Irrational Factors Affecting the Purchase of Online Game Items

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Abstract

Recently, a number of studies have drawn attention to purchasing online game items. Most of the studies are based on the assumption that consumers behave rationally. Accordingly, TRA- or value-based approaches have been mainly employed to understand the online purchases of game items. However, the purchasing behavior of consumers involves not only making rational decisions, but also making irrational decisions. Hence, their purchase behavior is affected by propensities for conspicuous consumption, impulsive consumption, and habitual consumption. Playing games can be highly addictive, and players often display such addictive behaviors. Our study explored both the rational and irrational factors in purchase behavior to understand how they are associated with purchasing game items. A total of 366 pieces of data were collected from Korean online game users through a survey. Regression analyses of the collected data showed that the behavior of buying game items was influenced not only by the intention to purchase which is a rational factor in consumption, but also by such irrational factors as habit, impulse, and ostentation which should be further emphasized in future studies.

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1. Introduction

In a rapidly-growing online gaming market, most online-game companies employ a freemium business model [1] that allows users to play games free of charge and encourages them to purchase digital items for game characters such as clothing, weapons, and accessories. For the sustainable growth of companies, it is therefore important to identify factors that influence the sale of game items.

Recent studies have begun to examine what factors influence purchasing game items. These studies are based on two main theories: customer-perceived value theory [1,2] and technology acceptance model [3,4]. Studies relying on the customer-perceived value theory assume that the intention to purchase is affected by the functional, social, and emotional values of game items, whereas other studies based on the technology acceptance model support the idea that usefulness and ease of use influence the intention to purchase game items.

Among the various types of information systems, online game system is a type of hedonic information system [5] such as web and mobile app for entertainments, socal network service, web cartoons, microblog [6], etc. Due to rapidly developing of multi-media contents, 3D and virtual reality technology, hedonic information system will be of increasing importance in the near future. Furthermore, various studies have tried to enhance users' emotion arousal of multimedia contents [7-9]. Nevertheless, there are few researches on hedonic information system in comparison with those on utilitarian information system.

Both of the two perspectives assume that game item purchasers behave rationally when making purchase decisions. However, as asserted by Dicher [10], a more generally accepted view is that people's purchasing behavior is influenced by psychological factors. Consumers' irrational purchasing behavior is epitomized by conspicuous consumption [11], impulsive consumption [12], addictive consumption [13] or habitual consumption [14]. In particular, many studies have demonstrated that game users are motivated to seek pleasure [15] and that irrational factors such as habit [3,16], immersion [17,18], and addiction [19] play are essential factors to motivate them.

In this respect, the authors conducted a comprehensive study of rational and irrational factors that influenced the decision of purchasing online game items. The present study attempts to determine which factors are more important. Furthermore, this study attempts to understand how the irrational consumption is theoretically related to the purchase of game items and proposes guidelines for companies to develop strategies for selling game items.

2. Related Work

2.1 Previous studies of game item purchases

Recently, studies have focused on the consumer's purchasing factors for game items. The first study was conducted by Lehdonvirta (2009) [20] which analyzed 14 different games popular in the United States, Finland, and South Korea and found that functional, hedonic, and social factors influenced the purchase of game items. Subsequently, the game item purchases were explained with information system theory and marketing theory, which are mainly represented by a technology acceptance model and customer-perceived value theory.

The technology acceptance model (TAM) [21] is one of the most commonly used models for analyzing users' behavior of using information systems. This model has been widely applied not only to the use of systems, but also to online purchase behavior. Thus, two studies have employed the model in relation to the purchase of game items.

Using the TAM, Kim (2012) found that perceived usefulness, pleasure and prices had influence on the game item value and satisfaction and demonstrated that such influence resulted in continued purchases [4]. Guo and Barnes (2012) used the unified theory of acceptance and use of technology (UTAUT) model to show that effort expectancy, performance expectancy, perceived enjoyment, and general achievements such as, performance improvement and personalization have effects on purchase intentions and that the purchase intentions and habits influence purchase behaviors [3].

In addition, meaningful results have been obtained from studies that employ the customer-perceived value theory to understand the behavior of buying game items. Customer value represents a customer-perceived difference between benefits and costs resulting from a product purchase [22]. A number of studies have used the customer-perceived value theory to understand purchase behaviors in the online market [23-25]. In respect of game item purchases, Kim et al. (2011) found that their functional, emotional, and social values had a positive effect on purchase intentions [2]. Park and Lee (2011) used a modified customer-perceived value theory to examine how the purchase intentions for game items are influenced by the integrated value of a game and the uniqueness of and satisfaction with game characters [1].

Those studies are based on the assumption that purchasing game items follows a planned decision-making process in which a model of rational behavior [26] is involved. However, some economists argue that human behaviors are often irrational. A study by Lee et al. (2015) which explored about 80 million pieces of purchase data discovered that purchase behaviors are associated with unconscious behaviors and conscious behaviors [27].

As a result, their study suggests that irrational behavior could be involved in purchasing game items. In further studies, emphasis should be placed on irrational factors such as habit, flow and addiction rather than the rationality of decision making, in association with the use of game services.

2.2 Irrational consumption behaviors

Becker (1962) asserted that consumers may demonstrate irrational behaviors [12]. He states consumers have shown to make impulsive, volatile, inertial, and habitual purchases

and be insensitive to changes. These ideas have been conceptualized as referring to conspicuous [11], impulsive [28], addictive [13], and habitual consumption [14].

