온라인게임 사용자의 충성도에 영향을 미치는 요인에 관한 연구 : 한국, 일본, 중국 온라인게임 시장 비교

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Determinants of Effecting Customer Loyalty : Comparison among Korean, Japanese and Chinese Online Game Market

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■ Abstract ■

The purposes of this research are to identify causalities among flow and customer loyalty in Chinese online games, and to identify the factors by which flow are influenced. This research tests the model with Chinese online game users and compare this result with Korea and Japanese results which were conducted by Lee's research. These implications are thought to be helpful for Korean online game companies to understand the Chinese online game user ard to develop the penetration strategies.

The results indicated that significant path coefficients to flow were the convenience of operator, the provision of information, the reality o" design. The results indicated that significant path coefficients to customer loyalty were the involvement of virtual community and flow. The involvement of virtual community to flow was not significant but to customer loyalty was significant. The provision of information was negatively influenced on flow. The result of comparison indicated that the path coefficients were different among nations. Korea online game companies need to develop the indigenized online game and to provide the information to their Chinese partner correctly and quickly.

Keyword : Chinese Onlire Game, Structural Equation Model, Casual Model, Flow, Customer Loyalty

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1. Introduction

A new revolutionary period of e-commerce has begun since the early 2000's. A vast decline in Internet company stocks caused the economic bubble to burst. Therefore, e-commerce managers recognized that the previous perspective focusing on the number of users should be converted into a business perspective, which focuses on establishing business models eliciting profitability [43]. On this occasion, the online game market has shown to be a major part of the profit model. Recent research realized the importance of this industry not only in the world culture but as a profitable business model.

Recently, Asian online game industry has been grown rapidly. 2005 e-Business White Paper of Korea Institute for Electronic Commerce (KIEC) indicated that the online game market was increased 155.36% from $ 5.6 billion in 2002 to $ 14.3 billion in 2007, compared with 61.2% for global game market. Additionally, Asian online game market held 22.68% ($ 2.2 billion) of market ratio in 2005, compared with 14.3 % ($ 0.8 billion) in 2002. Korea, Japan and China held over 90% in Asian online game market [38].

Especially, China has become the fastest-growing market with the largest potential in the global online game industry, in comparison with Korean and Japanese online game market. Since its landing in China in 1999, Chinese online games have won over 40 million users. According to International Data Corporation [32], the Chinese online game market size in 2001 was just 310 million yuan (1 dollar = 8.28 yuan), and it had expanded to 910 million yuan by 2002, with an increase rate as high as 193.5 percent. The IDC says China is expected to become the largest online gaming market by 2007, with availability of broadband and wireless networks acting as the key to growth.

With the rapid growth in Chinese online game market, Korean online game companies were trying to penetrate Chinese game markets. There are currently about 140 online games serving the Chinese market until March 2004. Of these games, only forty are locally produced, Korea online games have occupied more than fifty percent on the market.

Korean online game companies hoped that it would be successful to penetrate Chinese online game market and recklessly entered into that without understanding the core needs of those audiences. The lack of consideration, however, has forced many Korean online game companies to fail to penetrate Chinese online game market [30]. To penetrate to Chinese online game market successfully, Korean online game companies need to determine who the target customers are [55].

However, previous studies have been conducted mainly from the technological and psychological perspective of online games. The main concern of technological research was to design and develop a more attractive and effective online game environment [1, 49, 57]. What was found was that no matter how sophisticated the technologies applied, users would not revisit the game site if such technology failed to reflect the users' needs [43]. Furthermore, the results of psychological research were not generalized into business because it focused on negative effects caused by the game addiction [12, 25, 35, 39, 44]. Therefore, business-oriented research is more important in online game studies.

In online game area, more emphasis is being placed on the impact of a flow using business perspective [2, 11, 13, 28, 40, 42, 53]. Building upon the work of Csikszentmihalyi [16, 18], the flow construct has been proposed as important for under-

standing consumer behavior on information technology and World Wide Web. Recently, online game research also focus on flow and customer royalty [11, 13, 29, 40, 42, 43]. In those research, flow is intervening variable from determinant to customer loyalty.

