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경영학 석사학위논문

**A Study on User's Purchase
Intention in Freemium Mobile
Games**

프리미엄 모바일 게임에서의 구매 결정요인에
관한 연구

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Abstract

A Study on User's Purchase Intention in Freemium Mobile Games

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The purpose of this study is to investigate factors that have an effect on the sales of virtual items in freemium mobile games. The study primarily focuses on a role of free given items in a model. Based on the reviews of previous studies, we conduct an online survey within the "TantanSachunsung" game, and we use structural equation modeling in order to test the research model.

Apparently, there are complex and mixed effects on free items. Results of the study indicate that there are several factors (i.e., intention to use free items, social influence, usage habit, prior

usage experience, prior purchase experience) to predict user's intention to purchase virtual items in freemium mobile games. We found that there is a strong relationship between social influence and the intention to purchase virtual items in freemium mobile games through the intention to use free items. Moreover, we found that the statistically significant paths are different by each user group in the model.

Theoretical and managerial implications for the research are discussed with several suggestions for further research.

Keywords : Freemium Mobile Games, Structural Equation Model, PLS, Intention to Purchase Virtual Items, Intention to Use Free Sample, Self-Perception Theory, Social Influence, Self-Presentation Theory

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Table of Contents

1. INTRODUCTION	1
2. THEORETICAL BACKGROUND & HYPOTHESES	4
2.1. Intention to use free items	5
2.2. Social influence	6
2.3. Usage habit	9
2.4. Prior usage experience	11
2.5. Prior purchase experience	12
3. METHOD	14
3.1. Measurement	17
3.2. Data analysis	19
3.2.1. Convergent validity and reliability	19
3.2.2. Discriminant validity	21
4. RESULTS	24
5. DISCUSSION AND CONCLUSIONS	27
REFERENCES	32
Appendix A. Questionnaire Items	41
Appendix B. Screenshots of a freemium mobile game	43
국문초록	44

List of Tables

Table 1. Demographic information about the respondents	16
Table 2. Item convergent validity measurement	20
Table 3. Cross-loadings	22
Table 4. Correlation between constructs	23
Table 5. Summary of support for hypothesized paths	26
Table 6. PLS-MGA	29

List of Figures

Figure 1. The research model	13
Figure 2. The research model with empirical results	24
Figure 3. The comparison of results by the participant groups ·	28

1. INTRODUCTION

Virtual goods are generally understood to refer to objects (e.g., items, currencies, and characters) that are in existence inside various online games (Lehdonvirta, 2009). In recent years, researchers have been observing the intention to purchase virtual items in the virtual world such as Second Life and World of Warcraft (Guo and Barnes, 2011; Animesh et al., 2011; Guo and Barnes, 2012). According to Newzoo's Global Games Market Report, the global game market was \$91.8 billion in 2015. Among them, mobile took a large share of the market with \$30.4 billion.

This paper focuses on the freemium mobile game since there are many papers that conduct research on online games. Freemium is a mixed word using free and premium (Liu et al., 2014), which is commonly used as a business model. Liu et al. (2014) explained that a service or a product is offered free of charge, while a premium is charged for advanced features, functionality, or related products and services. Offering a free app is an effective way to attract consumers because some consumers tend to avoid risk and do not want to pay when they download an app. As a result, a number of mobile game application software (apps) are offered free of charge. Instead, virtual items are sold in apps. Therefore, selling virtual items in mobile game apps is a major source of revenue for online game

companies. In the present paper, we studied why people want to purchase virtual items in freemium mobile games. Because of the novelty of this revenue model, this research may be considered critical.

Since Bawa and Shoemaker (2004) studied the effects of a free sample on incremental brand sales, much research in recent years has focused on the question in many fields (Cheng and Liu, 2012; Liu et al., 2014). In their research, they mentioned three potential effects on sales, which are acceleration effect, cannibalization effect and expansion effect. However, little is known of the relationship of free items and sales of virtual items in online games. This is why we researched to figure out the factors that have an effect on the sales of virtual items in freemium mobile games with free items.

Previous literature on customer purchase intention stressed the role of factors such as quality, equity and value of service, satisfaction of customer, past loyalty, expected switching cost and preference of brand (Hellier et al., 2003). For online shopping behavior, Monsuwé et al. (2004) described that intention to shop online is related to ease of use, fun and several exogenous factors. The several exogenous factors are the traits of consumer, situational factors, and characteristics of product, trust and previous experience for online shopping. In a recent study, Weisberg et al. (2011) suggested that experience of purchasing needs to be considered as a primary factor in the expectation of

intention to purchase with features of the social context (e.g., social presence and trust).

In addition, previous studies on the intention to purchase virtual goods in the virtual world suggested that individuals purchase virtual goods for their functional or experiential value and symbolic or expressive value (Smith and Colgate, 2007; Kim et al., 2012). According to their papers, this phenomenon can be explained with the self-presentation theory.

Therefore, we considered that social influence is a key driver of the intention to purchase virtual items. We developed and tested a model that describes the social context of the intention to purchase virtual items by looking at past purchasing, past usage, and habit of playing with the intention to use free items. Theoretically, this may shed light on the social context of purchasing virtual items and using free items in a freemium mobile game. Hence, we think that this model has both academic and business implications.

This paper is organized as follows. The second section discusses the theoretical background of the current paper and the research hypotheses. The third section addresses the method and the fourth section presents the results of the study. Finally, this paper concludes with a discussion of the results, contributions, study limitations, and avenues for future research.