Table 1. Research of Game Items

Theoretical Background	Researches	Findings	Methodology
None	Lehdonvirta (2009) [20]	Factors influencing purchases include functional, pleasure, and social factors.	Case Study
TAM or UTAU	Guo and Barnes (2011) [3]	Expected efforts, expected performance, perceived value, pleasure, and reinforcement, among others, influence purchase intentions.	Survey
	Kim (2012) [4]	Perceived usefulness, perceived pleasure and perceived prices affect game value and satisfaction, which in turn affect repurchase intentions.	Survey
Customer Perceived Value	Park and Lee (2011) [1]	The integrated value of a game, the uniqueness of game characters and satisfaction with the game influence purchase intentions toward game items.	Survey
	Kim et al. (2011) [2]	Functional, emotional and social values positively affect purchase intentions toward digital items.	Survey
Others	Lee et.al. (2014) [27]	Unconsciousness might influence purchasing game items.	Real data

Conspicuous consumption is a behavior consumers exercise when they want to display their financial prowess [12]. The display of different financial power toward the public is a means of confirming that consumers acquire and maintain their social status. In general, the causes of conspicuous consumption are classified as psychological (personal psychological motivations), psychosocial (someone else influencing consumption) or sociocultural (social and cultural customs). Conspicuous consumption is affected by psychosocial or sociocultural factors because such consumption itself is considered as a means for displaying a superior position.

Impulsive consumption is a consumer behavior of buying an unneeded product on the spur of the moment without prior planning, merely because of an attraction towards the product's shape, package, or design [28]. Consumers taking part at sales events are more likely to make impulse decisions to purchase items they did not plan for. Impulse consumption is encouraged mainly by advertisements, fads, marketing strategies, sales pitches, or the ease of using a credit card. Highly expressive products such as clothing are often purchased on an impulse [29]. Impulsive consumption takes place online as well as offline [30].

Addictive consumption is characterized by an undue uncontrollable desire to make purchases and may involve compulsive buying or overspending out of available payment capacity [13]. Furthermore, addictive buying occurs as a way to overcome or avoid negative feelings such as anxiety, tension and depression.

Habitual consumption is also a form of irrational consumption which is often explored in the realm of marketing in order to understand the purchase behavior of consumers. Habitual consumption has four behavioral characteristics: automaticity, situational

constancy, functionality, amplification [14]. Habitual consumption occurs more frequently with products that have stronger brand value, and consumers have the tendency of habitually buying products with low-involvement processes.

Likewise, game item purchases occur not only under rational conditions with rational intentions, but also under irrational reasons. Therefore, this study explored both the rationality and irrationality of consumption behavior.

3. Research Model

3.1 Hypotheses

In examining general factors affecting game item purchases, this study took into consideration both rational and irrational factors underlying the buying behavior.

This study proposes a research model that explores and explains consumers' irrational purchase behaviors towards game items by taking into account the various propensities for consumption, as discussed above: conspicuous, impulsive, addictive, and habitual.

In addition, an UTAUT model derived from the theory of reasoned action (TRA) was used to analyze the rational factors of buying behavior. Based on this model, it was argued that purchase intentions would be affected by performance expectancy, effort expectancy, social influence and facilitating conditions [31]. In this study, the research model removed facilitating conditions for comparisons from the perspective of consumers' buying behavior, instead of removing the environmental aspects of the game play. The proposed model is schematized in **Fig. 1**.
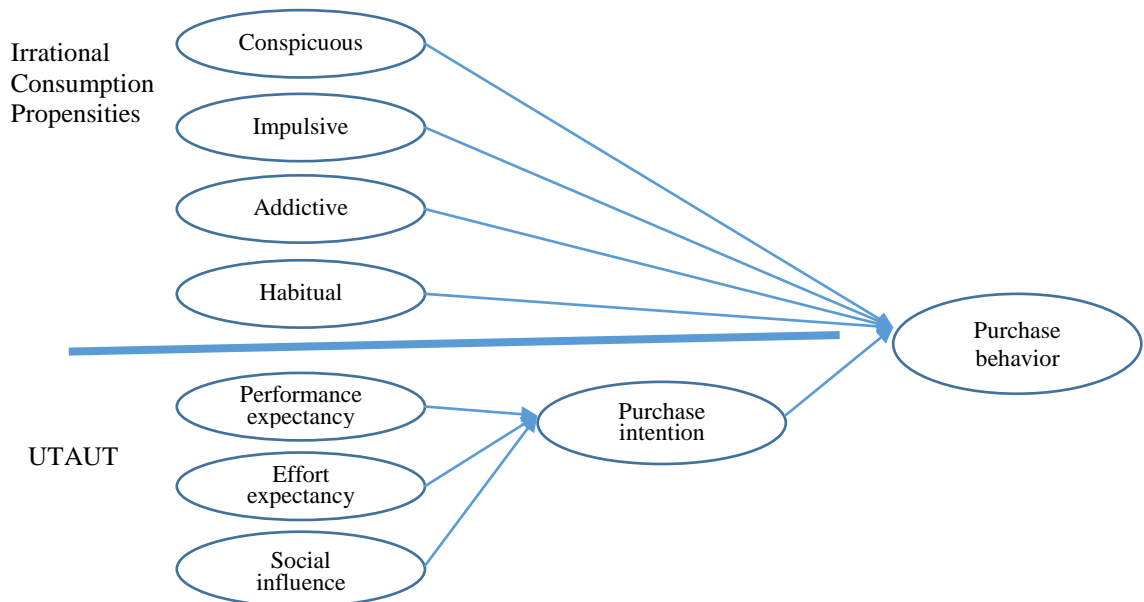