The purposes of this research are to identify causalities among flow and customer loyalty in Chinese online games, and to identify the factors by which flow are influenced. This research tests the model with Chinese online game users. Additionally, we compare this result with Korean and Japanese results which were conducted by Lee's research [43], because countries with different cultural and industrial background might have to be very careful about developing their penetration strategies [9, 43]. These implications are thought to be helpful for Korean online game companies to understand the Chinese online game user and to develop the penetration strategies.

2. Theoretical Background

2.1 Flow in IT and WWW

The original concept of flow was introduced by Csikszentmihalyi when he studied chess players, rock climbers, and dancers [16, 17]. He defined it as "the holistic experience that people feel when they act with total involvement." In 1997, he provided a comprehensive listing of eight components of flow : (1) a clear goal, (2) feedback, (3) challenges match skills, (4) concentration and focus, (5) control, (6) loss of self-consciousness, (7) transformation of time, and (8) the activity becomes autotelic (that is, perceived as worth doing for its own sake) [19]. When in the flow state, people become absorbed in their activity : their awareness is narrowed to the activity itself; they lose self-consciousness, and they feel in control of their environment. Such a concept has been extensively applied in studies of a broad range of contexts, such as sports, shopping, rock climbing, dancing, gaming and others [18, 29].

Building upon the work of Csikszentmihalyi, the flow construct has been proposed as important for understanding consumer behavior on information technology and World Wide Web, and as a way of defining the nature of compelling online experience, as presented in <Table 1>. For example, Trevino and Webster [54] presented arguments suggesting that the notion of flow is an important element of understanding human-technology interactions, and indeed, an important antecedent of attitudes toward technologies. They described four dimensions of the flow experience in the context of information technologies : (1) a control dimension, capturing the individual's perception that he exercise control over the interaction with the technology; (2) an attention focus, where the individual's attention is limited to the narrow stimulus represented by the technology ; (3) a curiosity dimension, suggesting that during a flow experience, there is a heightened arousal of sensory and cognitive curiosity ; and (4) an intrinsic interest dimension, implying that the individual's interaction with the technology extends beyond mere instrumentality to be pleasurable and enjoyable as an end in itself [2].

In subsequent work, Webster et al. [56] developed multi-item scales to measure the four dimensions of flow. They argued that flow would be associated with specific characteristics of software (specifically, perceptions of flexibility and modifiability) and with certain technology use behaviors (experimentation and future voluntary computer interactions). Based on the research results, they

〈Table 1〉 Constructs within Flow Models

Authors	Applications	Flow Antecedents	Flow Experience	Flow Consequences
Ghani et al. [22]	Humancomputer interactions	Control, Challenge.	Enjoyment, Concentration.	
Trevino and Webster [54]	Humancomputer interactions	Computer Skill, Technology Type, Ease of Use.	Control, Attention Focus, Curiosity, Intrinsic Interest.	Attitudes, Effectiveness, Quantity, Barrier Reduction.
Webster et al. [56]	Humancomputer interactions	Perceived Flexibility, Perceived Modifiability, Experimentation, Future Voluntary Use, Actual Use, Perceived Communication Quantity, Perceived Communication Effectiveness.	Control, Attention Focus, Curiosity and Intrinsic Interest.	
Ghani and Deshpande [23]	Humancomputer interactions	Control, Challenge.	Enjoyment, Concentration.	Exploratory use
Ghani [24]	Humancomputer interactions	Fit : balance of challenges and skills in the activity, Perceived Control, Cognitive Spontaneity.	Enjoyment, Concentration.	Focus on Process, Learning, Creativity.
Hoffman and Novak [28]	Web sites	Skill/Challenge Congruence Telepresence Interactivity, Vividness. Focused Attention Interactivity, Vividness, Involvement. Process Character		Increased Learning, Perceived Control, Exploratory Mindset, Positive Experience.
Agarwal and Karahanna [2]	Web sites	Playfulness, Personal Innovativeness.	Control, Attention Focus, Curiosity, Temporal Dissociation, Focused Immersion, Heightened Enjoyment.	Behavioral Intention to Use Perceived Usefulness, Perceived Ease-of-Use.
Novak et al. [46]	Web sites	Skill/Control Start Web, Imporatnce. Challenge Arousal Start Web, Interactive Speed, Importance. Interactive Speed Telepresence/Time distortion Focused Attention Challenge Arousal, Importance.		
Skadberg and Kimmel [50]	Web sites	Domain knowledge/Skill Information in the Web site /Challenge Telepresence Attractiveness Experience with Web sites Interactivity Speed, Ease of Use	Enjoyment, Time distortion.	Increased Learning, Changes of Attitude and Behavior (indirect, through learning).
Choi et al. [13]	Online game	Mechanic interaction Goal, Operator, Feedback. Social interaction Virtual world, Communication	Interest, Curiosity, Control, Focus.	Customer loyalty
Lee et al. [42]	Online game	impulsiveness, motivation, operator, feedback, design, information, time	Attention Focus, Curiosity, Intrinsic Interest.	Addiction, Customer Satisfaction, Customer loyalty
Kim et al. [40]	Online game	psychological temptation impulsiveness, motivation, site quality feedback, design, information, a sense of community	Attention Focus, Curiosity, Intrinsic Interest.	Addiction, Customer Satisfaction, Customer loyalty
Hsu and Lu [29]	Online game	Perceived ease of use		Attitude toward playing an online game, Intention to play an online game

