Asia Pacific Journal of Information Systems
Vol. 24, No. 2, June 2014 http://dx.doi.org/10.14329/apjis.2014.24.2.115

Effects of System Quality and Information Quality on the Use and Job Performance of an Enterprise Mobility Solution for a Mobile Office with a Consideration of Task Mobility and Task Interdependence as Control Variables*

Sunjip Yim**, Minsoo Shin***

In a dynamic business environment, the enterprise mobility solution for a mobile office (EMS) has been adopted to increase the competitive edge of organizations. By using an EMS, performance is expected to be enhanced. However, the related literature has paid little interest to the impact of system quality in an EMS on the information quality produced by the system. On the basis of socio-technical theory, we posited that the system quality in an EMS influences information quality. In addition, we investigated the relationships between the above two qualities, use and job performance by considering task mobility and task inter-dependence as control variables. Survey respondents were from many industries using EMSs. The result of structural equation modeling shows that system quality positively affects information quality, and other relationships in the model are proven statistically significant. We also found that system quality has stronger impacts on use and job performance than information quality does in EMS. However, system quality does not affect use in case both task mobility and task inter-dependence exist. The theoretical and practical implications of the result are discussed in the paper.

Keywords : Mobile Office, Socio-Technical Approach, System Quality, Information Quality, Task Mobility, Task Interdependence

---

* This research was supported by the MSIP(Ministry of Science, ICT and Future Planning), Korea, under the CPRC(Communications Policy Research Center) support program supervised by the KCA(Korea Communications Agency)(KCA-1194100004).

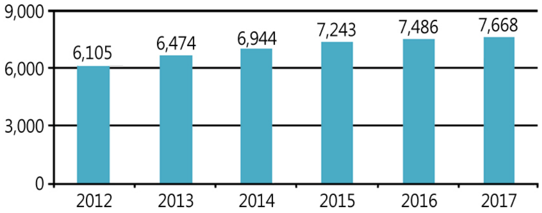
** Ph.D. Candidate, Information Technology Management Dept., Graduate School, Hanyang University
*** Corresponding Author, Professor, School of Business, Hanyang University

Ⅰ. Introduction

With the rapidly changing business environment and technologies, companies are needed to adapt themselves flexibly to the fierce market competition and enhance organizational performance in order to maintain sustainability. For this purpose, Gartner [2002] suggested the concept of real-time enterprises (RTE) defined as *enterprises that compete by using up-to-date information to progressively remove delays in managing and executing their critical business processes*.

One of factors for RTE is an information system (IS) for mobile office [Lee *et al*., 2011] which is also be termed "enterprise Mobility Solution" [Koo *et al*., 2012]. In this paper, we selected the term "enterprise mobility solution for mobile office [EMS]," which is defined as an IS or a solution by which employees can process their tasks while outside their offices [Kang *et al*., 2006]. In this solution, employees also connect to servers or intranets of their organizations via smartphones, tablet personal computers (PCs), or other information technology (IT) apparatus and complete their work without time and pace limits [Lee and Kim, 2010].

In South Korea, the EMS market was quickly expanded with the introduction of smartphones at the end of 2009 in South Korea. According to International Data Corporation [IDC, 2013][1], domestic market size reached ₩6.1 trillion (KRW, or won) in 2011 and will reach ₩6.5 trillion in 2013 and ₩7.7 trillion in 2017, with an average growth rate of 4.7%. The worldwide market size was estimated at ₩75 trillion in 2011 and it will reach ₩145 trillion in 2017, with an average growth rate of 25% [Lee and Kim, 2010; KT DIGIECO, 2012]. The mobile application and security market is also expected to grow fast.



Source: IDC 2013.

<Figure 1> Domestic Market Size of EMS (KRW: Billion)

EMSs are also extended to interconnect enterprise resource planning (ERP) systems or customer relationship management (CRM) systems in order to meet the organizational demands. Both private and public organizations have been trying to provide fixed-mobile convergence (FMC) and support the mobile work environment [Telecommunications Technology Association (TTA), 2011].

A primitive EMS was originally introduced on the requests of distribution or sales divisions of companies in South Korea. However, with the introduction of smartphones and tablet PCs and the progress in mobile telecommunication technologies, the mobile work environment can be supported more easily than before. The bring-your-own-device (BYOD), cloud services, and telecommuting systems trends also reinforce this change. Even social web applications such as social network services (SNSs) and other Web 2.0 services, which were originally developed for individual users in the non-work context, can be used in the mobile work environment. Therefore, increasing organizational performance by using an EMS has attracted increasing atten-

1) The IDC's concept of EMS includes a market for related software, mobile terminals, IT services, and mobile telecommunication services.

tion.

Now, an EMS can be extended to the realm of PC-based work processing. It uses wireless medium and supports telecommuting or work processing on the spot. Therefore, it provides flexibility in communication, collaboration, and information sharing [Sheng *et al.*, 2005]. The functions and usage environment of an EMS are different from those in a fixed IS environment. Hence, technology maturity [Gebauer *et al.*, 2007], user experiences [McCullogh, 2004], and the context of mobile IS use also result in different user requirements and work procedures [Zheng and Yuan, 2007; Gebauer, 2008]. The Korea Communications Commission (KCC) [2012] suggested that an EMS be composed of mobile terminals, mobile applications, a mobile network, and an IS related to enterprise work processing.

The previous literature on EMS is as follows. On the basis of task-technology fit theory (TTF), Gebauer *et al*. [2010] established a fit between managerial tasks, mobile IS, and mobile use. Gebauer [2008] also revealed that user-perceived technology maturity is a crucial factor in explaining the use of mobile technology, which affects job performance. Chatterjee *et al*. [2009] applied the IS success model in the context of work in healthcare. They showed that system quality and content (information) quality exerts impacts on the use of mobile technology.

In South Korea, EMSs utilizing personal digital assistants (PDAs) had been studied mainly until 2009. Subsequently, mobile ISs utilizing smartphones were studied [Lee, 2012]. Lee and Lee [2012] surveyed employees of hospitality companies for the EMS. They found that technological acceptance factors partly affect knowledge management activities, ultimately affecting job performance. Koo *et al*. [2012] showed that among information quality and service quality of EMS, only information quality indirectly affect job performance. Lee [2012] studied the relationships between the factors of composing EMSs using the data collected from the survey of experts.

The socio-technical approach was also applied to the context of an EMS [Chen and Nath, 2008]. This approach sees that a mutually shaping relationship exists between information and collaboration practices and tools developed for communication and knowledge sharing [Talja and Hansen, 2006]. This approach consists of (a) a technical subsystem, (b) a personal subsystem, (c) an external environment, and (d) a work system design [Hendrick and Kleiner, 2011]. System quality is also shown to influence information quality in the context of an IS in an organization [Gorla *et al*., 2010]. On the basis of the socio-technical approach, we considered interactions between an EMS and employees and among employees themselves. Therefore, we posited that system quality in mobile office influences information quality.

DeLone and McLean suggested the IS success model in 1992 and updated the model in 2002 [DeLone and McLean, 1992; 2002; 2003]. The IS success model is widely adopted by researchers and applied in many studies such as IS in organizations [Sedera and Gable, 2004], e-commerce [DeLone and McLean, 2004; Wang, 2008], and Web portal [Al-Debei *et al*., 2013]. We also used the IS success model in studying the relationship between system quality, information quality, use, and net benefits in EMS.

The previous literature has not shown much interest in the impact of the system quality on information quality in an EMS. In addition, according to TTF theory, task characteristics affect job performance. Thus, we considered task characteristics such as task mobility [Kakihara and Sørensen, 2002] and task interdependence [Wagemen and Baker, 1997] as control variables. Research questions are as follows.

Research question 1:
Does the system quality of an EMS influence information quality?

Research question 2:
When considering task characteristics as control variables, does the system quality and information quality of an EMS influence use and job performance?

We aimed to provide a model to answer these research questions using the socio-technical approach and the IS success model. The results reveal the impact of system quality on information quality in an EMS and provide practitioners with lessons in designing or operating an EMS. The remainder of this paper is organized as follows. In section 2, we review previous literature and related theories. In section 3, we constructed the theoretical model and describe the research methodology. In section 4, empirical data analysis is performed and the findings are discussed. Finally, in Section 6, conclusions are drawn.

