

Technology Acceptance and Perceived Reliability of Realistic Media Service

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Abstract

Convergence environment of broadcasting and telecommunication is emerged as a key part for new business opportunities reassembling value chains consisted of contents, platform, network, and devices. According to the development of information and communication technology, many customers are interested in acceptance and use of realistic media service. This paper examines the influence of technology acceptance and perceived reliability on intention to use realistic media service. A research model is suggested by integrating the original Technology Acceptance Model (TAM) and perceived reliability, which is recognized as an important factor to measure user perception for online media service. In order to analyze the influence of user attitude and perceived reliability on usage intention of customers for realistic media service, this study empirically conducted a survey with data collection of 404 users. The results of data analysis showed that perceived usefulness, perceived ease of use, and perceived reliability influence positively on usage intention of realistic media service. This study provides an insight to complement the prior studies with empirical evidence.

Keywords: Perceived Ease of Use, Perceived Reliability, Perceived Usefulness, Realistic Media Service, Technology Acceptance, Usage Intention

1. Introduction

With the rapid development of telecommunication techniques and high-speed networks, we are living in an age of the information revolution and the digital area, and humans want to acquire useful knowledge and information through the Internet since high-speed networks are connected with high-performance devices and platforms¹². Realistic media industry appears as a new business to create higher value through convergence skill of broadcasting and telecommunication with the development of ICT. A lot of media services in a variety of industry, such as tourism, culture, history, education, medical industry, were suggested for introduction and use of new technology in media service.

Few studies on media service trend suggested combined service models with realistic media. A study on realistic media industry forecasted that the market size

of realistic media will grow to 15-21 % annually^{13,15}. Lots of studies on media service technology were conducted in research institutes and universities, which they were focused on the development of core technologies related to realistic media service, such as high efficiency transcoding²⁷, 3D display technology¹¹, holography²³, network technology⁶, authoring tool²⁰ and devices¹⁹. For example, U.S. Navy and Marine Corps have a training program of realistic media service, which combined medical service with military media. Stephanie and Stephanie²⁴ suggested highly realistic and immersive training program for corpsmen, which was built around training scenarios that included sights, sounds, smells, and distractions to simulate realistic and challenging combat situations.

Korean government, which was ranked top 5 in global e-Government readiness survey by UN, provides world's most sophisticated e-Government services based on

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broadband information network⁹. It provides government policy and public information service as well as civil services through central and local government web sites. However, its readiness for public media services was not enough to provide two-way media services. Realistic media services have received a lot of attention to apply to public service. Especially, realistic public service in areas of culture and tourism, education, health, misfortune disaster, and environment was allowed in the trial cities in South Korea from 2008 to 2011. Public services based on convergence of broadcasting and telecommunication could provide useful and easy-to-use environment for public services by using TV at home, as one of the most familiar media for people.

Therefore, the purpose of this paper is to suggest an extended research model to integrate the original TAM with perceived reliability, and to identify the influencing factors to drive consumer's usage intention of realistic media service. To achieve research objectives, first we investigated a theoretical framework to explain the types of the public media services for citizens under convergence environment of broadcasting and telecommunication in South Korea. Second, we tested the hypotheses generated for behavioral intention of customers to use realistic media service through data collection of pilot services for the proliferation of broadcasting-telecommunication converged public services. Contribution of this study is to enhance our knowledge on user acceptance of realistic media service and to provide an emphasis on importance of perceived reliability on new media service.

2. Literature Review and Hypothesis Development

2.1 Technology Acceptance in Realistic Media Service

Public services based on convergence of broadcasting and telecommunication could provide useful and easy-to-use environment for public services by using TV at home, as one of the most familiar media for people. The development and diffusion of realistic media service also contributes to grow up media-related industry and new business opportunities by promoting people to accept and use new media service. Under the trial service with dependency to platform providers, delivering content and services through realistic media requires to have high skills and to collaborate and coordinate the participants between contents, platform, network, and device business.

Prior studies related on user acceptance of public media service, was not enough to explain this phenomenon.

Few studies on consumer acceptance of E-government²¹ and E-commerce⁵, has adopted the perspective of Technology Acceptance Model (TAM)², because of explanation power to conceptualize individual behavioral intention. Studies of media-based service acceptance have been conducted on the following subject, such as DMB^{9,10}, IPTV^{7,26} and social media service^{8,14}. Previous studies on realistic media service had a limitation to be mainly related to technological topics on contents development, platform technology, network communication, and device development. With the development of realistic media business ecosystem, user acceptance of realistic media service is very important issue for the diffusion of new business opportunity.

