The Moderating Effect of Reference Group on Online Game Loyalty: Focused on Hedonic Information System

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Abstract

This study approaches online games from the perspective of the hedonic information system and presents a theoretical model to explain online game acceptance by expanding the study of van der Heijden and the Technology Acceptance Model (TAM). The important variables of this model included perceived usefulness, perceived easiness, and perceived pleasure. Also, we investigate a moderating effect of personal reference group on online game acceptance. The subjects were divided into the high reference group (196 persons) and the low reference group (138 persons) based on the median value of reference group using the SEM(Structural Equation Model) method. An empirical analysis of the subjects found that perceived easiness, perceived pleasure, and perceived usefulness of the game influenced the intent of acceptance and game loyalty in the total group, in that order. On the other hand, comparative research of the two groups based reference group found that the high reference group showed high intent of game acceptance if a game agreed with the subjects' useful and easy values, even if it was somewhat inconvenient, whilst perceived pleasure of a game was the greatest influencing factor in the low reference group. In addition, in the relationship of intent of acceptance and loyalty, the low reference group showed high loyalty.

Keywords: *Online Game Acceptance Model, Hedonic Information System, Technology Acceptance Model, Reference Group*

1. Introduction

The game industry has become the core of the digital culture and digital content-related industries in Korea, and online games and mobile game present the leading model in the Korean digital content industry. The e-sports industry in Korea has the infrastructure for developing into a mature industry with a wide variety of game events, TV broadcasting focus on MMORPG, professional e-sports groups, and an audience that is excited over e-sports[1].

E-sports is the most distinct social phenomenon that is displaying characteristic of this on-line game in Korea. E-sports spread rapidly in young people in Korea. For example, E-Stars Seoul 2012 Tournament hold a Starcraft II and Tekken Tag Tournament, gamers participate from all over the world.

Traditionally, many studies have used the TAM(Technology Acceptance Model) with regard to consumers' acceptance of IT. TAM, based on TRA(Theory of Reasoned Action) is to predict the acceptance of the technology by perceived usefulness and perceived easiness[2, 3]. However, the TAM based on an attitude model that focused on utilitarian behaviors may not be appropriate for an interpretation of the acceptance of hedonic

system like a online games[4], which is entertainment technology based on hedonic value, although it may be appropriate for IT acceptance based on utilitarian value [5][6]. Information systems can be divided into Utilitarian Information Systems, which are focused on results, and Hedonic Information Systems, which pursue amusement, and the factors influencing the use of information systems are different [4]. Because a player of MMORPG differ gaming purposes and preferences, their game play styles using their behavioral similarities can grouping. Each player group may consist of both human and bot player with similar behaviors [7]. The bot players shows utilitarian behaviors, and the human players shows hedonic behaviors.

The influence of reference group is an individual variable that has a decisive influence on consumer acceptance of product [8, 9], online social networks service [10], and blog [11]. Reference group is particularly important in the interpretation of online game acceptance [5, 6].

People are willing to be involved in online game because they believe the games offer social values to individuals, ''guilds,'' and ''clans.'' Playing games provides their players with many benefits fun, which is a direct reward and other benefits such as sharing information about the games or participating in relevant game communities [12]. With respect to these benefits, the most important component of online game is a ''guild,'' where users generate social values by interacting with others as reference group [13]. McDonald *et al.*, [14] accentuate the importance of reference group in game, investigate reference group formation and the impact of social comparisons in a three-player ultimatum game.

In this regard, this study has the following purposes:

First, this study presents a representative model of IT acceptance expanded for the hedonic information system by approaching online gaming from the viewpoint of the hedonic information system. Second, this study examines the moderating role of online game acceptance, which varies by reference group.

2. Theoretical Background and Hypothesis

2.1. TAM and Pleasure

Davis and Davis, Bagozzi and Warshaw made TAM, based on TRA(Theory of Reasoned Action) theory, to predict the acceptance of the technology by perceived usefulness and perceived easiness [2, 3]. Davis suggested important two variables are belief variable of perceived usefulness (U) and perceived easiness (E). The perceived usefulness that is more influence in use intention than perceived easiness. Davis, Bagozzi and Warshaw investigated in comparing TRA theory and TAM in research. Their study's findings support TAM for word processor to MBA students. But, this suggested TAM which omit attitude in researches differing after their study have studied primal [15-20]. We study for on-line gamer's game acceptance, utilizing TAM model which omit pleasure of online game, adopting hedonic information system.

