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MEASURING THE COMPATIBILITY FACTORS IN MOBILE ENTERTAINMENT SERVICE ADOPTION

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ABSTRACT

This study examines compatibility factors that influence users' intention to adopt mobile entertainment service. Potential compatibility factors derived from previous research include (1) compatibility with past control experience, (2) compatibility with user's curiosity and intrinsic interest, (3) compatibility with social norms, (4) compatibility with perceived critical mass, (5) compatibility with preferred lifestyle and (6) compatibility with economical value. From survey conducted in South Korea, curiosity & intrinsic interest, social norms, preferred lifestyle and economic value were found to have positive influence on the intention to adopt mobile entertainment service. The results imply that MES provider must select the most appropriate techniques and features to enhance the level of intrinsic interests among users. In addition, MES provider should concern about cultural orientation and life style of users during development of MES contents and interface as well as marketing of MES service.

Keywords: Compatibility, Mobile Entertainment Service Adoption, Control, Curiosity, Intrinsic Interest, Social Norms, Critical Mass, Lifestyle, Economical Value.

1. INTRODUCTION

As the number of mobile phone subscriber has been increased, usage of mobile Internet service has also been increased in recent years. The mobile Internet refers to the World Wide Web (WWW) accessed from mobile devices such as cell phones and PDAs without using a desktop computer. The services provided via mobile Internet can be divided into four categories: communication, information, entertainment, and commerce services [35, 46]. It has been reported that by 2015 mobile content could be worth well in excess of $1 trillion, with voice comprising only a 10% share of the market. Especially, the market value of mobile entertainment service is increasing markedly and the numbers of users are growing rapidly.

Mobile entertainment service consists of three parts: mobile game, mobile music including ringtone, mp3, and ringback, and mobile movie including VOD (Video On Demand) and mobile broadcasting. In South Korea, while the mobile service craze in 2004 was m-banking, the most popular service of 2005 was Digital Multimedia Broadcasting (DMB) for mobile phones. Having adopted CDMA (Code Division Multiple Access) technology as its basic cellular platform, South Korea is making an ongoing effort towards the local development of entertainment related products and value-added services [5]. This implies that there are significant business opportunities in relation with mobile entertainment service.

The objective of this study is to find the factors that influence the adoption of mobile entertainment service. Among other potential factors that influence the adoption of mobile entertainment service, this study focuses on factors related to compatibility. Compatibility in this study is viewed as cognitive distance between mobile entertainment service and prior entertainment contents and technologies. Based on previous studies, this study derived potential compatibility factors influencing the adoption of mobile entertainment service: (1) compatibility with past control experience, (2) compatibility with user's curiosity and intrinsic interest, (3) compatibility with social norms, (4) compatibility with perceived critical mass, (5) compatibility with preferred lifestyle and (6) compatibility with economical value.

Measuring compatibility is important in success of mobile entertainment service as the services should work well with the ideas and beliefs of consumers in order to be adopted. In mobile entertainment service business, making customers return to the service repeatedly is important to increase the value of business. Thus, the study of compatibility factors influencing the adoption decision becomes important for the service providers to develop appropriate service strategy for both potential adopters and current adopters.

Most past studies have focused on adoption of task-oriented technology. Adoption of entertainment-oriented technology such as mobile entertainment service has hardly been addressed. As indicated in the study by Hsu et. al, [26], the factors influencing the adoption of entertainment-oriented technology are different from the factors influencing the adoption of task-oriented technology. In their study of on-line games, they found social norms and flow experience as key determinants of on-line game adoption as opposed to perceived usefulness and perceived ease-of-use as key factors of task-oriented technology adoption. This provides a need for undertaking this study.

The paper proceeds with a following sequence. First, potential compatibility factors of mobile entertainment service adoption are derived from previous research. Then, research model is presented followed by research methodology and results. Finally, the discussions and conclusions of the study are presented.

2. THEORETICAL BACKGROUND

Compatibility is defined as the degree to which using an innovation is perceived as consistent with the existing sociocultural values and beliefs, past and present experiences, and needs of potential adopters [42, 50]. The incompatibility of the potential adopters' values with the innovation could hinder the adoption process. The higher the compatibility of an idea is, the lower the uncertainty felt by the potential adopters [12].

