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Customers' Acceptance Process and the Influence of Social Norms in the Dissemination of Smart TV

¹Hyeongyu Jang and ²Mijin Noh

¹Department of Business Administration, College of Business,
Senior Researcher of Business Economics Research Institute, Gyeongsang National University,
501, Jinjudae-ro, Jinju 660-701, South Korea

²School of Business Administration, Kyungpook National University,
1370, Sankykdong, Bookgu, Daegu 702-701, South Korea

Abstract: Smart TV services, together with the digital convergence of communications and media technologies, have attracted increasing attention from researchers and practitioners in recent years. This research provided an empirical analysis about a theoretical model of attitude and reuse intention toward smart TV services, integrated technology acceptance and smart TV quality as integrated antecedents of attitude toward smart TV services and examined the relationships among social norms, attitude and reuse intention. For this, a survey of smart TV users was conducted and analyzed the data by using structural equation modeling. The results indicated that perceived usefulness and perceived ease of use had no influence on attitude but that perceived enjoyment had a positive effect on attitude. In addition, service quality, system quality and information quality had positive effects on attitude and social norms had considerable influence on reuse intention. Finally, attitude had a positive effect on reuse intention. These results have important implications for smart TV firms requiring strategic guidelines and a sustainable competitive advantage.

Key words: Smart TV quality, belief factors, social norms, reuse intention

INTRODUCTION

Smart TV can be defined as a TV platform with operating system that not only provides the broadcasting function of conventional TV but also application stores, searching, game and SNS service via internet connection (Bae and Chang, 2012). Smart TV services which have expanded dramatically in recent years, are expected to transform the daily life of individuals by offering a vast range of new services not available through traditional broadcasting technologies. Global smart TV market is expected to grow to supply 50% of new TV (1.31 million units) by 2013. In 2010, Apple released a new version of smart TV in the form of settop box and Google released standalone smart TV with Android OS. Samsung electronics and LG electronics both have their own OS on standalone smart TV (Bae and Chang, 2012). Smart TV has various characteristics like social networks, controllability, accessibility, integration, interactivity and synchronicity (Shin *et al.*, 2013). The success of smart TV is doubtful and is determined by consumers rather than suppliers (Bae and Chang, 2012). Therefore, this study focuses on perceived attributes for smart TV for consumers.

The rapid expansion of smart TV services calls for a better understanding of various factors and processes that induce users to form positive attitude but few studies have provided an empirical analysis of the determinants and outcomes of positive attitude toward smart TV services. In addition, the smart TV environment has been undergoing dramatic changes, reflecting the growth of the smart TV market and customers' increasingly sophisticated requirements and thus, there is a need for enhancing the quality of smart TV services (Shin *et al.*, 2013) and the smart TV adoption for the success of smart TV industry. Further, it is critical to turn first-time visitors into regular customers to achieve and maintain a sustainable and competitive market share.

To foster a successful smart TV industry, marketers should consider various quality aspects of smart TV including system quality, service quality and information quality. In this regard, the present study considers these quality factors based on an IP model and various belief factors-perceived usefulness (PU), Perceived Ease of Use (PEU) and Perceived Enjoyment (PE) based on the Technology Acceptance Model (TAM). For the sustainable growth of the smart TV industry, PU, PEU and

PE should be carefully considered to induce favorable attitude and reuse intention toward smart TV services. This study proposes belief factors and smart TV service quality factors as important determinants of the success of smart TV industry.

The purpose of this study is to develop and empirically test a theoretical model of determinants and outcomes of positive attitude toward smart TV services. The proposed theoretical model integrates TAM and a model of service quality into integrated antecedents of users' attitude toward smart TV services. It was surmised that the positive attitude was developed into reuse intention which was influenced by social influence.

Smart TV is a fusion technology between existing TV and computer that offers information processing and networking through conventional TV sets or set-top boxes. Smart TV includes a variety of characteristics of many IT products such as smart phones, smart PDAs and PCs (Bae and Chang, 2012). Therefore, characteristics of smart TV based on the TAM that is the most popular model among the technology adoption models was investigated.