Ⅱ. Literature Review

2.1 Enterprise Mobile Solution for Mobile Office (EMS)

On the Basis of TTF theory, Gebauer *et al.* [2010] established a fit between managerial tasks, a mobile IS, and mobile use. They also showed that high distraction and poor quality of a network connection are particularly challenging when designing an EMS. Gebauer [2008] also conducted empirical surveys, revealing revealing that (1) user-perceived technology maturity is a crucial factor for explaining the use of mobile technology, which affects job performance, and (2) mobile technology needs to be available in a variety of usage-situations. There are few studies that explore the EMS in a user-behavioral context. Rather, many researchers are interested in the topic of mobile work, where an EMS is implicitly covered.

Chatterjee *et al.* [2009] applied the IS success model to the context of work in healthcare. They showed that portability under system quality and the task structure under content (information) quality influence the use of mobile technology. Alhendawi and Baharudin's [2013] work can also be applied to an EMS. They analyzed the effects of quality factors of a web-based IS-system quality, information quality and service quality-on an employee's contextual performance. They revealed that especially information quality has an important role. A web-based IS can be easily transformed into an EMS if functions supporting mobile work are added.

In South Korea, EMS have been studied using in two approaches, technical and user behavioral. Results of the latter approach are summarized in <Table 1>. Early studies were interested in PDA-related EMSs until 2009. However, after the introduction of smartphones, mainly smartphone-based EMSs have been researched [Lee, 2012]. Lee and Lee [2012] surveyed employees

<Table 1> Domestic Research Summary

Researchers	Content of the study
Lee and Ok [2004]	Information quality (i.e., accuracy, timeliness, fitness, and reliability) is revealed to affect the use of an EMS.
Jung and Lee [2005]	In a PDA-based task process, technology, task, and personal characteristics are proved to affect the TTF, usage and performance.
Lee and Cho [2005]	For voluntary or non-voluntary users of PDAs in organizations, self-efficiency, interests, and direct fitness are shown to let both user groups evaluate ease of use highly.
Kim *et al*. [2007]	The success factor of an EMS in organizations is shown to be task-fitness. The roles of system quality and information quality are also spotlighted.
Cho and Lee [2009]	For PDA and other dedicated terminal users in 15 companies, system characteristics and administrative characteristics are proved to affect system satisfaction, task satisfaction and performance.
Lee and Lee [2012]	For hospitality companies using EMS, technological acceptance factors partly affect knowledge management activities, which, in turn, affect job performance.
Koo *et al*. [2012]	The information quality of an EMS indirectly affects job performance, but service quality (supporting services) does not.
Lee [2012]	In an EMS, three factors (real-time work-processing support, communication and collaboration support, and information quality) significantly affect the users' intention to use the EMS continuously.

* Source: Partly cited from Koo *et al*. [2012].

of hospitality companies for EMS use and examined the relationships between technological acceptance factors (perceived usefulness and perceived ease of use) and knowledge management activities. They found that technological acceptance factors partly affect knowledge management activities, which, in turn, affect job performance. Koo *et al*. [2012] showed that the information quality of an EMS indirectly affects job performance but service quality does not. Lee [2012] conducted empirical research on perceptions and acceptance of users of EMSs from data collected from experts. She showed that three factors-real-time work-processing support, communication and collaboration support, and information quality-significantly affect a user's intention to use an EMS continuously.

2.2 Socio-Technical Approach

In everyday life, people routinely assist each other when solving information problems [Mckenzie, 2003]. Talja and Hansen [2006] stated that receiving, interpreting, and indexing information-assigning names to pieces of information for the purposes of retrieval and re-use are part of the routine steps of work tasks and everyday life. They mentioned that the social-technical approach sees that a mutually shaping relationship exists between information and collaboration practices and tools developed for communication and knowledge-sharing.

Socio-technical approach is extended into the socio-technical interaction network (STIN) by Kling *et al*. [2003]. STIN's main interest is focused on the relationship between social actors, technologies, and artifacts. STIN attempts to explain the relationships between people and technologies [Kling *et al*., 2003]. In addition, Hendrick and Kleiner [2011] states that the socio-technical systems (STS) theory consists of (a) a technical subsystem, (b) a personal subsystem, (c) an external environment, and (d) a work system design.

According to the socio-technical approach, an organization is considered an open system since it exchanges influences with the environment [Heller, 2001]. Kim [2008] applied socio-technical systems (STS) theory to blogs. He chose three factors as the main characteristics of blogs: open system, unskillful internet users, and interaction between the system and users. Through these characteristics, system quality influences information quality.

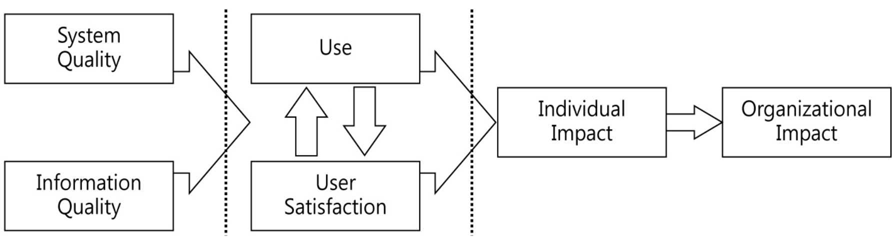
Chen and Nath [2008] analyzed mobile work by using the socio-technical approach. Based upon the information gathered from interviews with the Chief Information Officers (CIO), they identified the primary elements of the social and technical subsystems related to mobile work. Further, they suggested recommendations for organizations to improve their mobile work environment. Bélanger *et al*. [2012] studied a multilevel STS in a telecommuting situation. They proposed theoretical relationships between telecommuting and its IT artifacts. Since telecommuting is related to mobile work, we think their research result is relevant to our research.

Previous studies also showed that system quality influences information quality in an IS in organizations [Gorla *et al*., 2010], an ERP system [Ram and Wu, 2013], Web-based knowledge portals [Lin *et al*., 2007], and a project management IS [Raymond and Bergerson, 2008]. We extended this line of researches by adopting the socio-technical approach. Thus, we incorporated interactions between an EMS and employees and those between employees themselves. By considering mutually shaping relationships between an EMS and employees, we expect that information quality in the EMS can be enhanced by system quality.

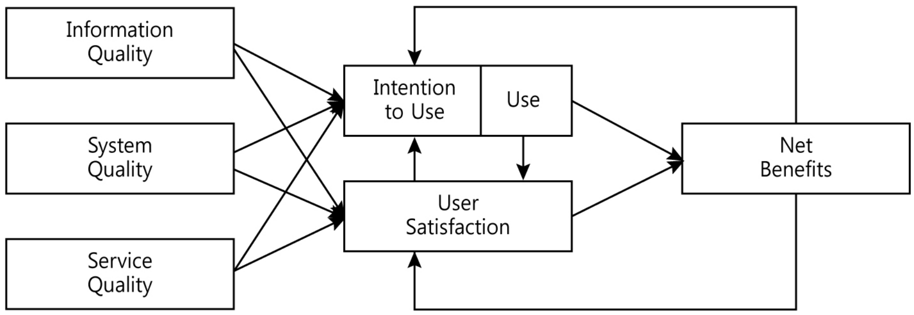
2.3 IS Success Model

DeLone and McLean [1992] suggested the IS success model. They reviewed the existing literature related to IS success, classified the composing dimensions, and constructed relationships among them, as shown in <Figure 2>.

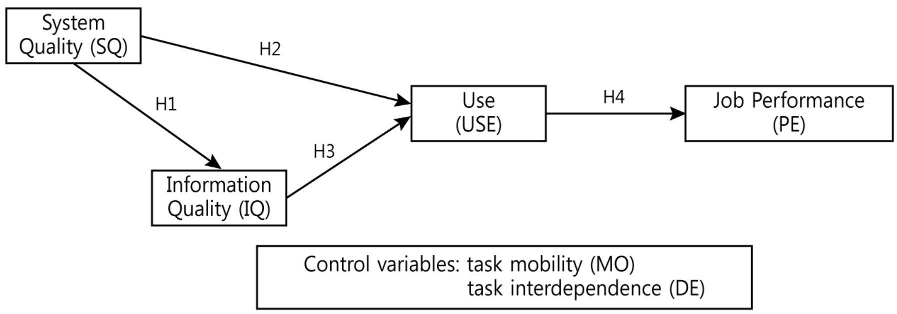
This original model was updated in 2002 [DeLone and McLean, 2002; 2003] as shown in <Figure 3> (service quality is added to this model). Furthermore, individual impact and organizational impact in the former version of the model were merged into net benefits. This updated



<Figure 2> The IS Success Model



<Figure 3> The updated IS Success Model



<Figure 4> Research model

model comprises six dimensions; system quality, information quality, service quality, (intention to) use, user satisfaction, and net benefits.