The importance of compatibility in predicting technology acceptance have been consistently supported in empirical IS studies. Instead of treating compatibility as uni-dimensional construct, Tornatzky and Klein [55] separated compatibility into

two dimensions: value compatibility and practical compatibility. While value compatibility refers to the fitness of the innovation with the values and norms of the potential adopters, practical compatibility refers to the fitness of the innovation with what people do. Recently Karahanna et al. [28] further disaggregate compatibility into four distinct constructs: compatibility with preferred work style, compatibility with existing work practices, compatibility with prior experiences and compatibility with values. While compatibility with preferred work style is defined as individual's self-concept about the way they like to work, compatibility with existing work practices is defined as the reality that individual is currently experiencing [28]. While compatibility with prior experience refers to individual's past encounters with technology, compatibility with values refers to technology fits with individual's value system. While the former two compatibilities — compatibility with preferred work styles and compatibility with existing work practices — are only appropriate for a problem-solving technology, the latter two compatibilities — compatibility with prior experiences and compatibility with values — are applicable to mobile entertainment service (MES) adoption. The latter two compatibilities are further refined in the following section.

3. RESEARCH MODEL

Compatibility with prior experiences

Prior experiences related to MES adoption could be the enjoyment and fun gained through watching television or using computer based entertainment technology. In the literature, total enjoyment and fun states are labeled as flow state. In the flow state, people become so absorbed in their activity that their awareness is narrowed to the activity itself and they lose self-consciousness [9]. In a domain of on-line games, Hsu and Lu [26] viewed flow as an extremely enjoyable experience, where an individual engages in an on-line game activity with total involvement. As the past flow experience is compatible with the mobile entertainment service, the intention to adopt the service would increase.

Hoffman and Novak [24] assert that flow requires high levels of control over hardware and software that users interact with. Since control indicates a balance between skills and challenges of the interaction, past experiences of being skillful in using hardware and software could influence the intention to adopt MES. In other words, past experiences of being skillful in using electronic devices such as computer, PDA, and mobile phone etc. while using innovative services such as e-learning, mobile commerce, and internet shopping, could influence the intention to adopt MES. Thus, the following hypothesis is derived:

H1: Intention to adopt MES is positively influenced by previous control experiences of using electronic devices and innovative services.

In addition to control, curiosity and intrinsic interest are considered to be associated with flow experience [24]. While intrinsic motivation leads to the performance of an activity that has little or no apparent reward beyond the activity itself, extrinsic motivation leads to the performance of an activity that has external rewards [12, 52]. To have flow experience, individuals must have their intrinsic motivation in using electronic devices and software. Past experiences of having curiosity and intrinsic interest in using electronic devices and software could influence the intention to adopt MES. Thus, the following hypothesis is derived:

H2: Intention to adopt MES is positively influenced by curiosity and intrinsic interest in using electronic devices and innovative services.