2. THEORETICAL BACKGROUND & HYPOTHESES

In this section, we present an overview of the self-perception theory to explain the intention to use free items and the self-presentation theory to identify social influence. Then, we discuss information system (IS) usage habit, prior usage experience and prior purchase experience. The self-perception theory and self-presentation theory is our main theoretical foundation and intention to use free items, social influence, usage habit, prior usage experience and prior purchase experience constructs were used to develop our model in this study.

In many studies, researchers defined behavioral intentions as a specific behavioral intention and some studies investigated purchase behavior intention (Shim et al., 2001; Mcknight et al., 2002; Vermeir and Verbeke, 2006; Guo and Barnes, 2011; Chiu et al., 2012; Kim et al., 2012; Hsu et al., 2012; Wang et al., 2013; Pöyry et al., 2013). McKnight et al. (2002) used “behavioral intentions” with three specific behaviors: following the advice of the web vendor; sharing personal information with the vendor; and intention to purchase goods or services from the vendor.

Moreover, Shim et al. (2001) proposed that the intention to use the Internet for searching is a main predictor of intention to

purchase with the channel. In our paper, we studied the intention to purchase virtual items in the freemium mobile game with intention to use free items, social influence, usage habit, prior usage experience and prior purchase experience.

2.1. Intention to use free items

There are many studies that investigated free samples (Schlereth et al., 2013). Bawa and Shoemaker (2004) discussed that free samples have three potential effects on sales: an acceleration effect (i.e., consumers buy earlier than they would have without sampling); a cannibalization effect (i.e., the number of paid purchases decreases since sample recipients would have purchased the product); and an expansion effect (i.e., consumers purchase the product who would not have tried without receiving the sample). The impact of free samples can differ significantly across different categories since the outcome of the freemium strategy depends on the interaction of these effects, which are determined by various factors (Liu et al., 2014). There are many studies in which similar models apply to digital products, such as music downloads (Wang and Zhang, 2009).

Lammers (1991) mentioned self-perception theory to study the effect of free samples on immediate consumer purchase.

According to the paper, a consumer probably goes through a process of developing self-perceptions and attributions about their behavior when they receive a free sample. Also, sampling has shaping effects in learning theory. Sampling is a form of shaping the actual purchase, which will raise the possibility of purchase from an operant conditioning perspective (Lammers, 1991). For these reasons, we studied the intention to use free items in the freemium mobile game.

H1. Intention to use free items has a positive effect on the intention to purchase virtual items in the freemium mobile game.

2.2. Social influence

Self-presentation theory (Goffman, 1978) describes why people present a desired image of themselves to other people. The theory explains motives for self-presentation (Schlenker and Weigold, 1990; Kim et al., 2012). First, people want to affect others and receive rewards through self-presentation. Second, an image is showed to maintain a personal identity and individuals use their image to socialize with similar people. Ma and Agarwal (2007) mentioned that members self-present in virtual communities (VCs) to build relationships with this motive, which

may also be connected to the first motive. Furthermore, Goffman (1978) discussed that effective social interaction does not happen, providing people do not show their identities. Thus, self-presentation could be a significant motive for participation in an online community.

While self-presentation could count on behavior, language, appearance, and possessions (e.g., clothing and accessories) to present a preferred image of themselves to other people offline (Schlenker and Weigold, 1990), people can use textual and symbolic presentation methods (e.g., emoticons and typographical mark) to present an online image (Kim et al., 2012). According to them, virtual items are also used for symbolic presentation online.

Aside from the social context, self-presentation theory also describes that this behavior is a function of an individual's degree of control over the presentation (Kim et al., 2012). Moreover, social influence has been proposed to impact self-presentation. Kelman (2006) suggested three processes of social influence in his research paper. There are compliance, internalization, and identification. For the compliance process, individuals follow informal norms to secure social approval, while the internalization process means that the value system of each individual becomes appropriate to the group's values. The values could lead to the following behavior after an individual assimilates the values of the group (Hitlin, 2003). Finally, in the identification process, an individual receives acceptance of social

influence to keep a positive self-defining relationship with a group. This process describes the group involvement (Dick, 2001) such as VC involvement for self-presentation in virtual communities (Kim et al., 2012). There are many previous studies that applied these three processes of social influence to understand IS adoption (Venkatesh and Davis, 2000; Ahuja and Galvin, 2003) and to research the intention to purchase virtual items (Kim et al., 2012).

Venkatesh et al. (2003) used the term social influence to define their construct as the extent to which a person perceives that important others believe he or she should use a particular system in the unified theory of acceptance and use of technology (UTAUT). Additionally, social influence was also represented as a subjective norm in the theory of reasoned action (TRA) (Shimp and Kavas, 1984), the technology acceptance model 2 (TAM2) (Venkatesh and Davis, 2000), the theory of planned behavior (TPB) (Ajzen, 1991), combined technology acceptance model and theory of planned behavior (C-TAM-TPB) (Mathieson, 1991), the decomposed theory of planned behavior (DTPB) (Taylor and Todd, 1995), image variable in the innovation diffusion theory (IDT) (Moore and Benbasat, 1991), and social factors in model of PC utilization (MPCU) (Thompson et al., 1991).

To explain purchasing behavior, Sheth et al. (1991) proposed a broader theoretical framework of perceived value. In their study, five values were presented such as social value, emotional value,

epidemic value, conditional value, and functional value. Kim et al. (2011) suggested that social self-image expression is a factor of social value and a person can improve one's image with virtual items. They mentioned that people purchase products to improve their social image because the purchase and use of virtual items can communicate one's symbolic meaning to others. Furthermore, Guo and Barnes (2009, 2012) used the term social influence to explain purchase behavior. For these reasons, we modified the social influence constructs to explain individual's perceptions for virtual items, which are influenced by other users in the freemium mobile casual game. We expect that social influence is a strong predictor of players' intention to purchase virtual items and the intention to use free items in the freemium mobile game.