Perceived usefulness and perceived ease of use have studied as major factors of TAM from previous literature. The original TAM contained three basic relationships affecting behavioral intention:

- Perceived ease of use leading to perceived usefulness,
 - Perceived ease of use leading to behavioral intention and
 - Perceived usefulness leading to behavioral intention.
- These three links have revealed a high consistency and validity in explaining the acceptance of several technological products and services. The aim of our study was to evaluate the impact of determinants on the intention to use realistic media service.

Realistic media service is one of the ICT-driven services. This service provides various kinds of data and information about users and organizations. In the case of medical media service, contents delivery consists of personal medical record, body check, drug, clinical history with sensitive meaning. Also, data transfers might occur frequently. In this case, reliability of data and media service is one of most important factors^{17,18}. From the original TAM perspective, this situation makes it difficult to understand the real phenomenon. Perceived usefulness and perceived ease of use as mediated variables to explain behavioral intention are pointed out as a limitation to explain usage intention of consumer. Given the expanding role and importance of perceived reliability in using realistic media service, it is imperative to enhance the understanding of factors that may affect consumers' behavioral intention to use realistic media service. Based on the above discussion, Figure 1 provides a research model in this study.

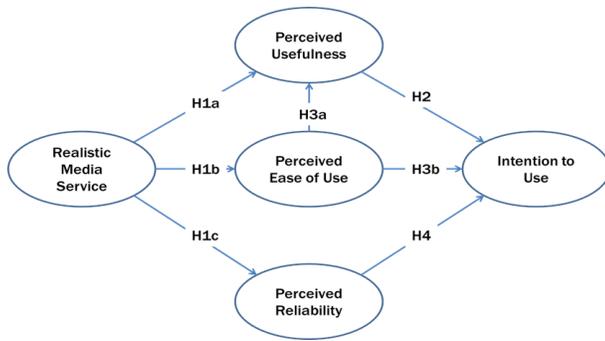


Figure 1. Research Model.

2.2 Perceived Usefulness and Perceived Ease of Use

Realistic media is increasingly used not only for the application area of broadcasting and entertainment, but also for new industry like exhibition and game using computer graphics, because realistic media have better expressiveness, realism, presence, immersion than existing media. Realistic media service refers to media services that can provide senses of immersion and presence, as various genre of movie, musical, game, performing art and other services. As we mentioned before, however, most studies about realistic media focused on technological issues and market trend, and there is no user view or service view on how to accept and use.

Market expansion requires the growth of supplies and demands essentially. Sun and Moon²⁵ studied on user acceptance of mobile contents. They adopted TAM theory, and indicated the results that mobile contents have positive influence on user attitude though perceived usefulness and perceived ease of use, and user attitude has positive influence intention to re-purchase. Elliott et al.³ argued that technology readiness¹⁶ has positive influence on perceived reliability in acceptance of self-scanning technology. Thus, we hypothesize the relationship between realistic media service and user perception on usefulness and ease of use, and reliability.

- [H1a] Realistic media service has positive impact on perceived usefulness.
- [H1b] Realistic media service has positive impact on perceived ease of use.
- [H1c] Realistic media service has positive impact on perceived reliability.

2.3 Intention to Use Realistic Media Service

Among the various efforts to understand and predict the process of user acceptance or adoption of information systems, the TAM introduced by Davis² is one of the most cited theoretical frameworks in the area of information systems. Key variables are perceived usefulness and perceived ease of use. Davis² defined that perceived usefulness is ‘the degree to which a person believes that using a particular system would enhance user’s job performance’, and that perceived ease of use is ‘the degree which a person believes that using a particular system would be free of effort’. Many researchers used these variables for finding the relationship between perceived usefulness, perceived ease of use and intention to use, or acceptance of target systems or services.

The application of TAM was widely adopted for usage of information services. Um et al.²⁶ investigated IPTV acceptance and relative efficiency. They found significant relationship between perceived usefulness, perceived ease of use and intention to use. Han and Moon⁷ also investigated continuous intention to use of IPTV service using TAM, and they found significant relationship between perceived usefulness and continuous usage intention. Thus, we hypothesize the relationship between user perception and usage intention.

- [H2] Perceived usefulness in using realistic media service has positive impact on intention to use.
- [H3a] Perceived ease of use in using realistic media service has positive impact on perceived usefulness.
- [H3b] Perceived ease of use in using realistic media service has positive impact on intention to use.

2.4 Perceived Reliability of Realistic Media Service

Perceived reliability is an important variable in technology acceptance⁵ and refers to ‘the correct technical functioning of technology’³. There are few researches about the impact of perceived reliability. Dabholkar¹ argued that perceived reliability has a positive impact on intention to use in setting self-service technology. Shareef et al.²² studied on customer behavior in mobile health care service. They argued that perceived reliability has a positive effect on intention to use ICT-driven service.

