「정보시스템연구」 제24권 제2호
한국정보시스템학회
2015년 6월, pp. 209~240

http://dx.doi.org/10.5859/KAIS.2015.24.2.209

Antecedent Factors Influencing the Continued Use of Smart Banking by Different Mobile Platforms: Android OS vs. iOS

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〈Content〉

Ⅰ. Introduction

Approximately 44% of the U.S. Internet population (107.0 million individuals) owned smartphones as of 2012, an increase of 31% (73.2 million) from 2011 (OPA, 2012). The number of mobile phone users in Korea reached 52 million as of the end of August, and approximately 40% of all Koreans were smartphone users. Korea's smartphone market is likely to remain bullish

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with the introduction of smartphones based on the fourth generation (4G) network. SK Telecom, Korea's largest mobile operator, is expected to offer seven smartphone models and one tablet PC model equipped with its new 4G service based on the long-term evolution (LTE) technology to meet the surging demand for video and other data-intensive services (The Korea Herald, 2011).

From the users' perspective, smartphone services are attractive since they can easily download and use smartphone applications. In addition, connectivity has been improved through the expansion of areas with wireless Internet access (Wi-Fi and 3G). From the perspective of banks, customers can directly use their mobile banking services that are based on smartphones through various applications or the banks' Web pages and access customized services without being subject to telecommunication firms' control. Banks can reduce the costs and effort they invest in the development and maintenance of applications by developing applications for smartphone operating systems instead of individual terminals. By developing and providing various applications for customers based on research results related to smart banking services, banks can increase the number of their customers.

In recent years, many studies have examined various attributes of smartphone based on chronological changes in Korea. Generally, previous studies of traditional banking, including Internet and mobile banking, have focused on the user's information system (IS) acceptance (Suh and Han, 2002), but some recent studies have considered the development of new technologies related to smartphone applications and the wireless Internet (Verkasalo et al., 2010). In particular, the acquisition of new customers is a top priority for firms because a purchase of products implies the user's acceptance of the products prior to the digital economy. However, studies of technology acceptance have increasingly considered a diverse range of perspectives due to the rapid development of new technologies and the wide expansion of consumer choice through the Internet. These studies focused more on users' continued use of existing technologies than on their acceptance of new ones.

This study examines the continuance intention toward the use of the smart banking service, which is the most active mobile banking service, based on the expectation-confirmation model of IS continuance (Bhattacherjee, 2001) in the context of the telecommunications deregulation and the development of technologies. The study investigates the relationships between various attributes of smart banking services, perceived usefulness, trust, satisfaction, and continuance intention of use and provides a comparison between the Android OS and iOS, which together account for the majority of smart banking services.

The rest of this paper is structured as follows.

Next section provides a brief literature review on the smart banking services. Section 3 deals with research model and hypotheses. In Section 4, issues related to measurement variables and data collections are discussed. In Section 5, the results of the analyses are demonstrated. Finally, section 6 presents research implications as well as limitations. Also, this section explores avenues for future research.

Ⅱ. Literature Review

2.1 Smart Banking Services

Generally, smart banking is similar to mobile banking but uses smartphones as the access device. Smart banking services offered through OS-based applications provide users with a more convenient interface and reduce the processing time by omitting multiphase access processes (Leyland et al., 2011). Users can not only conduct reliable banking transactions, including the verification and transfer of accounts, in Wi-Fi and 3G environments, but also access supplementary services, such as product subscriptions and accident reports. As in the case of online banking, the implementation of many financial services is possible in mobile banking, and enhanced security can be achieved by copying and using existing accredited certificates. Smartphone-based financial services have been expanding from traditional bank-related tasks to stocks, credit cards, and insurance.

As of August 2011, 21 Korean banks provided numerous financial services through smartphones based on Apple's iOS or Google's Android OS. Applications for Microsoft's Windows Mobile and Samsung's Bada are distributed, but their utilization rates are relatively low. From the perspective of service provision through the wireless Internet, smart banking services currently have no spatial limits and thus can maximize mobility, providing users with access to account balances and enabling them to transfer accounts, check deposits, trade currencies, verify check deposits, check transactions, use credit cards, and obtain cash advances. According to a recent survey in Online Publishers Association (OPA), Android phones led the market, followed closely by the iPhone, and all others declined sharply. More specifically, smart users were most likely to adopt Android phones (46%) and the iPhone (35%), followed by Blackberry (16%), Windows (7%), Nokia (2%), Palm (1%), and other (2%) devices (OPA, 2012). This suggests that many users access smart banking services based on the Android OS or iOS, but few studies have focused on smart banking. In this regard, the present study examines users' acceptance of smart banking services.

2.2 Trust

Trust has been examined in many studies, and

most studies, following Jarvenpaa and Tractinsky (1999) and Gefen et al. (2008), defined it as the belief that the outcome will be as expected by the user. In other studies, it has been defined as including economics-based trust and faith in humanity and a trusting stance (McKnight et al., 2001). The concept of trust is not formed on the basis of a single factor. That is, it can be formed only after considering the various factors that make it the most vital element in determining customers' actions in transactions that include economic aspects, such as banking services.

Trust has been examined by researchers in diverse fields (Byeon, 2008; Jarvenpaa and Tractinsky, 1999) and verified to be a crucial factor in banking research (Luo et al., 2010). Banking systems provide both online and offline services. In the case of online banking services, customers emphasize security and safety, because sensitive personal information is transferred and processed through wired and wireless Internet systems. Therefore, customers' use of online banking services is primarily based on trust, because the safety and security of their personal information in banking services cannot be verified directly.

Previous studies of online services have focused on trust (Deng et al., 2010), particularly on its antecedents and outcomes. Na et al. (2008) considered the perceived risk as an antecedent of trust in online shopping and measured purchase intentions as an outcome of trust. Consumers may avoid online banking services for many reasons, including expected security breaches in payment processing, perceived security risks arising from distrust in technologies, and functional risks (Hoffman et al., 1999).

Trust can foster individuals' intention to act by reducing their perceived risk (Jarvenpaa and Tractinsky, 1999) and act as an important factor in the triggering of use intentions toward services that require important information (e.g., transaction, personal, and account information). Smart banking reflects high levels of uncertainty and risk because consumers are less familiar with it than they are with offline banking. Therefore, since it allows no verification of the safety and security of financial information during transactions, it is essential to build consumers' trust in smart banking.

Extant literature of the initial stages of trust formation has focused on various concepts of online trust or factors that influence the success of electronic commerce (Hoffman et al., 1999). Later, the focus has shifted to antecedents or outcomes of trust (Gefen et al., 2003; Suh and Han, 2002), and recent studies have considered trust among online or mobile consumers (Wu, 2013). Gefen et al. (2003) considered trust based on the Technology Acceptance Model (TAM) and suggested the importance of its antecedents. On the other hand, marketing and management researchers and psychologists have recently focused on consumers' trust as a crucial element in e-commerce (Hoffman et al., 1999). Many scholars have provided support for this argument,

asserting that consumers consider other Web features only after security and privacy have been addressed (Dayal et al., 1999). However, few studies have considered this trust in the context of smart banking services. Luo et al. (2010) examined multidimensional trust and multifaceted risk perceptions in the initial stages of consumers' adoption of the wireless Internet platform. Aladwani (2001) identified trust as an important future challenge in online banking. Existing studies have examined trust in online banking, which is similar to smart banking. Trust in smart banking is an emerging area of interest in the field of service research. In this vein, the present study investigates trust in smart banking services based on previous studies of trust in online banking.