recommended that flow be conceptualized as consisting of three rather than four dimensions, with the third dimension representing a combination of intrinsic interest and curiosity [2].

Ghani proposed another conceptualization of the flow experience in human-computer interactions [22-24]. He presented that two key characteristics of flow are (1) total concentration in an activity and (2) the enjoyment one derives from an activity. Ghani modeled fitness of task (i.e., the difference between challenges and skills), perceived control, and cognitive spontaneity ("playfulness") as the antecedents of flow. The consequences of flow were a focus on the process, increased learning, and increased creativity. Ghani's work illustrated the complexity of the balance of a user's skills and challenges. Based on the testing results, Ghani found that the construct of fit (challenges and skills) influences flow indirectly, mediated through perceived control.

Hoffman and Novak [28] developed a theoretical model of flow within the hypermedia environment of the Web. They argued that the dimensions of control, curiosity, intrinsic interest, and attention focus were antecedents to flow rather than its core dimensions. Their model included several other antecedents of flow perceived congruence of skills and challenges, and the interactivity and telepresence from the literature on communication media. This model showed the consequences of flow as increased learning, perceived control, exploratory mind-set, and positive subjective experience. In 2000, Novak et al. [46] adjusted their 1996 theoretical model and tested it empirically using structured equation modeling. One important change was that the control construct was moved from a consequence to an antecedent of flow. The construct arousal was added as an antecedent of flow, and was a dependent variable of challenge. Surprisingly, Novak et al. did not find support for the hypothesis that greater flow corresponds to greater exploratory behavior while exploratory behavior corresponds with telepresence. Novak et al. [47] later empirically tested the impact of process characteristics and found that goal-directed processes were more conducive to flow than experiential ones [21, 47].

Extending the notion of flow as described by Trevino and Webster, Agarwal et al. [3] described a new construct called cognitive absorption in the context of individual behavior toward new information technologies. In 2000, they described that cognitive absorption was theorized as being exhibited through the five dimensions of temporal dissociation, focused immersion, heightened enjoyment, control, and curiosity. And cognitive absorption was posited to be a proximal antecedent of two important beliefs about technology use : perceived usefulness and perceived ease of use. In addition, they proposed that the individual traits of playfulness and personal innovativeness were important determinants of cognitive absorption [2].

Skadberg and Kimmel [50] proposed a flow model to predict the level of flow for a tourism website. They argued that three direct antecedents of flow were domain knowledge/skill, information in the web site/challenge, and telepresence, which was influenced by site attractiveness and interactivity. They described two dimensions of flow in that context : time distortion and enjoyment. The consequence of flow was increased learning, which impacted attitude and behavior.