Perceived easiness not only improves the perceived usefulness and intention to accept an online game but also allows flow experience as perceived pleasure [21]. Therefore, the perceived easiness of an online game will have a positive influence on the perceived usefulness, the intent of acceptance, and perceived pleasure.

The perceived usefulness of an online game includes the personal fun of playing games, social intercourse with other gamers, and self-expression through an avatar [22]. Therefore, the higher the perceived usefulness and the more benefits from online game, the higher the intent of accepting the online game.

Internet users who have more experiences of flow as an element of perceived pleasure have higher intent of purchasing on the Internet [23, 24]. In other words, cognitive absorption or perceived enjoyment as an element of perceived pleasure of online game

users has an important influence on the learning of IT user behavior [25], and is related to the fun and absorption in entertainment-oriented online games [5], to the perceived enjoyment in hedonic nature of an information system [4], affecting the intent of online game acceptance. Moreover, loyalty as a basic benefit of an online game will be affected by intent of acceptance.

H1: The perceived easiness of an online game has a positive influence on the perceived usefulness of the online game.

H2: The perceived easiness of an online game has a positive influence on online game acceptance intention.

H3: The perceived easiness of an online game has a positive influence on the perceived pleasure of an online game.

H4: The perceived usefulness of an online game has a positive influence on the perceived pleasure of an online game.

H5: : The perceived usefulness of an online game has a positive influence on the online game acceptance intention.

H6: The perceived pleasure of an online game has a positive influence on the online game acceptance of intention.

H7: The online game acceptance of intention has a positive influence on the online game loyalty.

2.2. The Moderating Effect of Reference Group

In online game, there are special communities such as guilds or clans for interactivity between users [26]. When users play MMORPGs, the activities are not independent, but are connected with those of others, and the activities and social relations created in games remain the same until the next play. In the online game environment, Members who encounter their usefulness through community managing activities are more influenced by the community senses-belonging, influence, and emotional association-which have positive effects on the commitments to the online community[27].

In particular, unique community senses are composed of membership, a sense of sharing, emotional association, desire fulfillment, and flow experience [28]. In other words, online game users influenced reference group like an online community that is useful to express themselves, a sense of sharing, standards and tradition, and a sense of responsibility can be created, which may lead to acceptance of online games. MMORPGs offer guild chatting services and guild messenger services to promote active involvement in guild activities [29]. Such active participation through reference group may increase commitments to online communities based on both standards and traditions and a sense of sharing and responsibility [27].

The study by Hsu and Lu found that social norm and perceived critical mass as reference group are positively related to intention to play an online game. But they do not investigate moderating effect of reference group. That is, low group with influencing reference group clearly may recognizes perceived easiness by differentiating between perceived usefulness and perceived easiness, and regarded perceived easiness more important than a high group with influencing reference group did. Furthermore, while low group with influencing reference group consumers positively accept risks and uncertainty, and attempt explorative purchasing, high group with influencing reference group consumers avoid risks or uncertainty whether something easily accessible is more important [30]. Particularly in the case of online games as hedonic systems, high reference group consumers may place more importance on perceived easiness and perceived usefulness than on perceived pleasure. Because it requires an initial effort to

become acquainted with an online game. From the above context, we can infer that perceived easiness and perceived usefulness has greater influence on the intent of IT acceptance among the low reference group, and perceived pleasure will be more important to the high reference group. Moreover, we can infer that intent of acceptance has greater influence on the game loyalty in the low reference group, because low group with influencing reference group consumers positively accept risks and uncertainty. In other words, it is to see that there is a significant difference in the influence of intent of acceptance on game loyalty between different levels of reference group influencing.

H8a: The perceived usefulness of an online game has greater influence on online game acceptance among a high reference group than among a low reference group.

H8b: The perceived easiness of an online game has greater influence on online game acceptance among a high reference group than among a low reference group.

H8c: The perceived pleasure of an online game has greater influence on online game acceptance among a low reference group than among a high reference group.

H8d: The intent of acceptance of an online game has greater influence on online game loyalty among a low reference group than among a high reference group.
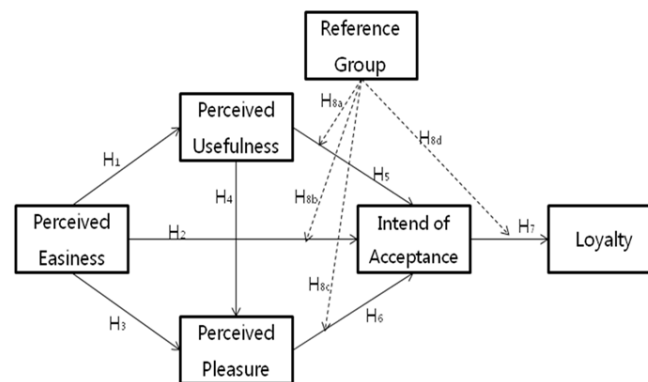