The IS success model is applied by researchers in many studies, such as IS in organizations [Sedera and Gable, 2004], knowledge management systems [Wu and Wang, 2006], e-commerce [DeLone and McLean, 2004; Wang, 2008], e-government [Wang and Liao, 2008], e-Learning [Eom *et al*., 2012], and Web portals [Al-Debei *et al*., 2013].

Ⅲ. Theoretical Model and Research Methodology

3.1 Research Model and Hypotheses

Using the theories and previous literature in the previous section, we constructed the research model as in <Figure 4>. First, we hypothesized the effect of system quality in EMS on information quality utilizing the socio-technical approach. Second, on the basis of the IS success model, we also hypothesized that system quality and information quality affect use. Third, we adopted task mobility and task interdependence as control variables.

DeLone and McLean [1992, 2003] suggested that researchers should select proper measures of constructs, including performance measures, on the basis of the context of each study. Furthermore, few studies have examined the relationship between information quality and behavioral intention (BI) of Web 2.0 services. According to Petter *et al*. [2008], one of the reasons is that information quality tends to be measured as a component of user satisfaction measures, rather than being evaluated as a separate construct. However, according to the socio-technical approach, we thought it reasonable to establish the hypothesis that system quality influences information quality in an EMS. In addition, to determine whether employees' job performance is improved by an EMS, we set job performance as a net benefit.

System quality → Information quality

Under the socio-technical approach, users of IS as social actors and an EMS as a technical subsystem mutually influence each other. An EMS facilitates users to access and use the information they need. Employees can use an EMS without time and place limits. They can interact with other users or use information other users have already input. This means that vigorous interactions between users and an EMS or among users themselves can enhance the quality of information that flows through the EMS.

In addition, researchers revealed that system quality enhances information quality in similar information-processing systems such as web-based knowledge services [Lin *et al.*, 2007], ERP systems [Ram and Wu, 2013], an IS in organizations [Gorla *et al.*, 2010], and project information systems (PMIS) [Raymond and Bergerson, 2008]. Especially, Gorla *et al.* [2010] argued that poor system quality causes lower information quality in an IS in organizations. Thus, on the basis of socio-technical approach and these previous studies, we formed hypothesis 1.

H1: System quality in an EMS positively affects information quality.

System quality, Information quality → Use → Job performance

On the basis of the IS success model, we argued that system quality and information quality affect the use of ISs in organizations, which, in turn, affects job performance. In a mandatory IS-use context, system quality is shown to affect use [Livari, 2005; DeLone and McLean, 2003]. Meanwhile, Petter *et al.* [2008], after summarizing 27 related papers, showed mixed support for the effect of system quality on information quality. Considering these situations, we formed hypothesis 2 to confirm the effect of system quality on information quality in an EMS.

H2: System quality in an EMS positively affects use.

Petter *et al.*[2008], after reviewing seven related papers, also suggested mixed support for the effect of information quality on use. In the case of a voluntary [Teng and Calhoun, 1996] or quasi-voluntary IS [Rai *et al.*, 2002], users who can access high-quality information tend to use the system more frequently. However, in the case of a mandatory IS [Livary, 2005], the aforementioned relationship does not hold. We wanted to test the IS success model for this relationship in an EMS. Therefore we formed hypothesis 3.

H3: Information quality in an EMS positively affects use.

As mentioned earlier, in the IS success model, net benefits include individual impact and organizational impact. Torkzadeh and Doll [1999], DeLone and McLean [2003], and Davis [1989] included job performance as a measure for individual impact. Following them, we set job performance as a net benefit in order to confirm whether employees as users show better job performance. Thus, and on the basis of the IS success model, we formed hypothesis 4.

H4: Use of an EMS positively affects job performance.

Task mobility and task interdependence

According to TTF theory, task characteristics affect job performance. To include this effect in our research model, we adopted task mobility and task interdependence as control variables in order to check their control effect on the relationships formed in the research model. Task mobility [Kakihara and Sørensen, 2002] and task interdependence [Wagemen and Baker, 1997] are two representative task characteristics in the context of an EMS.

Task mobility means the extent to which performance is accomplished along with changes in time and space [Cho, 2013; Kakihara and Sørensen, 2002; Graham and Marvin, 1996]. To process work in a mobile environment, rapid information transfer and decision-making are needed [Cho, 2013]. Thus, remote access to the main server should be secured at any time and in any place [Cho, 2013]. This means that task mobility guaranteed by an EMS can cause the increased use of the EMS. Following this logic, we selected task mobility as a control variable in the research model.

Task interdependence is the degree by which organizational employees or department should depend on other organizational members to accomplish the goal of the task [Cho, 2013; Wagemen and Baker, 1997]. Task interdependence mainly exists in organizations utilizing technology intensively. The interactive task interdependence requires complicated inter-relationship among activities of several units to complete a task [Cho, 2013]. Task interdependence increases the use of IS for information sharing [Staple and Jarvenpaa, 2000; Sharma and Yetton, 2007]. Based on these literatures, we selected task interdependence as a control variable, too.

3.2 Variables and Items Measured

Variables and items measured are listed in <Table 2> and <Table 3>.

<Table 2> Construct and its Definition

Construct	Description	Reference
System quality (SQ)	Performance of IS	Petter and McLean [2009]
Information quality (IQ)	The quality of the report or output produced and displayed by IS	Wang and Strong [1996] Petter and McLean [2009]
Use (USE)	The extent to which users utilize the IS	Petter and McLean [2009]
Job performance (PE)	The extent to which that users' productivity increases	Verive and Delay [2006] Gabel *et al*. [2008]
Task mobility (MO)	The extent to which task performance is accomplished, along with changes in time and space	Cho [2013] Kakihara and Sørensen [2002]
Task interdependence (DE)	The degree by which organizational employees or department should depend on other organizational members to accomplish the goal of the task	Cho [2013] Wagemen and Baker [1997]

<Table 3> Items Measured

Construct	Item no.	Item measured	Reference
System quality (SQ)	SQ1	Incessant access	Hamilton and Chervany [1981] Bailey and Pearson [1983] Srinivasan [1985] Lee and Ok [2004] Yang *et al.* [2005] Kim *et al.* [2009]
	SQ2	Response speed	
	SQ3	Reliability	
	SQ4	Ease of use	
Information quality (IQ)	IQ1	Accuracy	DeLone and McLean [1992] Wang and Strong [1996] Jarke and Vassiliou [1997] Herrera-Viedma *et al.* [2006]
	IQ2	Believability	
	IQ3	Timeliness	
	IQ4	Being up to date	
	IQ5	Understandability	
Use (USE)	USE1	Increase in the access time	DeLone and McLean [1992] Gelderman [1998] Rai *et al.* [2002]
	USE2	Increase in the frequency of access	
	USE3	Increase in the quantity of work processed through the EMS	
	USE4	Repetitive use of the EMS	
Job performance (PE)	PE1	Accurate processing of work	Goodhue and Thompson [1995] Verive and DeLay [2006] Gabel *et al.* [2008]
	PE2	Costs saving	
	PE3	Decrease in duplicated workload	
	PE4	Increase in productivity	
Task mobility (MO)	MO1	The time of working outside from the office	Kakihara and Sørensen [2002] Turban and King [2003] Durlacher Research [2000]
	MO2	The extent of working in many places or in the middle of moving	
	MO3	The extent of using the intranets of their organizations from outside the office.	
	MO4	The extent of responding quickly from outside the office	
Task inter-depend-dence (DE)	DE1	The extent to which my tasks are related to other members of my team	Tushman and Nadler [1978] Gebauer [2008]
	DE2	The extent to which my tasks are related to members of other teams	
	DE3	The extent of cooperating with other members of the company	
	DE4	The extent of sharing information with other members of the company	

System quality

System quality is defined as the performance of IS [Petter and McLean, 2009]. Bailey and Pearson [1983], Yang *et al*. [2005], and Kim *et al*. [2009] suggested accessibility as a measure of system quality. Especially, Kim *et al*. [2009] selected accessibility as one important characteristics of a ubiquitous computing system. In this regard, accessibility can be an important measure in an EMS. Considering the characteristics of EMS, we changed the term "accessibility" to "incessant access." In addition, Hamilton and Chervany [1981], Bailey and Pearson [1983], and Srinivasan [1985] selected response speed as a measure of system quality. The aforementioned researchers except Bailey and Pearson [1983] also selected reliability as a measurement. Following Lee and Ok [2004], we also set ease of use as a measure for system quality. In sum, we selected incessant access, reliability, response speed, and ease of use as measures of system quality.