2.2 Flow in Online Game

Previous studies on flow were conducted in

World Wide Web. Recently, there are a few studies on online game, and mainly conducted by Korean researcher as follows. Cho et al. [11] indicated that two broad categories of determinants to online game users' loyalty ; the characteristics of players (including Impulsiveness and Motive for Game playing) and the characteristics of the game playing environments (including playfulness of games and convenience of game playing). In this research, loyalty is measured as behavioral loyalty and cognitive loyalty as dependent variables for the determinants. The results of this research showed that impulsiveness and convenience positively influenced behavioral loyalty and that impulsiveness, motive and playfulness positively influenced cognitive loyalty.

Choi et al. [13] indicated that mechanical interaction (computer) and social interaction (human) influenced flow which subsequently influenced customer satisfaction. Moreover, the effect of social interaction on flow and customer loyalty was greater than that of mechanical interaction due to the user now being able to play with others (network character of Internet) ; different from previous video games when the user played alone

Lee et al. [42] conducted on online games to identify causalities among flow, addiction, customer satisfaction and customer loyalty in online games. The results indicated that six independent variables such as site design, information, operator, feedback, motivation and time have impacts on a flow. On the other hand, a person's impulsiveness, motivation, and average time spent are positively related with addiction. Conclusively, customer satisfaction and loyalty are positively related not with the addiction but with the flow. Furthermore, customer loyalty is significantly influenced by a flow and customer satisfaction. This indicated that online game companies have to develop a strategy for the flow which is more socially and ethically suitable than the addiction.

Kim et al. [40] indicated that psychological temptation, site quality and a sense of community influenced user's flow and addiction ; causalities among flow, addiction, customer satisfaction and customer loyalty were different between Korean and Japanese online games using MSEM (Multi-group Structural Equation Model). The empirical results of MSEM indicated that a sense of community to flow, flow to loyalty and customer satisfaction to loyalty were different between Korea and Japan. This emphasized the need for companies to understand the social and cultural aspects of Japan in order to penetrate their market.

In 2004, Hsu and Lu developed an extended technology acceptance model (TAM) with social influences and flow experience [29]. They argued that perceived ease-of-use is positively related to flow experience of playing of an on-line game, and flow experience is positively related to attitude toward playing an on-line game, and flow is positively related to intention to play an on-line game. However, they empirically found that flow experience was not statistically significantly related to attitude toward playing an on-line game.

Lee et al. [43] conducted multi-group comparison test to determine whether the path coefficients were different across Korean and Japanese online gamer. The results indicated that the significant variables were different each nation. The variables of Korean sample were the suitability of feedback, the precision of information, the reality of design and the involvement of virtual community, while in the Japanese, the convenience of operator, the precision of information, the reality of design and the involvement of virtual community.

Through the review of the relevant literature, the

determinant variables were different from that of studies on WWW. We identify the primary factors for online game as below : the convenience of operator, the suitability of feedback, the reality of design, the provision of information and the involvement of virtual community. This research hypothesizes that these determinants have a positive effect on flow and customer loyalty.

2.3 Research Model

Based on above theoretical background, the research model is designed in <Figure 1> and the following hypotheses were proposed :

Hypothesis 1. The higher convenience of operator provides users positive influence to flow.

Operators are characters and items which are used to play games. We identified the convenience of the operator as the manipulatability of operators to play games [51]. The higher convenience of operator provides users the more positive influence to flow. Previous research indicated that operator is an important determinant of influencing interaction between users and games [2, 20, 55].

Hypothesis 2. The higher provision of information provides users positive influence to flow.

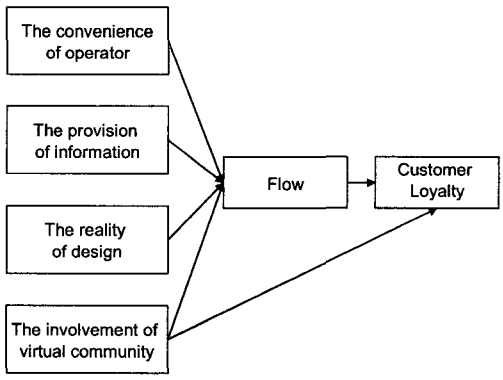
Information is the contents from online game to achieve the stated goals. Playing easily is very important because online game used by computer [11]. Clanton [14] argued that giving information during the game could not only improve the game users' ability but also make them feel pleasure through achieving the goal, and then they would experience flow. Game users who received more precise information about how to play the games tended to achieve online game goals and experience flow easier [13, 45].