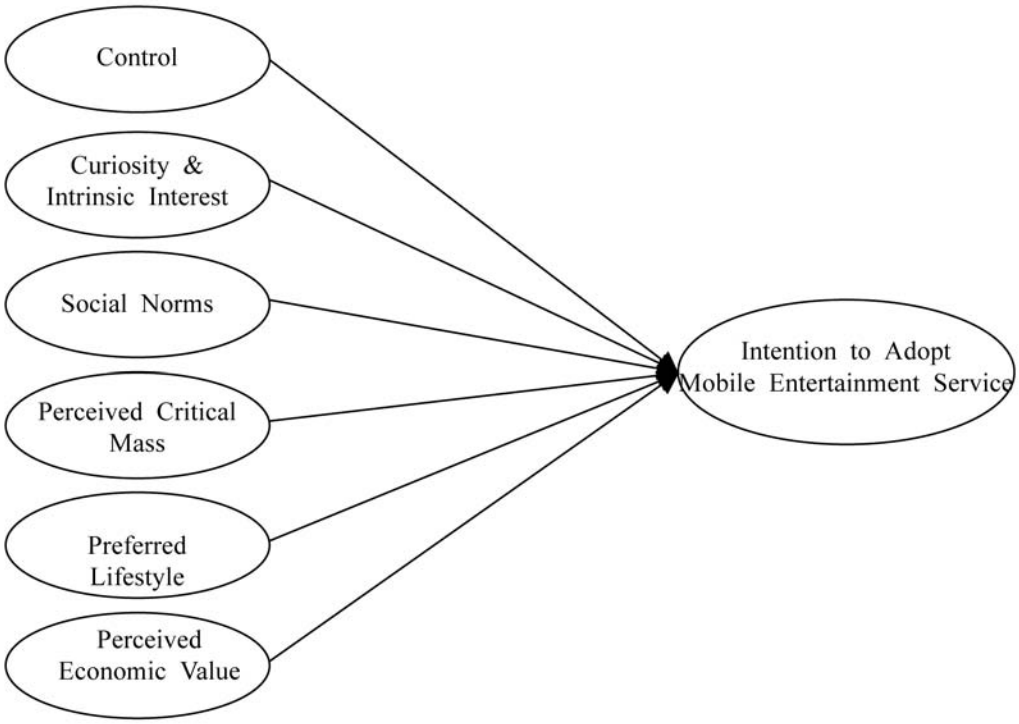

FIGURE 1. Research Model

Value Compatibility

Value compatibility was defined as fitness of the innovation with norms and values of the potential adopters [49]. From social psychology perspective, an individual inherits a set of norms by being part of the society or groups [18]. Based on the situation and society that an individual is a part of, the individual abide by some norms. For other norms one has to consider an adoption strategy to decide whether to comply [23]. Taken from Wikipedia (en.wikipedia.org), social norms is defined as "the rules that a group uses for appropriate and inappropriate values, beliefs, attitudes and behaviors." These rules may be explicit or implicit. While failure to comply to the rules can result in severe punishments such as isolation from the group, compliance to the rules results in rewards such as acceptance and popularity within a particular group [23].

Innovation diffusion research suggests that user adoption decisions are influenced by social norms beyond an individual's decision style and the characteristics of the IT. When the innovation adoption is perceived to comply to the rules, the intention to take this particular action will increase in accordance. Hsu and Lu [26] examined that social norms have a direct impact on the adoption of on-line games as users feel obligated to participate because they want to belong to a community. Lee [37] also suggested that Korean's adoption of ICT (Information Communication Technology) has a social normative implication. Taylor and Todd [53], and Venkatesh [57] also found a significant effect of social norms on behavior intention. Benefits of adopting an innovation is to enhance one's image or status in one's social system [48]. Association between social norms and intention to adopt MES is summarized in the following hypothesis:

H3: Intention to adopt MES is positively influenced by social norm.

Another type of social influence that is considered to have a direct effect on behavior intention is critical mass. Critical mass (en.wikipedia.org) is defined as the number of people needed to trigger a phenomenon. In the past research, perceived critical mass is shown to be positively related to behavior intention to adopt communication technology and groupware [39, 40]. The value of technology to a user is considered to be increased when the number of its adopters increases [26]. This can be confirmed from the fact that, email system gained its popularity as the number of users increased extensively. Critical mass is associated with the visibility of MES, meaning that if the service is being observed frequently in a peer group, individuals would be more likely to perceive the innovation. Thus, we hypothesize the following:

H4: Intention to adopt MES is positively influenced by perceived critical mass.

In consumer behavior research, lifestyle variable is considered to be significantly related to customer decisions [43, 59]. Defined as activity, attention, and opinion about one's life, lifestyle variable is addressed to have significant impact on behavior. Since a mobile phone is commonly treated as more personal item than wired devices such as personal computer, lifestyle is hypothesized to be as a useful predictor of consumers' intention to adopt MES. That is, if the service is compatible with users' lifestyle, the intention to adopt the service would increase eventually. Therefore, the following hypothesis is set forth.

H5: Intention to adopt MES is positively influenced by preferred lifestyle.