H2. Social influence has a positive effect on the intention to use free items in the freemium mobile game.

H3. Social influence has a positive effect on the intention to purchase virtual items in the freemium mobile game.

2.3. Usage habit

In many studies, habit has been considered to understand the

usage behavior of technology (Bergeron et al., 1995; Limayem and Hirt, 2003; Kim and Malhotra, 2005; Limayem et al., 2007; Venkatesh et al., 2012). In their research, they have operationalized “habit” differently. Bergeron et al. (1995) presented that habit is prior experience of executive information systems (EIS) use and habit is measured with terms of frequency of behavior. In addition, Kim and Malhotra (2005) also said that habit is a prior behavior of IS use. However, Limayem et al. (2007) mentioned habit as the extent to which a person believe that his or her behavior is automatic.

For these reasons, Venkatesh et al. (2012) used habit as a self-reported perception in the unified theory of acceptance and use of technology 2 (UTAUT 2), and they adopted the conceptual definitions of experience from Kim and Malhotra (2005). Thus, experience is the passage of chronological time and could result in the development of differing levels of habit depending on the extent of interaction and familiarity for a target technology. That is why in technology use, the empirical findings about the role of habit have described different basic processes by which habit affects technology use (Venkatesh et al., 2012).

For intention to purchase, Escobar-Rodríguez and Carvajal-Trujillo (2014) proposed that the usage habit has influences on the online purchase intention. Guo and Barnes (2009) also mentioned that people purchase virtual items due to their habit. Therefore, we studied the impact of usage habit on

the intention to use free items in the freemium mobile game and intention to purchase virtual items for this work.

H4. Usage habit has a positive effect on the intention to use free items in the freemium mobile game.

H5. Usage habit has a positive effect on the intention to purchase virtual items in the freemium mobile game.

2.4. Prior usage experience

Repeated occurrence is not “habit itself” while repetition is a prerequisite for the formation of habit (Mittal, 1988; Limayem et al., 2007). Therefore, prior usage experience is not the same as usage habit in this paper.

According to Venkatesh et al. (2012), experience is a necessary condition but not a sufficient requirement for the development of habit. Even habit and prior experience are used as the same constructs in some studies. As mentioned above, since there are distinctions between prior experience and habit, we researched the impact of prior usage experience as one of the key factors for the intention to purchase virtual items.

In many studies, past experience is used to understand specific

behavior intention or actual behavior (Bergeron et al., 1995; Kim et al., 2005). For this study, we examined the impact of prior usage experience on the intention to purchase virtual items in the freemium mobile game.

H6. Prior usage experience has a positive effect on the intention to purchase virtual items in the freemium mobile game.

2.5. Prior purchase experience

Ajzen and Fishbein (2005) suggested that feedback from previous experiences will have an effect on various beliefs and future behavior. Also, Ouellette and Wood (1998) examined the relationship between past behavior and future behavior with frequent performance in the past. Especially, previous purchase experience has been researched (Yoh, 2003; Elliot and Fowell, 2000; Park and Stoel, 2005).

Therefore, we considered prior purchase experience as a factor of the users' intention to purchase virtual items and the intention to use free items in the freemium mobile game.

H7. Prior purchase experience has a positive effect on the intention to use free items in the freemium mobile game.

H8. Prior purchase experience has a positive effect on the intention to purchase virtual items in the freemium mobile game.