Fig. 1. Research Model

Hypotheses underlying the proposed model are as follows:

H1: The higher propensity for conspicuous consumption of game items will have a more positive effect on purchase behavior. Veblen maintains that the elements of conspicuous consumption are involved in buying goods [11]. In particular, these elements serve to dress up game characters and strengthen their abilities [1]. Therefore, buying a game item is likely to occur as a way to show off to other players of the same game. Hence, we suggested a hypothesis that there is a positive correlation between game item purchase and conspicuous consumption.

H2: The greater propensity for impulsive consumption of game items will have a more positive effect on purchase behavior. Rook and other empirical studies have indicated that consumption can occur on impulse [28]. In-game items help players perform tasks especially in freemium games. If a user finds it difficult to perform a particular in-game task during the game play, one will likely have an impulse to buy helpful game items. In this sense, our second hypothesis is that a positive correlation between game item purchase and impulsive consumption propensity exists.

H3: The higher propensity for addictive consumption of game items will have a more positive effect on purchase behavior. Game users have a high propensity for game addiction and are willing to invest time and money [32]. This hypothesis suggests that the exposure of the addictive propensity to the purchase of game items have a positive impact on the purchase behavior towards game items.

H4: The higher propensity for habitual consumption of game items have a more positive effect on purchase behavior. Habitual buying behavior occurs frequently as a low-involvement offering [33-35]. Above all, players can easily become habitual gamers [16,17]. In most cases, accordingly, game item purchases are made out of a forced habit. In this sense, we hypothesized that the habit of buying game items have a positive impact on the purchase behavior towards game items.

Further, we formulated the following hypotheses based on the unified theory of acceptance and use of technology (UTAUT):

H5: According to the UTAUT, the higher performance expectancy of game users for game items have a more positive effect on their purchase intention for the items.

H6: According to the UTAUT, the higher effort expectancy of game users for game items have a more positive effect on their purchase intention for the items.

H7: According to the UTAUT, the higher social influence of game users on game items have a more positive effect on their purchase intention for the items.

H8: According to the TRA, TAM and UTAUT, the higher purchase intention of game users towards game items have a more positive effect on their purchase behavior.

3.2 Instrument development

We developed a questionnaire-based instrument with measurement items using a five-point Likert scale. The propensities for irrational consumption were assessed with items used in previous studies [36], and a model of rational consumer behavior was developed by the application of questionnaire items used for the UTAUT model in previous studies. For details, see **Table 2**.

Table 2. Definition of Constructs

Construct		Measures	Sources
Conspicuous consumption (CC) of game items	CC1	I purchase game items because of my social status in the game society.	Eastman et. al. (1999) [37]
	CC2	I am interested in a social status in the game society.	
	CC3	I have an intention to purchase game items because of my status in the game society.	
	CC4	I purchase game items to show off in the game society.	
Impulsive consumption (IC) of game items	IC1	When I see a good game item, I feel an impulse to buy it.	Verplanken and Herabadi (2001) [29]
	IC2	When I see a good game item, I find it hard to control myself. When I see a good game item, I find it hard to control my urge to buy it.	
	IC3	I feel guilty after buying a game item.	
	IC4	When I see a new game item, I want to buy it.	
Addictive consumption (AC) of game items	AC1	I purchase game items that I'm unable to pay for.	Faber and O'Guinn (1989) [38]
	AC2	Regardless of the items I purchase them.	
	AC3	You would be surprised to know how much I have spent on game items.	
	AC4	I feel uneasy when I don't buy a game item.	
	AC5	I regret purchasing a game item.	
Habitual consumption (HC) of game items	HC1	Buying game items is automatic for me.	Verplanken and Orbell (2003) [39]
	HC2	I make unconscious purchases of game items.	
	HC3	It needs no effort to purchase game items.	
Performance expectancy (PE) for game items	PE1	Game items are useful for playing the game.	Venkatesh et al. (2003) [31]
	PE2	Game items are useful for performing tasks effectively.	
	PE3	Game items are useful for performing tasks efficiently.	
Effort expectancy (EE) for game items	EE1	It is easy for me to become skillful at buying game items.	Venkatesh et al. (2003) [31]
	EE2	It is easy to buy game items.	
	EE3	There is an easy way to buy game items.	
Social influence (SI) on use of game items	SI1	Co-players' perception that game items should be purchased.	Venkatesh et al. (2003) [31]
	SI2	Non-player friends' perception that game items should be purchased.	
	SI3	The influence of my peers suggests that I should purchase game items.	
Purchase intention (PI) for game items	PI1	Desire to purchase game items.	Davis (1989) [21]
	PI2	Intention to purchase game items.	
	PI3	Intention to purchase items, despite other options available.	
Purchase behavior (PB) towards game items	PB1	Overall purchase behavior towards game items.	Davis (1989) [21]
	PB2	Number of game item purchases.	
	PB3	Amount of game item purchases.	

