A Comparative Study of Internet Banking Satisfaction Model in South Korea and Indonesia

Yulia Wati*, Chulmo Koo**

Banking industries have continuously innovated through technology-enhanced products and services. Many studies have recognized the importance of the Internet in banking industries, arguing that it has been widely adopted. Many studies published on the Internet banking in specific countries are mostly related with such issues as internet banking adoption and acceptance, security and risks of online banking system, and interface design. Several studies have been done to examine the differences and similarities between other banking channels and the Internet banking. However, to the best of our knowledge, only a limited number of studies has examined the differences and similarities between two specific countries in order to create a new customer satisfaction model. In this research, we studied the internet banking satisfaction model by comparing two countries: South Korea and Indonesia. We conducted an empirical study based on the data collected in both two countries. In this research, we found that countries which have adopted electric banking services, particularly between a country with high ICT adoption and a country with low ICT adoption, show different satisfaction trends. Based on the study results, herein we provide discussion, managerial, and practical implications.

Keywords : Electronic Banking, Internet Banking, End User Satisfaction, South Korea, Indonesia

* College of Business Chosun University
** Corresponding Author, College of Business Chosun University

Ⅰ. Introduction

Information Technology (IT) has become the major facilitator of business activities in the world today. Indeed, IT has transformed the service model from human-based to technology-based service in various industries [Turban et al., 2004]. One of them is the banking industry which has continuously innovated through technology-enhanced products and services [Sundarraj, 2005]. The most innovative product in this industry is electronic banking. Electronic banking consists of Internet banking, automatic teller machines (ATMs), mobile banking, and other electronic payment systems [Cheng et al., 2006], which capabilities range from bill payment to loan processing.

The ATM was first introduced as a cost efficient tool that provides the customers with more convenience [Calisir and Gumussoy, 2008]. Subsequently, telephone banking was launched, providing another delivery channel of banking and financial services via telecommunication devices connected to an automatic system of the bank. In short, customers can do the banking by simply using the telephone [Sundarraj and Wu, 2005]. The development in technology for financial services continued, and by the middle of the 1990s, many banks had already begun to adopt Internet banking through Web based technologies [Calisir and Gumussoy, 2008]. Previous studies have recognized the importance of the Internet and its wide range of adaptation in the banking industry [Hughes, 2001; Li, 2001; Maenpaa et al., 2008; Mols, 1999; Thorton and White, 2001]. Internet banking, also known as cyber banking and online banking, allows people to conduct various banking ac-

tivities at home, business sites, or even on the road [Turban et al., 2004].

Many studies published on Internet banking in specific countries mostly focus on the internet banking adoption and acceptance, security and risks of online banking system, and interface design [Bauer and Hein, 2006; Calisir and Gumussoy, 2008; Claessens et al., 2002; Cheng et al., 2006; Lai and Li, 2004; Luarn and Lin, 2005; Suh and Han, 2002; Weir et al., 2006]. Several studies have been also carried out to examine the differences and similarities between other banking channels and the Internet banking [Calisir and Gumussoy, 2008]. Wisner and Corney [2001] recorded by Calisir and Gumussoy [2008] identified the internet banking sites, evaluated them with respect to the customer feedback capabilities, and made comparisons between the brick and mortar and Internet banking. Yakhlef [2001] investigated the changes in implementing the Internet and determined how these changes had affected the brick and mortar distribution channels of banks. Akinci et al. [2004] conducted a survey to develop an understanding of consumer's attitudes and identified whether a significant difference existed among demographic profiles and attitudes of Internet banking users and nonusers.

However, to our knowledge, only a limited number of studies have examined the differences and similarities between two specific countries to create a new customer satisfaction model. Thus, our research is unique in that we studied the internet banking satisfaction model by comparing two countries: South Korea and Indonesia. To catch up with the growing trend toward internet banking in advanced coun-

tries, many Asian countries have aggressively invested in e-banking systems [Ono, 2005]. Among such Asian countries are Japan, South Korea, Taiwan, Singapore, and Hong Kong. Other developing Asian countries, including Indonesia, have also tried to keep up with the global pace in the e-banking development [Wahid et al., 2004]. In 2003, for instance, the results of the Digital Access Index (DAI) project by International Telecommunication Union (ITU) declared that between 1998 and 2002, South Korea made the greatest improvement in ICT access [Ono, 2005]. While the e-commerce industry including banking industry in South Korea has been rapidly matured [Country Commerce, 2008], that in Indonesia still remains to be further improved. Thus, by comparing the consumer behavior in the banking industry between a country with high ICT adoption and a country with low ICT adoption, we can gain a new insight into how the antecedents of internet banking influence end user satisfaction in different cultures. In particular, this research aims to make a contribution to e-banking acceptance/adoption in developing countries, particularly in South Korea and Indonesia.

Ⅱ. E-Banking

2.1 Prior Research of e-Banking

In recent studies, many researchers from various countries have investigated how customers perceive and adopt Internet banking, such as those in Hong Kong [Cheng et al., 2006 and Yiu et al., 2007], Finland [Maenpaa et al., 2007], India [Kumra et al., 2004], Malaysia [Sohail and Shanmungham, 2003], Romania [Gurau,

2001], Taiwan [Chau and Lai, 2003; Shih and Fang, 2006], Jordania [Sukkar and Hassan, 2005], and Estonia [Lustsik, 2002]. Most of the researchers evaluated the level of the acceptance of Internet banking in each country by using the traditional model of TAM (perceived usefulness, perceived ease of use) with various variables such as customer trust, perceived risk, personal innovativeness, security concerns, human interface, Internet access cost, convenience, and network quality attributes. Also, some studies replicated the TAM in different contexts and expanded the theory of reasoned action (TRA) to probe the attitude and subjective norm factors that would influence the adoption intention of Internet banking. Another study conducted by Sukkar and Hassan [2005] examined the research model for the acceptance of Internet banking in developing countries and found that the culture variable is a significant factor to be counted. Bank service quality, customer preferences, and satisfaction were also verified in Internet Banking [Lustsik, 2002].