In particular, we assumed that perceived reliability may be a key element in user’s intention to use the

realistic media service. Perceived reliability is the perception of confidence and trust of users in proper and accurate functioning of the site while interacting with it through realistic media services, as promised by service providers²¹. Therefore, we defined realistic media service as the degree to which people felt the presence and the immersion that media services encouraged them to use a new system. Thus, we hypothesize the relationship between perceived reliability and usage intention.

[H4] Perceived reliability in using realistic media service has positive impact on intention to use.

3. Research Method

3.1 Instrument Construction

In this section, we define operational definition of 5 variables; realistic media service, perceived usefulness, perceived ease of use, perceived reliability and intention to use. Base on literature review, we adopted operational definition and modified that. Realistic media service refers to degree to which people had the immersion that media services encouraged them to use a new system. And perceived usefulness refer to 'degree to which a person believes that using realistic media service would enhance his or her job performance' and, perceived ease of use refer to 'degree to which a person believes that using a particular system would be free of effort'². Perceived reliability refers to 'degree to which a person believes that realistic media service would act the correct technical functioning of technology'³. Intention to use refers to 'degree to which a person tend to use realistic media service'²⁶.

3.2 Data Collection

Measurement items of each construct were extracted from prior studies. All measurement items were measured by five-point Likert-type scales with ranging from strongly disagree to strongly agree. Data for this study were collected from potential users of a regional province of South Korea. We surveyed for two months with support of Provincial Government of Gyeongsangbuk-Do. A total of 1,000 were mailed for citizens living in the province. 404 respondents of 421 replied questionnaires were usable with approximately 42% of the response rate. Table 1 indicates the demographics statistic of 404 respondents.

4. Results

4.1 Validity and Reliability

We have employed PLS (Partial Least Squares) for data analysis. Confirmatory factor analysis in Table 2 presents the values of cross loading, composite reliability, standardized Cronbach's alphas, and AVE explained by each construct. Cross loading values of most measurement items are higher than 0.7. A widely accepted level of adequacy for Cronbach's alpha has been at least 0.7. All Cronbach's alpha of variables has more than 0.7. At the same time, all of the AVE values are higher than the threshold of 0.5. Thus, the convergent validity and reliability are acceptable.

We tested discriminant validity by showing the cross loadings value of all variables. Table 3 shows results of discriminant validity. All indicators loaded more higher on their own construct than on other construct. Fornell and Larcker⁴ proved that constructs have difference if the square root of AVE of a certain construct is larger

Table 1. Sample Statistic

Item	Frequency	Percent	Realistic Media Service Items	Mean	S.D.	
Gender	Male	232	57.4%	Media Service on Culture and Tourism	3.80	0.805
	Female	170	42.1%			
	Non-response	2	0.5%	Media Service on Environment	3.75	0.822
Age	~19	2	0.5%	Media Service on Health Care	3.89	0.860
	20~29	40	9.9%			
	30~39	143	35.4%			
	40~49	142	35.1%	Media Service on Disaster and Emergency	3.96	0.883
	50~	77	19.1%			

Table 2. Results of Confirmatory Factor Analysis and Reliability

Variable	Item	Cross Loading	Composite Reliability	Cronbach' a	AVE
Realistic Media Service	Acceptance and use for culture and tourism	0.729	0.819	0.708	0.531
	Acceptance and use for environment	0.736			
	Acceptance and use for health care	0.768			
	Acceptance and use for disaster and emergency	0.680			
Perceived Usefulness	Useful in obtaining public information	0.788	0.840	0.714	0.636
	Possible to expand extended service	0.823			
	Professional work and organizing	0.780			
Perceived Ease of Use	Easy to inter-communication	0.819	0.857	0.750	0.667
	Easy to check realtime request	0.834			
	Easy to link as additional service	0.796			
Perceived Reliability	Reliable service without interruption	0.782	0.877	0.813	0.641
	System recovery against shutdown	0.790			
	Reliable to protect privacy	0.844			
	Information security to disclosure	0.785			
Intention to Use	Enhancement of benefits	0.854	0.889	0.813	0.727
	Quick response	0.820			
	Increasing service quality	0.883			

than the absolute value of the standardized correlation of that construct with any other construct in the analysis. According to Fornal and Larcher⁴ with Table 3, all the correlation indicators are less than the square root of AVE, assuring the discriminant validity.

Table 3. Results of Discriminant Validity

	Mean	S.D.	RMS	PU	PEOU	PR	INT
Realistic Media Service (RMS)	3.85	0.616	0.729				
Perceived Usefulness (PU)	3.63	0.676	0.428	0.797			
Perceived Ease of Use (PEOU)	3.61	0.675	0.427	0.358	0.816		
Perceived Reliability (PR)	3.96	0.668	0.456	0.415	0.553	0.801	
Intention to Use (INT)	3.66	0.749	0.390	0.396	0.342	0.553	0.853

* Correlation is significant at the 0.01 level, diagonal shows the square root of the AVE for each construct

4.2 Hypothesis Testing

Table 4 reports the results of the hypothesis tests. All hypotheses are accepted with significant level. Realistic media service has a positive impact on the perceived usefulness (b = 0.336, t = 6.180, p<0.01), as stated in Hypothesis 1a. Hypothesis 1b postulated that realistic media service has a positive impact on perceived ease of use, and it is supported (b = 0.427, t = 7.405, p<0.001).