2.3 Continuous Intentions

Existing models of technology acceptance attempt to explain the factors that influence the acceptance of new technologies by analyzing various variables that influence use intentions or use based on expectations through potential users' indirect experience before their acceptance. Before the rise of the digital economy, product purchases represented the acceptance itself, and therefore, attracting new customers was the sole objective of firms. The popularization of the Internet and the development of various online services, however, have provided users with a wider range of options, and research on technology acceptance has started to consider different perspectives.

Merikivi and Mantymaki (2008) identified continuance intentions as the circumstance that places practical value on computers in that they support users to work more swiftly, efficiently, and creatively and allow them to create practical business value. Kim et al. (2007) defined these intentions as the use of applications to perform work or the act of using Web-compatible applications and applying them to work. Based on previous research, the continuance intention can be defined as the intention to start and continue using existing technologies.

Oliver's (1980) expectation-confirmation theory (ECT) is widely used to examine customer satisfaction and post-purchase actions. He claimed that consumers' expectation prior to their accurate perception of certain goods or services and the perceived use outcome combine to form their expectation and confirmation and that this combination influences satisfaction, which in turn has the greatest effect on their continuance intentions. An example of a typical ECT study that examined continuance intentions is Bhattacherjee's (2001), who referred to the TAM (Davis, 1989) and suggested that users' expectations can change after their technology acceptance through their experience and that their post-acceptance expectation is a relatively important factor influencing their actions.

According to Bhattacherjee (2001), a theoretical expansion is required to apply ECT to

a new environment, such as a new IS. He claimed that expectations, which exist before acceptance and are included in ECT, should not be considered, because they are already reflected in users' expectation-confirmation and their satisfaction. In addition, because users' expectations can change after their acceptance through their direct experience, their post-acceptance expectations may be more important, and therefore, related factors were included in his study. Bhattacherjee (2001) also concluded that although perceived usefulness and ease of use (belief variables in the TAM) can be used as variables for post-acceptance expectations, perceived ease of use should be excluded, because it has no significant effect on users' actions (Davis, 1989; Karahann et al., 1999).

As such, previous studies of the factors that influence users' satisfaction and continuance intentions toward online banking revealed that satisfaction and perceived usefulness, particularly satisfaction, have significant effects on continuance intentions (Bhattacherjee and Premkumar, 2004). Therefore, in this study an attempt is made to explain the continuance intention of use toward technology based on the Oliver's (1980) ECT for the purpose of understanding a disconnected phenomenon between continued use and technology acceptance that remains unexplained in the TAM.

Ⅲ. Research Model and Hypotheses

In this study, smartphones are defined as mobile devices that provide functions similar to those of PCs, such as wireless Internet access and

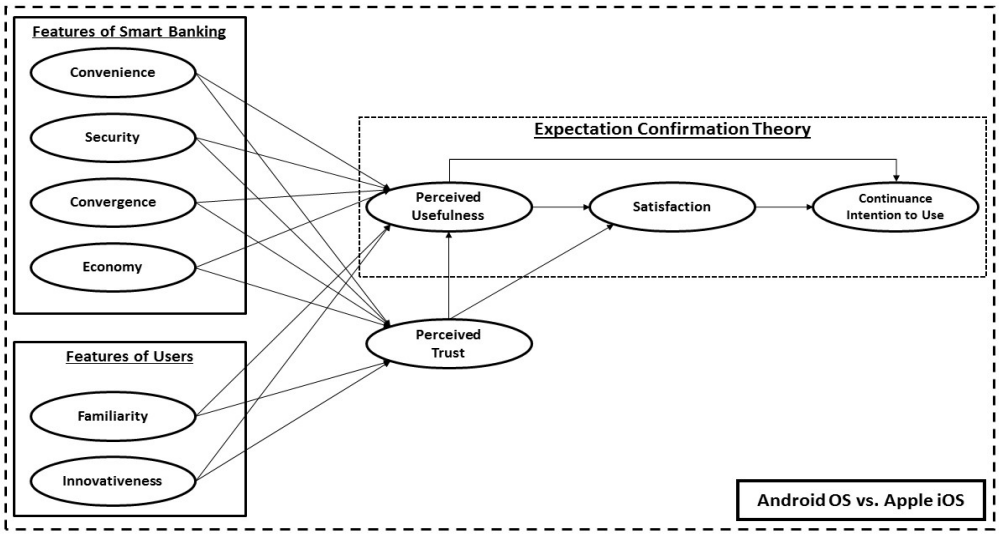

Figure 1 Research Model

applications based on high-performance hardware, and smart banking, currently the most active type of electronic financial service, is examined. The study empirically verifies the propagation and continued use of smart banking services by considering the factors that, according to previous research, influence intentions to adopt mobile banking services and focusing on those factors that can characterize the properties of smart banking. In addition, following previous findings that electronic financial services cannot be sufficiently explained simply by considering their technological attributes (Venkatesh and Davis, 2000), this study integrates additional variables. For this purpose, the characteristics of the users' purpose or the tendency in their actions after accepting electronic financial services are included in the research model. Therefore, based on ECT and the TAM, this study's model suggests characteristics of smart banking and users' characteristics, and the fact that continuance intentions toward the use of smart banking services should be measured from a holistic point of view. Figure 1 shows the research model.

3.1 Smart Banking

In the last decade, domestic mobile banking has been based on the Wireless Application Protocol (WAP), Integrated Circuit (IC) chips, Virtual Machines (VMs), and smartphones, and with the introduction of new technologies and methods, it has become a growth engine of electronic financial services. From the user's perspective, there are substantial differences between these methods in terms of subscriptions and use, available services, and security. The typical smartphone channel generally involves high-performance hardware similar to that of PCs and is advantageous in terms of transaction costs, because it enables users to access various wireless networks, such as existing mobile communications networks, Wi-Fi, and Bluetooth, and generates no service charges (Chen et al., 2009). In addition, convenience and control have improved through an intuitive and useful interface based on the usability of multiple bank services, and various sensors, such as the GPS, allow the real-time provision of customized services by tracking the user's location (Kim, 2010). Further, security systems make use of accredited certificates, thus differentiating smart banking from existing mobile banking channels. Today's users require more useful and reliable services, and this expectation is likely to grow. The results of previous studies have suggested that various attributes of mobile banking channels positively affect their perceived usefulness and consumer trust (Lee, 2009; Lee et al., 2011).