2.2 E-Banking Conditions in South Korea and Indonesia

The concept of culture is complex because the culture system is always changing over time and place, and it is influenced by various aspects such as geography, language, currency, social norms, and traditions. These variables certainly have an influence on the transfer of technology between two countries [Sukkar and Hassan, 2005]. In the case of South Korea and Indonesia, culture can be described in terms of values and norms, where values indicate what is worth doing or having, and norms are defined as shared beliefs about proper behaviors

[Straub *et al.*, 2002]. The study by Kim [2002] supported the cultural hypothesis by emphasizing the Confucian aspect of the South Korean culture. Korean parents have approached computers and the Internet not as a new technology or a gadget, but as a medium of education which might potentially facilitate economic and social advancement. The Wall Street Journal reported that Korea is now the world leader in both quantity and quality of Internet users [Lee, 2003]. E-commerce is highly developed in the nation's financial sector. All South Korean banks offer online and mobile banking services, which are becoming increasingly sophisticated [Country Commerce, 2008]. In only three years, South Korea has achieved an Internet banking penetration of 24% of the population, ranking the third in the world. The Gartner Group reported that the primary reason for the sudden emergence of Korea as a world leader in Internet service was its government's critical role in creating a favorable competitive environment for ICT firms [Lee, 2003].

Indonesia, on the other hand, lags behind in this arena. The country is the fourth most populous in the world, occupying a vast territory but faced with huge poverty problems and economic and socio-cultural disparities [Wahid *et al.*, 2004]. Business monitor International Ltd. [2005] recorded that Indonesia's IT service market reached US$ 271 million in 2004 while achieving its annual growth of 18% from 2003 on IBM figures. The banking sector is expected to be the largest buyer of IT products and services in Indonesia during the year of 2005, with increased spending between 20~25%, amounting as much as US$750 million. Generally, the Indonesian banking sector allocates around 20% to 30% of its whole budget to IT, but in recent years spending has been relatively restrained and focused on maintenance.

Ⅲ. Theoretical Review

3.1 End User Satisfaction

User satisfaction is an important criterion for measuring the success of information system [Zviran and Erlich, 2003]. Customers, satisfied with the quality of a service, are more inclined to return to a service outlet, to repurchase from the provider, to spread favorable word of mouth, and to pay regular or even premium prices [Van Reil *et al.*, 2003; Zeithaml *et al.*, 2002]. We identify the quality dimensions recommended by DeLone and McLean [1992] by dividing quality dimension into two parts: system quality and information quality. For system quality, *reliability* refers to the dependability of system operation, *flexibility* refers to the way the system adapts to changing demands of the user, *integration* refers to the way the system allows data to be integrated from various sources, *accessibility* refers to the ease with which information can be accessed or extracted from the system, and *timeliness* refers to the degree to which the system offers timely responses to requests for information or action. Information quality is shaped by four dimensions: *completeness* represents the degree to which the system provides all necessary information; *accuracy* represents the user's perception that the information is correct; *format* represents the user's perception of how well the information is presented; and *currency* represents the user's perception of the degree to which the information is up to date.

3.2 Technology Readiness Index (TRI)

Rogers [1995] and Walczuch *et al.* [2007] suggested that there are differences in peoples' disposition towards using technology. He classified people into five groups based on their characters ranging from innovators to laggards. Regardless of the rapid penetration of new technologies into everyone's daily life, ample evidence still suggests increasing frustration and disappointment among general users [Parasuraman, 2000]. This indicates that not all users are ready to embrace the cutting edge technology despite its convenience [Mick and Fournier, 1998]. Zeithaml *et al.* [2002] defined "technology readiness" as "propensity to embrace and use new technologies for accomplishing goals in home life and at work" [Parasuraman, 2000]. Technology readiness has four underlying dimensions: first, *optimism*, defined as a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency; second, *innovativeness*, defined as a tendency to be a technology pioneer and thoughtful leader; third, *discomfort* is defined as a perceived lack of control over technology and a feeling of being overwhelmed by it; and finally, *insecurity* is defined as distrust of technology and skepticism about its ability to work properly. While optimism and innovativeness are contributors to technology readiness, discomfort and insecurity are inhibitors [Zeithaml *et al.*, 2002].

3.3 Social Presence

Social presence is defined as the extent to which a medium allows users to experience others as being psychologically present [Gefen and Straub, 2003]. Social presence is embedded in communication theory [Short *et al.*, 1976], and is characterized by some researchers as the capability of the medium to transmit information richness [Straub and Karahanna, 1998]. It also describes the extent to which a medium is perceived as sociable, warm, sensitive, personal, or intimate when it is used to interact with other people [Qiu and Benbasat, 2009]. However, recent viewpoints [Biocca, 2003; Qiu and Benbasat, 2009] are prone to conceptualize social presence "as a transient phenomenological state that varies with medium, knowledge of the other, content of the communication, environment, and social context." Social presence implies a psychological connection with the user, who perceives the website as "warm", personal, sociable, thus creating a feeling of human contact [Yoo and Alavi, 2001]. Examples of website features that encourage social presence include socially rich text content, personalized greetings [Gefen and Straub, 2003], human audio [Lombard and Ditton, 1997], or human video [Kumar and Benbasat, 2002]. Gefen and Straub [2003] suggested that pictures and text are able to convey personal presence in the same manner as do personal photographs or letters. Hassanein and Head [2006] showed emotive text and pictures of humans as resulting in higher perceptions of social presence within websites. In this study, social presence refers to perceptions by the user that the website has human contact, and is personal, sociable, warm, and sensitive [Cyr *et al.*, 2007].
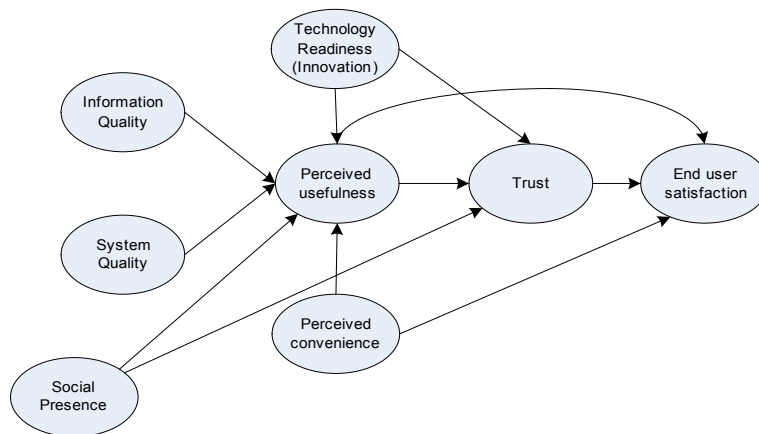
3.4 Trust

More recently, the growth of online banking

has brought up the issues of trust and distrust in the mind of the consumer. Trust is used for a situation when two parties enter some kind of interaction without specifying which of the components-trustfulness or trustworthiness-is the most crucial. Similarly, distrust describes a situation when the link is missing without specifying in the definition which component is most important [Tullberg, 2008]. Examining trust may offer insights into how developing countries can increase e-banking adoption [Benemati and Serva, 2007]. In those studies, they argued that in developing countries, as banks become increasingly automated, banks must carefully consider the implication of using technology, because this automation may decrease trust and increase distrust in the mind of the customer. Trust in banking institutions as well as usage of retail financial services appear as underlying pre-requisites for the adoption of Internet banking [Centeno, 2004].