Realistic media service has a positive impact on the perceived reliability (b = 0.456, t = 9.368, p<0.01), as stated in Hypothesis 1c. Hypothesis 2 postulated that perceived usefulness has a positive impact on intention to use, and it is supported (b = 0.242, t = 4.431, p<0.001). Perceived ease of use has a positive impact on the perceived usefulness (b = 0.215, t = 3.766, p<0.01) and intention to use (b = 0.164, t = 2.623, p<0.001), as stated in Hypothesis 3a and 3b. Hypothesis 4 postulated that perceived reliability has a positive impact on intention to use, and it is also supported (b = 0.164, t = 3.011, p<0.001). They jointly explain 20% of the variance in intention to use (R² = 0.204).

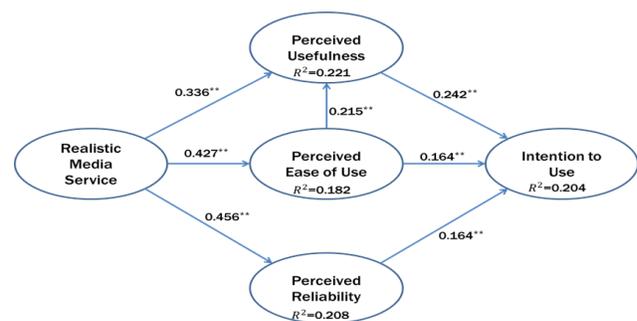


Figure 2. Hypothesis Test Results. ** : p<0.01, * : p<0.05

Table 4. Hypothesis Test Results

Hypothesis	Path coefficients	t-value	Result
H1a Realistic Media Service → Perceived Usefulness	0.336**	6.180	Accepted
H1b Realistic Media Service → Perceived Ease of Use	0.427**	7.405	Accepted
H1c Realistic Media Service → Perceived Reliability	0.456**	9.368	Accepted
H2 Perceived Usefulness → Intention to Use	0.242**	4.431	Accepted
H3a Perceived Ease of Use → Perceived Usefulness	0.215**	3.766	Accepted
H3b Perceived Ease of Use → Intention to Use	0.164**	2.623	Accepted
H4 Perceived Reliability → Intention to Use	0.164**	3.011	Accepted

** : $p < 0.01$, * : $p < 0.05$

5. Discussion and Conclusions

This study tried to suggest a theoretical framework to explain which factors influence on user acceptance of realistic media service. From prior literatures, we have identified that realistic media service can influence on intention to use through perceived usefulness and perceived ease of use, which are major critical factors of TAM. According to the results of this study, TAM is very useful in identifying user acceptance and usage of realistic media service, like other previous studies on media acceptance.

Realistic media service requires two-way interaction with presence and immersion through communication between users and service providers. This study identified perceived reliability is an important factor related to user acceptance. Perceived reliability of data in realistic media service is one of most important factors. From prior studies, perceived usefulness and perceived ease of use as mediated variables to explain behavioral intention are pointed out as a limitation to explain usage intention of consumer. In this study, we identified the expanding role and importance of perceived reliability in using realistic media service.

With the development of information and communications technology, media service as a convergence service of broadcasting and telecommunication has evolved from DMB and IPTV to Smart TV service. Realistic media service will pay more attention to next generation of media services, with the finding of this study, which the TAM is very useful for applying to user acceptance of realistic media services. We propose two main findings from data analysis of this study. First, TAM can be used for acceptance and use of media service area. Second, perceived reliability can complement user's behavioral intention on realistic media service.

This study has limitations in conducting empirical research of realistic media service. First, this study is limited to generalize the results, because of biased data collection in local region. Second, this study did not consider the hedonic factor to explain perceived enjoyment of realistic media service. For further research to solve the limitation in this study, further studies have to try data collection with appropriate sampling method for generalization of the results. Also, we believe that further study will be better to apply both perspective of utilitarian and hedonic factors with moderating variables like gender, age, and experience. This study provides theoretical insights of causal relationship by application of technology acceptance model and perceived reliability. This empirical evidence shows that perceived usefulness and perceived ease of use, in addition, perceived reliability as complementary factor to predict user behavior intention of media service, are very important factors for user to accept and use media service. This study contributes to provide an insight to complement the prior studies with empirical evidence.

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