Gummerus and Pihlstrom (2011) examined customers' perception of the value of mobile services by defining convenience as an antecedent of perceived usefulness and found that mobile services facilitate reasonable actions by reducing the required effort and time. Park

(2008) demonstrated the inconvenience of the early mobile banking services resulting from browsers running on small screens and a lack of security and found that the VM, later proposed for increased security and faster service, is not sufficient to foster consumers' trust because of its complex processes. However, it is widely expected that smartphones will have considerable influence on trust and perceived usefulness by allowing security to be expanded and reinforced through electronic signatures based on authorized certificates, as in the case of PCs. There is little difference between existing mobile banking services and bank services, but the provision of additional services through various functions clearly differentiates smart banking services. One example is Kookmin Bank, which provides information on the prices of apartments, real estate agencies, and maximum loan amounts and uses the augmented reality function of smartphones to offer consultations. Hanabank provides an account book function that is directly linked to banking through its smartphone application. According to a 2010 report issued by the Hana Institute of Finance, smartphone services, including location-based and social networking services, facilitate new customer acquisition and business model development, and the usefulness of smart banking, which exceeds that of other channels, is expected affect users positively.

Based on smartphones and access environments, telecommunications firms have extended their investment in wireless data communications systems and reduced psychological barriers to mobile Internet access by providing smartphone users with flat rates for data use. Therefore, unlike in the case of IC chips or VM mobile banking, there is no monthly service charge to be paid to telecommunications firms for using smart banking, and in the absence of additional data charges as a result of flat-rate payment structures for most smartphone users, transaction payments have generally disappeared in smart banking (Kim, 2011). In addition, users can subscribe to smart banking directly through their smartphone without having to visit bank branches, which makes its use simple and fast and thus provides them with temporal and psychological advantages. Recently, transaction fees for transfers through smart banking have been reduced, and many strategies for creating differentiation have surfaced, including the development of exclusive financial packages for smartphones. Many studies of the acceptance of Internet banking have verified that economy or costs are an important factor influencing users' continuance intentions (Jayawardhena and Foley, 2000) and suggested that achieving economy based on additional fees for services, such as the provision of financial information, can play a vital role in continuance intentions toward the use of mobile banking services (Mathieson et al., 2001). To empirically verify the relationships between the aforementioned factors, we propose the following hypotheses:

H1: Attributes of smart banking services influence perceived usefulness.
H1-1: Convenience positively affects perceived usefulness.
H1-2: Security positively affects perceived usefulness.
H1-3: Convergence positively affects perceived usefulness.
H1-4: Economy positively affects perceived usefulness.
H2: Attributes of smart banking services influence trust.
H2-1: Convenience positively affects trust.
H2-2: Security positively affects trust.
H2-3: Convergence positively affects trust.
H2-4: Economy positively affects trust.

3.2 User Characteristics

Users generally become associated without resistance when using a service or system similar to those with which they have some experience. Particularly in the case of smartphone applications that provide banking services, the environment is similar to that of PC applications, which reduces barriers for users. In previous studies, it has been noted that familiarity is an individual evaluation pertaining to a certain service's ease of use, i.e., the perceived experience with a certain service (Noh, 2005). In addition, a user's familiarity has been found to have positive effects on perceived usefulness and trust (Gefen et al., 2003; Karahanna et al., 2006). Further, previous studies of online services have found familiarity to affect significantly users' acceptance and continuance intentions (Kim and Jung, 2008; Lee and Kwon, 2011).

Individuals' innovativeness is a major user characteristic, influencing their adoption and dissemination of an innovation, and is related to their adoption time for new technologies (Rogers, 2003). Personal innovativeness can be defined as the extent to which the individual accepts a new technology in its early stages, and takes an interest in a new thought, action, or object and in the risks involved in using the new technology. Lu et al. (2005) investigated several latent constructs such as intentions to adopt wireless technologies and the relationship between personal innovativeness and perceived usefulness. O'Cass and Carlson (2012) examined the role of consumers' perception of a Web site's innovativeness as a factor that influences their trust in it. The importance of trust and perceived usefulness can be seen in their identification as key ingredients in building customer relationships. To empirically verify the relationships between the aforementioned characteristics, we propose the following hypotheses:

H3: In smart banking, user characteristics influence perceived usefulness.
H3-1: Familiarity positively affects perceived usefulness.
H3-2: Innovativeness positively affects perceived usefulness.
H4: In smart banking, user characteristics influence trust.

H4-1: Familiarity positively affects trust.
H4-2: Innovativeness positively affects trust.

3.3 Continuance Intentions

Using a model in which trust was combined with technology adoption, Gefen et al. (2003) verified that perceived ease of use is an antecedent of trust formation and that trust has a positive effect on perceived usefulness. Wu and Wang (2005) examined users' acceptance of mobile commerce and verified that its perceived risk, cost, compatibility, and perceived usefulness significantly affect use intentions and that perceived ease of use has an indirect effect through perceived usefulness. Luarn and Lin (2005) extended the TAM and focused on cost reductions in mobile banking settings and ISs, concluding that perceived usefulness, ease of use, trust, self-efficacy, and costs have significant effects on use intentions. Smartphones are highly useful because their high-performance hardware allows faster information processing, and improvements in the wireless communications infrastructure has enhanced access to multiple wireless networks. In addition, increases in the size of screens, resolution, and graphic processing have led to increased legibility, making possible the use of multiple electronic financial services through a single device (formerly not feasible through IC chips).

Customer satisfaction is an evaluation of some purchase choice and is different from attitudes, which reflect a general evaluation of a particular target (Oliver, 1980). Customers' perceived value, trust, reputation, and image, in addition to their individual characteristics, have been suggested as factors that influence their satisfaction. Therefore, we propose the following hypotheses about continuance intentions:

H5: Perceived trust positively affects usefulness.
H6: Trust positively affects satisfaction.
H7: Perceived usefulness positively affects satisfaction.
H8: Perceived usefulness positively affects continuance intentions.
H9: Satisfaction positively affects continuance intentions.

Ⅳ. Research Methodology

4.1 Measurement Variables

We obtained the items for the questionnaire used in this study mainly from previous research studies. However, we modified each item to include smart banking services as the technology to be evaluated. We obtained the items for convenience from Gummerus and Pihlstrom (2011) and Chang (2009); for security from Buellingen and Woerter (2004) and Kim (2010); for convergence from Kim and Chen (2011); for economy from Ho (2006); for familiarity from Karahanna et al. (2006) and Ha (2010); for innovativeness from Park (2009); for perceived

trust from Lee and Chung (2008) and Park et al. (2011); for perceived usefulness from Davis (1989) and Bhattacherjee (2001); and for satisfaction and continuance intentions from Bhattacherjee (2001). We measured all items based on a seven-point Likert-type scale ranging from

Table 1. Measurement items

Constructs	Measurement Items	Previous Research
Convenience	The process of using s-banking services is easy. The process of using s-banking services is simple. It is easy to understand the use of s-banking services.	Gummerus and Pihlstrom (2011)
Security	S-banking is largely stable. S-banking is more stable than other online channels. Personal information has never been stolen in s-banking. Transaction information is protected in s-banking.	Buellingen and Woerter (2004), Jin (2010)
Convergence	S-banking provides various functions. S-banking provides the latest functions. S-banking provides optimized functions.	Shin (2010), Kim and Jeon (2011).
Economic	S-banking is cheap. Additional s-banking services are cheap. S-banking is cheaper than face-to-face banking.	O et al. (2006)
Familiarity	I am used to using s-banking. I am used to using additional s-banking services. I am accustomed to the way s-banking is used.	Karahanna et al. (2006), Ha (2010),
Innovativeness	I actively accept and use s-banking. I quickly accept and use s-banking. I positively accept and use s-banking. I pushfully accept and use s-banking.	Park (2009)
Trust	S-banking is trustworthy. S-banking has the ability to fulfill its tasks. S-banking keeps customers' best interests in mind. S-banking keeps its promises.	Suh and Han (2002), Zhou (2012)
Perceived Usefulness	Using s-banking improves my performance in managing personal finances. Using s-banking enhances my effectiveness in managing personal finances. Overall, s-banking is useful in managing personal finances.	Davis (1989), Bhattacherjee (2001)
Satisfaction	I am satisfied with my s-banking use. I am pleased with my s-banking use. I am content with my s-banking use. I am delighted with my s-banking use.	Bhattacherjee (2001)
Continuance Intentions	I intend to continue using s-banking instead of discontinuing it. My intentions are to continue using s-banking instead of any other alternative means (traditional banking). If I could, I would like to discontinue using s-banking (reverse-coded). I intend to continue using s-banking in the future.	Bhattacherjee (2001)