Ⅳ. Research Model

As showed in <Figure 1> below, the study proposed a new model for studying the integrated model of end user satisfaction. Technology readiness, social presence, and trust construct and their relationships with end user satisfaction were investigated empirically in the internet banking cases in South Korea and Indonesia. Furthermore, by encompassing perceived usefulness with TRI dimensions and other variables, we proposed an integrated internet banking model. This study also explores how human warmth and sociability can be integrated through self-service technology.

4.1 Hypotheses Development

4.1.1 Information and System quality

User satisfaction primarily has been measured by various subsets of beliefs about specific systems, information, and other related characteristics (e.g. IT service) [Wixom and Todd, 2005]. Information quality and systems quality have positive impact on satisfaction [DeLone and McLean, 1992, 2003]. System and informa-

<Figure 1> Research Model

tion characteristics have been core elements in the literature on user satisfaction [DeLone and McLean, 1992, 2003]. Several elements of web quality, such as information quality have been reported to be related to perceived usefulness [e.g. Lederer *et al.*, 2000; Lin and Lu, 2000]. Furthermore, Saeed, Huang, and Yi [2003] have proposed that system quality and information quality are important drivers of customer perception and subsequent online behavior. Thus, we hypothesized:

H 1-1 : *Information quality has a positive impact on perceived usefulness of Internet banking in South Korea as well as Indonesia*

H 1-2 : *Systems quality has a positive impact on perceived usefulness of Internet banking in South Korea as well as Indonesia*

4.1.2 Perceived Convenience–Perceived Usefulness–End User Satisfaction

According to Yoon and Kim [2007], place, time, and execution dimensions of perceived convenience have positive impact on perceived usefulness and behavior intention to use. In context of electronic banking, location/place dimension refers to the user's perception that they can use e-banking to accomplish their jobs in places that are more accessible to them. Time dimension refers to users' perception that they can use e-banking to accomplish their jobs whenever the time is convenience for them. And execution dimension is users' perception of e-banking convenience in the process of accomplishing their task. Study by Karahanna and Straub [1999] suggested that accessibility is a multidimensional construct encompassing both physical terminal access and system usage abi-

lity. They argue that more accessible an information system is, the less effort is needed to use it. Liao and Cheung [2002] argued that expected convenience is one of important quality attributes in e-banking industry. The perceived convenience of time, execution and place in efficient way [Yoon and Kim, 2007] of doing bank transaction using internet banking is considerable. Based on the foregoing, we argue that more convenience the location, time, and execution are, more perceived usefulness gained by users in using internet banking. Therefore, it is reasonable if we argue that the convenience the users feel toward e-banking will influence their satisfaction. Thus, our hypotheses are:

H 2-1 : *Perceived convenience has a positive impact on perceived usefulness of Internet banking in South Korea as well as in Indonesia*

H 2-2 : *Perceived convenience has a positive impact on end user satisfaction of Internet banking in South Korea as well as in Indonesia*

4.1.3 Perceived Usefulness–End User Satisfaction

It is reasonable to assert the interaction between perceived usefulness and user satisfaction. Usefulness, the most salient belief in technology acceptance model proposed by Davis [1989], shows that a user's perception about the potential benefits of using a technology engenders positive effect towards it [Davis, 1989; Davis, *et al.*, 1989; Davis *et al.*, 1992]. Similarly, previous study hypothesized that perceived usefulness predicts satisfaction [Bhattacherjee, 2001]. Hence, we hypothesized:

H 3 : *Perceived usefulness has a positive impact on*

end user satisfaction of Internet banking in South Korea as well as in Indonesia

4.1.4 Perceived Usefulness–Trust/ Distrust

Gefen *et al*. [2003] integrated customer trust into traditional TAM model in the context of online shopping, while in this study we integrated this model in the context of internet banking. Kaufaris and Sosa [2003] indicated that perceived website usefulness is a significant antecedent of initial trust. Study in e-commerce by Suh and Han [2002] indicated that perceived usefulness has a direct impact on trust. However, the effect of this variable in internet banking has never been studied. Prior studies using TAM variables have also shown that it has a significant impact on customer attitude [Bhattacherjee, 2002]. Hence, we argued that perceived usefulness has a positive impact on trust of internet banking.

H 4 : Perceived usefulness has a positive impact on trust of internet banking in South Korea as well as in Indonesia

4.1.5 Social Presence

Butcher *et al*. [2001] argued that social comfort (a customer's feeling of anxiety or relaxation arising from the interaction with a service employee) will influence customer's service encounter satisfaction. Simon [2001] argued that "information richness and social presence are closely related concepts", and that "information-rich, consumer-oriented websites should help reduce ambiguity, increase trust/reduce risk, and encourage users to purchase with lo-

wer levels of consumer dissonance" [Cyr *et al*., 2007]. Hassanein and Head [2006] showed that higher user perceptions of social presence on websites selling apparel to result in higher level of trust in the online vendors. While Gefen and Straub [2003] were not able to show a link between perceived social presence and perceived usefulness in e-service (including e-banking), Qiu and Benbasat [2009] identified a significant mediating effect of social presence on website content credibility in their study. Kumar and Benbasat [2006] found that social presence and perceived usefulness both significantly affect customer loyalty. Therefore, we set hypothesis:

H 5-1 : Social presence has a positive influence on perceived usefulness of Internet banking in South Korea as well as in Indonesia

H 5-2 : Social presence has a positive influence on trust of Internet banking in South Korea as well as in Indonesia

4.1.6 Technology Readiness

We assumed that the technology readiness of customers in banking industry will influence their satisfaction when using internet banking. According to social cognitive theory, consumers' strong ability to use computer is related to positive perception [Luszczynska *et al*., 2005], as they can more easily utilize such service with greater optimism and innovation compared to less competent users. In the area of electronic services, where customers interact with technology rather than with service staff [Dabholkar, 1996], experiences will, to a large extent, depend on the technology readiness of customers [Parasuraman, 2000; Parasuraman and Colby,

1997]. Benemati and Serva [2007] stated that distrust in technology often arises from a lack of understanding its role and function. Thus, we set the sixth hypothesis as following.