Information quality

Information quality is defined as the quality of the report or output that is produced and displayed by an IS [DeLone and MacLean, 1992; Gorla *et al*., 2010]. We considered accuracy, believability, timeliness, being up-to-date, and understandability as measures of system quality. Wang and Strong [1996] classified information quality into four dimensions: intrinsic, contextual, representational, and accessibility. After reviewing the previous literature, we selected frequently and commonly mentioned measures. Following this logic, we chose accuracy and believability from the intrinsic dimension, timeliness and being up-to-date from the contextual dimension, and understandability from the representational dimension [DeLone and McLean, 1992; Wang and Strong, 1996; Jarke and Vassiliou, 1997; Herrera-Viedma *et al*., 2006].

Use

The term "use" means the extent to which users utilize an IS. Seddon and Kiew [2007] argued that for mandatory systems, usefulness is a better measure than use. However, DeLone and McLean [2003] responded that there can still be considerable variability of use, even in mandatory systems [Petter *et al*., 2008]. In the case of an EMS, employees also show a variability of use. Some may use most of the EMS, while others may use it only to some extent. Following this logic, we included use as a construct in the research model. The measurement items were selected from MeLone and McLean [1992], Gelderman [1998], and Rai *et al*. [2002].

Job performance

We considered job performance of employees who use an EMS as a net benefit in the IS success model. Job performance is defined as the extent to which users' productivity increases. The measurement items were selected from Goodhue and Thompson [1995], Verive and DeLay [2006], and Gabel *et al*. [2008].

Task mobility and task interdependence

Task mobility means the extent to which task performance is accomplished along with changes in time and space [Cho, 2013; Kakihara and Sørensen, 2002; Graham and Marvin, 1996]. The measurement items for it are from Kakihara and Sørensen [2002], Turban and King [2003], and Durlacher Research [2000].

Task interdependence is the degree by which organizational employees or department should depend on other organizational members to accomplish the goal of the task [Cho, 2013; Wagemen and Baker, 1997]. The measurement items for it are from Tushman and Nadler [1978] and Gebauer [2008].

4. Data Analysis and Results

4.1 Data Collection

We surveyed employees from various industries in October, 2012. All the indicators utilized a seven Likert scale. We used SPSS 18.0 for the data analysis and AMOS 18.0 with the maximum likelihood method for the confirmatory factor and structural model analysis. A total of 249 people participated in the survey. The sample demographic profile is in <Table 4>.

<Table 4> Sample Demographic Profile

Item	Item description	Frequency	Percent
Industry of organization	Information Technology	92	37%
	Finance/insurance	73	29%
	Manufacturing	31	12%
	Public organization	14	6%
	Retail/logistics	12	5%
	Construction	4	2%
	Health-care	3	1%
	Others	20	8%
Working place	Office (worker)	170	68%
	Outside the office	62	25%
	Production line	3	1%
	Others	14	6%
Age	From 21 to 30	53	21%
	From 31 to 40	121	48%
	From 41 to 50	56	22%
	From 50 on	19	8%
Main ICT terminal	smartphone	187	75%
	Tablet PCs	57	23%
	PDA, etc.	5	2%

4.2 Data Analysis and Measurement Model Results

Skewness and kurtosis values confirmed the normality of the data as in <Table 5>.

<Table 5> Skewness and Kurtosis

	Skewness		Kurtosis	
	statistics	standard error	statistics	standard error
SQ1	-1.157	0.154	1.387	0.307
SQ2	-0.843	0.154	0.187	0.307
SQ3	-0.805	0.154	0.062	0.307
SQ4	-0.758	0.154	0.420	0.307
IQ1	-0.966	0.154	0.721	0.307
IQ2	-0.642	0.154	-0.005	0.307
IQ3	-0.800	0.154	0.143	0.307
IQ4	-0.573	0.154	-0.111	0.307
IQ5	-0.986	0.154	1.194	0.307
USE1	-0.409	0.154	-0.343	0.307
USE2	-0.561	0.154	-0.197	0.307
USE3	-0.431	0.154	-0.280	0.307
USE4	-0.526	0.154	-0.200	0.307
PE1	-0.296	0.154	-0.317	0.307
PE2	-0.326	0.154	-0.348	0.307
PE3	-0.199	0.154	-0.501	0.307
PE4	-0.433	0.154	0.291	0.307
MO1	-0.043	0.154	-1.252	0.307
MO2	0.052	0.154	-1.340	0.307
MO3	-0.597	0.154	-0.600	0.307
MO4	-0.546	0.154	-0.652	0.307
DE1	-0.483	0.154	-0.577	0.307
DE2	-0.412	0.154	-0.584	0.307
DE3	-0.550	0.154	-0.503	0.307
DE4	-0.465	0.154	-0.608	0.307

Cronbach's alpha value is 0.92 which exceeds the minimum acceptable value 0.7. We conducted factor analysis using principal axis factoring (PAF) and VARIMAX rotation. As a result, the Kaiser-Meyer-Olkin measures of sampling adequacy is 0.90 which is more than the minimum acceptance value 0.5. The significant level of Bartlett's test of sphericity is 0.000. Hence, the data we used passed the test of Kaiser-Meyer-Olkin measures and Bartlett's sphericity [Bae, 2009]. The rotated factor matrix is as in <Table 6>. Eigenvalues for each factor range from 4.157 to 2.870. Cumulative variance reaches 82.21%.

<Table 6> Rotated Factor Matrix, Eigenvalues, and Cumulative Variance

	factors					
	1	2	3	4	5	6
IQ5	0.815	0.168	0.141	0.171	0.053	0.256
IQ4	0.813	0.155	0.131	0.081	0.163	0.157
IQ2	0.802	0.137	0.209	0.174	0.033	0.240
IQ1	0.796	0.007	0.197	0.067	0.065	0.308
IQ3	0.791	0.156	0.138	0.202	-0.005	0.240
USE4	0.159	0.876	-0.004	0.296	0.153	0.093
USE2	0.187	0.858	-0.043	0.309	0.202	0.097
USE1	0.155	0.856	-0.066	0.308	0.225	0.116
USE3	0.083	0.844	-0.006	0.195	0.217	0.167
DE3	0.157	-0.016	0.930	-0.031	-0.092	0.031
DE2	0.162	-0.050	0.923	0.070	-0.012	0.057
DE4	0.105	0.000	0.905	-0.014	0.019	0.021
DE1	0.200	-0.008	0.888	0.020	-0.068	0.104
PE3	0.162	0.244	-0.023	0.839	0.232	0.139
PE2	0.162	0.308	0.036	0.827	0.178	0.156
PE1	0.228	0.373	0.022	0.760	0.225	0.143
PE4	0.203	0.415	0.045	0.721	0.173	0.247
MO1	-0.030	0.106	-0.147	0.232	0.860	0.117
MO2	-0.050	0.083	-0.162	0.296	0.829	0.105
MO3	0.165	0.340	0.093	0.054	0.787	0.095
MO4	0.246	0.292	0.055	0.102	0.785	0.109
SQ4	0.282	0.092	-0.009	0.170	0.071	0.833
SQ2	0.246	0.073	0.113	0.133	0.148	0.788
SQ1	0.416	0.225	0.076	0.082	0.133	0.742
SQ3	0.431	0.174	0.085	0.256	0.137	0.677
Eigenvalue	4.157	3.826	3.558	3.193	3.102	2.870
Explained variance	16.626	15.303	14.231	12.770	12.409	11.482
Cumulative variance	16.626	31.929	46.160	58.930	71.339	82.821

<Table 7> Cronbach's Alpha, Composite Reliability, and AVE of CFA Model

Constructs	Cronbach's Alpha	Composite reliability	AVE
Measurement model	0.92		
SQ	0.90	0.83	0.68
IQ	0.93	0.90	0.71
USE	0.96	0.92	0.86
PE	0.94	0.91	0.79
MO	0.89	0.74	0.67
DE	0.95	0.88	0.82

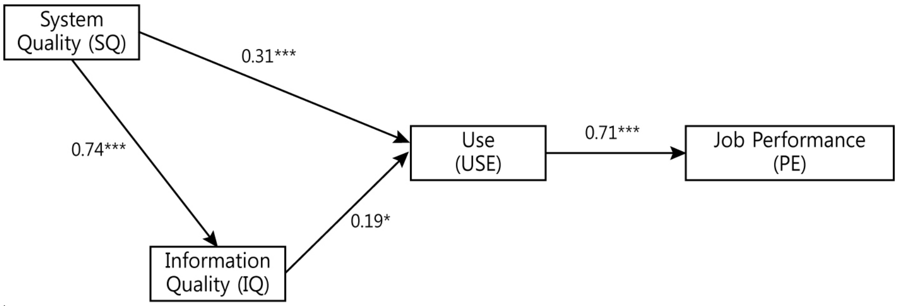
Confirmatory factor analysis (CFA) for this six-factor measurement model was performed. The result is shown in <Table 7>. Each values of Cronbach's alpha, composite reliability, and average variance extracted (AVE) exceeds the recommended values of 0.7, 0.7, and 0.5.