Over the last few years, the number of mobile phones in the world has increased at an exponential rate with many developed countries reaching 90% ownership rates. The low prices and the availability of new technology result in the reality that even children now own and regularly use mobile phones [21]. Gurbaxani and Mendelson studied that price is the driving force behind the rapid growth of computer spending in the last few decades [22]. Kar studied the impact of price elasticity (adopters' sensitivity to price changes) on the adoption of mainframe computers in the United States [29]. Although, the importance of price in innovation diffusion is recognized by many IS researchers, little has been done to assess its impacts on the adoption decision empirically. Particularly, the studies of mobile phones mainly focused on the price of physical product, not on the level of service charges. In this study, value of service is considered to be perceived differently due to individuals' economic situation and past experiences. For example, if someone consumed a similar service with comparable price in the past, then the person is likely to have intention to adopt the new service. Accordingly, we hypothesized;

H6: Intention to adopt MES is positively influenced by perceived economic value.

Intention to adopt mobile entertainment service

Fishbein and Ajzen showed in their research that behavior is best predicted by an individual's attitude toward the behavior rather than the attitude towards objects involved in the behavior [17]. Therefore, in this study, we will focus on the attitude toward the behavioral intention to adopt the mobile entertainment service, rather than the attitude towards the mobile entertainment service (MES) itself. There is considerable evidence that intention to perform a behavior predicts the actual behavior [17]. As examined through TRA (Theory of Reasoned Action), we also assumed that the intention to adopt the innovative service is directly connected to the actual use of system.

3. RESEARCH METHODOLOGY

The study was carried out in South Korea as the country is well-known for the development of mobile internet service. The questionnaire items are described in the appendix. All items were measured by using a five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree"(5). 317 questionnaires were distributed to a convenience sample consisting of college students and working adults in the country. Among 317, 170 questionnaires were given to college students of two nearby schools including both undergraduate students and graduate students. 135 questionnaires were returned, out of which 131 were considered usable for analysis. 147 questionnaires were given to working adults who work in a variety of industries and hold da variety positions in their companies. 138 were considered usable for analysis. Total of 269 questionnaires were used for this study. Table 1 summarizes the profile of the respondents.

4. RESULTS

Consistent with the two-step approach advocated by Anderson and Gerbing [1], we estimated a measurement model prior to

TABLE 1. Demographic Profile

	Frequency	Percent (%)
Gender		
Male	140	52.1
Female	129	47.9
Age		
19-24	84	31.2
25-30	93	34.5
31-40	57	21.1
41-50	25	9.2
Over 51	10	3.7
Experience in MES use		
No experience	91	33.8
Under 3 months	42	15.6
3 months–1/2 year	37	13.7
1/2 year–1year	36	13.3
Over 1 year	63	23.4
Expenditure for cell phone use per month		
Under 20,000 Won	11	4.0
₩20,000 ~ ₩40,000	64	23.8
₩40,000 ~ ₩60,000	107	39.7
₩60,000 ~ ₩80,000	60	22.3
₩80,000 ~ ₩100,000	16	5.9
Over 100,000 Won	11	4.0

USD $1 = ₩975.70; EUR 1 = ₩1546.29 in April 2008

TABLE 2.
Reliability and Confirmatory Factor Analysis Result

Construct	Factor loading	Cronbach's α
Control		0.83
PE_2 PE_3 PE_4 PE_5 PE_6	0.719 0.768 0.836 0.804 0.738	
Curiosity & Intrinsic Interest		0.69
PE_8 PE_9 PE_10	0.680 0.809 0.859	
Social Norms		0.75
SI_1 SI_2	0.895 0.895	
Perceived Critical Mass		0.78
SI_6 SI_7	0.906 0.906	
Preferred Lifestyle		0.73
IV_1 IV_2 IV_3	0.814 0.889 0.724	
Perceived Economic Value		0.63
IV_4 IV_5	0.854 0.854	
Intention to Adopt		0.74
AI_1 AI_2 AI_3	0.822 0.886 0.722	

examining the structural model relationships. We used AMOS 5.0 with covariances as the input to estimate the model. Cronbach's alpha provides evidence of internal consistency. As Table 2 shows, the estimate ranged from .63 to .83, showing internal consistency. To investigate the convergent validity of the scales, we performed a confirmatory factor analysis using Maximum Likelihood (ML) estimation in AMOS 5.0. We have found that all factor loadings from latent constructs to their corresponding measurement items are statistically significant, as shown in Table 2.