H 6-1 : Optimism and innovativeness aspect of technology readiness have positive influence while discomfort and insecure aspect have negative influence on perceived usefulness of internet banking in South Korea as well as in Indonesia

H 6-2 : Optimism and innovativeness aspect of technology readiness have positive influence while discomfort and insecure aspect have negative influence on trust of internet banking in South Korea as well as in Indonesia

4.1.7 Trust-End User Satisfaction

A customer makes many technology decisions almost solely on the basis of trust [Urban *et al.*, 2000; Benemati and Serva, 2007]. Specific to web-enabler interactions, numerous researchers have pointed out that online trust is fundamental to online purchase intentions [Cyr *et al.*, 2007; Flavian *et al.*, 2005]. Trust may reduce behavioral uncertainty, giving the consumer a perception of some control over a potentially uncertain transaction [Pavlou, 2003], encourage future transactions [Bhattacherjee, 2002; Gefen *et al.*, 2003], and help build long-term relationship [Bhattacherjee, 2002]. Users of internet banking will increasingly develop their trust in this application over time. Therefore, we claim that trust will have a positive impact on end user satisfaction of internet banking.

H 7 : Trust has a positive impact on end user satisfaction of internet banking in South Korea as well as in Indonesia

Ⅴ. Research Methodology

5.1 Data collection

For a survey conducted in Indonesia, a test was distributed to undergraduate students, university staffs, and users around campuses, who had previously used internet banking from one of private banks in Indonesia. The questionnaire was also put on the website, and the respondents were invited to fill out the online questionnaire (the IP address of each respondent was checked). The same research field was applied to South Korea. To examine the proportion, users were asked to evaluate the internet banking they used. By the time this survey was closed, the total of 180 and 112 valid respondents from South Korea and Indonesia, respectively, were collected. Lists of demographic information of the respondents can be seen in <Table 1>.

The survey instruments were adopted from previous researches that could be seen in <Appendix 1>. The questions were prepared in English, and to reduce the ambiguity of the instruments, they were translated into Indonesian for respondents in Indonesia, and into Korean for respondents in South Korea.

5.2 Construction Development

Questions for information and system dimensions were adopted from Wixom and Todd [2005] with several revisions to meet our requirements. TRI items were adopted from Parasuraman [2000]. Furthermore, for end user satisfaction variable, we used 3 items to ask the user about their satisfaction with the internet

<Table 1> Demographic Respondents

Measure	Item	South Korea		Indonesia	
		Freq	%	Freq	%
Gender	Male	65	36.1%	66	57.9%
	Female	115	63.9%	46	40.4%
Age	18~24	40	22.2%	88	77.2%
	25~31	101	56.1%	22	19.3%
	32~38	28	15.6%	1	0.9%
	39~44	11	6.1%	1	0.9%
Education	Graduate or similar	27	15.0%	17	14.9%
	University or similar	145	80.6%	79	69.3%
	High school	8	4.4%	16	14.0%
	Others	0	0.0%	0	0.0%
Usage time	1~3	165	91.7%	54	47.4%
	4~6	12	8.3%	34	29.8%
	7~9	0	0.0%	7	6.1%
	> 9	0	0.0%	17	14.9%
Kind of transactions	Inter account transfer	141	78.3%	43	37.7%
	Payment	75	41.7%	37	32.5%
	Balance checking	114	63.3%	71	62.3%
Reason for not using internet banking	Lack of Trust	16	13.4%	16	14.0%
	Privacy Concern	33	27.7%	19	16.7%
	Security Concern	35	29.4%	22	19.3%
	Other Alternatives	8	6.7%	9	7.9%
	Difficult to use	27	22.7%	7	6.1%

banking. Perceived usefulness items were adopted from Chau and Lai [2003]; trust and social presence were adopted from Gefen and Straub [2003] and Cyr et al. [2007] with several revisions to meet our research needs; and perceive convenience items were adopted from Yoon and Kim [2007]. In order to maintain overall consistency, all variables were measured by using seven-point, Likert scales, ranging from 'strongly disagree' to 'strongly agree' (see <Appendix 1>).

5.3 Data Analysis

In the SEM analysis LISREL 8.8 was used to measure the validation of research model. Using the SEM analysis, firstly, we focused on measurement model and then on the overall structural model [Joreskog and Sorbom, 1993]. The aim of the two-step approach is to assess the reliability and validity of the constructs before they used in the full model. In order to meet good convergence validity, a minimal

sample size of 100 will usually be sufficient with three or more indicators [Anderson and Gerbing, 1984]. Thus, our simple sizes were sufficient for further analysis.

5.4 Reliability and Validity of Measurement Items

Using both Indonesia and Korea data, we executed explanatory factor analysis using VARIMAX method for technology readiness dimension. The VARIMAX method attempts to perform a rotation by maximizing the variance of squared loadings for each factor. This method tends to polarize the factor loadings so that they are either high or low, thereby making it easier to identify factors with specific observed variables [Marcoulides and Hershberger, 1997]. Next, Confirmatory Factor Analysis (CFA) was applied to assess the construct validity of all variables. With CFA it is possible to place substantively meaningful constraints on the factor model. The advantage of CFA is that it allows for testing hypotheses about a particular factor structure.

Each item was modeled as a reflective indicator of its latent construct. Model estimation was done using a maximum likelihood model with covariance matrix as an input. The minimum iteration was achieved, assuring that the estimation process yielded an admissible solution while eliminating any concern about multicollinearity effects. For a measurement model to have sufficiently good model fit, the chi-square value normalized by a degree of freedom should not exceed 3 [Chau and Hu, 2001; Sundarraj and Wu, 2005]. Moreover, goodness of fit index should exceed 0.90, Adjusted Good-

ness of Fit should be greater than 0.80, root mean square of approximation should be greater than 0.08, and Normed Fit Index should be greater than 0.90 [Chau and Hu, 2001; Sundarraj and Wu, 2005; Joreskog and Sorbom, 1993] (see <Table 2> and <Table 3>).