Table 2. Demographic characteristics

Demographics		Full (245)		Android OS		iOS	
		Frequency	%	Frequency	%	Frequency	%
Gender	Female	67	72.7	105	73.4	29	28.4
	Male	178	27.3	38	26.6	73	71.6
Age	20-29	7	2.9	5	3.5	2	2.0
	30-39	203	82.9	117	81.8	86	84.3
	40-49	25	10.2	13	9.1	12	11.8
	Over 50	10	4.1	8	5.6	2	2.0
Education	High school	7	2.9	5	3.5	2	2.0
	College	213	86.9	124	86.7	89	87.3
	Graduate school	25	10.2	14	9.8	11	10.8

"strongly disagree" (1) to "strongly agree" (7).

Before sending the questionnaire to potential respondents, we examined the instrument for face validity by soliciting input from 3 IS researchers, 3 marketing researchers, 3 bank officials, and 10 graduate students with some smart banking experience. Table 1 shows the measurement items.

4.2 Data Collection

We collected the data through a survey conducted on September 2012 in Korea. The respondents had some experience using smart banking services in Korea and resided in metropolitan areas as well as small cities in provinces. We distributed 400 questionnaires and received a total of 245 (61.25%) responses. In terms of age and education, most respondents were between the ages of 30 and 39 (82.9%); most had a first degree (86.9%). In addition, the Android OS was used by 105 females and 38 males, whereas iOS, by 29 females and 73 males. Table 2 shows the demographic characteristics of the respondents.

Ⅴ. Results

5.1 Reliability and Validity

To assess the convergent and discriminant validity of the measurement model, we conducted a confirmatory factor analysis using AMOS 19.0. We tested the fit of the measurement model to the data to validate the measurement model. This evaluation was based on a number of fit indices, including the root mean square residual (RMR), the goodness-of-fit index (GFI), the comparative fit index (CFI), $\chi 2$ ($\chi 2$/df), and the root mean square error of approximation (RMSEA). In general, a good fit is indicated when the GFI and the CFI values exceed 0.90 (Bentler, 1990) and the RMR and the RMSEA values are less than 0.08 (Ha et al., 2007). In addition, the value of $\chi 2$/df should be less than 3

Table 3. Reliability and convergent validity for the Android OS

Construct	Factor Loadings	C.R.	ICR (>0.7)	AVE (>0.5)	Cronbach's α (>0.7)
Con3	1.000	-	0.806	0.523	0.805
Con2	0.997	8.600			
Con1	0.942	8.387			
Secu1	1.000	-	0.906	0.703	0.905
Secu4	1.038	12.742			
Secu3	1.011	12.636			
Secu2	0.944	11.197			
Conv1	1.000	-	0.836	0.716	0.828
Conv3	1.450	8.805			
Conv2	1.179	8.430			
Econ2	1.000	-	0.895	0.792	0.895
Econ3	1.055	12.897			
Econ1	0.983	12.223			
Fam1	1.000	-	0.913	0.708	0.913
Fam4	1.018	11.670			
Fam3	1.097	12.079			
Fam2	1.169	13.144			
Inn3	1.000	-	0.886	0.688	0.885
Inn4	0.850	12.109			
Inn2	0.815	12.375			
Inn1	0.707	10.023			
Pu2	1.000	-	0.847	0.770	0.846
Pu3	0.993	9.128			
Pu1	1.166	10.339			
Tr3	1.000	-	0.894	0.693	0.892
Tr4	1.001	12.006			
Tr2	0.885	10.461			
Tr1	0.848	11.413			
Sa4	1.000	-	0.940	0.726	0.940
Sa3	1.167	14.670			
Sa2	1.117	13.471			
Sa1	1.229	14.615			
Int4	1.000	-	0.936	0.724	0.935
Int3	1.092	15.889			
Int2	1.023	14.292			
Int1	1.007	13.876			

$\chi 2$=665.238, df=549, $\chi 2$/d =1.212, RMR=0.054, GF =0.803, CFI=0.970, RMSEA=0.039.

(Goodhue, 1995). As shown in Tables 3 and 4, all indices indicated that the measurement model provided a satisfactory fit to the data.

Reliability and validity are often considered

good indicators of research quality. We used the reliability scores suggested in Fornell and Larcker (1981). Cronbach's alpha (α), which is a measure of the squared correlation between observed and true scores, is widely used to analyze internal consistency for testing reliability. If the value of α exceeds 0.7, sufficient reliability is indicated, whereas if it is less than

Table 4. Reliability and convergent validity for iOS

Construct	Factor Loadings	C.R.	ICR (>0.7)	AVE (>0.5)	Cronbach's α (>0.7)
Con3	1.000	-	0.786	0.509	0.783
Con2	0.968	6.692			
Con1	0.997	6.997			
Secu4	1.000	-	0.911	0.706	0.909
Secu1	0.966	12.470			
Secu3	1.017	13.228			
Secu2	0.996	10.824			
Con3	1.000	-	0.848	0.722	0.852
Con1	1.071	8.564			
Con2	1.089	8.277			
Econ3	1.000	-	0.902	0.796	0.898
Econ2	1.150	12.538			
Econ1	0.899	11.545			
Fam4	1.000	-	0.896	0.695	0.900
Fam2	1.146	10.645			
Fam3	1.187	9.605			
Fam1	1.205	10.592			
Inn4	1.000	-	0.874	0.680	0.871
Inn3	0.787	10.289			
Inn2	0.812	9.048			
Inn1	0.707	8.586			
Pu3	1.000	-	0.770	0.733	0.763
Pu2	0.767	5.762			
Pu1	1.095	7.330			
Tr4	1.000	-	0.855	0.665	0.826
Tr3	0.976	8.852			
Tr2	0.841	7.552			
Tr1	0.811	8.031			
Sa4	1.000	-	0.900	0.698	0.899
Sa3	1.134	8.240			
Sa2	1.324	9.389			
Sa1	1.309	9.378			
Int4	1.000	-	0.938	0.726	0.939
Int3	0.961	13.916			
Int2	1.068	15.658			
Int1	0.968	13.589			

χ^2=529.484, df=544, χ^2/df=1.010, RMR=0.066, GFI=0.801, CFI=0.998, RMSEA=0.010.