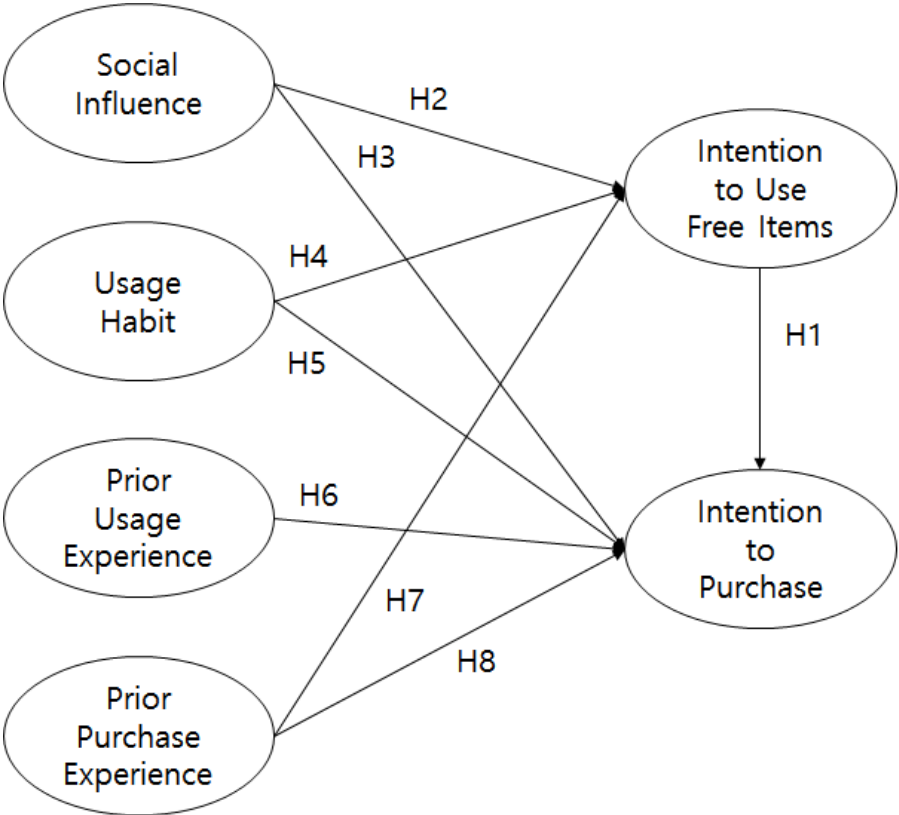


Figure 1. The research model

3. METHOD

In this study, our target population was the current users of the freemium mobile game. The research model was tested with data from the users of the TantanSachunsung mobile game. According to a report by Newzoo, South Korea has the fifth largest games market globally and mobile takes the largest share of the market, followed by PC/MMO. Among many South Korean mobile games, this mobile casual game app was chosen because it uses freemium strategy and is available for download from Google Play Store and App Store (iTunes). To play this mobile game, the user has to find tiles with the same pictures and have them disappear by touching them with rules. Freemium strategy was published in May 2015 and has about 1,600,000 users. According to App Annie, freemium strategy ranked second in downloads from Google Play and iTunes on May 25, 2015 in South Korea. TantanSachunsung has a two game mode, which are the stage mode and the match mode. Users play alone in the stage mode while users can play with others in the match mode.

To obtain data for our research, an online survey was carried out in Korean. A total of 4,785 completed responses were received within 3 days and 229 invalid responses were deleted. Therefore, a total of 4,556 qualified responses were obtained for quantitative analysis. We calculated the required sample size

based on the power analysis technique using G*Power 3.1, a general power analysis program for statistical tests (Faul et al., 2007). For our model with a medium effect size ($1-\beta=0.8$, $\alpha=0.05$, $f^2=0.15$) and 5 predictors, the required sample size should be 92. As a result, the responses were enough for use of the SEM-PLS technique. Table 1 shows the demographic information about the respondents.

Table 1. Demographic information about the respondents (N=4,556)

Measure	Items	Frequency	Percent
Gender	Male	639	14
	Female	3917	86
Marital Status	Single	2518	55.3
	Married	2038	44.7
Age	<19	91	2
	19-24	902	19.8
	25-29	846	18.6
	30-35	1279	28.1
	35<	1438	31.6
Education	High School ↓	710	15.6
	University ↓	2920	64.1
	Graduate School ↓	926	20.3
Income (per month)	< ₩ 1,000,000	1557	34.2
	₩ 1,000,000 ~ ₩ 1,999,999	1242	27.3
	₩ 2,000,000 ~ ₩ 2,999,999	1012	22.2
	₩ 3,000,000 ~ ₩ 3,999,999	394	8.6
	₩ 4,000,000 ~ ₩ 4,999,999	166	3.6
	₩ 5,000,000 ~ ₩ 9,999,999	136	3
	₩ 9,999,999 <	49	1.1
Mobile OS	Android	3005	66.0
	iOS	1503	33.0
	Other	48	1.1

3.1. Measurement

We used multi-item scale measurement in our research. Wherever possible, we adopted items used and validated in literature. However, we were unable to replicate some of the items because they were initially designed within the context of general IS adoption or Web-based platforms. Instead, we developed two original scale items using the work of prior research to guide us and we modified 19 items from previous scales to relate specifically to our study. As presented in Appendix A, the final version of the questionnaire included 33 questions (9 General and 24 scale items). Intention to use free items, social influence, usage habit and intention to purchase were measured using a 7-point Likert-type scale with a score of '1' meaning 'strongly disagree' and a score of '7' meaning 'strongly agree'. Moreover, we used self-reported usage experience and self-reported purchase experience, amount of previously purchased items, and money spent as a proxy for prior purchase experience. Before we conducted the formal online survey, a pretest of the questionnaire was carried out among 36 users who had experience in various mobile casual games. Our intent was to further improve content validity by assessing the difference between the understanding of participants of the pretest on measurement items and the definitions of the variables

that they are intended to measure.

Our intention to use the free items construct was operationalized with four items. FI3 was based on Chandon et al. (2000). FI1, FI2 and FI4 were specifically developed for our research and also based on the intention to use free items in previous research. The social influence construct was operationalized with four items. SI1 and SI4 were a slight modification of one of the items from Kim et al. (2011). No existing items were appropriate for measuring the construct for our study and thus, SI2 and SI3 were specifically developed for our research and also based on the concept of social influence. Usage habit was operationalized with four items including frequency of playing (UH1), obvious choice (UH2), natural choice (UH3), and automatic behavior (UH4). Except for UH1, all items were adapted from Limayem et al. (2003). UH1 was based on Chiu et al. (2012). Prior usage experience consisted of three measurement items: frequency of visiting the app (PU1), frequency of playing the stage mode (PU2) and frequency of playing the match mode (PU3). For Prior purchase experience, respondents were asked to choose their answer among options: experience of purchasing virtual game money (PP1), experience of purchasing virtual items for the game (PP2), experience of purchasing other virtual items such as a pet or customs (PP3), and the amount spent (PP4). All items were adapted from Park and Stoel (2005), except for PP4, which was newly developed for this study. The items used to measure the

intention to purchase were based on Animesh et al. (2011) and Guo and Barnes (2012).

3.2. Data analysis

We used SEM-PLS modeling in SmartPLS 3.0 to evaluate the proposed model and hypothesized relationships among constructs. Moreover, latent constructs can be modeled as formative or reflective indicators in SmartPLS. Particularly, because of specific advantages, such as minimal restrictions on measurement scales, sample distribution, and sample size, PLS has become popular in modern research. PLS is an outstanding causal-predictive analysis where hypothesized relationships are complicated and few bases have been established.