In order to gain the overall model fit, the items reliability values below the recommended level were excluded from the model. For Indonesia data, among 4 technology readiness dimensions, discomfort and unsecured dimensions could not be used in this research. When we conducted the second order confirmatory factor analysis, only innovation and optimism had adequate reliabilities of 0.52 and 0.97, respectively [Nunnally and Bernstein, 1994]. The two other dimensions had shown a good fit in CFA. For South Korea data, the explanatory factor analysis showed that Dis1 loaded well on unsecure while Dis2, Dis4, and Un1 loaded well as unique variables. Therefore, we also dropped unsecure and discomfort variables from the model. In3 was excluded from the model because it showed index below the recommended value. Study by Liljander et al. [2006], Taylor et al. [2002], and Yi et al. [2003] have also reported the similar problem with the dimensionality of technology readiness. The CFA result of internet banking can be seen below. After excluding the invalid items, all factor loadings were greater than the recommended 0.5 cutoff and were statistically significant [Nunnally and Bernstein, 1994].

The internal validity of the measurement model was examined by calculating the composite reliability (CR) and average variance extracted (AVE) [Fornell and Larcker, 1981]. As displayed in <Table 4>, All the items of com-

<Table 2> CFA Result of Internet Banking (Indonesia)

Model	X^2	df	X^2/df	GFI	AGFI	RMSEA	NFI
Recommended value	Significant at p >= 0.05[a]	-	<= 3[b]	> 0.90[b,c]	> 0.80[b]	< 0.08[b]	> 0.90[b]
2nd order technology readiness index	90.55[*]	61	1.48	0.90	0.84	0.059	0.91
2nd order Information Quality	42.98[**]	29	1.48	0.93	0.86	0.06	0.94
2nd order System Quality	8.84[*]	16	0.50	0.98	0.96	0.00	0.99
Full CFA Model	388.13[***]	130	2.98	130	0.93	0.85	0.95

Note) [a] : Byrne [1998], [b] : Chau and Hu [2001], Sundarraj and Wu [2005], [c] : Joreskog and Sorbom [1993].
[*] significant at level p < 0.1, [**] significant at level p < 0.05, [***] significant at level p < 0.001.

<Table 3> CFA Result of Internet Banking (South Korea)

Model	X^2	df	X^2/df	GFI	AGFI	RMSEA	NFI
Recommended value	Significant at p >= 0.05[a]	-	<= 3[b]	> 0.90[b,c]	> 0.80[b]	< 0.08[b]	> 0.90[b]
2nd order technology readiness index	19.11[*]	13	1.47	0.97	0.94	0.051	0.97
2nd order Information Quality	55.66[**]	27	2.06	0.94	0.88	0.077	0.97
2nd order System Quality	29.18[***]	15	1.94	0.96	0.91	0.073	0.98
Full CFA Model	117.17[**]	67	1.75	0.92	0.85	0.065	0.95

Note) [a] : Byrne [1998], [b] : Chau and Hu [2001], Sundarraj and Wu [2005], [c] : Joreskog and Sorbom [1993].
[*] significant at level p < 0.5, [**] significant at level p < 0.001, [***] Significant at level p < 0.1.

posite reliability were well above the recommended value 0.7 [Nunnaly and Bernstein, 1994]. The AVE represents the amount of variance captured by the construct's measure relative to measurement errors and the correlations among the latent variables. In this study, the AVE value of each measure extracted more than or equal to 50% of variance, reflecting an adequate internal validity [Bagozzi and Yi, 1988]. The composite reliability can be calculated as follows: (square of the summation of the factor loading)/{(square of the summation of the factor loading)+(summation of error variables)} [Wang and Liao, 2008].

Finally, the discriminant validity of the scale was assessed using the guideline recommended by Fornell and Larcker [1981] where square root of the AVE from the construct should be greater than the correlation shared between the construct and other constructs in the model. Both <Table 5> and <Table 6> list the correlation among the constructs with the square root of the AVE on the diagonal. All the diagonal values exceeded the inter-construct correlations; hence, the test of discriminant validity was acceptable. Therefore, we concluded that the scales should have sufficient construct validity.

<Table 4> CFA Results of Internet Banking Measure (Indonesia and South Korea)

Variable	Items	South Korea				Indonesia			
		t-value	ST	CR	AVE	t-value	ST	CR	AVE
TRI	IN1	-	0.80*			n.s	n.s		
	IN2	10.19	0.73*	0.85	0.58	-	0.57*	0.79	0.56
	IN3	n.s	n.s			5.57	0.90*		
	IN4	11.81	0.91*			5.62	0.74*		
	OP1	-	0.71*			n.s	n.s		
	OP2	9.10	0.73*	0.87	0.67	-	0.74*	0.79	0.56
	OP3	10.52	0.87*			6.67	0.76*		
	OP4	10.04	0.82*			6.62	0.75*		
	DIS1	n.s	n.s			n.s	n.s		
	DIS2	n.s	n.s	n.s	n.s	n.s	n.s	n.s	n.s
	DIS3	n.s	n.s			n.s	n.s		
	DIS4	n.s	n.s			n.s	n.s		
	UN1	n.s	n.s			n.s	n.s		
	UN2	n.s	n.s	n.s	n.s	n.s	n.s	n.s	n.s
	UN3	n.s	n.s			n.s	n.s		
	UN4	n.s	n.s			n.s	n.s		
Information Quality	CP1	-	0.88**			-	0.88**		
	CP2	16.42	0.95**			9.81	0.86**		
	AC1	-	0.80**			-	0.66**		
	AC2	12.19	0.77**	0.97	0.79	6.26	0.73**	0.95	0.67
	FM1	-	0.91**			-	0.86**		
	FM2	12.55	0.92**			9.30	0.83**		
	CR1	-	0.96**			-	0.79**		
	CR2	10.39	0.87**			8.74	0.90**		
	RL1	-	0.91**			-	0.92**		
	RL2	10.14	0.90**			6.96	0.71**		
System Quality	FX1	-	0.95***			-	0.81*		
	FX2	22.22	0.92***			11.10	0.94*		
	IT1	-	0.95***			-	0.91*		
	IT2	20.64	0.91***			14.93	0.95*	0.96	0.76
	AS1	-	0.93***			-	0.82*		
	AS2	19.02	0.89***			10.18	0.89*		
	TL1	-	0.99***			-	0.90*		
	TL2	21.35	0.89***			9.08	0.75*		
Perceived convenience	PC1	-	0.95**			-	0.88***		
	PC2	25.40	0.94**	0.90	0.75	13.26	0.90***	0.90	0.76
	PC3	11.66	0.68**			10.66	0.88***		
Social Presence	SP1	-	0.92**			-	0.88***		
	SP2	27.63	0.99**	0.97	0.91	13.93	0.91***	0.91	0.76
	SP3	25.79	0.97**			11.50	0.83***		
Perceived usefulness	PU1	-	0.93**			-	0.91***		
	PU2	34.12	0.94**	0.96	0.87	14.46	0.90***	0.92	0.74
	PU3	21.83	0.92**			11.99	0.82***		
	PU4	22.78	0.94**			11.58	0.81***		
Trust	TR1	-	0.71**			-	0.85***		
	TR2	16.32	0.84**	0.87	0.68	12.64	0.92***	0.91	0.76
	TR3	12.06	0.91**			11.25	0.85***		
End-user Satisfaction	SF1	-	0.96**			-	0.80***		
	SF2	25.11	0.96**	0.94	0.84	10.85	0.90***	0.90	0.75
	SF3	17.81	0.85**			10.86	0.90***		