<Table 8> shows that the squared root of AVE for each construct (the numbers in parenthesis) is greater than the corresponding inter-construct correlations. Therefore, we conclude overall that the measures are valid.

4.1 Structural Model Results and Discussion

The result of conducting the structural model is in <Figure 5>.

After estimating the structural model, we obtained the goodness-of-fit statistics as in <Table 9>. The p-value of Chi-square is 0.000. A ratio of Chi-square to the degree of freedom of no more than 2 or 3 is considered a good fit to the model [Carmines and McLver, 1981]. The ratio of our model is 0.95. In the case when the aforementioned ratio is less than 2 and the p-value of Chi-square is small, the model is considered to have a good fit. In general, the values of CFI, GFI and NNFI (TLI) indicate a better fit if they are more than 0.9. According to Browne and Cudeck [1993], the value of RMSEA in the range of 0.05 and 0.08 indicate a fair fit. SRMR should be less than 0.08 [Bae, 2009]. Therefore, we concluded that our model has a fair fit.



* significant at p-value < 0.05, with one-tailed test
*** significant at p-value < 0.01, with one-tailed test

<Figure 5> Structural Model Results (n = 249)

<Table 8> Correlation Coefficient Value between Constructs and AVE

	SQ	IQ	USE	PE	MO	DE	AVE
SQ	(0.83)						0.68
IQ	0.75	(0.85)					0.71
USE	0.43	0.39	(0.93)				0.86
PE	0.54	0.48	0.71	(0.89)			0.79
MO	0.34	0.18	0.49	0.52	(0.82)		0.67
DE	0.20	0.37	-0.31	0.63	-0.14	(0.90)	0.82

* Numbers within parenthesis means the square root of AVE.

<Table 9> Fit Measures of the Structural Model

Chi-square	Degree of Freedom	CFI	GFI	NNFI (= TLI)	RMSEA	SRMR
216.66	111	0.975	0.909	0.969	0.062	0.079

The path coefficient from system quality in an EMS to information quality is 0.74. As mentioned in 3.1, system quality is shown to influence information quality in Web-based knowledge services, ERP systems, IS in organizations, and PMIS. We showed that the effect for system quality on information quality also exists in an EMS.

The direct effect of system quality on information quality is 0.31 and the effect of information quality on use is 0.19. It means that, in an EMS, system quality affects use and job performance more than information quality does. Furthermore, we also found that the effects of system quality on use and job performance are partially mediated by information quality. That is, system quality has a stronger influence on use and job performance when considering these partial mediation effects than when not considering them. This suggests a guideline for practitioners to consider when designing or operating an EMS.

The indirect effect from system quality on use via information quality is 0. 14 (= 0.74×0.19). Then the total effect from system quality on use amounts to 0.45 (= 0.31+0.14). This total effect is 45.1% larger than the effect without considering partial mediation effects via information quality. The effect of use in an EMS on job performance is 0.71. The effects of system quality and information quality on job performance mediated via use are 0.32 (= 0.45×0.71) and 0.13 (= 0.19×0.71) each.

Standardized regression weights of observable variables are listed in <Table 10>.

We tested the structural model again, as shown in <Figure 6>, for the case where task mobility exists. There were 166 respondents whose average score on the measurement items for task mobility was greater than 4.0.

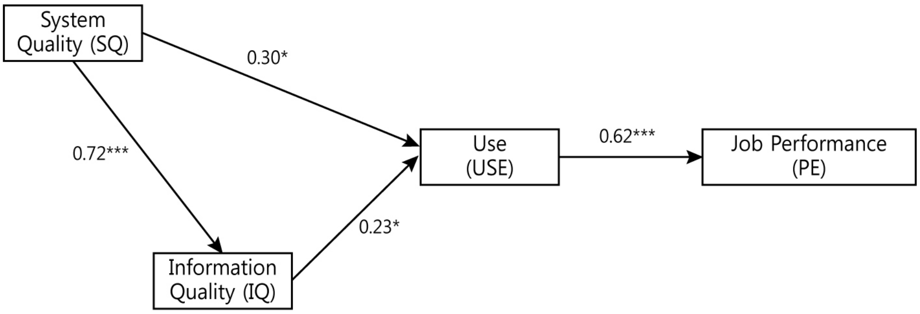
<Table 10> Standardized Regression Weights of Observable Variables

Construct	Item no.	Item measured	Weights
System quality (SQ)	SQ1	Incessant access	0.91
	SQ2	Response speed	0.72
	SQ3	Reliability	0.92
	SQ4	Ease of use	0.80
Information quality (IQ)	IQ1	Accuracy	0.78
	IQ2	Believability	0.85
	IQ3	Timeliness	0.87
	IQ4	Being up-to-date	0.89
	IQ5	Understand ability	0.78
Use (USE)	USE1	Increase in the access time	0.97
	USE2	Increase in the frequency of access	0.97
	USE3	Increase in the quantity of work processed through the EMS	0.82
	USE4	Repetitive use of the EMS	0.92
Job performance (PE)	PE1	Accurate processing of work	0.91
	PE2	Costs saving	0.90
	PE3	Decrease in duplicated workload	0.87
	PE4	Increase in productivity	0.89

* p-value < 0.001.

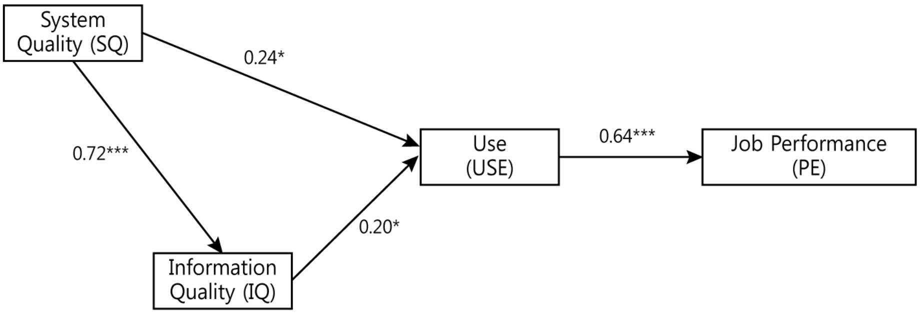
In this case, the value of GFI is more than 0.8 and less than 0.9. According to Hair *et al.* [2006], the value of GFI more than 0.8 can be acceptable. Furthermore, the role of GFI as a goodness-of-fit statistics has not been considered a priority recently [Bae, 2008]. Thus, we also concluded that the model in <Figure 6> and the following models in this paper have a reasonable fit.

Comparing the case when task mobility exists to the result of analyzing all respondents, the effect of system quality on use decreases slightly



*Chi-square = 212.13, Degree of freedom = 111, CFI = 0.957, GFI = 0.873, NNFI(TLI) = 0.947, RMSEA = 0.074, SRMR = 0.089.

<Figure 6> Structural Model Results with Task Mobility (n = 166)



*Chi-square = 203.47, Degree of freedom = 110, CFI = 0.970, GFI = 0.894, NNFI(TLI) = 0.963, RMSEA = 0.066, SRMR = 0.081.

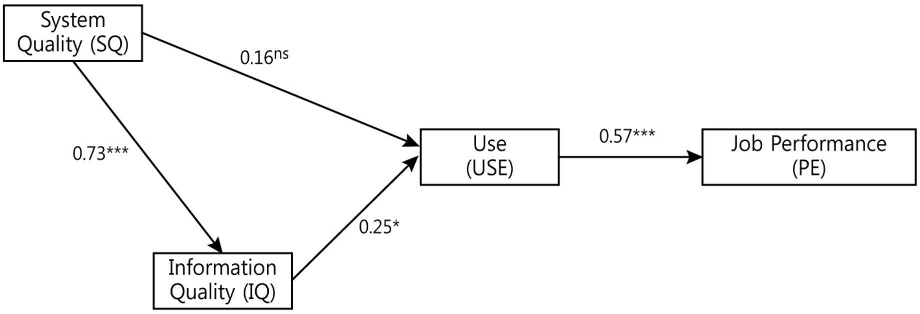
<Figure 7> Structural Model Results with Task Interdependence (n = 194)

(from 0.31 to 0.30) whereas the effect of information quality on use increases (from 0.19 to 0.23). When task mobility exists, the direct effects from system quality and information quality on use also increase slightly (from 0.50 = 0.31 + 0.19 to 0.53 = 0.30 + 0.23). The effect from system quality on job performance via use decreases (from 0.32 to 0.29[2]) whereas the effect from information quality on job performance via use increases slightly (from 0.13 to 0.14[3]). This means that, when task mobility exists, the influence of information quality is strengthened compared to that of system quality in an EMS.