Smart TV services entail a type of convergence technology reflecting media and information technologies and provide broadcasting and information content to users through mobile IP networks. From this perspective, users' attitude toward TV should be explained in part by using TAM (Shin *et al.*, 2008) is a dominant theory of new technology acceptance and a number of empirical studies in various fields have established its robustness (Davis *et al.*, 1989; Adams *et al.*, 1992; Agarwal and Prasad, 1998; Lin and Lu, 2000; Legris *et al.*, 2003; Lee *et al.*, 2007). Previous studies have used TAM to examine IT use and to predict the behavior and attitude of users. The TAM facilitates a better understanding of the process by which users come to accept information technology and provides a theoretical basis for explaining users' acceptance processes of new technology. Some of TAM's most important variables are PU, PEU and PE which have been shown to have positive effects on users' attitude (Davis *et al.*, 1989). User's attitude indicates their beliefs and emotions. Although their attitude does not directly determine their behavior as customers, they can have positive effects on their behavioral intention.

Although TAM is considered to be parsimonious, predictive and robust, PU and PEU cannot fully explain user adoption for a technology such as smart TV. In particular, TAM lacks comprehensive approaches to technological and broadcasting aspects of smart TV adoption (Ha and Yook, 2009). In this regard, Venkatesh and Davis (2000) theorized that the effects of external variables on use intention are mediated by PU and PEU.

Shin (2013) investigated the key influence of sociability on users' acceptance and intent to continue using Social TV by proposing a research model based on the TAM (Yu *et al.*, 2005) indicated that attitude, subjective norms and perceived behavior control can influence behavioral intention, demonstrating that PE is the most important factor influencing attitude and behavioral intention toward T-commerce and extending TAM to shopping and T-commerce based on interactive TV. Thus, the present study also considers PU, one of the most widely accepted theoretical frameworks for examining media adoption (Kang and Atkin, 1999), to overcome the limitations of conventional TAM research.

Smart TVs aim to focus on being easy, enjoyable and useful and has been rapidly developed by Korean technology companies like Samsung and LG Electronics (Shin *et al.*, 2013). In launching a new product or service like smart TV, one of the most crucial tasks is to ensure and improve service quality not only by meeting users' expectations but also by effectively addressing competitive pressure. The quality of smart TV services experienced by users must be equal to or better than conventional cable and satellite TV services. Smart TV providers must not only provide services that meet users' expectations but also ensure that their offerings are compelling enough to attract customers away from competitors. Some studies have modeled the impact of smart TV service quality on customers' attitude (Shin *et al.*, 2013) and others have focused on the antecedents and outcomes of users' positive attitude (Pitt *et al.*, 1995; Lin and Lu, 2000; Ha and Stoel, 2009).

Previous studies have indicated that, in terms of gaining access to markets with new IT products or services, service quality, system quality and customer service quality are three critical determinants of customers' positive attitude. First, customer service is a key element of service assurance (Kim and Sugaya, 2006). An effective smart TV provider allows customers to identify the highest level of service quality and ensures that it is achieved. Second, because of smart TV's technical requirements, the system must be robust to ensure the quality, reliability and availability of services (Bilgehan and Matthews, 2008). Third, customer service, particularly with respect to the quality of the customer's experience with TV and voice services, is vital to the success of any TV provider (Kerpez *et al.*, 2006).

Previous studies have referred to social influence as social factors, subjective norms, or social norms. Social influence has been examined as social factors and defined as the individual's internalization of the reference groups' subjective culture and specific interpersonal agreements that the individual has made with others, in specific social

(Shen *et al.*, 2006). Thompson *et al.* (1991) used the term social norms to define social influence and suggested that social norms are similar to subjective norms.

A number of studies have examined the role of social influence in the process by which new information products are used. Malhotra and Galletta (1999) found that social influence plays an important role in determining customers' acceptance and use of new services. Venkatesh and Davis (2000) proposed TAM2 that explains perceived usefulness and usage intentions in terms of social influence (subjective norm, voluntariness and image) and cognitive instrumental processes. Mazman *et al.* (2009) determined that in what ways elementary education prospective teachers are being informed about innovations and to explain the role of social influence in the usage process of a technological innovation in terms of genders.

Based on the above discussion, the present study examines the role of social influence in the process by which customers make use of smart TV and determines the ways in which smart TV users are informed about new products. Further, the study examines the role of social influence in usage process of smart TV services.