Hypothesis 3. The higher reality of design provides users positive influence to flow.

Online games differ from previous computer games because users play with other humans in a virtual community rather than the computer. The Computer is merely a mediating tool connecting among humans within cyber space. Therefore it is important to have game users feel their space as real. To make an interface of a game site look like the real world, design is a primary factor. Therefore, the reality of design is defined as the interface making game users feel online games as part of the real world. Technological researchers also consider design as an important determinant in developing successful online games [1, 49, 57].

Hypothesis 4. The higher involvement of virtual community provides users positive influence to flow.

Hypothesis 5. The higher involvement of virtual community provides users positive influence to customer loyalty.



<Figure 1> Research Model

Virtual community is defined as computer-mediated spaces with potential for integration of

member-generated content and communication [26]. Virtual community was not considered importantly because past game users just played game with computer by themselves. However, with the development of Internet, online game users should solve problems together interacting with other users in virtual communities [13]. Therefore, the interaction among game users has become an important factor, and it accelerates the appearance of virtual community. This theory was proven by China Internet Network Information Center (CNNIC), which indicated that one of the primary reasons to play Chinese online game is to make friends [15]. Online game can give them a good place to meet many kinds of person and obtain new experiences in the large country. Therefore, we proposed that virtual community influenced not only flow but also customer loyalty directly.

Hypothesis 6. The higher flow provides users positive influence to customer loyalty.

Flow is the condition where game users believe their current experience is optimal, get pleasure and have high creativity and productivity [17]. When online game users achieve flow, they receive an optimal experience which makes they revisit the site. This experience (flow) is a driving force which attracts game users without any compensation [28]. Therefore, we proposed that flow influenced customer loyalty directly.

3. Research Method

3.1 Sample

To test the model, a convenience sample of 437 online game users provided the data through several game rooms in China. The demographic statistics indicated that male (74.8%) was more than female (25.2%); most of the respondents were unmarried (95.7%). Sixty-two percent of respondents were under 20 year ; 74.4% were high school and undergraduate; 93.1% were student. 96.3% have an income under 500 yuan. Period of the Internet usage was 2~6 years (93%). The i_day (times of using the Internet per a day) and the g_day (times of using online game per a day) was equally distributed.

3.2 Measurement

This research developed multi-item measures for each construct. Through the review of the relevant literature, we identified the primary factors for online game and translated items into Chinese. Sixteen items for four determinants are selected : the convenience of operator, the provision of information, the reality of design, and the involvement of virtual community. The convenience of operator is measured by five items (O1-5), the provision of information by three items (IF1-3), the reality of design by four items (D1-D4) and the involvement of virtual community by four items (C1-4). We then measured flow by four items (F1-4) and customer loyalty by two items (CL1-2). Total 22 items were selected. We asked respondents to indicate on a seven point Likert scale to what extent the determinants influence on flow in online game.

4. The Results

4.1 Measurement Model

4.1.1 Convergent validity

The validity of the measurement model was evaluated by investigating convergent and discriminant validity. The purpose of convergent validity

is to ensure unidimensionality of the multiple-item constructs and to eliminate unreliable items [8]. The convergent validity was evaluated by investigating the value of standardized factor loadings, standardized residual covariance (SRC) and reliability. Items should load at least 0.60 on their respective hypothesized component and all loadings need to be significant ($p < 0.05$, $t \geq 2.0$) [6, 53]. Items with at least ±2.57 within SRC matrix should be deleted from the model [9, 36, 48]. Reliability for all items of a construct should be evaluated jointly by investigating composite reliability (CR) and the average variance extracted (AVE). For a construct to possess good reliability, CR should be at least 0.60 and the AVE should be at least 0.5 [5, 7, 27, 36, 52].