For the case where task interdependence exists, we estimated the structural model, as shown in <Figure 7>. There were 196 respondents whose average score on the measurement items for task interdependence was greater than 4.0.

Comparing the case when task interdependence exists to the result of analyzing all respondents, the effect of system quality on use decreases (from 0.31 to 0.24) whereas the effect of information quality on use increases slightly (from 0.19 to 0.20). Compared to the case when task mobility exists, the results are characterized by the fact that the size of the effect of system quality in an EMS on information quality

2) 0.29 = (0.30 × 0.62) + (0.72 × 0.23 × 0.62).
3) 0.14 = 0.23 × 0.62.



*Chi-square = 214.23, Degree of freedom = 110, CFI = 0.960, GFI = 0.879, NNFI(TLI) = 0.950, RMSEA = 0.074, SRMR = 0.084.

<Figure 8> Structural Model Results with Both Task Mobility and Task Interdependence (n = 172)

<Table 11> Structural Model Results Summary

	All	With task mobility	With task interdependence	With both task mobility and task interdependence
SQ → USE (direct)	0.31	0.30(↓)	0.24 (↓↓)	N.S.
IQ → Use	0.19	0.23(↑↑)	0.20 (↑)	0.25
SQ and IQ → Use(direct)	0.50(0.31+0.19)	0.53(↑0.30+0.23)	0.44(↓↓0.24+0.20)	0.25
SQ → PE (indirect)	0.32	0.29(↓)	0.25 (↓↓)	0.10
IQ → PE (indirect)	0.13	0.14(↑)	0.13 (=)	0.14

is lowered. When employees' tasks are interdependent, the employees are affected by information quality rather than by system quality. This means that the information quality produced or used by employees through an EMS is important when task interdependence prevails and the role of system quality is at least reduced. The effect from system quality on job performance via use decreases (from 0.32 to 0.25[4]) while the effect from information quality on job performance via use is unchanged (from 0.13 to 0.13[5]). This means that, when task mobility exists, the influence of system quality is weakened compared to that of system quality in an EMS.

For the case both when task mobility and task interdependence exist simultaneously, we selected 172 respondents whose score multiplied by the average score on the measurement items for task mobility and task interdependence was greater than 16.0. The result of estimating the structural model is shown in <Figure 8>.

Comparing this case to the result of analyzing all respondents, the coefficient from system quality to use is insignificant whereas the effect of information quality on use increases (from 0.19 to 0.25). The effect from system quality on job performance via use decreases drastically (from 0.32 to 0.10[6]) whereas the effect from information quality on job performance via use increases slightly (from 0.13 to 0.14[7]).

<Table 11> summarizes all the results above.

4) 0.25 = 0.24 × 0.64 + 0.72 × 0.20 × 0.64.
5) 0.13 = 0.20 × 0.64.
6) 0.10 = 0.73 × 0.25 × 0.57.
7) 0.13 = 0.25 × 0.57.

Compared to the result of analyzing all respondents, the effect from system quality to use decreases; furthermore, the effect from information quality to use increases when task mobility or task interdependence exists, but not simultaneously. In particular, with the case of task mobility, the effect of information quality on use increases comparatively, whereas in the case of task interdependence, the effect of system quality on use decreases comparatively. These findings shed light on the roles of task mobility and task interdependence in EMU. However, the roles of task characteristics, including but not limited to, these two should be studied further in following researches. Nevertheless, it deserves attention that, when both task mobility and task interdependence exist simultaneously, system quality in an EMS does not have an influence on use.

To summarize, all hypotheses for all the cases we considered are shown to hold, with the exception of H1 in the case when both task mobility and task interdependence exist simultaneously. The reason for rejecting H1 should be studied further. Such rejection might be the result from the weak negative correlation between task mobility and task interdependence in our data. To a certain extent, the trial to support both task mobility and task interdependence simultaneously in an EMS seems not to be successful.

Ⅴ. Conclusions

To cope with the rapidly changing business environment and technologies, EMSs have been introduced. Enhancement of organizational performance through an EMS is gaining importance. With the adoption of smartphones and tablet PCs and with the development of telecommunication technologies, the implementation of an EMS is getting easier and the market size is expanding.

However, few EMS or mobile work researchers have attempted to incorporate the effect of system quality on information quality and the related effects on use and job performance. We adopted the socio-technical approach to scrutinize these relationships. Using this approach and reflecting on the interactions between an

<Table 12> Hypothesis Test Results

Hypothesis	All	With task mobility	With task interdependence	With both task mobility and task interdependence
H1. System quality in an EMS positively affects information quality.	accept***	accept***	accept ***	accept***
H2. System quality in an EMS positively affects use.	accept***	accept*	accept*	reject
H3. Information quality in an EMS positively affects use	accept*	accept*	accept*	accept*
H4. Use of an EMS positively affects job performance.	accept***	accept***	accept***	accept***

* significant at p-value < 0.05 with one-tailed test.
*** significant at p-value < 0.01, with one-tailed test.

EMS and employees as users and on information sharing among employees themselves, we formed the hypotheses that the system quality of an EMS affects information quality. Further we applied the IS success model to the context of an EMS to see whether system quality and information quality affect use and job performance. We also introduced control variables such as task mobility and task interdependence in the research model following TTF theory.

We surveyed employees who use EMSs in their organizations and tested the structural model. The result shows that all hypotheses we formed are accepted. As expected, system quality influences information quality significantly. With this influence, the effects of system quality on use and job performance are bigger than those of information quality. In addition, we found that when task mobility or task interdependence exists independently, all the hypotheses are still accepted. However, when both control variables are in effect simultaneously, system quality does not affect use.

The theoretical contribution of this research is as follows. We revealed that in an EMS, system quality affects information quality following the socio-technical approach. In addition, system quality and information quality in an EMS also affect use and job performance with control variables such as task mobility and task interdependence. For management, when both task mobility and task interdependence exist simultaneously, the EMS does not seem to have a complete solution for employees. Practitioners should consider these two task characteristics that need to be supported first and should prioritize one. It is desirable that they design or operated focusing on the chosen task characteristics.

We think this research can be extended in the following direction: More task characteristics related to EMS or mobile work are needed to be considered in the model as control variables. Especially, interactions among existing and newly added task characteristics might provide us with a more detailed understanding of EMS use, which is becoming an inevitable trend in many industries.

⟨References⟩

[1] Kang, Y.J., Lee, W.J., and Seo, Y.J., "Effects of the mobility on the PDA use of Mobile office environments," *Management Science*, Vol. 23, No. 1, 2005, pp. 21-41.

[2] Koo, S.H., Lee, J.E., and Shin, M.S., "The Effect of Mobile Office Service Quality Factors on the User Satisfaction: Focused on Usage and Job Characteristics," *Korea Society of IT services Journal*, Vol. 11, No. 2, 2012, pp. 1-16.

[3] Kim, Y.Y., Yang, H.D., and Ahn, J.H., "Mobile IS Success in Mandatory Usage Context: The Role of Compatibility with Work," *Korean Management Science Journal*, Vol. 32, No. 3, 2007, pp. 71-88.

[4] KCC(Korea Communications Committee), "The Information Security Guideline for the introducing and operating secured mobile office," 2012.

[5] Moon, S.B., "Basic Concepts and Application of Structural Equation Modeling," *Hakjisa*, 2009.

[6] Bae, B.R., "Structural Equation Modeling with Amos 17.0-Principles and Practice," *Second Edition*, Chungram, 2009.

[7] Bae, B.R., "LISREL Structural Equation Model-Understanding, Utilizing and Programming," *Second Edition*, Chungram, 2008.

[8] Lee, K.B. and Kim, J.W., "The research for the market trends of mobile office and needs of enterprise," *KT Digieco*, 2010.

[9] Lee, B.H. and Ok, S.J., "A Study of the Success Factors on the Mobile Office System," *Internet e-Commerce Research*, Vol. 4, No. 2, 2004, pp. 33-47.

[10] Cho, S.M. and Lee, S.R., "A Study about The Impacts of Characteristics of Information Systems and Managerial Control on Job Satisfaction and Performance in the Mobile Work Environment," *Journal of Information Policy*, Vol. 166, No. 4, 2009, pp. 49-72.