Figure 1. The Research Model

3. Research Methodology

3.1. Data Collection

To verify the model and hypotheses derived previously, relevant data was collected through an online survey using a questionnaire on variables. This study conducted a preliminary research on the characteristics of online gamers' attitudes toward online game communities through an offline focus group interview and then, based on the results of the preliminary research, carried out the main research online. The questionnaire was composed in the form of a web page. The survey was advertised using web banners on the first pages of online game websites and hyperlinks on several college websites. The respondents were asked to select their favorite online game. They were also asked to answer the questions regarding perceived easiness, perceived usefulness, perceived pleasure, intent of acceptance, game loyalty, and influencing of reference group.

A total of 334 respondents participated. The characteristics of the respondents are as follows in Table 1. The sample consists of more males (90.4%) than females (9.6%), most (85.7%) are between the ages of 20 and 29, and the majority have a university or lower level of education (93.7%), implying that people with lower education are more likely to use online game.

Table 1. Descriptive Statistics of User Group

Demographics		N=334	%
Gender	Male	302	90.4
	Female	32	9.6
Age	Less than 20	35	10.5
	20 age - less than 30	286	85.7
	More than 30	13	3.8
Education	High school	20	6
	(2 years)College	277	82.9
	Bachelor's degree	36	10.8
	More than master's degree	1	0.3

3.2. Instrument Development

The instruments in this study are based on previous studies and reworded to suit the context of online game [31]. The scale items are measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The original English-language questionnaire was administered in Korean. To avoid cross-cultural methodology issues, back-translation (with the material translated from English into Korean and then back into English, the versions compared, and discrepancies resolved) is used to ensure consistency between the survey versions [32, 33].

Perceived easiness is measured by three items adopted from Venkatesh and Davis[18], and Agarwal and Karahanna[25]. The coefficient alpha is 0.852. Also perceived usefulness is measured using a scale of three items revised from Venkatesh and Davis, and Agarwal and Karahanna. The coefficient alpha of perceived usefulness is 0.646. Perceived pleasure is measured using a thee item scale adopted from Hsu and Lu, Agarwal and Karahanna. The coefficient alpha of perceived pleasure is 0.764. Intent of acceptance is measured by a three-item scale based on Venkatesh and Davis and Agarwal and Karahanna. The coefficient alpha of intent of acceptance is 0.801. Loyalty is measured by a three-item scale based on Oliver(1993). The coefficient alpha of loyalty is 0.809. Finally, reference group items are adopted from Hsu and Lu, Park and Kim. The coefficient alpha of reference group is 0.794.

4. Structural Model Analysis and Result

4.1. Measurement Model

Mathematical models for verifying our research hypothesis are represented as following.

$$LO = a + b_1IA + b_2RG + b_3IARG + e \qquad (1)$$

$$IA = a + b_1PU + b_2PE + b_3PP + b_4PURG + b_5PERG + b_6PPRG + e \qquad (2)$$

$$PP = a + b_1PU + b_2PE + e \qquad (3)$$

$$PU = a + b_1PE + e \qquad (4)$$

Where, L denotes loyalty, IA is Intend of Acceptance, RG is reference group, PP is perceived pleasure, PU is perceived usefulness and PE is perceived easiness of the game.

Overall measurement quality is assessed using confirmatory factor [34]. Although measurement quality is sometimes assessed factor by factor, in the current study each multiple-item indicator is considered simultaneously to provide for the fullest test of convergent and discriminant validity.

As shown in Table 2, one items with low factor loadings (below 0.50) are dropped from further analysis [34, 35].

All loadings exceed 0.70, except Game loyalty 03(0.680). The χ2 fit statistics show 188.226 with 104 of freedom ($\chi2/df = 1.810$) ($p < 0.001$). The root mean square error of approximation (RMSEA) is 0.049; the comparative fit index (CFI) is 0.962; the adjusted goodness-of-fit index (AGFI) is 0.910; and the normed fit index (NFI) is 0.921. All statistics support the overall measurement quality given the number of indicators.

Furthermore, As shown in Table 2, one construct with low of the Composite construct reliability(CCR) and Average variance extracted(AVE) (below 0.70).