We used unconstrained confirmatory factor analysis to evaluate convergent validity for six constructs, which included four determinant and two dependent factors. Items which loaded on multiple constructs or had low item-to-construct loadings were deleted from the model. The results of unconstrained CFA indicated that O5 was deleted from the convenience of operator, C2 from the involvement of virtual community, and F3 from flow. Sequentially, O3 was deleted from the convenience of operator, D1 from the reality of design and F4 form flow because of under 0.5 for SMC. Therefore, after six items were deleted, 16 items remained within this model. The results were summarized in <Table 2>.

The results of the fit statistics for the models were summarized in <Table 3>. We began this analysis with Model 1, which was default model included 22 items. The fit statistics for model 1 was weak. However, during evaluating the convergent validity, the fit statistics were improved. Finally, the fit statistics of the final model were good and the convergent validity of model was satisfactory.

〈Table 2〉 Results of elimination

Factors	Items	Elimination			Final Items
		FL	SMC	SRC	
O	O1-5	O5	O3		O1, 2, 4
IF	IF1-3				IF1-3
D	D1-4		D1		D2-4
C	C1-4	C2			C1, 3, 4
F	F1-4	F3	F4		F1, 2
CL	CL1-2				CL1-2
Total	22	3	3	0	16

Note) * FL : Standardized Factor Loading,
SMC : Squared Multiple Correlations
SRC : Standardized Residual Covariance
** O : The convenience of operator,
IF : The provision of information
D : The reality of design,
C : The involvement of virtual community
F : Flow
CL : Customer Loyalty

〈Table 3〉 Results of the fit statistics for the models

Fit Index	Threshold	Model 1	Model 2	Model 3
Chi-square		1243.604	517.074	200.456
d.f	(> .05)	194	137	89
p		0	0	0
Chi-square/df	(< 5.0)	6.41	3.774	2.252
RMR	(< 0.05)	0.221	0.113	0.077
GFI	(> 0.80)	0.797	0.894	0.949
AGFI	(> 0.80)	0.736	0.853	0.921
NFI	(> 0.80)	0.758	0.88	0.94
CFI	(> 0.80)	0.786	0.908	0.966
AIC	(more less)	1361.604	6230.73	294.456

Model 1 = Default Model
Model 2 = Adjusted Model after evaluation of standardized factor loadings
Model 3 = Final Model after evaluation of squared multiple correlations

The results of convergent validity and reliability were reported in <Table 4>. The results indicated that the value of standardized factor loading for each item to its respective construct was significant ($p < 0.05$), and all loadings ranged from 0.663 to

0.925. CR was over 0.718 and AVE was over 0.50 expect 0.460 for the reality of design and 0.477 for the involvement of virtual community. However, because it was acceptably close to the standards and factor loading and CR were acceptable, we didn't delete it. All the values demonstrated good reliabilities. The fit statistics of unconstrained CFA indicated that the chi-square of the model was 200.5 with d.f. of 89, the ratio of chi-square to d.f. was 2.252, GFI was 0.949, AGFI was 0.921 and RMR was 0.07 ; all were acceptable.

4.1.2 Discriminant validity

The purpose of discriminant validity is to identify if the correlation between constructs is not equal to 1.0 and if the constructs differ from each other [8, 10]. It was tested by two subsequent procedures. First, we checked whether correlations among the latent constructs were significantly less than 1 [4]. The coefficient of the correlations should be under 0.9. The results of correlations indicated that all of the correlations between constructs were not unduly vast (the highest is 0.400 in <Table 5>).

〈Table 5〉 Correlation of factors

	O	IF	D	C	F	CL
O	1					
IF	-0.308	1				
D	0.269	-0.149	1			
C	0.291	-0.267	0.333	1		
F	0.272	-0.369	0.236	0.165	1	
CL	0.4	-0.293	0.263	0.33	0.316	1

Note) O : The convenience of operator,
IF : The provision of information
D : The reality of design,
C : The involvement of virtual community
F : Flow CL : Customer Loyalty