Table 5. Correlation matrix and the square root of the AVE for the Android OS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)Convenience	0.723									
(2)Security	0.413**	0.838								
(3)Convergence	0.435**	0.426**	0.846							
(4)Economy	0.477**	0.419**	0.480**	0.890						
(5)Familiarity	0.463*	0.462*	0.495**	0.493**	0.841					
(6)Innovativeness	0.422**	0.526**	0.395**	0.465**	0.458**	0.830				
(7)Perceived usefulness	0.396**	0.392**	0.522**	0.574**	0.525**	0.479**	0.878			
(8)Trust	0.506**	0.520**	0.482**	0.607**	0.525**	0.490**	0.551**	0.833		
(9)Satisfaction	0.354**	0.404**	0.509**	0.569**	0.494**	0.568**	0.524**	0.489**	0.852	
(10)Continuance intentions	0.417**	0.517**	0.528**	0.469**	0.467**	0.487**	0.603**	0.495**	0.613**	0.851

**p<0.01. Numbers along the diagonal indicate the square root of the AVE.

0.3, the reliability is insufficient. Tables 3 and 4 show all Cronbach's α values for Android OS and iOS. As the tables indicate, all values were greater than 0.7, which represents a good level of reliability.

Validity concerns the study's success in measuring what is supposed to be measured and focuses on the question of whether the collected data accurately reflect what is examined. Yin (2003) indicated three tests for establishing the quality of empirical data: construct, internal, and external validity. Among these, construct validity is generally used for testing validity and is divided into convergent validity and discriminant validity. The selecting indicators were theoretically sound and reliably measured. By

Table 6. Correlation matrix and the square root of the AVE for iOS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Convenience	0.713									
(2) Security	0.207**	0.840								
(3) Convergence	0.284**	0.316**	0.850							
(4) Economy	0.409**	0.367**	0.547**	0.892						
(5) Familiarity	0.346**	0.159**	0.259**	0.401**	0.834					
(6) Innovativeness	0.506**	0.264**	0.386**	0.469**	0.431**	0.824				
(7) Perceived Usefulness	0.403**	0.221**	0.401**	0.346**	0.438**	0.433**	0.856			
(8) Trust	0.360**	0.299**	0.364**	0.276**	0.470**	0.387**	0.576**	0.816		
(9) Satisfaction	0.384**	0.257**	0.277**	0.425**	0.528**	0.406**	0.440**	0.421**	0.836	
(10) Continuance Intentions	0.414**	0.357**	0.501**	0.591**	0.497**	0.458**	0.471**	0.400**	0.645**	0.852

**p<0.01. Numbers along the diagonal indicate the square root of the AVE.

convention, indicators should have factor loadings of 0.7 or above on their latent factors. We conducted a confirmatory factor analysis to test convergent validity and used the average variance extracted (AVE) to test discriminant validity. Tables 3 and 4 show the results and recommended values for these validity measures for the Android OS and iOS and indicate that all measures satisfied the recommended values.

Sufficient discriminant validity is indicated when the squre root of each construct's AVE exceeds its correlations with other constructs. As shown in Table 5 (Android OS) and 6 (iOS), the numbers along the diagonal far exceeded off-diagonal elements, indicating sufficient discriminant validity for both Android OS and iOS.

5.2 Analysis Results for the Android OS

To investigate the effects of variables, we tested the hypotheses by using structural equation modeling with AMOS 19.0. All goodness-of-fit indices for the Android OS model were satisfactory: $\chi 2$ = 605.512, df = 578, $\chi 2$/df = 1.048, RMR = 0.058, GFI = 0.829, CFI=0.993, RMSEA=0.018. Therefore, we tested the hypotheses for the Android OS.

We considered the characteristics of smart banking services (convenience, security, convergence and economy) and user characteristics (familiarity and innovativeness) as factors that motivate continued use and tested the relationships between these factors and perceived usefulness and trust and between perceived usefulness, trust, satisfaction, and continuance intentions of use of smart banking.

First, we investigated the relationships between various attributes of smart banking services, including convenience, security, and convergence, and economy and perceived usefulness. The results indicate that convenience had no significant effect on perceived usefulness (β = 0.082, t = 1.033), providing no support for hypothesis 1-1. In addition, security had no significant effect on perceived usefulness (β = 0.052, t = 0.951), providing no support for hypothesis 1-2. On the other hand, convergence had a significant positive effect on perceived usefulness (β = 0.232, t = 3.178), providing support for hypothesis 1-3. There was a significant relationship between economy and perceived usefulness for the Android OS (β = 0.153, t = 2.753), providing support for hypothesis 1-4.

Second, we tested the relationships between various attributes of smart banking services, including convenience, security, convergence, and economy, and trust. Convenience, security, and economy significantly affected trust (β = 0.209, t = 2.184; β = 0.174, t = 1.987; β = 0.209, t = 2.547), providing support for hypotheses 2-1, 2-2, and 2-4, respectively. However, convergence was not a significant predictor of trust, providing no support for hypothesis 2-3.

Third, we assessed the relationships of

familiarity and innovativeness to perceived usefulness. Familiarity significantly affected perceived usefulness (β = 0.131, t = 2.283), providing support for hypothesis 3-1. This suggests that the more familiar is the customer with the use of smartphone-based banking services, the more likely he or she is to perceive them as useful. There was a significant positive relationship between innovativeness and perceived usefulness (β = 0.144, t = 2.200), providing support for hypothesis 3-2. This suggests that customers who actively adopt smart banking services are likely to recognize them as useful.

Fourth, familiarity was a significant predictor of trust (β = 0.155, t = 1.718), providing support for hypothesis 4-1. On the other hand, there was no significant relationship between innovativeness and trust (β = 0.066, t = 0.820), providing no support for hypothesis 4-2. This suggests that customers of smart banking do not recognize trust in smart banking services.

Finally, we examined the relationships between trust and perceived usefulness and between satisfaction and continuance intentions. As shown in Table 7, the path coefficient from trust to perceived usefulness was significant at the 5% level (β = 0.200, t = 2.410), providing support for hypothesis 5. Perceived trust had no significant effect on satisfaction (β = 0.179, t = 0.865), providing no support for hypothesis 6. Perceived usefulness significantly affected satisfaction (β = 1.584, t = 4.319), providing support for hypothesis 7. In addition, perceived

Table 7. Results of hypothesis testing for the Android OS

Hypotheses			Estimate	S.E.	t	Result
H1-1	Convenience	Perceived usefulness	0.082	0.080	1.033	Not supported
H1-2	Security	Perceived usefulness	0.052	0.055	0.951	Not supported
H1-3	Convergence	Perceived usefulness	0.232	0.073	3.178***	Supported
H1-4	Economy	Perceived usefulness	0.153	0.055	2.753***	Supported
H2-1	Convenience	Trust	0.291	0.133	2.184**	Supported
H2-2	Security	Trust	0.174	0.087	1.987**	Supported
H2-3	Convergence	Trust	0.119	0.106	1.120	Not Supported
H2-4	Economy	Trust	0.209	0.082	2.547**	Supported
H3-1	Familiarity	Perceived usefulness	0.131	0.057	2.283**	Supported
H3-2	Innovativeness	Perceived usefulness	0.144	0.066	2.200**	Supported
H4-1	Familiarity	Trust	0.155	0.09	1.718*	Supported
H4-2	Innovativeness	Trust	0.066	0.08	0.820	Not supported
H5	Trust	Perceived usefulness	0.200	0.083	2.410**	Supported
H6	Trust	Satisfaction	0.179	0.207	0.865	Not Supported
H7	Perceived usefulness	Satisfaction	1.584	0.367	4.319***	Supported
H8	Perceived usefulness	Continuance intentions	0.808	0.153	5.275***	Supported
H9	Satisfaction	Continuance intentions	0.326	0.088	3.691***	Supported

