000년과 2001년 The University of Texas at Austin, Department of MSIS(Management Science and Information Systems)에서 초빙교수로 Managing Information을 강의하였다. 2000년 CFE(Certified Fraud Examiner) 자격을 취득하였으며, 현재 Association of Certified Fraud Examiners, Korea Chapter 회장으로 활약하고 있다. 주요 관심분야로는 경영정보시스템 전략, 계획 및 관리, Fraud 예방 및 적발, 경영혁신, 정보/지식의 이전 및 상용화, 과학기술단지 및 벤처, 데이터마이닝 등이다.



이상규 (Lee, Sang Kyu)
수원대학교 경제·금융학과 조교수로 재직 중이며, 경희대학교 경제학과를 졸업하였다. Saginaw Valley State University에서 경영학석사(MBA)를, University of Wisconsin - Milwaukee에서 경제학석사와 박사 학위를 취득하였고, 학위 취득 후 Ball State University 경제학과에 초빙 조교수로 재직하였다. 전공으로는 국민소득계정(System of National Accounts)과 국제경제학이며, 지식경제(knowledge economy)와 e-commerce에도 관심을 가지고 연구 중이다. 현재 Association of Certified Fraud Examiners, Korea Chapter 사무총장직을 맡아 경제범죄 및 fraud에 대한 연구를 수행 중이며, 부정방지를 위해 노력하고 있다.

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