The evidence of discriminant validity exists that reference group of the Composite construct reliability(CCR) and Average variance extracted(AVE) are 0.797 and 0.754, Intent of acceptance is 0.813(CCR) and 0.773(AVE), Game loyalty is 0.827(CCR) and 0.789(AVE), Perceived pleasure is 0.778(CCR) and 0.739(AVE), Perceived easiness is 0.820(CCR) and 0.835(AVE), respectively. Thus, according to this assessment, the measures appear to have acceptable levels of validity.

Table 2. Measurement Model Resulting from Confirmatory Factor Analysis a

Construct and variables	Factor Loadings	CCR[b]	AVE[c]
Reference group 03	.824	.797	.754
Reference group 02	.768		
Reference group 01	.759		
Intent of acceptance 01	.828	.813	.773
Intent of acceptance 02	.801		
Intent of acceptance 03	.705		
Game loyalty 01	.825	.827	.789
Game loyalty 02	.825		
Game loyalty 03	.680		
Perceived pleasure 02	.842	.778	.739
Perceived pleasure 01	.834		
Perceived pleasure 03	.698		
Perceived usefulness 01	.779	.691	.668
Perceived usefulness 02	.700		
Perceived usefulness 03	.798		
Perceived easiness 01	.904	.820	.835
Perceived easiness 02	.884		
Perceived easiness 03[d]	-		

a χ^2 = 188.226, df = 104 (χ^2/df = 1.810), p = 0.000, GFI = 0.939, AGFI = 0.910, RMSEA = 0.049, NFI = 0.921, CFI = 0.962.
b Composite construct reliability.
c Average variance extracted.
d The item was deleted after confirmatory factor analysis.

4.2. Overall Model Results

To verify the theoretical model and the hypotheses, this study used the AMOS program. AMOS is a technique of the structural equation model that can analyze both the theoretical model and measurement model, including many hierarchical variables.

The verification found that the five hypotheses were all significant<table 3>. Perceived usefulness of a game had the greatest influence (path coefficient = 0.293) on the intent of acceptance, whilst the perceived pleasure (path coefficient = 0.166) and perceived easiness(path coefficient = 0.175) had the low influence on the intent of acceptance and was statistically significant.

One interesting fact was the result of the hedonic information system, which is an online game. The path coefficient of perceived pleasure was 0.399 in the relationship between perceived usefulness and perceived pleasure. Also, the path coefficient of perceived pleasure was 0.156 in the relationship between perceived easiness and perceived pleasure. In other words, perceived usefulness and perceived easiness influence in intent of acceptance though perceived pleasure. This signifies that users will accept an online game if it gives them hedonic value like a perceived pleasure rather than utilitarian value like a perceived easiness and perceived usefulness. These differentials the path coefficients among perceived easiness, perceived usefulness, and perceived pleasure are identical to the results of the study by Van der Heijden, which first mentioned the hedonic information system, and the results of the study by Hsu and Lu.

Table 2. Structural Model Analysis Results (Total)

	Path	Coefficient	T-value	Result
H_1	perceived easiness → perceived usefulness	0.222	2.981	accept
H_2	perceived easiness → acceptance intention	0.175	3.505	accept
H_3	perceived easiness → perceived pleasure	0.156	2.364	accept
H_4	perceived usefulness → perceived pleasure	0.399	5.425	accept
H_5	perceived usefulness → acceptance intention	0.293	3.852	accept
H_6	perceived pleasure→ acceptance intention	0.166	2.213	accept
H_7	acceptance intention → loyalty	0.623	10.429	accept

$\chi^2 = 177.612$, df = 70 (χ^2/df = 2.537), p = 0.000, GFI = 0.932, AGFI = 0.897, RMSEA = 0.068, NFI = 0.904, CFI = 0.939.

4.3. The Moderating Effect of Reference Group

A reference group was found to have a moderating effect on the relationships among perceived usefulness, perceived easiness, and perceived pleasure, intent of acceptance, and game loyalty which supported all the hypotheses on moderating effect. In the event of high reference group, like the total group, the perceived usefulness of a game had the greatest influence (path coefficient = 0.300) on the intent of acceptance, whilst the perceived pleasure of a game had the lowest influence on the intent of acceptance (path coefficient = 0.128) and was statistically significant. This varied from the low reference group at the significance level of 99%. On the other hand, unlike the total group, the perceived pleasure of a game had the greatest influence (path coefficient = 0.267) on the intent of acceptance in the event of low reference group, whilst the perceived usefulness of a game had the lowest influence on the intent of acceptance and was statistically insignificant (path coefficient = 0.048). This also varied from the high reference group at the significance level of 99%.