*p<0.1, **p<0.05, ***p<0.01.

usefulness significantly affected continuance intentions (β = 0.808, t = 5.275), providing support for hypothesis 8. Finally, the path coefficient from satisfaction to continuance intention was significant at the 1% level (β = 0.326, t = 3.691), providing support for hypothesis 9. This suggests that the higher the level of satisfaction with smart banking services, the more likely is the customer's continuance intention. Table 7 shows the results of hypothesis testing for the Android OS. R2 is also known as the coefficient of determination or the squared multiple correlation. The four attributes of smart banking, except for convenience and security and user characteristics, explained 62.9% (R2 = 0.629) of the variance in perceived usefulness. All variables, except for convergence and innovativeness, explained 56.2% (R2 = 0.562) of the variance in trust. In addition, 18.5% of the variance in satisfaction was explained by perceived usefulness, and 59.3% of continuance intentions, by perceived usefulness and satisfaction. In this regard, the structural model showed substantial explanatory power. Therefore, because the variance explanation power of all variables is over 10% of validity scope (Falk and Miller, 1992), the explanation power of the structural model is very high.

5.3 Analysis Results for iOS

All goodness-of-fit indices were satisfactory for iOS: $\chi 2 = 563.753$, df = 568, $\chi 2/df = 0.993$, RMR = 0.071, GFI = 0.803, CFI=1.000, RMSEA=0.000. Therefore, we tested the hypotheses for iOS.

We tested the research model for iOS that consisted of various attributes of smart banking (i.e., convenience, security, convergence, and economy) and user characteristics (i.e., familiarity and innovativeness). First, among the four attributes of smart banking, convenience (β = 0.219, t = 1.917) and convergence (β = 0.231, t = 2.911) affected perceived usefulness positively, providing support for hypotheses 1-1 and 1-3, respectively. However, the path coefficient from security to perceived usefulness (β = 0.026, t = 0.516) was not significant, and there was no significant relationship between economy and perceived usefulness (β = 0.025, t = 0.342), providing no support for hypotheses 1-2 and 1-4, respectively. Second, among the attributes of smart banking, security (β = 0.168, t = 1.998), convergence (β = 0.251, t = 2.239), and economy (β = 0.219, t = 0.027) positively affected trust, providing support for hypotheses 2-2, 2-3, and 2-4. On the other hand, convenience had no significant effect on trust, providing no support for hypothesis 2-1. Third, we tested the relationships between user characteristics and perceived usefulness. The path coefficient from familiarity to perceived usefulness was positive and significant (β = 0.211, t = 2.714), providing support for hypothesis 3-1. Innovativeness had no significant relationship with perceived usefulness (β = 0.029, t = 0.331), providing no

support for hypothesis 3-2. Fourth, we investigated the relationships between user characteristics and trust. Familiarity predicted trust ($\beta = 0.425$, $t = 3.842$), providing support for hypothesis 4-1. On the other hand, there was no significant relationship between innovativeness and trust ($\beta = 0.102$, $t = 0.725$), providing no support for hypothesis 4-2. Finally, we tested the relationships between trust, perceived usefulness, satisfaction, and continuance intentions. As shown in Table 8, there was a significant relationship between trust and perceived usefulness ($\beta = 0.198$, $t = 2.329$), providing support for hypothesis 5. Trust had no significant effect on satisfaction ($\beta = 0.098$, $t = 0.625$), providing no support for hypothesis 6. The path coefficient from perceived usefulness to satisfaction was significant at the 0.01 level ($\beta = 0.877$, $t = 3.494$), providing support for hypothesis 7. Perceived usefulness positively affected continuance intentions ($\beta = 0.764$, $t = 3.654$), providing support for hypothesis 8, and satisfaction positively affected continuance intentions ($\beta = 0.537$, $t = 3.988$), providing support for hypothesis 9. This suggests that the higher the level of satisfaction with smart banking services, the more likely the customer's continuance intention.

In terms of squared multiple correlations based on the structural equation, three attributes of smart banking (convenience and economy) and user characteristics (innovativeness) explained 90.3% of the variation in perceived usefulness. All variables except for convenience and

Table 8. Results of hypothesis testing for iOS.

Hypotheses			Estimate	S.E.	t	Result
H1-1	Convenience	Perceived usefulness	0.219	0.114	1.917*	Supported
H1-2	Security	Perceived usefulness	0.026	0.05	0.516	Not supported
H1-3	Convergence	Perceived usefulness	0.231	0.08	2.911***	Supported
H1-4	Economy	Perceived usefulness	0.025	0.073	0.342	Not supported
H2-1	Convenience	Trust	0.114	0.176	0.646	Not supported
H2-2	Security	Trust	0.168	0.084	1.998**	Supported
H2-3	Convergence	Trust	0.251	0.112	2.239**	Supported
H2-4	Economy	Trust	0.219	0.108	2.027**	Supported
H3-1	Familiarity	Perceived usefulness	0.211	0.078	2.714***	Supported
H3-2	Innovativeness	Perceived usefulness	0.029	0.088	0.331	Not supported
H4-1	Familiarity	Trust	0.425	0.111	3.842***	Supported
H4-2	Innovativeness	Trust	0.102	0.141	0.725	Not supported
H5	Trust	Perceived usefulness	0.198	0.085	2.329**	Supported
H6	Trust	Satisfaction	0.098	0.156	0.625	Not supported
H7	Perceived usefulness	Satisfaction	0.877	0.251	3.494***	Supported
H8	Perceived usefulness	Continuance intentions	0.764	0.209	3.654***	Supported
H9	Satisfaction	Continuance intentions	0.537	0.135	3.988***	Supported

*p<0.1, **p<0.05, ***p<0.01.

innovativeness explained 41.1% of the variance in trust. In addition, perceived usefulness predicted 45.5% of the variation in satisfaction, and perceived usefulness and satisfaction predicted 59.5% of the variation in continuance intentions. In this regard, the structural model showed substantial explanatory power. Therefore, the explanation power of the structure model is high because the explanatory power of all variables is over 10% of a proper testing scope (Falk and Miller, 1992).