Note) ST : standardized coefficient of factor loading.
Indonesia : * significant at level p < 0.1, ** significant at level p < 0.05, *** significant at level p < 0.001;
South Korea : * significant at level p < 0.5, ** significant at level p < 0.001, *** Significant at level p < 0.1;
(-)t value for these parameters were not available because they were fixed for scaling purposes

<Table 5> Correlation Matrix and AVE (Indonesia)

Construct	Construct								
	IN	OP	IQ	SQ	CV	SP	PU	TR	SF
IN	**0.865**								
OP	0.369	**0.866**							
IQ	0.297	0.462	**0.816**						
SQ	0.208	0.354	0.754	**0.873**					
CV	0.191	0.434	0.646	0.748	**0.933**				
SP	0144	0.166	0.397	0.402	0.392	**0.935**			
PU	0.205	0.416	0.623	0.650	0.675	0.243	**0.928**		
TR	0.310	0.317	0.695	0.633	0.505	0.314	0.560	**0.935**	
SF	0.287	0.312	0.622	0.626	0.593	0.442	0.529	0.691	**0.930**

Note) Diagonal elements are the square root of the average variance extracted (AVE). Off-diagonal elements are the correlations among constructs.

<Table 6> Correlation Matrix and AVE for South Korea Case

Construct	Construct								
	IN	OP	IQ	SQ	CV	SP	PU	TR	SF
IN	**0.874**								
OP	0.289	**0.906**							
IQ	0.142	0.520	**0.890**						
SQ	0.128	0.525	0.814	**0.929**					
CV	0.126	0.560	0.699	0.749	**0.932**				
SP	0.062	0.022	0.174	0.072	0.146	**0.978**			
PU	0.083	0.055	0.686	0.796	0.809	0.016	**0.966**		
TR	0.193	0.481	0.762	0.702	0.596	0.228	0.653	**0.910**	
SF	0.120	0.425	0.792	0.757	0.641	0.196	0.687	0.784	**0.958**

Note) Diagonal elements are the square root of the average variance extracted (AVE). Off-diagonal elements are the correlations among constructs.
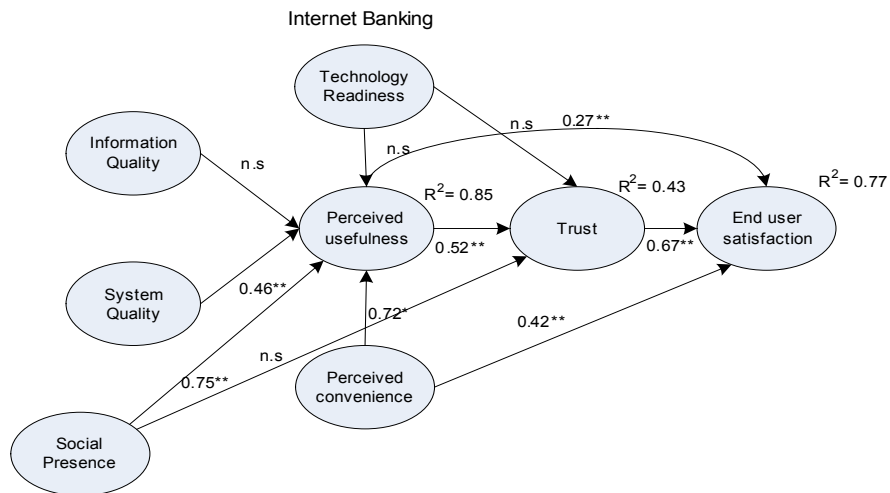
5.5 Structural Model

The structural model was tested with the data collected from the validated measures to estimate the coefficients of the causal relationships between constructs, which would validate the hypothesized effects. All indices re-sults provided evidence of a good model fit for both Indonesia (X^2 = 471.71 df = 301, RMSEA = 0.062, GFI = 0.90, AGFI = 0.83, NFI = 0.90) and South Korea cases (X^2 = 435.71, df = 258, RMSEA = 0.062, GFI = 0.91, AGFI = 0.81, NFI= 0.92). The path coefficient and p-value for each equation in the hypothesized model are presented in <Figure 2> and <Figure 3>.

Note) * p < 0.1, ** p < 0.001.

<Figure 2> Hypotheses Testing Result (Indonesia)

Note) ** p < 0.001.

<Figure 3> Hypotheses Testing Result (South Korea)

As expected, system quality had a significant influence on perceived usefulness, while information quality showed no significant influence on perceived usefulness. Consequently, hypothesis 1-2 was supported while hypothesis 1-1 was not both for Indonesia and South Korea cases (β = -0.19, -0.25, respectively). In addition, perceived convenience had a significant influence on both perceived usefulness and end user satisfaction, thus H 2-1 and H 2-2 were supported. As expected, perceived usefulness had a significant and positive impact on both trust and end user satisfaction in the internet banking of South Korea and Indonesia. There-

fore, H3 and H4 were supported.

Social presence had a positive impact on perceived convenience in Indonesia, but it had no impact on trust (β = -0.29). On the contrary, social presence had a significant impact on trust, but it had no impact on perceived convenience in South Korea (β = -0.04). Hence, H 5-1 was supported for Indonesia case, while H 5-2 was not supported. Contrary to hypotheses 6-1, technology readiness had no significant impact on perceived usefulness both for Indonesia and South Korea (β = -0.06, -0.04 respectively). However, the path from TRI to trust of South Korea was positive and significant, while the path was insignificant for Indonesia. Therefore, hypothesis 6-2 was supported for the South Korea case, and this hypothesis was not supported for the Indonesia case (β = 0.10). Finally, trust also showed a significant impact on end user satisfaction with internet banking in both South Korea and Indonesia. Thus, H7 was supported.