MATERIALS AND METHODS

Research model: To increase a new product's market share, the firm must focus on quality assurance. Smart TV services represent a new technology and thus, the smart TV industry has attracted considerable attention from IS and marketing researchers. Davis *et al.* (1989) proposed TAM as a model of users' acceptance of new information

systems and DeLone and McLean (2003) stressed the importance of system quality, information quality and service quality as the major measures of the performance of information management. The present study investigates the relationship between attitude and reuse intention toward smart TV services and considers PU, PEU and PE based on the extended TAM and the study focuses on service quality, system quality and information quality. Figure 1 presents the three technology acceptance constructs, the three smart TV quality constructs and the social influence construct.

Research hypotheses: Previous TAM studies have considered PU and PEU to estimate users' acceptance of new technologies. A number of studies have suggested that such variables have positive effects on attitude toward the use of new technologies (Davis *et al.*, 1989) and they explain customers' use of new IT services such as smart TV and the Internet and consider PE based on TAM2 (Kim *et al.*, 2009; Shin, 2009a). Shin (2009b) suggested that IPTV is an important innovation and empirically demonstrated its positive effects on customers' attitude through PU. According to Kim *et al.* (2009), since the development of information and communication technology, a large number of studies have verified the importance of PU, PEU and PE in users' acceptance processes toward new technology. Specially, studies in social sciences, social psychology and organizational behavior have considered those variables for explaining customers' behavior about new technology (Gefen *et al.*, 2003). Ha and Stoel (2009) examined the relationships between attitude and PU,

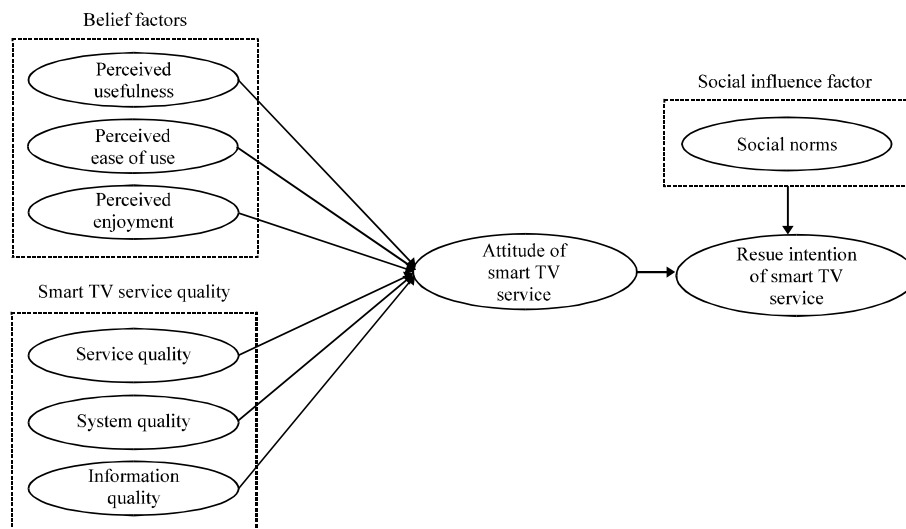


Fig. 1: Research model

PEU and PE. Ong *et al.* (2004) employed TAM2 by considering PU and PEU to examine customers' technology acceptance. Shin *et al.* (2013) investigated the effects of perceived interactivity on the motivations and attitudes towards smart TV in Korea. A number of studies have used TAM2 and thus, the following hypotheses are proposed to examine the relationship between customers' attitude toward smart TV services and PU, PEU and PE:

- **Hypothesis 1:** Perceived usefulness has a positive effect on customers' attitude toward smart TV services
- **Hypothesis 2:** Perceived ease of use has a positive effect on customers' attitude toward smart TV services
- **Hypothesis 3:** Perceived enjoyment has a positive effect on customers' attitude toward smart TV services

DeLone and McLean (2003) suggested that information quality, system quality and service quality have positive effects on customers' use of and satisfaction with information systems and a number of studies have considered these three quality attributes as the core measures of the performance of information systems. Information quality estimates the outputs' quality of an information system by taking into account its timeliness and accuracy and service quality measures the user's satisfaction with the information system (Pitt *et al.*, 1995). Lin and Lu (2000) examined the use of websites based on TAM and the relationship between information quality/system quality and PU/PEU. Shin (2009a) found a close relationship between system quality and PU based on TAM in terms of IPTV services. To measure users' acceptance of a new information technology such as smart TV, many studies have used TAM and considered the quality of the information system. A number of studies have evaluated the effectiveness of smart TV services by considering PU, PEU, PE and attitude and attitude perceiving customers through subdivision and management methods of the contents' value chain are the most important factors behind researches. In this regard, the following hypotheses were proposed:

- **Hypothesis 4:** Service quality has a positive effect on customers' attitude toward smart TV services
- **Hypothesis 5:** System quality has a positive effect on customers' attitude toward smart TV services
- **Hypothesis 6:** Information quality has a positive effect on customers' attitude toward smart TV services

Theory of Rational behavior considers social norms as one of the factors having a direct effect on purchase intention (Fishbein and Ajzen, 1975). According to the theory of reasoned action, social norms have a direct effect on purchase intention. Venkatesh *et al.* (2003) claimed that social norms are critical in the early stages of services based on a new information technology. Hsu and Lu (2004) proposed that social influence, including social norm, affected intention to play an online games. Lee (2009) analyzed users' acceptance of online banking services and found that it has considerable influence on their intention to use such services through social norms. Schierz *et al.* (2010) provided an empirical analysis of factors determining consumers' acceptance of mobile payment services and found social norms have considerable influence on attitude toward use of mobile payment services. Previous studies have suggested that social norms have direct effects on users' intention to use information systems. In this regard, the present study examines the relationship between social norms and reuse intention and we propose the following hypothesis was proposed:

- **Hypothesis 7:** Social norms have a positive effect on reuse intention toward IPTV services

Davis *et al.* (1989) proposed a conceptual model of users' acceptance of information technology and suggested that PU and PEU can be explained by their attitude and that their attitude, by their intention. There exist a number of studies based on TAM (Bruner and Kumar, 2005; Lee *et al.*, 2007) and thus, a hypothesis based on TAM was proposed by considering the relationship between users' attitude and intention to examine their acceptance of smart TV services. Some studies have found a close relationship between attitude and intention (Hubona and Kennick, 1996; Wu and Wang, 2005). Lee (2009) investigated a mobile banking service based on TAM and the TPB model and found that attitude had positive effects on intention. Kinugasa *et al.* (2010) analyzed the diffusion pattern of IPTV services based on TAM and suggested a close relationship between attitude and intention. Kim *et al.* (2013) analyzed customers' acceptance of a smart TV based on the TAM. In this regard, we propose the following hypothesis of the relationship between attitude and intention to examine the user's acceptance of smart TV services:

- **Hypothesis 8:** Attitude has a positive effect on reuse intention toward smart TV services

Measures: All the items were assessed based on a seven-point Likert-type scale ranging from strongly disagree (1) to strongly agree 7. Table 1 lists all the items and provides operational definitions.

Table 1: Measurement items and operational definitions

Variables	Operational definitions	Measurement items	Studies
Perceived usefulness	A belief that the users' time and effort will be saved by using smart TV services	Smart TV services are very useful in my life Smart TV services improve my performance Smart TV services upgrade my life	Davis <i>et al.</i> (1989) and Kim <i>et al.</i> (2009)
Perceived ease of use	A belief that customers will make less effort to use smart TV services	Smart TV services provide me with very useful functions and information Using smart TV is very clear and easy Using smart TV require considerable skill	Davis <i>et al.</i> (1989) and Kim <i>et al.</i> (2009)
Perceived enjoyment	A belief that smart TV services are pleasing and enjoyable	In general, using smart TV is easy I enjoy using smart TV Using smart TV makes me happy Using smart TV makes me cheerful	Ha and Stoel (2009), Kim <i>et al.</i> (2009) and Shin (2009a)
Service quality	User's overall experience with smart TV services, including their application responsiveness, functionality, usability and service context	I can receive immediate service if there is any problem using smart TV Smart TV devices are excellent I receive excellent customer service (e.g., after-sales service) from my smart TV provider I receive promised services from my smart TV provider My smart TV provider makes continuous efforts to improve their service quality	Pitt <i>et al.</i> (1995), Lederer <i>et al.</i> (2000) and DeLone and McLean (2003)
System quality	Extent to which the system allows the user to use smart TV services easily and efficiently	I trust the smart TV system Connecting smart TV is easy Response speed of smart TV is fast	DeLone and McLean (2003)
Information quality	Extent to which the user perceives the information provided by smart TV services is accurate and necessary	Smart TV provides various multimedia like pictures, voices, videos and so on Smart TV provides a wide range of information and services It is easy to obtain necessary information through smart TV	Lin and Lu (2000) and DeLone and McLean (2003)
Social norms	Influence of significant others on the user's attitude and intention toward smart TV services	Smart TV provides accurate information People who are important to me recommend using smart TV People who are important to me find using smart TV beneficial People who are important to me believe that using smart TV is a good idea.	Hsu and Lin (2008)
Attitude	User's positive attitude toward smart TV services	Using smart TV is a good idea.	Shin (2009a) and Davis <i>et al.</i> (1989)
Reuse intention	User's reuse intention toward smart TV services	Using smart TV is wise Using smart TV services is beneficial I will use smart TV again I will use smart TV again because using smart TV is convenient Given the opportunity, I will use smart TV continuously	Lin and Lu (2000)