5.4 Comparison between Android OS and iOS

To compare paths between the Android OS and iOS, we conducted a path analysis of Android OS (n=142) and iOS (n=102) users. For this purpose, we examined the differences in the hypothesized paths between the Android OS and iOS based on the formula given by Chin et al. (1996), which was applied for an analysis of moderating effects (Table 9) and was examined in Keil et al. (2000) and Ahuja and Thatcher (2005):

$$t_{ij} = \frac{p_1 - p_2}{\sqrt{\left(\frac{n_1 - 1}{n_1 + n_2 - 2} \times SE_1^2 + \frac{n_2 - 1}{n_1 + n_2 - 2} \times SE_2^2\right)} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

p_i = path coefficient

n_1, n_2 = sample size of the data set

SE_1, SE_2 = standard error of the path

First, convenience, security, and economy had differential effects on perceived usefulness, depending on the operating system. In the relationship between convenience and perceived usefulness, the path coefficient was lower for the Android OS (0.082) than for iOS (0.219), and this difference was significant (t-value = -11.05). In the relationship between economy and perceived usefulness, the path coefficient was higher for the Android OS (0.052) than for iOS (0.026), and this difference was significant (t-value = 3.787). In the relationship between security and perceived usefulness, the path coefficient was higher for the Android OS (0.153) than for iOS (0.025), and this difference was significant (t-value = 15.650). On the other hand, there was no significant difference between the Android OS and iOS in terms of the effects of convergence on perceived usefulness. Second, we compared the Android OS and iOS in terms of the effects of various attributes of smart banking on trust. The effects of convenience and convergence on trust varied according to the operating system. Convenience had a greater effect on trust for the Android OS, whereas convergence had a greater effect for iOS. On the other hand, there were no significant differences between the Android OS and iOS in terms of the effects of security and economy on trust. Third, we examined the differences between the Android OS and iOS in terms of the effects of user characteristics on perceived usefulness and trust. The path coefficient (t = 2.283) from familiarity to perceived usefulness was significant and higher for iOS, and the path

coefficient (t = 2.200) from innovativeness to perceived usefulness was significant and higher for the Android OS. In addition, familiarity and innovativeness had greater effects on trust for the Android OS than for iOS. Finally, we investigated the relationships between trust, perceived usefulness, satisfaction, and continuance intentions to examine the differences based on the two operating systems. Trust and perceived usefulness had greater effects on satisfaction for the Android OS than for iOS. In addition, perceived usefulness had a greater effect on continuance intentions for the Android OS. However, satisfaction had a greater effect on continuance intentions for iOS. Table 9 shows the results for the differences between the Android OS and iOS.

Ⅵ. Conclusion

6.1 Summary

Based on previous research, this study considered convenience, security, convergence, and economy as the major attributes of smart banking services based on the Android OS and iOS and familiarity and innovativeness as the major user characteristics and examined the

Table 9. Statistical comparison of paths

Hypotheses			Android OS (A)	iOS (I)	Comparison of Paths	
H1-1	Convenience	Perceived usefulness	0.082	0.219	-11.056***	A<I
H1-2	Security	Perceived usefulness	0.052	0.026	3.787***	A>I
H1-3	Convergence	Perceived usefulness	0.232	0.231	0.102	-
H1-4	Economy	Perceived usefulness	0.153	0.025	15.650***	A>I
H2-1	Convenience	Trust	0.291	0.114	8.964***	A>I
H2-2	Security	Trust	0.174	0.168	0.540	-
H2-3	Convergence	Trust	0.119	0.251	-9.384***	A<I
H2-4	Economy	Trust	0.209	0.219	-0.824	-
H3-1	Familiarity	Perceived usefulness	0.131	0.211	-9.277***	A<I
H3-2	Innovativeness	Perceived usefulness	0.144	0.029	11.687***	A>I
H4-1	Familiarity	Trust	0.155	0.425	-20.986***	A>I
H4-2	Innovativeness	Trust	0.066	0.102	-2.535**	A<I
H5	Trust	Perceived usefulness	0.2	0.198	0.184	-
H6	Trust	Satisfaction	0.179	0.098	3.333***	A>I
H7	Perceived usefulness	Satisfaction	1.584	0.877	16.843***	A>I
H8	Perceived usefulness	Continuance intentions	0.808	0.764	1.903*	A>I
H9	Satisfaction	Continuance intentions	0.326	0.537	-14.800***	A>I

*p<0.1,**p<0.05,***p<0.01.

effects of perceived usefulness and trust through satisfaction on continuance intentions based on a path analysis. The results can be summarized as follows.

First, it was found that among the four attributes of smart banking, convenience (the ease of controlling and using smart banking services) significantly affected perceived usefulness (Gummerus and Pihlstrom, 2011), and security and economy positively affected trust (Blanca, 2011). This suggests that the higher the level of security provided by smart banking services, the higher the level of the user's trust. Consistent with the findings of Luo et al. (2010), this provides support for the argument that security is a major factor influencing users' trust in wireless Internet services. Second, among the two user characteristics, familiarity significantly affected perceived usefulness and trust. The attitudes of users were more likely to be positive toward performance improvements and trust in banking services when the similarity between traditional Internet/mobile banking settings and smart banking services were increased (Gefen et al., 2003; Karahanna et al., 2006). Third, according to the empirical analysis of the relationships between perceived usefulness, trust, satisfaction, and continuance intentions, there was a significant relationship between trust and perceived usefulness. This result is consistent with previous findings suggesting that the users' performance increases as their trust in the provision of a given service increases (Gefen et al., 2003; Pavlou 2003). Perceived usefulness significantly affected satisfaction, and perceived usefulness and satisfaction significantly affected continuance intentions. This is consistent with ECT (Bhattacherjee and Premkumar, 2004), and, given the significant effect of perceived usefulness on continuance intentions in this study, it can be concluded that improving users' work efficiency may ultimately facilitate their satisfaction and continuance intentions (Bhattacherjee, 2001; Blanca, 2011). Finally, the analysis of the differences between the Android OS and iOS indicated that security and economy had greater effects on perceived usefulness and convenience had a greater effect on trust for the Android OS than for iOS. On the other hand, innovativeness had a greater effect on perceived usefulness and familiarity and innovativeness had greater effects on trust for iOS than for the Android OS. For Android OS users, perceived trust and perceived usefulness significantly affected satisfaction, and perceived usefulness significantly affected continuance intentions. On the other hand, for iOS users, convenience significantly affected perceived usefulness, and convergence significantly affected trust. In addition, familiarity significantly affected perceived usefulness, and trust significantly affected continuance intentions.

6.2 Implications

The results of this research provide several

important contributions to the literature. First, despite the continued proliferation of smart banking services, few studies have examined them, although many have considered Internet or mobile banking. In this regard, this study provides an important theoretical basis for future research on smart banking. Second, the study makes an important theoretical contribution by integrating two theoretical perspectives to identify the factors that influence adoption decisions concerning smart banking. The study drew on the TAM and ECT from previous research on continuance intentions toward IS use in the context of smart banking. The study fills a theoretical gap in the literature on smart banking by developing a research model and evaluating it based on an empirical data set composed of potential and repeat customers. Third, for the Android OS, economy positively affected perceived usefulness and trust, suggesting that an important merit of the Android OS is its economy. That is, as compared to the expensive and exclusive iOS-based Apple smartphones, a smartphone using the Android OS may be perceived as a more economical choice. In this regard, future research on the Android OS should consider the importance of economy. In addition, the results suggest that the higher the level of trust in smart banking, the more likely it is to be perceived as useful, and thus lead to satisfaction and finally continuance intentions. Fourth, convergence and familiarity positively affected perceived usefulness and trust for iOS. iOS provides various functions, and because the operating system is familiar to existing Apple users, this familiarity may facilitate their continued preference for iOS. In this regard, future research on iOS applications should consider convergence and familiarity. Finally, the analysis of the differences between the Android OS and iOS suggested that smart banking is based on information devices deeply rooted in people's everyday lives and that they employ different applications. Future research on smart banking should reflect user characteristics, and in this regard, the present study provides an important theoretical basis for analyzing differences between smartphone operating systems.