[11] Lee, S.R. and Cho, S.M., "Mobile devices, Mobility, PDA, Professional fit, Technology acceptance model, TAM, Voluntariness," *Business Administration Research*, Vol. 34, No. 4, 2005, pp. 1023-1052.

[12] Lee, J.E., "An empirical study on End-user's perception and acceptance of mobile office, *Journal of Information Technology applications and management*, Vol. 19, No. 4, 2012, pp. 97-112.

[13] Lee, J.E., Koo, S.H., Choi, Y.S., and Shin, M.S., "The Effect of Mobile Office's Quality and Task Characteristics on an Employee's Task Performance," *Seminar of Society for e-Business Studies*, 2011, pp. 48-57.

[14] Lee, H.S. and Im, J.H., "SPSS 12.0 Manual," bobmunsa, 2005.

[15] Lee, H.L. and Lee, K.S., "An Exploratory Study for Adoption of Smart Mobile Office in Hospitality Industry and Application of the Hard Laddering Technique," *Journal of Tourism Science*, Vol. 36, No. 3, 2012, pp. 11-34.

[16] Jung, N.H. and Lee, K.C., "Influence of Task-Technology Fit on the PDA Driven Mobile Task Performance: Emphasis on Individual Characteristics and Task," *Knowledge Management Research*, Vol. 6, No. 1, 2005, pp. 71-84, 2005.

[17] Cho, I.H., "The Market and Opportunity of Domestic Enterprise Mobility," *KT Digieco*, 2013.

[18] TTA(Telecommunications Technology Associaion), "ICT Standardization Strategy Map Ver, 2011," 2011.

[19] KT Digieco trends report, "Growing Interests for the Market of App Store for enterprise use," 2012.

[20] Al-Debei, M.M., Jalal, D., and Al-Lozi, E., "Measuring web portals success: a respecification and validation of the DeLone and McLean information systems success model," *International Journal of Business Information Systems*, 2013.

[21] Alhendawi, K.M. and Baharudin, A.S., "The effects of quality factors of web-based information system on the employee contextual performance," *Journal of Theoretical and Applied Information Technology*, Vol. 52, No. 3, 2013.

[22] Bailey, J.E. and Pearson, S.W., "Development of a tool for measuring and analyzing computer user satisfaction," *Management Science*, Vol. 29, No. 5, 1983, pp. 530-545.

[23] Bélanger, F., Watson-Manheim, M.B., and Swan, B.R., "A multi-level socio-technical systems telecommuting framework," *Beha-*

viour and Information Technology, 2012, pp. 1-23.

[24] Browne, M.W. and Cudeck, R., "Alternative Ways of Assessing Model Fit," KA Bollen and J. Scott Long (Eds.): Testing structural equation models, 1993, pp. 136-162.

[25] Carmines, E.G. and McIver, J.P., "Analyzing models with unobserved variables: Analysis of covariance structures," *Social measurement: Current issues*, 1981, pp. 65-115.

[26] Chatterjee, S., Chakraborty, S., Sarker, S., Sarker, S., and Lau, F.Y., "Examining the success factors for mobile work in healthcare: a deductive study," *Decision Support Systems*, Vol. 46, No. 3, 2009, pp. 620-633.

[27] Chen, L. and Nath, R., "A socio-technical perspective of mobile work, Information, Knowledge," *Systems Management*, Vol. 7, No. 1, 2008, pp. 41-60.

[28] Cho, N., "The use of smart mobile equipment for the innovation in organizational coordination," *Springer Berlin Heidelberg*, 2013, pp. 1-36.

[29] Davis, F.D., "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS quarterly*, 1989, pp. 319-340.

[30] DeLone, W.H. and McLean, E.R., "Information systems success revisited," *Proceedings of the 35th Annual Hawaii International Conference on System Sciences*, IEEE, 2002.

[31] DeLone, W.H. and McLean, E.R., "Information Systems Success: The Quest for the Dependent Variable," *Information Systems Research*, Vol. 3, No. 1, 1992, pp. 60-95.

[32] Delone, W.H. and Mclean, E.R., "Measuring e-commerce success: applying the DeLone and McLean information systems success model," *International Journal of Electronic Commerce*, Vol. 9, No. 1, 2004, pp. 31-47.

[33] DeLone, W.H. and McLean, E.R., "The DeLone and McLean model of information systems success: A ten-year update," *Journal of Management Information Systems*, Vol. 19, No. 4, 2003, pp. 9-30.

[34] Durlacher Research Ltd, "Mobile Commerce Report (2000)," 2000.

[35] Eom, S.B., Ashil, N.J., Arbaugh, J.B., and Stapleton, J.L., "The role of information technology in e-learning systems success," *Human Systems Management*, Vol. 31, 2012, pp. 147-163.

[36] Gable, G.G., Sedera, D., and Chan, T., "Re-conceptualizing information system success: the IS-impact measurement model," *Journal of the Association for Information Systems*, Vol. 9, No. 7, 2008, pp. 377-408.

[37] Gartner Research Group, "It's time for the real-time enterprise," *Gartner Research Group Special Report*, October, 2012.

[38] Gebauer, J., Shaw, M.J., and Gribbins, M.L., "Task-technology fit for mobile information systems," *Journal of Information Technology*, Vol. 25, No. 3, 2010, pp. 259-272.

[39] Gebauer, J., Shaw, M.J., and Subramanyam, R., "Once Built Well, They Might Come: A study of mobile e-mail, University of Illinois at Urbana-Champaign," *College of Business Working Paper*, 2007, pp. 07-0117.

[40] Gebauer, J., "User requirements of mobile technology: A summary of research results. Information, Knowledge," *Systems Management*, Vol. 7, No. 1, 2008, pp. 101-119.

[41] Gelderman, M., "The relation between user satisfaction, usage of information systems and performance," *Information and Manage-*

ment, Vol. 34, No. 1, 1998, pp. 11-18.

[42] Goodhue, D.L. and Thompson, R.L., "Task-technology fit and individual performance," *MIS quarterly*, Vol. 19, No. 2, 1995, pp. 213-236.

[43] Gorla, N., Somers, T.M., and Wong, B., "Organizational impact of system quality, information quality, and service quality," *The Journal of Strategic Information Systems*, Vol. 19, No. 3, 2010, pp. 207-228.

[44] Graham, S. and Marvin, S., "Telecommunications and the city: Electronic spaces, Urban Places," London: Routledge, 1996.

[45] Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E., "Multivariate Data Analysis," 6th ed., Englewood Cliffs, NJ: Prentice Hall, 2006.

[46] Hamilton, S. and Chervany, N.L., "Evaluating information system effectiveness-Part I: Comparing evaluation approaches," *MIS quarterly*, Vol. 5, No. 3, 1981, pp. 55-69.

[47] Heller, F., "Towards a socio-ecotechnology," *Journal of Engineering and Technology Management*, Vol. 18, 2001, pp. 295-312.

[48] Herrera-Viedma, E., Pasi, G., Lopez-Herrera, A.G., and Carlos, P., "Evaluating the information quality of Web sites: A methodology based on fuzzy computing with words," *Journal of the American Society for Information Science and Technology*, Vol. 57, No. 4, 2006, pp. 538-549.

[49] Hendrick, H.W. and Kleiner, B.M., "Macroergonomics: An introduction to work system design," *in: HFES issues in human factors and ergonomics book series*, Vol. 2, 2011.

[50] IDC, "Korea Enterprise Mobility Market Dynamics," *2012 and Beyond, March*, 2013.

[51] Jarke, M. and Vassiliou Y., "Data Warehouse Quality: a review of the DWQ project," *Proceedings of the Conference on Information Quality*, Cambridge, MA: Citeseer, 1997, pp. 299-313.

[52] Kakihara, M. and Sørensen, C., "Mobility: An extended perspective, In System Sciences," HICSS, *Proceedings of the 35th Annual Hawaii International Conference on 2002*, IEEE, pp. 1756-1766.

[53] Kamal, M.A. and Baharudin, A.S., "The effects of quality factors of web-based information system on the employee contextual performance," *Journal of Theoretical and Applied Information Technology*, Vol. 52, No. 3, 2013, pp. 236-242.

[54] Kim, C., Oh, E., Shin, N., and Chae, M., "An empirical investigation of factors affecting ubiquitous computing use and U-business value," *International Journal of Information Management*, Vol. 29, No. 6, 2009, pp. 436-448.

[55] Kim, H.N., "The phenomenon of blogs and theoretical model of blog use in educational contexts," *Computers and Education*, Vol. 51, No. 3, 2008, pp. 1342-1352.