RESULTS

Sample and the procedure result: A survey of smart TV users was conducted and obtained 225 questionnaires. Table 2 shows the demographic characteristics of the respondents: 64.4% of the respondents were males, 28.0 and 24.9% subscribed to Mega TV and SK Broadband, respectively and 43.5% used smart TV because it offered a wide range of channels and content.

Measurement: To assess model fit, a confirmatory factor analysis was conducted by using AMOS 17.0 (Table 3). The measurement scales was evaluated by considering the following two criteria suggested by Fornell and Larcker (1981). First, construct reliability should exceed 0.8. Second, average variance extracted (AVE) for each construct should exceed the variance from the measurement error for the construct (AVE should exceed 0.5). The results of the confirmatory factor analysis provide an overview of model fit. The chi-square/degree of freedom ratio (χ^2/df) was 1.734 ($p < 0.001$), the Goodness-of-Fit Index (GFI) was 0.850, the Adjusted Goodness-of-Fit Index (AGFI) was 0.804, the Comparative Fit Index (CFI) was 0.950, the normed fit index (NFI) was 0.890 and the Root Mean Square Error of Approximation (RMSEA) was 0.057. Based on widely used criteria, these results indicate only a marginal fit (Chau, 1997). Table 4 shows the correlations among the constructs which indicate that multicollinearity was not a serious problem in the proposed model.

Hypothesis testing: Structural Equation Modeling (SEM) for the analysis of data was adopted. Figure 2 presents the results obtained using the structural model, including non-significant paths (i.e., shown as dotted lines) and standardized path coefficients between constructs.

First, Hypotheses 1 and 2 were supported but Hypothesis 3 was rejected. That is, both PU ($\beta = 0.167, t = 1.281$) and PEU ($\beta = 0.099, t = 0.986$) had no significant effect on attitude but PE ($\beta = 0.587, t = 2.790$) had a positive effect on attitude. Second, Hypotheses 4, 5 and 6 were supported. That is, service quality ($\beta = 1.554, t = 4.405$), system quality ($\beta = 1.400, t = 2.979$) and information quality ($\beta = 1.803, t = 3.493$) had positive effects on attitude. Third, Hypothesis 7 was supported, suggesting that social norms are a significant predictor of reuse intention ($\beta = 0.641, t = 9.740$). Finally, Hypothesis 8 was supported. That is, attitude had a positive effect on reuse intention ($\beta = 0.408, t = 7.262$). The results of structural equation modeling are reported in the Table 5. Approximately 79% of the variance in the attitude of smart TV services was explained by the belief factors and smart

Table 2: Demographic characteristics of respondents

Variables	Frequency	Percentage
Gender		
Male	145	64.4
Female	80	35.6
Total	225	100.0
Main broadcasters		
Mega TV	63	28.0
SK broadband	56	24.9
Hana TV	40	17.8
Cable TV	50	22.2
Others	16	7.1
Total	225	100.0
Motive for using smart TV		
Children's education	38	17.0
Good picture quality	22	9.9
Low cost	10	4.5
Various channels and content	97	43.5
Ease of use	28	12.6
Interaction	18	8.1
Others	10	4.5
Total	223	100.0