4. Empirical Results

4.1 Data gathering and analysis

For the purpose of this study, a pilot survey was conducted on Hoseo University students using 33 samples. The survey discovered errors in some phrases which were then corrected for the present study. A new questionnaire survey was designed for use in this study and performed of League of Legends (LOL) users. Banners were used to promote the survey, and $1 game item vouchers were proposed as an incentive for the users to respond to the

survey. Google Docs was used for data collection in the web-based survey. LOL is a very popular online game which has up to 7.5M concurrent users and is enjoyed by hundreds of millions of users in 12 countries around the world, including the United States, China and South Korea. This game has also been used for understanding game users' behavior in academic research [40-44].

The survey was conducted during the period of August 13th to 25th, 2016, and a total of 409 questionnaires were retrieved. Out of them, 366 questionnaires were analyzed by excluding 25 questionnaires with incomplete data and 18 more due to doubtful responses. Demographically, the respondents were mostly male (92%) with a mean age of 22.3 years. They had an average of 23.4 months' experience playing the game.

We conducted a factor analysis for reliability test. Because each variable was measured by multi-item constructs, a factor analysis with varimax was adopted to check the unidimensionality among items. The principle of deleting was that factor loading values were under 0.5. There was no item with factor loading of lower than 0.5. The results showed in **Table 3**.

The results showed that there were nine factors among the variables. The addictive consumption and habitual consumption can be considered as a single unified construct. Each of the other seven variables is considered as a single construct respectively. The analyzed constructs included propensities for conspicuous consumption, impulsive consumption and habitual consumption, performance expectancy, effort expectancy, social influence, purchase intention and purchase behavior. The initially defined two variables, addictive consumption and habitual consumption, were measured as one variable, as the concept of addiction was presumed to include the aspect of habitual consumption. As a result, in analyzing variables, this study incorporated the propensity for addictive consumption into the propensity for habitual consumption.

Cronbach's alpha analysis was used for examining the reliability of the instruments. A higher cutoff value of 0.7 may be used because these instruments have been adopted previously. All constructs had higher than 0.7 cutoff alpha value, ranging from 0.773 to 0.983. The result shows in **Table 4**.

The Pearson's correlation coefficient for each pair of variables showed a satisfactory level of discriminant validity, with a value of < 0.85 meeting Kline's criterion. The range of value was from -0.231 to 0.765 as presented in **Table 5**. Consequently, discriminant validity was found to exist between questionnaire items [45].

Our analyses of reliability and validity for the questionnaire survey in this study revealed that the questionnaire had construct validity, reliability, and discriminant validity. Accordingly, the hypotheses of this study can be tested using multiple regressions with the collected data.

Table 3. Results of Factor Analysis

	Propensity for Conspicuous Consumption	Propensity for Impulsive Consumption	Propensity for Habitual Consumption	Performance Expectancy	Effort Expectancy	Social Influence	Purchase Intention	Purchase Behavior
CC1	0.105	0.052	0.044	-0.106	-0.096	-0.139	0.734	-0.044
CC2	0.042	-0.08	0.031	-0.009	0.063	0.101	0.805	-0.018
CC3	-0.002	0.031	0.071	0.055	-0.085	0.022	0.823	0.108
CC4	0.085	0.06	-0.071	-0.012	0.07	0.001	0.734	-0.009
IC1	0.285	0.892	0.104	0.248	0.022	0.042	0.038	0.124
IC2	0.277	0.882	0.13	0.254	0.022	0.052	0.014	0.11
IC3	0.263	0.879	0.076	0.228	0.036	0.043	0.028	0.13
IC4	0.372	0.778	0.032	0.104	-0.054	0.197	0.012	0.062
AC1	0.917	0.166	-0.023	0.22	-0.079	-0.048	0.05	0.149
AC2	0.912	0.168	-0.016	0.231	-0.087	-0.051	0.053	0.146
AC3	0.921	0.142	-0.016	0.204	-0.058	-0.026	0.085	0.122
AC4	0.693	0.174	0.002	-0.185	0.016	-0.05	-0.077	0.002
AC5	0.905	0.169	-0.1	0.218	-0.106	-0.055	0.057	0.116
HC1	0.344	0.307	0.084	0.845	-0.092	-0.075	-0.051	0.066
HC2	0.341	0.297	0.114	0.847	-0.071	-0.083	-0.043	0.075
HC3	0.296	0.312	0.092	0.84	-0.177	-0.057	-0.049	0.08
PE1	-0.018	0.135	0.236	-0.059	0.315	0.856	-0.005	-0.016
PE2	-0.02	0.097	0.268	-0.024	0.313	0.862	0.014	-0.002
PE3	-0.04	0.05	0.142	-0.075	0.268	0.877	-0.018	-0.01
EE1	0.183	0.079	0.081	0.041	0.04	-0.084	0.052	0.897
EE2	0.126	0.121	0.043	-0.016	0.028	-0.043	-0.063	0.925
EE3	0.27	0.124	0.014	0.163	-0.063	0.114	0.046	0.722
SI1	-0.098	0.053	0.159	-0.09	0.886	0.341	0.003	-0.024
SI2	-0.109	0.019	0.182	-0.107	0.88	0.355	-0.012	-0.017
SI3	-0.088	-0.058	0.089	-0.081	0.91	0.202	-0.031	0.045
PI1	0.054	0.089	0.927	0.052	0.173	0.192	0.021	0.039
PI2	0.06	0.071	0.934	0.063	0.148	0.177	0.01	0.046
PI3	0.065	0.097	0.937	0.099	0.083	0.192	0.028	0.051
PB1	0.718	0.309	0.329	0.278	-0.067	0.065	0.139	0.2
PB2	0.713	0.323	0.319	0.276	-0.064	0.078	0.153	0.192
PB3	0.698	0.259	0.305	0.25	-0.015	0.069	0.168	0.187