3.2.1. Convergent validity and reliability

The adequacy of the measurement model was examined based on the criteria of reliability and validity. Reliability was tested based on the composite reliability (CR) values. As illustrated in Table 2, all of the values of CR are above 0.804, satisfying the generally acceptable level. The convergent validity of the scales

was evaluated by two criteria (Fornell and Larcker, 1981; Chiu et al., 2012): (1) all indicator loadings need to be significant and higher than 0.7 and (2) the average variance extracted (AVE) by each construct need to be higher than the variance because of the measurement error for that construct. In other words, AVEs need to be higher than 0.50. Table 3 shows that all of the items indicate a loading higher than 0.7 on their respective constructs, and Table 2 demonstrates that all of the AVEs range from 0.507 to 0.861. This means that both criteria for convergent validity were satisfactory and the measurement items we used converged on the same latent construct.

Table 2. Item convergent validity measurement

Constructs	Items	AVE	Composite Reliability
Intention to Use Free Items (FI)	4	0.507	0.804
Social Influence (SI)	4	0.647	0.880
Usage Habit (UH)	4	0.861	0.961
Prior Usage Experience (PU)	3	0.602	0.820
Prior Purchase Experience (PP)	4	0.647	0.878
Intention to Purchase (IP)	5	0.812	0.956

3.2.2. Discriminant validity

To examine discriminant validity, we conducted the following two tests. First, for our model, the cross-factor loadings (see Table 3) indicate good discriminant validity because the loading of each measurement item on its assigned latent variable is higher than their cross-loadings on any other construct (Chin, 2003; Chiu et al., 2012). Second, as illustrated in Table 4, the square root of the AVE from the construct is much higher than the correlation shared between the construct and other constructs in our model (Fornell and Larcker, 1981; Chiu et al., 2012). So, there was strong empirical evidence for supporting the reliability and validity of the constructs in our research model.

Table 3. Cross-loadings

	FI	SI	UH	PU	PP	IP
F1	0.674	0.189	0.168	0.036	-0.117	0.016
F2	0.677	0.233	0.176	0.077	-0.099	0.066
F3	0.726	0.363	0.216	0.144	0.058	0.233
F4	0.767	0.266	0.163	0.099	-0.004	0.127
SI1	0.324	0.774	0.170	0.148	0.022	0.258
SI2	0.292	0.784	0.153	0.081	0.006	0.244
SI3	0.283	0.820	0.132	0.088	-0.017	0.229
SI4	0.344	0.838	0.197	0.144	0.022	0.307
UH1	0.221	0.176	0.923	0.464	0.109	0.180
UH2	0.241	0.177	0.944	0.425	0.089	0.173
UH3	0.244	0.210	0.921	0.412	0.082	0.176
UH4	0.254	0.199	0.925	0.407	0.089	0.186
PU1	0.074	0.086	0.465	0.763	0.079	0.123
PU2	0.152	0.108	0.395	0.770	0.101	0.099
PU3	0.104	0.141	0.238	0.795	0.075	0.142
PP1	0.006	-0.003	0.084	0.076	0.866	0.382
PP2	-0.045	0.028	0.092	0.105	0.804	0.370
PP3	-0.016	0.004	0.087	0.100	0.900	0.411
PP4	-0.073	0.010	0.048	0.057	0.618	0.245
IP1	0.204	0.288	0.179	0.137	0.364	0.843
IP2	0.199	0.362	0.152	0.153	0.275	0.852
IP3	0.148	0.260	0.185	0.154	0.491	0.936
IP4	0.143	0.283	0.173	0.139	0.449	0.943
IP5	0.136	0.291	0.178	0.137	0.403	0.926

Table 4. Correlation between constructs

	FI	SI	UH	PU	PP	IP
FI	0.712					
SI	0.389	0.804				
UH	0.259	0.206	0.928			
PU	0.137	0.146	0.459	0.776		
PP	-0.034	0.012	0.099	0.107	0.804	
IP	0.182	0.326	0.193	0.159	0.445	0.901

Note: Diagonal elements (in **bold**) are the square root of the average variance extracted (AVE).

4. RESULTS

We tested the hypotheses using the bootstrapping method after establishing the validity of the survey instrument. Path coefficients and R² values were obtained by running the PLS algorithm to assess the predictive performance of the structural model. The construct for the intention to use free items had an