Table 3: Results of the confirmatory factor analysis

Items	Standardized loading	t-value	Composite reliability	Average variance extracted
PU1	0.881	-	0.880	0.646
PU2	0.901	20.305		
PU3	0.845	17.768		
PU4	0.846	17.360		
PEU1	0.860	-	0.867	0.685
PEU2	0.884	17.573		
PEU3	0.908	18.054		
PE1	0.916	-	0.851	0.656
PE2	0.848	17.931		
PE3	0.815	16.463		
SQ1	0.720	-	0.833	0.501
SQ2	0.738	10.303		
SQ3	0.750	9.414		
SQ4	0.680	8.450		
SQ5	0.775	10.846	0.831	0.553
SYQ1	0.811	-		
SYQ2	0.829	13.841		
SYQ3	0.763	12.493		
SYQ4	0.640	9.986	0.802	0.545
IQ1	0.818	-		
IQ2	0.831	14.741		
IQ3	0.739	12.473		
SN1	0.791	-	0.849	0.652
SN2	0.893	14.985		
SN3	0.884	18.035		
AT1	0.834	-	0.846	0.647
AT2	0.880	16.232		
AT3	0.824	14.750		
RI1	0.927	-	0.902	0.755
RI2	0.932	25.363		
RI3	0.857	20.197		

TV service quality variables in the model. About 71% of the variance in the reuse intention of smart TV services accounted for by the attitude of smart TV services and social norms. For example, if the $R^2 = 0.707$ we say that the attitude of smart TV services and social norms variables explain 70.7% of the variance of reuse intention of smart TV services. As the R^2 (squared multiple correlations) of all constructs in the model exceeded 20%, explained a portion of each variable.

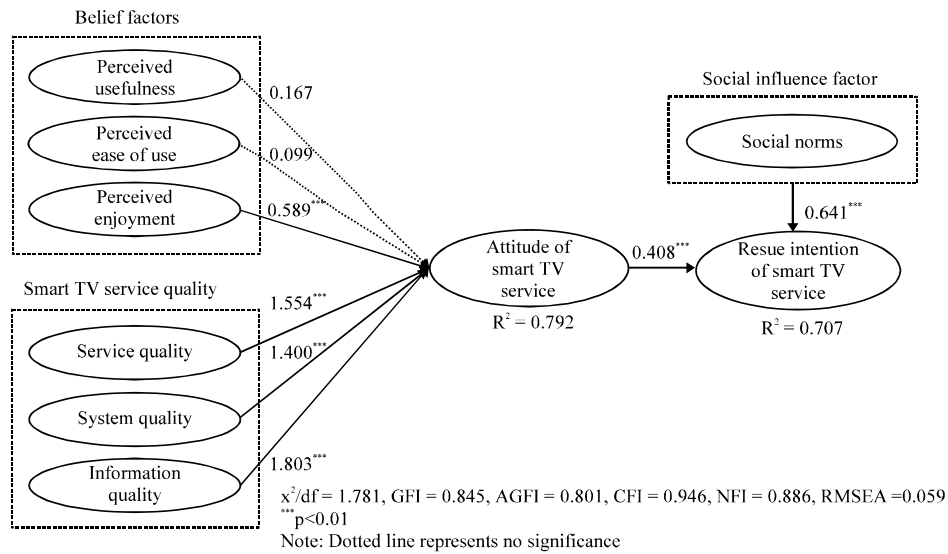


Fig. 2: Research results

Table 4: Correlation matrix

Parameters	1	2	3	4	5	6	7	8	9
1-Perceived usefulness	0.80								
2-Perceived ease of use	0.31***	0.82							
3-Perceived enjoyment	0.58***	0.49***	0.81						
4-Service quality	0.48***	0.40***	0.56***	0.70					
5-System quality	0.51***	0.41***	0.59***	0.74***	0.74				
6-Information quality	0.62***	0.38***	0.68***	0.67***	0.72***	0.73			
7-Social norms	0.34***	0.05***	0.30***	0.40***	0.33***	0.36***	0.80		
8-Attitudes	0.46***	0.17***	0.41***	0.63***	0.56***	0.59***	0.53***	0.80	
9-Reuse intentions	0.45***	0.14***	0.38***	0.46***	0.48***	0.52***	0.65***	0.76***	0.86***

*** p<0.01, values along the diagonal are the square root of AVE

Table 5: Results of structural equation modeling

Hypothesized effect	Estimate	t-value	Conclusion
H 1: Perceived usefulness->Attitude	0.167	1.281	Not supported
H 2: Perceived ease of use->Attitude	0.099	0.986	Not supported
H 3: Perceived enjoyment->Attitude	0.587	2.790***	Supported
H 4: Service quality->Attitude	1.554	4.405***	Supported
H 5: System quality->Attitude	1.400	2.979***	Supported
H 6: Information quality->Attitude	1.803	3.493***	Supported
H 7: Social norms->Reuse intention	0.641	9.740***	Supported
H 8: Attitude->Reuse intention	0.408	7.262***	Supported