The results also have implications for managerial decisions in several ways. First, the respondents were individuals with some experience in using smart banking services. The results indicate that smart banking attributes and user characteristics significantly affected perceived usefulness and trust, and in turn continuance intentions through satisfaction. In general, existing literature has been limited in that they have typically focused on verifying use intentions toward mobile banking services and investigating continuance intentions. In this regard, the present study extended previous research by providing important insights into operational strategies for financial firms wishing to continue smart banking services for their customers. Second, the results indirectly verify

some differences between smart banking and mobile banking. More specifically, providing users with smartphone service settings that are similar to those for mobile banking may facilitate their adoption of smart banking by fostering their positive perception of its usefulness and trust, and simpler procedures and applications for smart banking in conjunction with innovative convergence technologies may induce users to perceive improved performance. This result is expected to facilitate the development of banking service applications or supplementary services. Third, this study adopted some variables in ECT and verified the significant direct effect of perceived usefulness on continuance intentions. Therefore, financial firms should recognize the increasing usefulness of core banking services as a means for the continued acquisition of customers and reflect this in their strategies to differentiate their services. In addition, because non-face-to-face financial services limit customer contact, service providers should focus on fostering their customers' trust, particularly during the formation of their banking service brands. Finally, this study focused on the Android OS and iOS, which account for a majority of the smartphone market, and investigated the differences between the users of these two operating systems. For the Android OS, security and economy positively affected satisfaction through perceived usefulness, and convenience positively affected satisfaction through trust. However, for iOS, convergence significantly affected trust, which in turn significantly affected continuance intentions. This result has important implications for smartphone operators and banking providers with a market share that wish to find niche markets. More specifically, iOS has a larger market share in the U.S. than in Korea for smartphone operators in the development of differentiation strategies.

6.3 Limitations and Future Research

Several caveats are necessary in assessing our results although this study provides meaningful theoretical and managerial implications. First, to determine the factors influencing continuance intentions toward smart banking, we used some variables for technology acceptance suggested in previous studies. In this regard, future research should examine the effects of factors influencing service acceptance by comparing mobile banking with smart banking. Second, previous studies of mobile banking in general have focused on detailed functional aspects, such as account transfers and confirmation. Therefore, future research may investigate users' continuance intentions based on specific functions of smart banking.

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[Appendix] A Brief Comparison Table for Features: Android OS vs. iOS

Feature	Android OS	iOS
Company	Google/Open Handset Alliance	Apple Inc.
Market share	81.2%	15.0%
Package manager	APK	iTunes
Application store	Google Play	App Store
NFC payment software	Google Wallet	Apple Pay
Official SDK platform	Linux, Mac OS X & Windows	Mac OS X using iOS SDK
Printer support	Google Cloud Print	AirPrint
Major web browser	Chrome, Opera, Firefox, etc.	Safari, Chrome, Opera Mini
External memory cards	Yes	Only for photo/video
Voice recognition	Google Now	Siri

Note: The table contains examplary feature lists. The exhaustive features are listed, including but not limited to Android OS and iOS, on the following link: http://en.wikipedia.org/wiki/Comparison_of_mobile_operating_systems

김도형(Kim, Do-Hyung)

경북대학교 경영정보학 석사학위를 취득하였으며, 현재 IBK 시스템에서 SI 사업본부 대리로 재직 중이다. 주요 연구 관심분야는 모바일 플랫폼, e-비즈니스 등이다.

하성호(Ha, Sung-Ho)

하성호 교수는 한국과학기술원에서 박사학위를 취득하고 현재 경북대학교 경영학부 교수로 재직 중이다. 국내외 저널의 편집위원을 맡고 있으며 e-비즈니스, 데이터마이닝을 주로 연구하고 있다.

박경배(Park, KyungBae)

미국 University of Texas at Dallas에서 경영정보학 석사학위를 취득하고, Virginia Tech.에서 박사과정 후, 현재 경북대학교 경영학부에서 박사과정 중이다. 주요 연구 분야는 텍스트마이닝, 자연어처리 등이다.

<Abstract>

Antecedent Factors Influencing the Continued Use of Smart Banking by Different Mobile Platforms:
Android OS vs. iOS

Kim, Do-Hyung · Ha, Sung-Ho · Park, KyungBae

Purpose

This study investigates the relationships between various attributes of smart banking (convenience, security, convergence, and economy), user features (familiarity and innovativeness), perceived usefulness, trust, satisfaction, and continuance intentions and provides a comparison of Google's Android OS and Apple's iOS.

Design/methodology/approach

We considered a sample of 245 respondents and used structural equation modeling to analyze the data.

Findings

The results indicate that convergence and familiarity significantly affected perceived usefulness and that security and economy significantly affected perceived trust in smart banking services. The relationships of security, economy, and innovativeness to perceived usefulness and those of convenience and familiarity to perceived trust were stronger for the Android OS than for iOS. The study contributes by proposing an integrated framework and providing a comparison between the Android OS and iOS in the context of smart banking.

Keywords: Smartphone; user characteristics; empirical studies in HCI; web applications

<국문초록>

모바일 플랫폼에 따른 스마트 뱅킹의 지속사용에 영향을 미치는 선행요인: Android OS vs. iOS

김도형 · 하성호 · 박경배

연구 목적

본 연구는 스마트 뱅킹(smart banking)의 다양한 속성과 사용자 속성, 지각된 즐거움, 신뢰 및 만족, 그리고 지속 사용 의도와의 관계를 구글의 안드로이드 운영체제(Android OS)와 애플의 운영체제(iOS)간 비교 분석하였다.

연구설계/방법론/접근법

본 연구의 목적을 달성하기 위해 2012년 9월 국내에서 실시된 설문조사를 바탕으로 총 245개의 샘플을 수집하였으며 이를 토대로 구조방정식을 통해 분석해 보았다.

결과

스마트 뱅킹 서비스에서 수렴성과 친숙성은 지각된 유용성에 유의미한 영향을 미치는 것으로 나타났으며, 보안성과 경제성은 지각된 신뢰성에 유의미한 영향을 미치는 것으로 밝혀졌다. 또한, 보안성, 경제성 및 혁신성의 지각된 유용성과의 관계, 그리고 편의성 및 친숙성의 지각된 신뢰성과의 관계에서 모두 안드로이드 운영체제가 iOS 보다 강한 영향력을 미침을 확인 할 수 있었다. 본 연구는 스마트 뱅킹에 관한 서로 다른 두 운영체제(Android OS vs. iOS)간의 비교분석을 수행함과 동시에 통합된 프레임워크를 제안함으로써 관련 연구에 이바지 할 것으로 기대된다.

키워드: 스마트폰, 사용자 특성, HCI 실증연구, 웹 어플리케이션

* 이 논문은 2015년 5월 20일 접수, 2015년 6월 16일 1차수정, 2015년 6월 17일 게재 확정되었습니다.