In the internet banking service in Indonesia, R^2 values show that system quality, social pres-ence, and perceived convenience account for 84% of variance of perceived usefulness. In addition, perceived usefulness and perceived convenience explained 67% of variance in the trust toward internet banking. Lastly, 76% of variance in end user satisfaction toward internet banking was explained by trust, perceived convenience, and perceived usefulness. In internet banking in South Korea, system quality and perceived convenience explained 84% of variance of perceived usefulness, while 67% of variance of trust was explained by technology readiness, social presence, perceived convenience, and perceived usefulness as well. Trust and perceived usefulness account for 74% of variance of end user satisfaction.

Ⅵ. Discussion and Implications

6.1 Discussion

This study investigates the differences and similarities of internet banking between two

<Table 9> Summary of Hypotheses Result

Hypotheses	Indonesia		South Korea	
	t-value	Result	t-value	Result
Information quality → perceived usefulness	-1.17	Not supported	-1.06	Not supported
System quality → perceived usefulness	2.54	Supported	3.05	Supported
TRI → perceived usefulness	-0.87	Not supported	-1.01	Not supported
TRI → trust	0.97	Not Supported	2.13	Supported
Social presence → perceived convenience	6.48	Supported	-0.83	Not supported
Social Presence → trust	-1.30	Not Supported	1.98	Supported
Perceived convenience → perceived usefulness	2.95	Supported	5.65	Supported
Perceived convenience → end-user satisfaction	3.94	Supported	2.09	Supported
Perceived usefulness → trust	2.26	Supported	5.54	Supported
Perceived usefulness → end user satisfaction	3.07	Supported	2.51	Supported
Trust → end user satisfaction	6.97	Supported	6.51	Supported

different countries to create a new customer satisfaction model. We also examine the combination effects by combining technology readiness dimension, social presence issue, perceived usefulness, trust, and several other constructs based on the DeLone and McLean [2003] model. We have noted that there were measurement errors on technology readiness dimension, particularly in the discomfort and insecurity dimensions. Thus, we couldn't use both dimensions in our internet banking model of Indonesia, while insecure dimension can be used in our internet banking model of South Korea. In this study, we only used four items for each dimension. The statistical result showed some errors when analyzing this construct. From our literature study, others have reported the similar problems with the dimensionality of TR [Liljander et al., 2006; Taylor et al., 2002; Yi et al., 2003]. It also stated that one of the authors has performed several studies with a complete set of TR items, but failed to extract the expected dimensions. Liljander et al. [2006] argued that it might be an indication that the scales are not readily suitable for explaining TR with respect to particular companies or products, for which Parasuraman [2000] also called for further research. Without further research, the reasons for discrepancies can only be speculated [Liljander et al., 2006]. An argument from Liljander et al. [2006] may explain why the insecure dimension was reliable in internet banking of South Korea, while it was unreliable in Indonesia. They said construct measures should be adapted to different countries. Feeling of discomfort and insecurity may manifest themselves in different ways in different cultures.

The proposed model has successfully predicted user satisfaction toward IB and explains how the role of different constructs shows different indications in different countries. The result also shows that system quality has positive and significant impact on perceived usefulness, while information quality has a negative but insignificant impact on perceived usefulness. This negative relationship between information quality and perceived usefulness suggests that users require useful information in a particular time and at the same time, expect a higher level of perceived usefulness. Moreover, the study showed that social presence plays important role in explaining perceived usefulness in internet banking in Indonesia, while this construct was insignificant in the case of South Korea. However, our analysis indicated that this social presence has positive impact on trust in internet banking in South Korea, while it was not significant in Indonesia. The finding in South Korea supports the study by Hassanein and Head [2003]. Our empirical result also indicates that perceived convenience has significant impact on perceived usefulness in Indonesia as well as in South Korea. Regarding technology readiness dimensions, discomfort and insecurity could not be confirmed in our study. When we dropped both dimensions from our study, evidence indicates that one of technology readiness dimensions (innovation) has positive impact on trust in internet banking in South Korea. However, no positive relationship of technology readiness dimensions has been found in internet banking in Indonesia. The influence of innovation is also relatively small. Our findings may provide some support for the inability of

technology readiness construct in explaining customer adoption behavior toward self service technology. Moreover, our study results that trust is significantly influenced by perceived usefulness. Finally, end user satisfaction is significantly positively affected by perceived usefulness, trust, and perceived convenience. Among three constructs influencing end user satisfaction, trust is reported to have the most significant impact. It also supports the study by Suh and Han [2002].

Furthermore, the direct and indirect effects among constructs can be seen in <Table 10> and <Table 11>. In Internet model of Indonesia, social presence has the strongest direct and total effect on perceived usefulness. In addition, perceived usefulness exhibits the strongest direct and total effect on trust. Moreover, perceived convenience and trust have the big-gest direct and total effects on end user satisfaction of the internet banking service in Indonesia. On the other hand, the internet model of South Korea showed that system quality has the strongest direct and total effects on perceived usefulness. Likewise, in the Indonesian case, perceived usefulness has the strongest effect on trust, followed by system quality. In sum, perceived usefulness and perceived convenience have the strongest direct and total effects on end user satisfaction.

6.2 Conclusion and Managerial Implication

In this study, we find that internet banking satisfaction trend is different in different countries. Specifically, a country with high ICT adoption and a country with low ICT adoption show

<Table 10> The Direct, Indirect, and Total Effect among construct of Internet Banking model (Indonesia)

Construct	Direct			Indirect			Total Effect		
	PU	TR	SF	PU	TR	SF	PU	TR	SF
SQ	0.46				0.24	0.16	0.46	0.24	0.16
SP	0.75				0.39	0.26	0.75	0.39	0.26
PC	0.72		0.42		0.37	0.25	0.72	0.37	0.67
PU		0.52				0.35		0.52	0.35
TR			0.67						0.67

<Table 11> The Direct, Indirect, and Total Effect among construct of Internet Banking model (South Korea)