[56] Kling, R., McKim, G., and King, A., "A bit more to it: Scholarly communication forums as socio-technical interaction networks," *Journal of the American Society for Information Science and Technology*, Vol. 54, No. 1, 2003, pp. 47-67.

[57] Lin, H., Fan, W., Wallace, L., and Zhang, Z., "An empirical study of web-based knowledge community success," *In System Sciences, HICSS*, 40th Annual Hawaii International Conference, IEEE, 2007.

[58] Livari, J., "An empirical test of the DeLone-McLean model of information system success," *The DATA BASE for Advances in Infor-*

mation Systems, Vol. 36, No. 2, 2005, pp. 8-27.

[59] McCullough, M., "Digital Ground: Architecture, pervasive computing, and environmental knowing," *Cambridge*, MA: MIT Press, 2004.

[60] McKenzie, P., "A model of information practices in accounts of everyday-life information seeking," *Journal of Documentation*, Vol. 59, No. 1, 2003, pp. 19-40.

[61] Petter, S., DeLone, W., and McLean, E., "Measuring information systems success: models, dimensions, measures, and interrelationships," *European Journal of Information Systems*, Vol. 17, No. 3, 2008, pp. 236-263.

[62] Petter, S. and McLean, E.R., "A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level," *Information and Management*, Vol. 46, No. 3, 2009, pp. 159-166.

[63] Rai, A., Lang, S.S., and Welker, R.B., "Assessing the validity of IS success models: An empirical test and theoretical analysis," *Information systems research*, Vol. 31, No. 1, 2002, pp. 50-69.

[64] Ram, J., Corkindale, D., and Wu, M.L., "Examining the role of system quality in ERP projects," *Industrial Management and Data Systems*, Vol. 113, No. 3, 2013, pp. 350-366.

[65] Raymond, L. and Bergeron, F., "Project management information systems: An empirical study of their impact on project managers and project success," *International Journal of Project Management*, Vol. 26, No. 2, 2008, pp. 213-220.

[66] Seddon, P. and Kiew, M.Y., "A partial test and development of DeLone and McLean's model of IS success," *Australasian Journal of Information Systems*, Vol. 4, No. 1, 2007, pp. 90-109.

[67] Sedera, D. and Gable, G.G., "A factor and structural equation analysis of the enterprise systems success measurement model," *Association for Information Systems*, 2004.

[68] Sharma, R. and Yetton, P., "The contingent effects of training, technical complexity and task interdependence on successful information systems implementation," *MIS Quarterly*, Vol. 31, No. 2, 2007, pp. 219-238.

[69] Sheng, H., Nah, F.F.H., and Siau, K., "Strategic implications of mobile technology: A case study using value-focused thinking," *The Journal of Strategic Information Systems*, Vol. 14, No. 3, 2005.

[70] Srinivasan, A., "Alternative measures of system effectiveness: associations and implications," *MIS quarterly*, Vol. 9, No. 3, 1985, pp. 243-253.

[71] Staples, D.S. and Jarvenpaa, S.L., "Using Electronic Media for Information Sharing Activities: A replication and extension," *Proceedings of the 21st ICIS, December* Vol. 10, No. 13, 2000, pp. 117-133.

[72] Steiger, J.H., "Structural model evaluation and modification: An interval estimation approach," *Multivariate behavioral research*, Vol. 25, No. 2, 1990, pp. 173-180.

[73] Talja, S. and Hansen, P., "Information sharing, in: New directions in human information behavior," *Springer Netherlands*, 2006, pp. 113-134.

[74] Teng, J.T.C. and Calhoun, K.J., "Organizational computing as a facilitator of operational and managerial decision making: An exploratory study of manager's perceptions," *Decision Sciences*, Vol. 27, No. 4, 1996, pp. 673-710.

[75] Thompson, J.D., "Organizations in Action, McGraw-Hill," *New York*, 1967.

[76] Torkzadeh, G. and Doll, W.J., "The development of a tool for measuring the perceived impact of information technology on work," *Omega*, Vol. 27, No. 3, 1999, pp. 327-339.

[77] Turban, E. and King, D., "Introduction to E-commerce," *New Jersey: Prentice Hall*, 2003.

[78] Tushman, M.L. and Nadler, D.A., "Information processing as an integrating concept in organization design," *The Academy of Management Review*, Vol. 3, No. 3, 1978, pp. 613-624.

[79] Verive, J.M. and DeLay, N., "Measuring Telework ROI: Metrics Based on the Employee Life Cycle," *World at Work Journal*, Vol. 15, No. 2, 2006, pp. 6-15.

[80] Wageman, R. and Baker, G., "Incentives and cooperation: The joint effects of task and reward interdependence on group performance," *Journal of organizational behavior*, Vol. 18, No. 2, 1997, pp. 139-158.

[81] Wang, Y.S., "Assessing e-commerce systems success: a respecification and validation of the DeLone and McLean model of IS success," *Information Systems Journal*, Vol. 18, No. 5, 2008, pp. 529-557.

[82] Wang, Y.S. and Liao, Y.W., "Assessing e-Government systems success: A validation of the DeLone and McLean model of information systems success," *Government Information Quarterly*, Vol. 25, No. 4, 2008, pp. 717-733.

[83] Wang, R.Y. and Strong, D.M., "Beyond accuracy: What data quality means to data consumers," *Journal of Management Information Systems*, Vol. 12, No. 4, 1996, pp. 5-33.

[84] Wu, J.H. and Wang, Y.M., "Measuring KMS success: A respecification of the DeLone and McLean's model," *Information and Management*, Vol. 43, No. 6, 2006, pp. 728-739.

[85] Yang, Z., Cai, S., Zhou, Z., and Zhou, N., "Development and validation of an instrument to measure user perceived service quality of information presenting Web portals," *Information and Management*, Vol. 42, No. 4, 2005, pp. 575-589.

[86] Zheng, W. and Yuan, Y., "Identifying the Difference Between Stationary Office Support and Mobile Work Support: A Conceptual Framework," *International Journal of Mobile Communications*, Vol. 5, No. 1, 2007, pp. 107-122.

〈Appendix〉 Survey Questionnaires

<System quality>
- ○ An EMS provides reliability.
- ○ An EMS provides incessant access.
- ○ An EMS is easy to use.
- ○ An EMS provides quick response.

<Information quality>
- ○ An EMS provides accurate information.
- ○ An EMS provides timely information.
- ○ An EMS provides up-to-date information.
- ○ The inforamtion provided by an EMS is understandable
- ○ The inforamtion provided by an EMS is believable.

<Use>
- ○ The time of using an EMS is increasing.
- ○ The frequency of accessing an EMS is increasing.
- ○ The quantity of work processed through an EMS is increasing.
- ○ I use an EMS repeatedly.

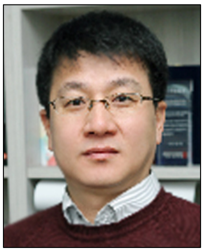
<Job performance>
- ○ An EMS helps process work more accurately.
- ○ An EMS helps save costs.
- ○ An EMS decreases duplicative workload.
- ○ An EMS increases the productivity.

<Task mobility>
- ○ I spend many hours in working outside from my office.
- ○ I work in many places or in the middle of moving places.
- ○ There are many needs to use the intranets of their organizations from outside my office.
- ○ Many times, I have to respond quickly from outside my office.

<Task interdepency >
- ○ My tasks are closely related with other members of my team.
- ○ My tasks are closely related with members of other teams.
- ○ Many times, I need to cooperate with other members of the company.
- ○ There are much information to share with other members of the company.

◆ About the Authors ◆

Sunjip Yim
Sunjip Yim is a Ph.D. Candidate at the Information Technology Management Department, Graduate School in Hanyang University. He received a B.A. (1994) and an M.S. (1996) in Economics from Yonsei University. He had worked in the telecom industry (1996) and governmental agencies for Trade (1998) and ICT (2004). His research interests include the enterprise mobile solution for mobile office, information quality in the social web, broadcasting and telecommunication industry analysis and strategies, e-business models and strategies, and digital convergence strategies.



Minsoo Shin
Minsoo Shin is a professor at the School of Business in Hanyang University. He received Ph.D. from Cambridge University, UK. Before joining the Hanyang faculty, Professor Shin had been on the faculty of Business School of Manchester Metropolitan University and University of East Anglia in UK. His research interests include broadcasting and telecommunication industry analysis and strategies, contents industry analysis and strategies, knowledge management, e-business models and strategies, and digital convergence strategies.

Submitted : September 25, 2013
1st revision : January 28, 2014
2nd revision : April 09, 2014
Accepted : April 17, 2014