Table 4. Results of Reliabillity Analysis

Variable	Cronbach's α	Number of Items
CC (Propensity for conspicuous consumption)	0.773	4
IC (Propensity for impulsive consumption)	0.962	4
HC (Propensity for habitual consumption)	0.913	8
PE (Performance expectancy)	0.948	3

EE (Effort expectancy)	0.858	3
SI (Social influence)	0.961	3
PI (Purchase intention)	0.977	3
PB (Purchase behavior)	0.983	3
Total reliability	0.909	31

Table 5. Results of Discriminant Validity Analysis

Pearson's Correlation Coefficient	CC	IC	HC	PE	EE	SI	PI	PB
CC	1							
IC	0.075	1						
HC	0.088	0.581	1					
PE	-0.001	0.163	-0.1	1				
EE	0.046	0.319	0.383	0.037	1			
SI	-0.021	0.004	-0.231	0.62	0.001	1		
PI	0.045	0.24	0.097	0.432	0.136	0.321	1	
PB	0.204	0.607	0.765	0.093	0.431	-0.072	0.372	1

4.2 Results

First of all, we conducted a regression analysis of purchase intentions to understand the rational purchase model. We used performance expectancy, effort expectancy, and social influence as independent variables and set the intention to purchase as a dependent variable. The mathematical model is as below.

$$PI_i = B_0 + \beta_1 PE_i + \beta_2 EE_i + \beta_3 SI_i + \varepsilon_i$$
$$PB_i = B_0 + \beta_1 CC_i + \beta_2 IC_i + \beta_3 HC_i + \beta_4 PI_i + \varepsilon_i$$

The analysis results showed that beta values of performance expectation, effort expectation, and social influence were positive whereas t-values of performance expectancy, and effort expectancy are 6.219 and 2.602. These were significant variable. In contrast, t-value of the social influence was 1.510, which was not significant. Our results were very similar to those of Guo and Barnes's [3] which also used UTAUT model. However, the regression model's explanatory power was not significantly high with an R^2 value of 20 percent. The results of regression analysis for purchase intention is as follows.

**Table 6.** Results of Regression Analysis for Purchase Intention

	B	Standard Error	β Coefficient	t –value	Significant Probability
(Constant)	1.136	.194		5.848	.000
PE**	.392	.063	.372	6.219	.000
EE**	.105	.040	.122	2.602	.010
SI	.080	.053	.090	1.510	.132
$R^2 = 0.206$, Modified $R^2 = 0.200$, F = 31.322					

The regression analysis for purchase behavior revealed that beta values of all independent variables are positive from 0.188 to 0.649 whereas t-values of all variables are ranging from 4.312 to 17.97 as in **Table 7**. The significant level is under 0.1. Thus, the purchase behavior was influenced by all of the propensities for conspicuous consumption, impulsive consumption, habitual consumption, and purchase intention. Above all, a propensity for impulsive consumption and habitual consumption was found to have the greatest influence on the purchase behavior, with the highest t-value. The model's explanatory power is very high with a modified R^2 value of 0.704.

Table 7. Results of Regression Analysis for Purchase Behavior

	B	Standard Error	β Coefficient	t -value	Significant Probability
(Constant)	-0.321	0.163		-1.965	0.05
CC	0.211	0.049	0.123	4.312	0
IC	0.188	0.04	0.169	4.703	0
HC	0.649	0.036	0.63	17.97	0
PI	0.367	0.041	0.264	8.997	0
$R^2 = 0.708$, Modified $R^2 = 0.704$, F = 218.389					