Construct	Direct			Indirect			Total Effect		
	PU	TR	SF	PU	TR	SF	PU	TR	SF
SQ	0.73				0.58	0.12	0.73	0.58	0.12
SP		0.10				0.02		0.10	0.02
Inno		0.11				0.02		0.11	0.02
PC	0.59		0.21		0.47	0.10	0.59	0.47	0.31
PU		0.79	0.22			0.17		0.79	0.39
TR			0.21						0.21

different acceptance behaviors. The implications of our findings are important especially for the management in the bank, particularly for the adoption of internet banking. Based on our analysis, we may assume that Indonesia can represent a country in the early stage of information technology adoption, while South Korea represents a country of high technology. This study shows that perceived usefulness, perceived convenience, and trust are important factors which should be taken into account when implementing internet banking in Indonesia or in other countries at the similar level of technological development. On the other hand, perceived convenience and perceived usefulness are two important aspects to be considered in high ICT countries such as South Korea. Furthermore, our model indicates that trust is the most critical determining factor to ensure success in internet banking implementation in both high and low tech countries. The respondents from Indonesia argue that they do not want to adopt internet banking because of privacy and security concerns. Therefore, the bank management should consider seriously this trust issue when implementing internet banking particularly in low ICT countries. In fact, this issue is found to be similar in such countries as Jordan, Thailand, and Nigeria [Benemati and Serva, 2007; Sukkar and Hasan, 2005]. Moreover, the management should take into account other recommended constructs in the process of adopting electronic banking in accordance to the environment in their countries.

The empirical results also emphasize the importance of assuming multidimensional constructs. System quality, perceived usefulness, perceived convenience, perceived usefulness, trust, and other significant constructs for each model in this research need to be carefully reviewed when establishing strategies to increase electronic banking. This study has provided a reliable and valid model for managerial implication. Researchers can also use the model as the foundation for the development of comprehensive research in electronic banking among other electronic services in general.

6.3 Limitations and Suggestions for Further Research

Although the findings are reliable and useful, the present study has certain limitations. Firstly, the validity of technology readiness constructs causes some problem in our model. As noted by Liljander *et al*. [2006], the fact that a number of other studies have been unable to extract the proposed four dimensions shows that our study may give more evidence to the invalidity of the constructs. Our study is also limited in that we used only four items for each dimension. The selected items for this study might be inadequate to represent the general conditions proposed by Parasuraman [2000]. In addition, we do not consider for different cultural variables in our study. Thus, further research is needed to verify the cultural role in our proposed model. Lastly, the sample size is another limitation, particularly for the Indonesia sample size. Even though our study sufficiently analyses the confirmatory factors, further findings are needed to strengthen the validity of this study. Extensive studies comparing more country samples are suggested for in-depth analysis.

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〈Appendix 1〉 Variables and Items of research

Variables		Items
Information Quality	Completeness	◦ Internet banking provides me with a complete set of information ◦ Internet banking provides me with all the information I need
	Accuracy	◦ Internet banking produces correct banking information ◦ There are few errors in the information I obtain from internet banking
	Format	◦ The banking information provided by internet banking is well formatted ◦ The banking information provided by internet banking is clearly presented on the screen
	Currency	◦ Internet banking produces the most current information ◦ The information from internet banking is always up to date
Systems Quality	Reliability	◦ Internet banking performs reliably and securely ◦ The operation of internet banking dependable
	Flexibility	◦ Internet banking can be adopted to meet a variety of needs ◦ Internet banking can flexibly adjust to new demands or conditions
	Integration	◦ Internet banking effectively integrates data from several accounts ◦ Internet banking effectively combines data to meet user's need
	Accessibility	◦ Internet banking allows information to be readily accessible to me ◦ Internet banking makes information easily to access
	Timeliness	◦ Internet banking provides information in timely fashion ◦ Internet banking returns answers to my request quickly
TR (Innovativeness)		◦ In general, I am among the first in my circle of friends to acquire new technology when it appears. ◦ I can usually figure out new high-tech products and services without help from others. ◦ I keep up with the latest technological developments in my areas of interest. ◦ I enjoy the challenge of figuring out high-tech gadgets.
TR (Optimism)		◦ Technology gives people more control over their daily lives. ◦ I like the idea of doing business via computers because I'm not limited to regular business hours. ◦ Technology makes me more efficient in my occupation. ◦ Technology gives me more freedom of mobility
TR (Discomfort)		◦ Sometimes, I think that technology systems are not designed for use by ordinary people. ◦ Many new technologies have health or safety risks that are not discovered until people have used them. ◦ There is no such thing as a manual for a high-tech product or service that's written in plain language. ◦ There should be caution in replacing important people-tasks with technology because new technology can break down or get disconnected.

TR (Insecurity)	◦ I do not consider it safe giving out a credit card number over a computer. ◦ Any business transaction I do electronically should be confirmed later with something in writing. ◦ I do not consider it safe to do any kind of financial business online. ◦ I worry that information I send over the Internet will be seen by other people.
End-user Satisfaction	◦ Overall, I'm satisfied with the self-service of internet banking ◦ The whole self-service technology through internet banking offered by the bank exceed my expectation ◦ The whole self-service technology through internet banking offered by the bank are close to my ideal expectation
Perceived usefulness	◦ I can accomplish my banking tasks more quickly using internet banking ◦ I can accomplish my banking tasks more easily using internet banking ◦ Internet banking enhances my effectiveness in utilizing banking service ◦ Internet banking enhances my efficiency in utilizing banking service
Trust	◦ I can trust the internet banking ◦ I trust the information presented by internet banking ◦ I feel this internet banking would provide me with good service
Social presence	◦ There is a sense of human contact in the internet banking ◦ There is a sense of personalness in the internet banking ◦ There is a sense of sociability in the internet banking
Perceived convenience	◦ I can perform my banking activities in accessible location of internet banking. ◦ Using Internet banking enables me to accomplish my banking transaction easily ◦ Using Internet banking enables me to accomplish my banking transaction at any time anywhere

◆ About the Authors ◆

Yulia Wati

Yulia Wati is a master/PhD student at College of Business Administration, Chosun University, South Korea. She received her bachelor's degree in management from Bina Nusantara University, Indonesia. Her research interests include Green Information Technology, Human Behavior and Information Technology, Information Technology Strategy, and Social Aspects of Information System.

Chulmo Koo

Chulmo Koo is an assistant professor in Chosun University, Korea. He received a Ph. D. in Management Information Systems from Sogang University, Korea. His research area is on Electronic Commerce Strategy and Performance, Green IT Management, Technostress, and Social Network Technologies Usage. His papers have been appeared in the International Journal of Electronic Commerce, International Journal of Information Management, Journal of Internet Commerce, Industrial Management and Data Systems, and Information Systems Frontiers. Currently he does actively research on Green IT Practices and publish in AMCIS 2009 and HICSS 2010.