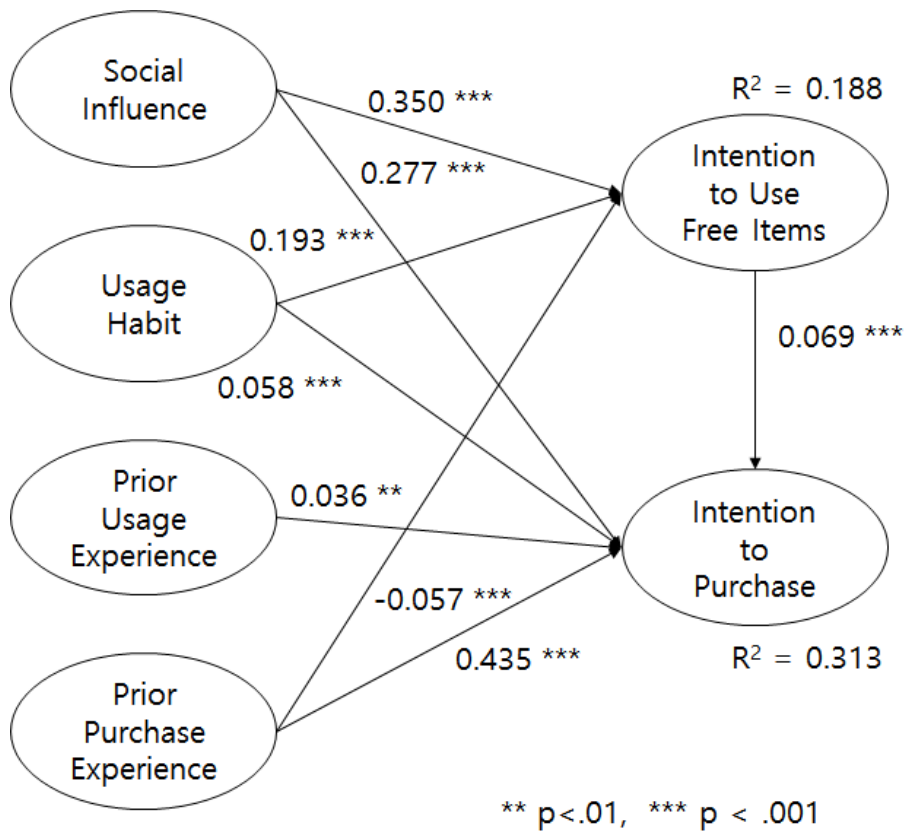


Figure 2. The research model with empirical results

R2 value of 0.188, indicating that the model accounted for 18.8% of the variance in the intention to use free items. The construct for purchase intention had an R2 value of 0.313, indicating that the model accounted for 31.3% of the variance in general purchase intention of TantanSachunsung players. Thus, nearly half of the intention to purchase virtual items in the mobile casual game was explained by the respondents' intention to use free items, social influence, usage habit, prior usage experience and prior purchase experience.

Overall, as shown in Figure 2, there is strong support for most of the relationships in the research model. As expected, intention to use free items was also significantly related to intention to purchase (H1) ($p < .001$). The result indicates that social influence has a significant effect on intention to use free items (H2) ($p < .001$). Also, a strong positive relationship was observed between social influence and intention to purchase (H3) ($p < .001$). The influence of usage habit on intention to use free items was significant (H4) ($p < .001$) and the influence of usage habit on intention to purchase was also significant (H5) ($p < .001$). Therefore, there is a positive relationship between usage habit and intention to use free items and between usage habit and intention to purchase. In addition, our research findings showed that prior usage experience is a determinant of intention to purchase (H6) ($p < .01$). Moreover, the influence of prior purchase experience on intention to purchase was particularly strong (H8),

since the path coefficient was the largest of all relationships in our research model ($p < .001$).

However, our findings showed that the path between prior purchase experience and intention to use free items (H7) was not supported and the path coefficient was negative ($p < .001$).

Table 5. Summary of support for hypothesized paths

No.	Hypothesis	Supported
1	Intention to use free items has a positive effect on the intention to purchase virtual items in the freemium mobile game.	✓
2	Social influence has a positive effect on the intention to use free items in the freemium mobile game.	✓
3	Social influence has a positive effect on the intention to purchase virtual items in the freemium mobile game.	✓
4	Usage habit has a positive effect on the intention to use free items in the freemium mobile game.	✓
5	Usage habit has a positive effect on the intention to purchase virtual items in the freemium mobile game.	✓
6	Prior usage experience has a positive effect on the intention to purchase virtual items in the freemium mobile game.	X
7	Prior purchase experience has a positive effect on the intention to use free items in the freemium mobile game.	✓
8	Prior purchase experience has a positive effect on the intention to purchase virtual items in the freemium mobile game.	✓

5. DISCUSSION AND CONCLUSIONS

The purpose of this study is to examine thoroughly the complex relationships between intention to use free items, social influence, usage habit, prior usage experience, prior purchase experience and intention to purchase in the context of a freemium mobile game. In this study, we observed several significant findings. First, our major finding was that social influence was a key predictor of the intention to purchase virtual items in the freemium mobile game. Kim et al. (2012) explained that people are affected by social influence with self-presentation theory. For the same reason, the finding further reveals that social influence significantly influences the intention to use free items in a freemium mobile game. In our study, usage habit of the freemium mobile game significantly affects the intention to use free items in the freemium mobile game and usage habit of a freemium mobile game significantly affects the intention to purchase virtual items in the freemium mobile game. For prior usage experience, significant positive impact on the intention to purchase was found. Prior purchase experience affects the intention to purchase virtual items in the freemium mobile game while significant negative impact was found in the relationship between prior purchase experience and the intention to use free items in the freemium mobile game. Additionally, our findings

indicate that there was a statistically significant relationship in the intention to use free items and the intention to purchase virtual items in the freemium mobile game.

In order to figure out a comparison of results by the participant groups, we divided the samples into two groups. To divide, we changed user's stage number of the stage mode and level of the match mode into a Z-score. Then, we created a high level group and low level group with the sum of z-points. We then ran the multi group analysis described in Figure 3. Interestingly, the low level group was more affected than the high group by the free items. Especially, there is a statistically higher relationship between social influence and intention to use free items in the low level group than the relationship in the high level group (see Table 6). For the high level group, the impact of prior usage