Fig. 2 above shows t-values of independent variables affecting purchase behavior. In the past, researches mainly focused on purchase intention. But our result shows that habitual consumption has the highest t-value, 17.970. It is well known that habit is formed and enforced by habit loop which has three elements, a cue, a routine, and a reward [46]. Online game items can easily provide users with these three elements. For example, a cue can be triggered by showing items to users while a routine behavior can be created by activation of buying process. A reward can be provided by the effect of the purchased items on game play. The second highest t-value is seen in purchase intention (8.997). Impulsive and conspicuous consuming tendency follow with the third and fourth highest t-values respectively.
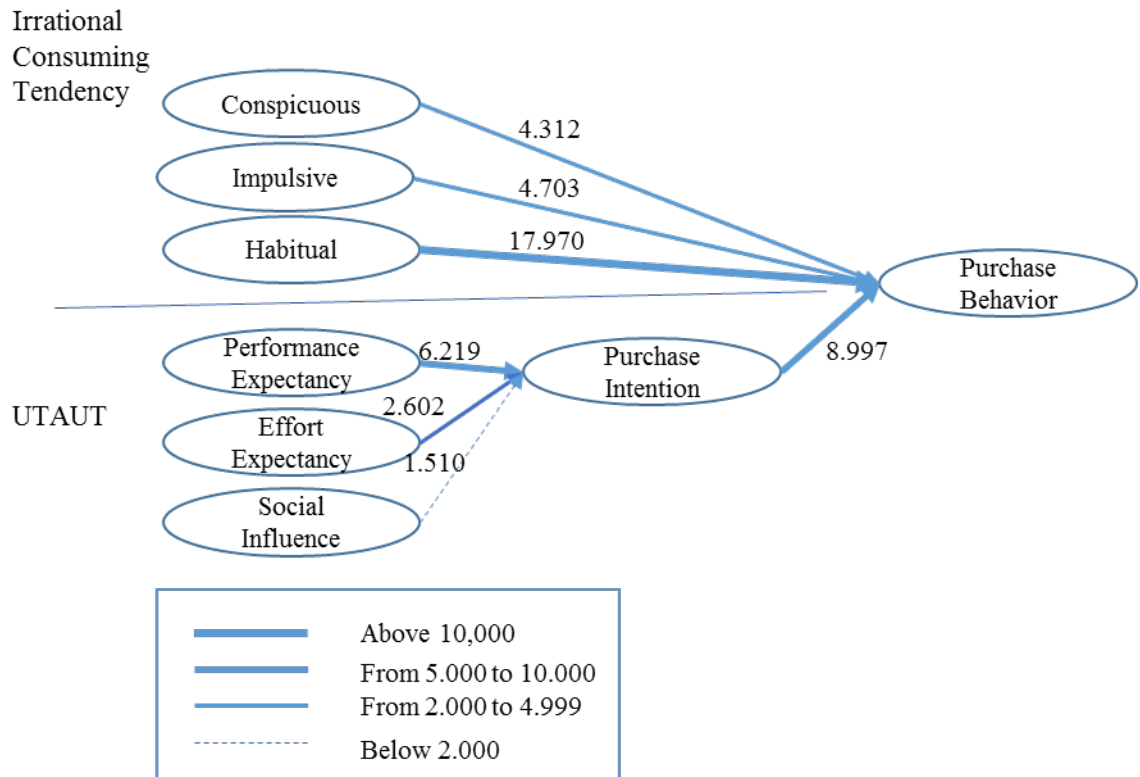
Fig. 2. Result of Resgression

Among the factors affecting purchase intention, performance expectancy has the highest effect whereas effort expectancy also exerts a meaningful effect. But social influence has no significant effect. A research shows that online game may cause aggression, addiction, loose self-control and narcissistic personality [47]. Thus, the result that efforts expectancy is higher than social influence could have been caused by the fear of people's general negative attitude toward game players.

Overall, our result shows not only purchase intention but also irrational consuming tendency variables such as conspicuous, impulsive, and habitual consumptions affect purchase behaviors.

5. Conclusions

Our study identified and examined both rational and irrational factors influencing the purchase of game items. Study findings showed that the rational factors in buying behavior such as performance expectancy and effort expectancy influenced the intention to purchase game items which in turn affects purchase behavior. Furthermore, the buying behavior was also affected by the factors of irrational behavior such as propensities for conspicuous consumption, impulsive consumption and habitual consumption. In explaining purchase

intentions, the goodness-of-fit of the model for rational buying behavior was low with a level of 20%, whereas the results from the regression analysis assessing both rational and irrational factors exhibited a high level of explanatory power with a value of 70.4%. Therefore, the rational and irrational factors in purchase behavior should be taken into account together in analyses of game item purchases.

Our study has contributed to academic field by testing the interplay between economic and psychological analyses of individual purchase decision-making of game items. Although some might consider the results of our research are just within the bounds of common sense, there have been few studies that considered a user of online games as an irrational subject. It might have been caused by the view that an online game is a kind of information system. Because information system may originally be designed for the users who seek the proper information [48], the user's behaviors are presumed to be rational. However, role of information system is expanded from serving simple information to commerce and entertainments [5]. It will become more important to understand a user as a person in real life for requirement engineering. Our study broadens the viewpoints on user behavior in online game, and the assumptions are empirically tested.

The study indicates that consumers' behavior towards online purchases are not always rational. Previous studies are based on models of rational behavior in analyzing consumer behavior like purchasing game items, using online shopping malls, or using online banking. However, the findings of these studies suggest that when it comes to buying certain products, irrational purchases are more likely to take place online. Therefore, future studies should explore a wide range of irrational factors in the consumption behavior for online consumers.

For the practical implications, this study suggests that game companies should pay attention to irrational factors when developing sales strategies for game items. In light of the finding that the propensity for habitual consumption the highest effect on purchase behavior, web pages should be designed to facilitate users' habitual purchases of game items.

The limitation of our study provides a direction for future studies. In our study, the data was collected from a single source, League of Legends, which is our study's limitation. Purchase behavior can vary depending on games' characteristics and the business model. Thus, future studies may cover a variety of different games in order to ensure the reliability of their results.