Structural equation model in Figure 2 shows that the first hypothesis on past control experience is not supportive (β = 0.01). This indicates that levels of skillfulness in the past in using electronic devices or services are not related to MES adoption. The second hypothesis on curiosity and intrinsic interest is appeared to be supportive ($\beta = 0.19$ $p < 0.05$). While the third hypothesis on social norms is appeared to be supportive ($\beta = 0.33$ $p < 0.01$), the fourth hypothesis on perceived critical mass ($\beta = 0.11$) is shown to be not supportive. Since 66% of the respondents of this study have already used MES before, perceived critical mass might no longer significantly influence on the behavioral intention. Both fifth hypothesis on preferred lifestyle ($\beta = 0.34$ $p < 0.01$) and sixth hypothesis on economic value ($\beta = 0.31$ $p < 0.01$) are appeared to be supportive.

The goodness-of-fit index (GFI), the normed-fit index (NFI), and the comparative fit index (CFI) values in Figure 2, were .910, .885, and .946, respectively, which means that the model fits the data well [30]. The root mean square error of approximation (RMSEA) was .053. Taken collectively, the indices seem to show a reasonable fit, even though the chi-square index is significant ($\chi^2_{160} = 280.1$, $p < .01$).

5. DISCUSSIONS AND CONCLUSION

The primary objective of this study is to find the compatibility factors that influence the adoption of mobile entertainment service. Six potential factors were identified and four of them — curiosity & intrinsic interest, social norms, preferred lifestyle and economic value, were found to have positive influence on the intention to adopt mobile entertainment service. The results indicate that stimulating consumers' curiosity and intrinsic interest

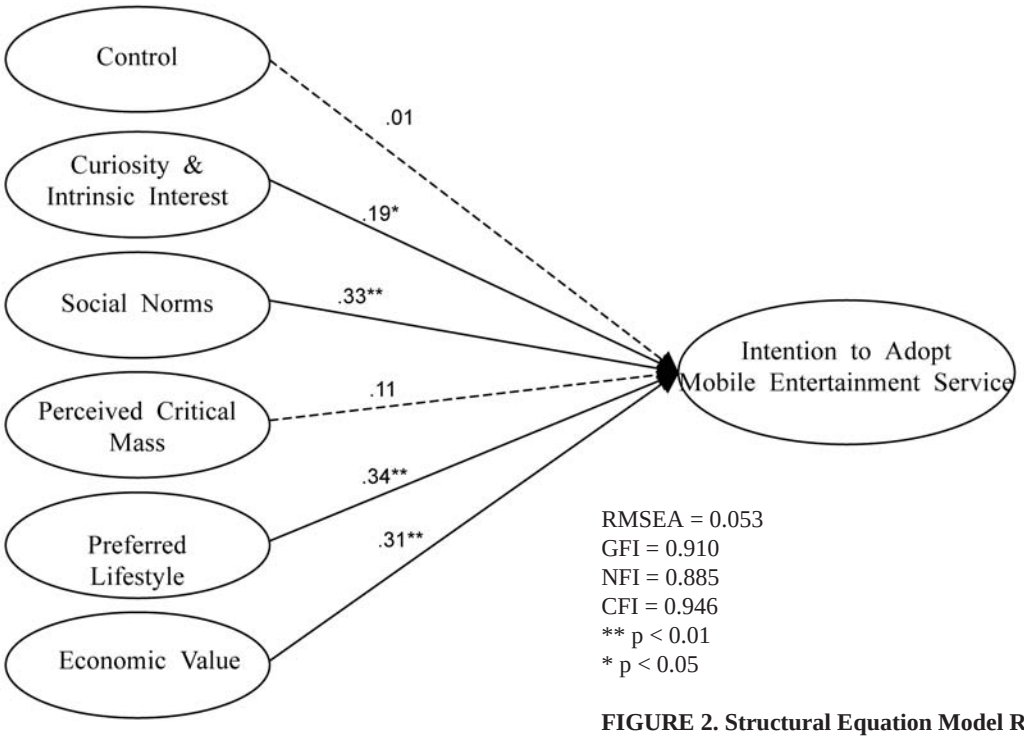

FIGURE 2. Structural Equation Model Result

is more important than concerning usability of MES in relation to user's skillfulness with MES and associated device. Thus, it is important for MES provider to ensure that the most appropriate techniques and features are selected to create an enhanced level of intrinsic motivation among users. One way of fostering user's interests and curiosity is to induce a state of playfulness (Webster and Martocchio, 1992) and pleasure and inherent satisfaction (Vallerand, 1997) from MES. Design features allowing social interactions with peers such as sending mobile contents to friends would be an example.