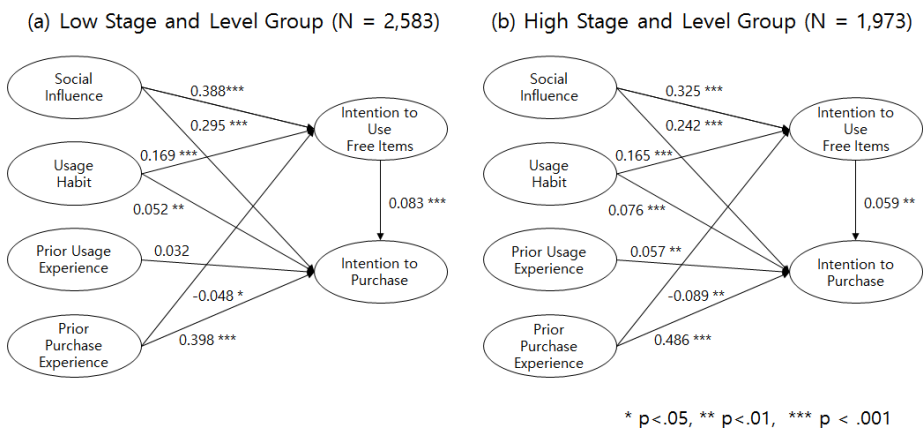


Figure 3. The comparison of results by the participant groups

experience on intention to purchase was significant while the impact was not significant for the low level group.

Table 6. PLS-MGA (Low Level Group - High Level Group)

	Path Coefficients-diff	p-Value
Intention to Use Free Items → Intention to Purchase	0.024	0.180
Social Influence → Intention to Purchase	0.053	0.031
Social Influence → Intention to Use Free Items	0.063	0.008
Usage Habit → Intention to Purchase	0.023	0.826
Usage Habit → Intention to Use Free Items	0.004	0.444
Prior Usage Experience → Intention to Purchase	0.025	0.820
Prior Purchase Experience → Intention to Purchase	0.088	0.999
Prior Purchase Experience → Intention to Use Free Items	0.041	0.107

Based on the findings of our study, we would like to share several findings that are worthy of consideration for theory development. First, social influence and prior purchase experience

are key drivers of the intention to purchase virtual items in a freemium mobile game. Second, when there is the intention to use free items, users are more likely to purchase virtual items by social influence and habit of usage. Third, many studies considered usage of information technology (IT) and much effort was devoted in trying to explain behavior intention from other factors. However, as the mobile game market becomes more popular and many people use a freemium mobile game without much reasoning process, habit may play a role in the intention to purchase virtual items in a freemium mobile game. Forth, for practical implications, our results suggest that paid users should be considered more carefully than free users in a freemium mobile game since there is a strong relationship between prior purchase experience and intention to purchase. Additionally, our findings indicate that a company should give the chance to use free items for the low level group more because free items is more effective for the low level group than the high level group. Moreover, due to social influence, we suggest applying self-presentation theory to a freemium mobile game.

Even though we tried our best to design and implement this research, there are two study limitations. First, since we conducted our survey only for 3 days, there might be non-response bias. Second, in this study, we could measure users' intention to purchase virtual items in a freemium mobile game but we could not investigate actual purchase. For future

research, the relationship between intention to purchase and actual purchase behavior should be considered.

In conclusion, this study has contributed particularly to a better understanding of purchase behavior in a freemium mobile game, as well as raising many interesting questions for future research. Since the sale of virtual items with a freemium mobile game is a relatively new source of revenue, there is a lack of understanding of what motivates people to purchase virtual items. This study examined the intention to purchase virtual items in a freemium mobile game. We hope that this study might encourage empirical research and additional theorizing aimed at a better comprehension of purchase behavior in a freemium mobile game.

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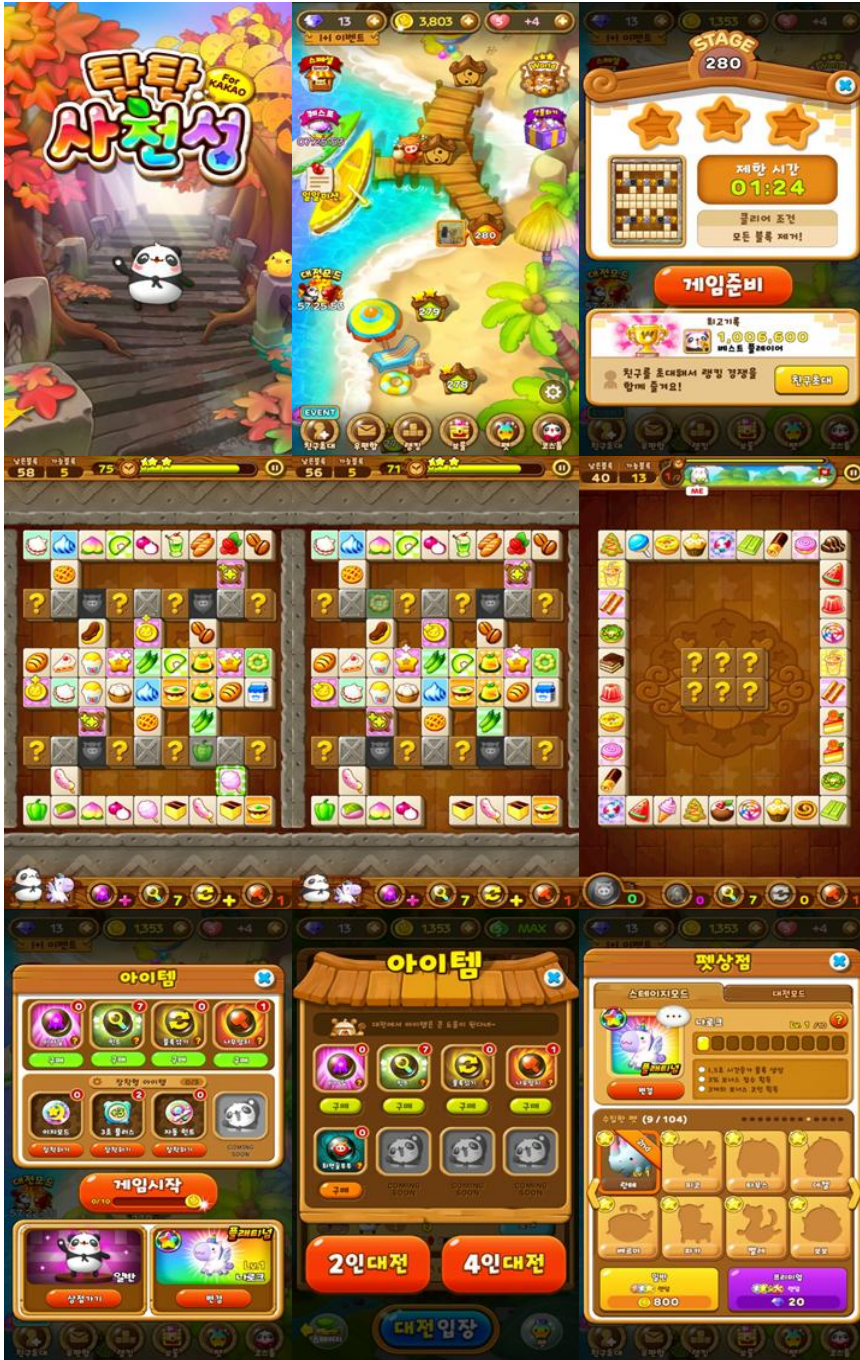
Appendix A. Questionnaire Items