References

[1] B. Park and K. Lee, "Exploring the value of purchasing online game items," *Computers in Human Behavior*, Vol. 27, No. 6, pp. 2178-2185, 2011. Article (CrossRef Link)

[2] H. Kim, S. Gupta and J. Koh, "Investigating the intention to purchase digital items in social networking communities: A customer value perspectives," *Information and management*, Vol. 48, No. 6, pp. 228-234, 2011. Article (CrossRef Link)

[3] Y. Guo and S. Barnes, "Purchase behavior in virtual worlds: An empirical investigation in Second Life," *Information & Management*, Vol. 48, No. 7, pp. 303-312, 2011. Article (CrossRef Link)

[4]   B. Kim, "Understanding key factors of users' intentions to repurchase and recommend digital items in social virtual worlds," *Cyberpsychology, Behavior, and Social Networking*, Vol. 15, No. 10, pp. 543-550, 2012. Article (CrossRef Link)

[5]   H. Heijden, "User Acceptance of Hedonic Information Systems," *MIS Quarterly*, Vol. 28, pp. 695-704, 2004. Article (CrossRef Link)

[6]   Y. Gao, S. Zhao, Y. Yang and T.-S. Chua, "Multimedia social event detection in microblog," in *Proc. of MMM Conference*, January 5-7, 2015. Article (CrossRef Link)

[7]   S. Zhao, H. Yao, Y. Gao, R. Ji. W. Xie, X. Jiang, T.-S. Chua, "Predicting Personalized Emotion Perceptions of Social Images," in *Proc. Of ACM on Multimedia Conference*, 2016. pp. 1385-1394, 15-19 October 2016. Article (CrossRef Link)

[8]   S. Zhao, H. Yao, Y. Gao, G. Ding, T.-S. Chua, "Predicting Personalized Image Emotion Perceptions in Social Networks," *IEEE Trans Affective Computing*, Vol. PP, No. 99, pp 1-1, 2016. Article (CrossRef Link)

[9]   S. Zhao, H. Yao, Y. Gao, R. Ji, G. Ding, "Continuous probability distribution prediction of image emotions via multi-task shared sparse regression," *IEEE Trans Multimedia*, Vol. 19 No. 3, pp. 632–645, 2017. Article (CrossRef Link)

[10] E. Dichter, "Psychology in market research," *Harvard Business Review*, Vol. 25, No. 4, pp. 432-443, 1947. Article (CrossRef Link)

[11] T. Veblen, "Theory of the Leisure Class: An Economic Study of Institutions," Macmillan, New York, 1899. Article (CrossRef Link)

[12] G. Becker, "Irrational behavior and economic theory," *The Journal of Political Economy*, Vol. 70, No. 1, pp. 1-13, 1962. Article (CrossRef Link)

[13] R. Elliot and K Wattanasuwan, "Consumption and the symbolic project of the self," *European Advances in Consumer Research*, Vol. 3, pp. 17-20, 1998. Article (CrossRef Link)

[14] K. Murray, "Special session summary habitual consumption," *Advances in Consumer Research*, Vol. 32, pp. 34-37, 2005. Article (CrossRef Link)

[15] C. Murphy, "Why games work and the science of learning," *Alion Science and Technology*, pp. 1-10, 2011. Article (CrossRef Link)

[16] H. Lin and Y. Wang, "An examination of the determinants of customer loyalty in mobile commerce contexts," *Information & Management*, Vol. 43, pp. 271–282, 2006. Article (CrossRef Link)

[17] D. Choi and J. Kim, "Why people continue to play online games: In search of critical design factors to increase customer loyalty to online contents," *CyberPsychology and Behavior*, Vol. 7, No. 1, pp. 11-24, 2004. Article (CrossRef Link)

[18] A. Voiskounsky, O. Mitina and A. Avetisova, "Playing online games: Flow experience," *PsychNology Journal*, Vol. 2, No. 3, pp. 259-281, 2004. Article (CrossRef Link)

[19] J. Charltona and I. Danforth, "Distinguishing addiction and high engagement in the context of online game playing," *Computers in Human Behavior*, Vol. 23, No. 3, pp. 1531–1548, 2007. Article (CrossRef Link)

[20] V. Lehdonvirta, "Virtual item sales as a revenue model: identifying attributes that drive purchase decisions," *Electronic Commerce Research*, Vol. 9, No. 1-2, pp. 97-113, 2009. Article (CrossRef Link)

[21] F. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, Vol. 13, No. 3, pp 319–340, 1989. Article (CrossRef Link)

[22] W. Dodds, K. Monroe and D. Grewal, "Effects of price, brand, and store information on buyers' product evaluations," *Journal of Marketing Research*, Vol. 28, No. 3, pp. 307-319, 1991. Article (CrossRef Link)

[23] S. Mosavi, and M. Ghaedi, "An Examination of the effects of perceived value and attitude on customers' behavioral intentions in e-shopping," *African Journal of Business Management*, Vol. 6, No. 5, pp.1950-1959, 2012. Article (CrossRef Link)

[24] L. Wu, K. Chen, P. Chen and S. Cheng, "Perceived value, transaction cost, and repurchase-Intention in online shopping: A relational exchange perspective," *Journal of Business Research*, Vol. 67, No. 1, pp. 2768–2776, 2014. Article (CrossRef Link)

[25] H. Kim, H. Chan and S. Gupta, "Value-based adoption of mobile internet: An empirical investigation," *Decision Support Systems*, Vol. 43, No. 1, pp. 111-126, 2007. Article (CrossRef Link)