It also became clear that customers no longer are affected by the visibility (i.e. critical mess) when adopting the mobile entertainment service. Rather than the critical mass, customers weighted more on the social norms. According to Bandura [2], Korean (i.e. sample of this study) social system is group oriented compared to individualistically oriented Western social system. Collectivists's behavior is closely linked to norms (Muk, 2007). It is important for MES providers to understand cultural orientation of users for the success of MES. MES provider should adopt techniques and features that foster group-oriented activities to get opinion leaders to drive the service adoption. Similar results were found in Muk (2007). Muk found that user's cultural orientation embedded in the belief systems influences adoption of SMS advertising (Short Message Service). Taiwanese user's intention to adopt SMS advertising is influenced by social norms whereas American user's decision is based on attitudinal factors.

Both preferred lifestyle and economic value, were found to have positive influence on the intention to adopt MES. This indicates that MES adopted by users is a reflection of his/her life style as long as it matches with socioeconomic conditions. For MES provider, life-style approach would seem to have a broader acceptance for economically appropriate target users. While development of task oriented applications do not concern life style characteristics of users, development of MES content and interface need to understand life style of users.

Although study findings can be used to devise appropriate service strategy for the potential users, this should be done cautiously for some reasons. First, this research investigated MES adoption model in general. However, several distinctive genres are available in MES and adoption models may vary across different genres of MES. Therefore, future studies should classify MES into more specific sub categories and empirically test the model in each of the sub categories. This will make generic MES adoption model to be more specific to certain kinds of MES. At the same time, MES adoption model of this study should not be generalized and used in other mobile applications. This study mainly focused on the mobile entertainment service that the enjoyment, social influences, and the personal values were the main focuses. As other mobile applications have different features, the findings of this study should not be applied to predict the compatibility of other mobile service categories. Hence, future study may investigate the compatibility factors influencing other mobile services.

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APPENDIX:

Questionnaire Items for Measuring Compatibility of Mobile Entertainment Service (MES) Adoption

Items Measures for Control and Curiosity and Intrinsic Interest:

Variable Name	Item
Control	
PE1	It is easy for me to become skillful at using innovative services.
PE2	It is easy for me to become skillful at using electronic devices.
PE3	It is easy for me to remember how to use innovative services.
PE4	It is easy for me to remember how to use electronic devices.
PE5	My capacity or skills can cope with the challenge of using innovative services.
PE6	My capacity or skills can cope with the challenge of using electronic devices.
Curiosity and Intrinsic Interest	
PE7	My intrinsic interest affected me when using innovative services.
PE8	My intrinsic interest affected me when using electronic devices.
PE9	While using innovative services, I found myself being absorbed in the service.
PE10	While using electronic devices, I found myself being absorbed in the devices
PE11	I was curious when using innovative services.
PE12	I was curious when using electronic devices.

Item Measures of Social Norms and Perceived Critical Mass:

Variable Name	Item
Social Norms	
SI1	Using MES improves my image within the organization [48].
SI2	Having MES is a status symbol in my peer group [48].
SI3	Persons who use MES have more prestige than those who do not [48].
SI4	My friends think that I should use MES [26].
Perceived Critical Mass	
SI5	Most people in my class/office use MES frequently [26].
SI6	I have seen what others do by using an MES [42].
SI7	MES is very visible in my peer group [42].

Item Measures of Preferred Lifestyle and Economical Value:

Variable Name	Item
Preferred Lifestyle	
PV1	Using MES is compatible with all aspects of my life [48].
PV2	I think that using MES fits well with the way I like to spend time.
PV3	Using the MES goes with what I believe mobile devices should be used for [48].
Perceived Economical Value	
PV4	The price of MES is compatible with the service provided
PV5	I am less cost-conscious about the innovative services including MES.

Item Measures of Intention to Adopt Mobile Entertainment Service:

Variable Name	Item
AI1	It is worth to adopt mobile entertainment service (MES) [42].
AI2	I will frequently use MES in the future [42].
AI3	I will strongly recommend others to use MES [42].