A reference group was found to have moderating effect on the relationship between the intent of acceptance and game loyalty, which also supported the hypothesis. In the event of low reference group, the intent of acceptance of a game had the more influence (path coefficient = 0.619) the loyalty of game than in the event of high reference group(path

coefficient = 0.488), This also varied from the high reference group at the significance level of 99%.

Table 2. Structural Model Analysis Results (Total)

Number of Hypotheses		High Reference Group	Low Reference Group	Testing of hypothesis
H8a (Perceived Usefulness → Intent of Acceptance)	Path Coefficient	0.300	0.048	Accept (High innovativeness)
	Standard error	0.103	0.196	
	Sample size	196	138	
	T-value	13.82*		
H8b (Perceived Easiness → Intend of Acceptance)	Path Coefficient	0.134	0.058	Accept (High innovativeness)
	Standard error	0.087	0.072	
	Sample size	196	138	
	T-value	8.71*		
H8c (Perceived Pleasure → Intent of Acceptance)	Path Coefficient	0.128	0.267	Accept (Low innovativeness)
	Standard error	0.083	0.130	
	Sample size	196	138	
	T-value	-11.07*		
H8d (Intent of Acceptance → Loyalty)	Path Coefficient	0.488	0.619	Accept (Low innovativeness)
	Standard error	0.074	0.101	
	Sample size	196	138	
	T-value	-12.98*		

χ^2 = 281.728, df =140 (χ^2/df = 2.012), p = 0.000, GFI = 0.898, AGFI = 0.848, RMSEA = 0.055, NFI = 0.842, CFI = 0.912.

5. Conclusions

This study regarded an online game as a type of hedonic information system, focus on combined perceived pleasure with the TAM, which is an IT acceptance model, and used reference group as a moderator for analysis. In agreement with the results of the study by Hsu and Lu, this analysis found that perceived easiness, perceived usefulness, and perceived pleasure were all important influencing factors in the interpretation of online game acceptance. Furthermore, the greatest influencing factors on the intent of online game acceptance about the total group were the perceived usefulness, perceived pleasure, and perceived easiness of the game, in this order. In other words, an online game is a kind of hedonic information system, as claimed by van der Heijden. Because the main objective of an online game is the pursuit of pleasure through interaction with the system, perceived usefulness is more important than perceived easiness in relationship of perceived pleasure. However, when we divided the game users into two groups by level of reference group and conducted a verification of hypotheses, an interesting result appeared. In other words, the high reference group showed high intent of game acceptance if a game agreed with their useful values, even if it was somewhat inconvenient, whilst perceived pleasure of a game was the greatest influencing factor in the low reference group.

As Deutsch and Gerad [36] asserted, individuals' perceptions of norms consist of two influence : informational and normative. The first occurs if a user perceives information as enhancing his or her knowledge; the second occurs when a person conforms to the expectations of others in order to obtain a reward or avoid punishment. This study found that for online games, the high reference group regarded perceived usefulness and perceived easiness as more important than perceived pleasure. Conversely, the low reference group regarded perceived pleasure as more important than perceived usefulness and perceived easiness. In the case of perceived pleasure, which is an important variable in the acceptance of an online game, the difference was found between the two groups divided by reference group level. This result indicates that perceived pleasure is

commonly an important element in online game acceptance, regardless of reference group level.

This research is extending TAM to be suitable for online game combining perceived pleasure and TAM, moderating effect of reference group in online game. Also, we are supplying registration point so that enterprise can take advantage of these result and rear successful on-line game. But this study has a few limitation and suggestions for future studies.

First, we have tried to collect more generalized data. But this study used for 334 data sample. Most of the respondents were college students in their twenties. Therefore, through additional study, need effort that generalize finding of this study. Specially, need to consider weight of woman gamers.

Second, future study need to consider additional game style. For example, serious game is in use in health care, education, military, corporate and public institution etc. For the development of serious game, it is necessary to articulate the specific features that lend themselves best to the creation of effective learning games [37]. That is, perceived easiness or perceived pleasure is important in occasion of serious game. We need to verify model of study dividing to game style such as serious game.

Third, additional studies focused on community of online game, specially MMORPG, are required. Members of online communities who have a great deal of knowledge of MMORPGs are expected to serve as core opinion leaders in the communities. A opinion leader and community member as reference group may directly influence participation in and commitments to online communities. In addition, the role of online communities is more crucial for the MMORPGs that require complex skills and strategies than those that can be played simply for fun. Therefore, studies that examine guilds and clans of MMORPGs considering the characteristics of MMORPGs communities are required.

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