***p<0.01

DISCUSSION

A research model based on smart TV quality and TAM was designed by considering the process by which users accept new technology services. The proposed model considers technology acceptance factors (i.e., PU, PEU and PE) based on Davis *et al.* (1989), smart TV quality factors (i.e., service quality, system quality and information quality) based on DeLone and McLean (2003) and social norms based on Hsu and Lin (2008). In this study, we focused on examining the relationships among technology acceptance factors, smart TV quality factors, social norms, attitude and reuse intention.

Results are as follows, First, Hypotheses 1 and 2 were supported but Hypothesis 3 was rejected. These results are inconsistent with the findings of previous studies based on original TAM but are consistent with those studies based on TAM2 (Ha and Stoel, 2009; Shin, 2009a; Lee, 2010). Ha and Stoel (2009) examined users' acceptance of online shopping and showed that PEU has no positive effect on their attitude. Smart TV services represent a relatively new phenomenon and thus, smart TV providers do not offer services that are clearly differentiated from those provided by traditional broadcasters. Furthermore, users are more likely to carefully choose smart TV services than any other services based on information technology. Therefore, this study's results demonstrate that smart TV firms must provide their customers with very useful information. Second, Hypotheses 4, 5 and 6 were supported, indicating that service quality, system quality and service quality had direct effects on attitude. These results are consistent with the findings of Shin (2009b) and suggest that, in the long term, smart TV providers must strengthen their service quality to expand their market share. In terms of marketing, smart TV providers should highlight the vast

range of services they offer to effectively accommodate the diverse needs of their customers. Finally, Hypotheses 7 and 8 were supported. Lee (2010) examined users' intention toward e-learning based on TAM and the TPB model and suggested that, among social norms, subjective norms are likely to have the most significant effect on users' intention to make continuous use of e-learning. As indicated by previous studies based on TAM2, attitude represents an important determinant of reuse intention.

This study's results provide a better understanding of some important issues surrounding smart TV services that have not been addressed by previous studies. First, in terms of theory building, this study applies TAM and DeLone and McLean (2003) model to smart TV services. This approach is likely to facilitate the stable development of theories about services based on information technology (e.g., smart TV services). Hence, the proposed model makes important contributions to the emerging literature on mobile TV and mobile games, among others. Second, a number of studies have examined services based on information technology but few have considered smart TV services or combined TAM with service quality. In this regard, the present study contributes to the literature by proposing a model combining TAM2 with a model of service quality for new services based on information technology (e.g., smart TV) and provides rich avenues for future research on such services. Third, PU and PEU did not have a significant effect on attitude but PE had a significant positive effect which indicates that PU and PEU are more important than PE in smart TV services. This result has particularly important implications for managers who need to allocate limited resources to retain and expand their current customer base. That is, service providers should develop strategies for facilitating customers' ability to enjoy services based on information technology (including smart TV services) which is likely to induce potential customers' confidence and interest. Fourth, we provided quality characteristics of smart TV after this study employed smart TV as the target technology. Smart TV is one of the smart devices which are leading to future technologies. Therefore, the results can suggest important information when researchers investigate customers' acceptance of smart devices. Finally, smart TV is released in earnest in 2010. Because smart TV industry is still at a preliminary stage, the features of smart TV are not clearly established yet. The manufacturers of smart TV wonder which characteristics of smart TV attract customers' attentions. Therefore this study can provide smart TV's characteristics for the manufacturers. On the other hand, this study shows advantages of smart TV which customers think about the smart TV's quality. This

study has some limitations. First, we could not measure real-time interactive services and the direct purchase of smart TV services because smart TV services represent a relatively new phenomenon but they are likely to be important characteristics of smart TV services as they mature. Thus, future research should consider these characteristics of smart TV services. Second, compared with studies employing an elaborate experimental design, the present study is based on a survey and has more uncontrolled variables and thus, the results may be biased. However, a survey of smart TV service users is very difficult to conduct because of little users toward smart TV services. In this regard, future research should survey smart TV users in various countries.

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