[26] M. Fishbein, and I. Ajzen, "Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research," Addison-Wesley, Massachusetts, 1975. Article (CrossRef Link)

[27] J. Lee, J. Lee, and H. Lee, J. Lee, "An exploratory study of factors influencing repurchase behaviors toward game items: A field study," *Computers in Human Behavior*, Vol. 53, No. c, pp. 13-23, 2015. Article (CrossRef Link)

[28] D. Rook, "The buying impulse," *The Journal of Consumer Research*, Vol. 14, No. 2, pp. 189-199, 1987. Article (CrossRef Link)

[29] B. Verplanken, and A. Herabadi, "Individual differences in impulse buying tendency: Feeling and no thinking," *European Journal of Personality*, Vol. 15, pp. 571-583, 2001. Article (CrossRef Link)

[30] S. Madhavaram, and D. Laverie, "Exploring impulse purchasing on the Internet," *Consumer Research*, Vol. 31, pp. 59-66, 2004. Article (CrossRef Link)

[31] V. Venkatesh, M. Morris, G. Davis and F. Davis "User acceptance of information technology: toward a unified view," *MIS Quarterly*, Vol. 27, No. 3, pp. 425-478, 2003. Article (CrossRef Link)

[32] K. Kim and J. Boo, "The relationship between flow state, addiction orientation in online games and personal psychological factors," *Korea Counseling Research*, Vol. 7, No. 4, pp. 1169-1187, 2006. Article (CrossRef Link)

[33] B. Verplanken, H. Aarts, A. van Knippenberg, and A. Moonen, "Habit versus planned behavior: A field experiment," *British Journal of Social Psychology*, Vol. 37, No. 1, pp. 111-128, 1998. Article (CrossRef Link)

[34] J. Ouellette and W. Wood, "Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior," *Psychological Beliefs*, Vol. 123, No. 1, pp.54-74, 1998. Article (CrossRef Link)

[35] H. Aarts and A. Dijksterhuis, "Habits as knowledge structures: Automaticity in goal-directed behavior," *Journal of Personality and Social Psychology*, Vol. 78, No. 1, pp. 53-63, 2000. Article (CrossRef Link)

[36] E. Edwards, "Development of a new scale for measuring compulsive buying behavior," *Financial Counseling and Planning*, Vol. 4, pp. 67-84, 1993. Article (CrossRef Link)

[37] J. Eastman, R. Goldsmith and L. Flynn, "Status consumption in consumer behavior: Scale development and validation," *Journal of Marketing: Theory and Practice*, Vol. 7, pp. 41-52, 1999. Article (CrossRef Link)

[38] R. Faber and T. O'Guinn, "Classifying compulsive consumers: Advances in the development of a diagnostic tool," *Advances in Consumer Research*, Vol. 16, pp. 738-744, 1989. Article (CrossRef Link)

[39] B. Verplanken and S. Orbell, "Reflections on past behavior: A Self-report index of habit strength," *Journal of Applied Social Psychology*, Vol. 33, No. 6, pp. 1313-1330, 2003. Article (CrossRef Link)

[40] J. Shim, T. Kim and S. Kim, "Decision support of Bad Player Identification in MOBA Games using PageRank based Evidence Accumulation and Normal Distribution based Confidence Interval," *International Journal of Multimedia and Ubiquitous Engineering*, Vol. 9, No. 8, pp. 13-24, 2014. Article (CrossRef Link)

[41] J. Bae, D. Koo and P. Mattila, "Affective motives to play online games," *Journal of Global Scholars of Marketing Science*, Vol. 16, No. 2, pp. 174-184, 2016. Article (CrossRef Link)

[42] Y.-C. Lin and Y.-C. Lee, "The influence of the personality traits of webcasters on online games," *International Journal of Electronic Customer Relationship Management*, Vol. 11, No, 1, pp. 94-103, 2017. Article (CrossRef Link)

[43] H. Han, S. Kim and H. Koo, Analysis of Gender Identity of On-line Game Character: focused on League of Legend User," *Journal of Korea Game Society*, Vol. 14, No. 5, pp. 147-160, 2014. Article (CrossRef Link)

[44] D. Johnson, E. Lennart and P. Wyeth, "All about that Base: Differing Player Experiences in Video Game Genres and the Unique Case of MOBA Games," in *Proc. of the 33rd Annual ACM Conference on Human Factors in Computing Systems 2015*, pp. 2265-2274, April 18 - 23, 2015. Article (CrossRef Link)

[45] R. Kline, "Principles and Practice of Structural Equation Modeling," *Guilford Press*, New York, 2011. Article (CrossRef Link)

[46] P. Lally, C. H. M Jaarsveld, H. W. Potts and J. Wardle, "How are habits formed: Modelling habit formation in the real world," *European Journal of Social Psychology*, Vol. 40, No. 6. pp. 998–1009, 2010. Article (CrossRef Link)

[47] E. Kim, N. Kee, T. Ku and S. Kim, "The relationship between online game addiction and aggression, self-control and narcissistic personality traits," *European Psychiatry*, Vol. 23, No. 3, pp. 212-218, 2008. Article (CrossRef Link)

[48] T. D. Wilson, "Human information behavior," *Informing Science*, Vol. 3, No. 2, pp 49-55, 2000. Article (CrossRef Link)

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