Construct	Item	Questions
Intention to Use Free Items	FI1	I have received free items (gems) from TantanSachunsung.
	FI2	I have received free items (gems) from TantanSachunsung frequently.
	FI3	These free gems remind me that I need the items in TantanSachunsung.
	FI4	I have purchased items with these free gems in TantanSachunsung.
Social Influence	SI1	I think that my pet or customs help me differentiate myself from other users.
	SI2	My friends in TantanSachunsung use items for the game.
	SI3	My friends in TantanSachunsung use pet or customs.
	SI4	Using the virtual items sold here makes a good impression on other users.
Usage Habit	UH1	I often play TantanSachunsung.
	UH2	I don't even think twice before playing TantanSachunsung.
	UH3	Playing TantanSachunsung has become natural to me.
	UH4	Playing TantanSachunsung has become a habit for me.
Prior Usage Experience	PU1	In the last month, how many times did you visit TantanSachunsung?
	PU2	How many times did you play the stage or quest mode per day on average?
	PU3	How many times did you play the match mode per day on average?

Prior Purchase Experience	PP1	Have you ever purchased items (gems) in TantanSachunsung?
	PP2	Have you ever purchased items for the game in TantanSachunsung?
	PP3	Have you ever purchased other items such as pet and customs in TantanSachunsung?
	PP4	How much money did you spend on buying virtual items from TantanSachunsung during the last month?

Intention to Purchase	IP1	I am likely to consider the purchase of virtual items for the game (e.g., missile, hint, mixing block, hammer, easy mode, 3s plus and other items) in TantanSachunsung.
	IP2	I am likely to consider the purchase of pet or customs in TantanSachunsung.
	IP3	I am likely to consider the purchase of virtual items (gems) in TantanSachunsung.
	IP4	If I could, I would like to purchase virtual items (gems) in TantanSachunsung.
	IP5	I would like to purchase virtual items (gems) in TantanSachunsung frequently.

Appendix B. Screenshots of a freemium mobile game



프리미엄 모바일 게임에서의 구매 결정요인에 관한 연구

프리미엄 (Freemium)이란 일정한 기능을 무료로 제공하고 추가적인 고급 기능은 유료로 제공하는 것을 말한다. 본 연구는 점차적으로 커지고 있는 게임 시장에서 주목 받고 있는 프리미엄 모바일 게임 (Freemium mobile game)을 통하여 이용자의 가상 아이템의 구매 결정 요인을 알아보았는데, 특히 무료 아이템의 사용 의사가 판매에 미치는 여러 가지 영향에 대하여 초점을 맞추어 살펴보았다.

이를 위하여 프리미엄 전략을 사용하는 국내 캐주얼 모바일 게임인 ‘탄탄 사천성’의 이용자를 대상으로 설문조사를 하고, 이를 Smart-PLS를 이용한 구조분석을 통해 검증하였다.

분석 결과로 무료 아이템 사용 의사, 사회적 영향, 사용 습관, 과거 사용 경험, 과거 구매 경험이 프리미엄 모바일 게임에서 가상 아이템의 구매 의사에 유의적인 정(+)의 영향을 미치고 있음을 확인하였으며, 그 중 사회적 영향과 사용 습관은 무료 아이템의 사용 의사에 따라 구매 의사에 영향력이 더 커지는

것을 알 수 있었다. 또한, 이러한 무료 아이템 사용 의사의 영향은 상위 레벨 그룹에 비해 하위 레벨 그룹에서 더 효과적인 것으로 나타났다.

본 연구의 분석결과는 프리미엄 모바일 게임에서 이용자들이 가상 아이템을 구매하게 되는 결정 요인에 대하여 실증적으로 파악하고 이해하는데 통찰력을 제공하며 특히, 프리미엄 모바일 게임을 개발하고 운영하는 기업에 이론적·실천적 측면에서 도움을 줄 수 있을 것으로 기대한다.

주요어 : 프리미엄 모바일 게임, 구조방정식 모델, PLS
구조 모델, 가상아이템 구매 의사, 무료 샘플 사용
의사, 자기 지각 이론, 사회적 영향, 자기 표현
이론

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