〈Table 4〉 Results of the confirmatory factory analysis

Factor	Item	FL	CR	AVE
O	I can manipulate the characters and items to play game (O1)	0.824	0.826	0.613
	With many function of the characters and items, I can play games easer (O2)	0.925		
	The feedback is provided to me appropriately (O3)	0.848		
IF	Games provide me with correct information what I do (IF1)	0.796	0.774	0.536
	Games provide me with sufficient information how to play it (IF2)	0.914		
	Games provide me with precise information what I am doing, when I play game (IF3)	0.726		
D	Avatar is similar to human (D1)	0.663	0.718	0.46
	The interface of game is harmonious (D2)	0.81		
	Avatar and the interface of game is similar to real world (D3)	0.756		
C	When I play game, I believe that the members of games are my colleague (C1)	0.739	0.732	0.477
	I communicate with members actively (C3)	0.801		
	I believe that I belong to the game site (C4)	0.758		
F	When I play game, I feel pleasure and fun (F1)	0.809	0.777	0.636
	When I play game, I feel curiosity (F2)	0.883		
CL	I will be continuous to play this game (CL1)	0.827	0.781	0.641
	I will recommend this game to others (CL2)	0.877		

Note) O : The convenience of operator,
IF : The provision of information
D : The reality of design,
C : The involvement of virtual community
F : Flow
CL : Customer Loyalty

Secondly, we conducted on a chi-square difference test where the chi-square measurements with two analyses were compared. One analysis used constrained model in which the correlation between two constructs set 1.0 and the other used unconstrained model in which the correlation was freely estimated [8, 34]. Thus, the difference in degrees of freedom between the two models was 1. When a value of chi-square difference was over 3.84 with d.f of 1 ($p < 0.05$), the two constructs were statistically different. The six constructs paired against one another were tested and all constructs were different ($p < 0.05$).

4.2 Structural Model

After the measurement model was satisfied, the structural model was evaluated. The structural model was well converged. The results indicated that the chi-square of the model was 229.967 with d.f. of 92, the ratio of chi-square to d.f. was 2.500, GFI was 0.940 and AGFI was 0.912. The results indicated that all the fit statistics were acceptable.

〈Table 6〉 Results of structural model

Path			Estimate	S.E.	t	p
O	→	F	0.157*	0.054	2.729	0.006
IF	→	F	-0.309**	0.06	-5.228	0.000
D	→	F	0.164*	0.074	2.683	0.007
C	→	F	-0.029	0.069	-0.466	0.641
C	→	CL	0.298*	0.068	5.175	0.000
F	→	CL	0.302	0.061	5.312	0.000

Note) * $p < 0.01$
O : The convenience of operator
IF : The provision of information
D : The reality of design
C : The involvement of virtual community
F : Flow CL : Customer Loyalty

The results of structural model analysis were given in <Table 6>. The results indicated that significant path coefficients to flow were the convenience of operator, the provision of information, the reality of design. The results indicated that significant path coefficients to customer loyalty were the involvement of virtual community and flow. Especially, the involvement of virtual community to flow was not significant, but to customer loyalty was significant. Additionally, the provision of information was negatively influenced on flow.

5. Discussion

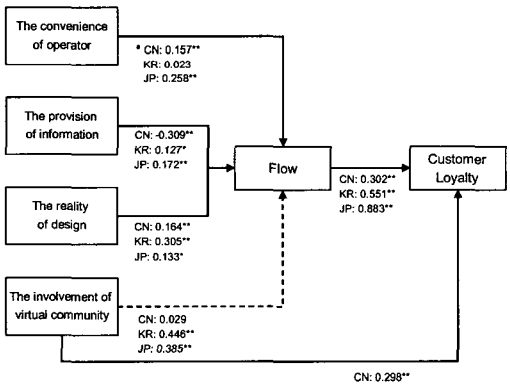
We discussed this general hypotheses (H1~H6) on the results of structural model and proposed the implications for Chinese online game companies, in comparison with Korea and Japanese results which were conducted by Lee's research in <Figure 2> [43].

According to H1, the higher convenience of operator provides users positive influence to flow ($\beta > 0$). The path coefficient of the convenience of operator to flow indicated $\beta = 0.157(p = 0.01)$, which supported H1. When online game users could manipulate tools such as characters and items at their convenience, they would experience flow [2, 20, 54]. This result was similar to Japan, but different from Korea [40, 43]. Lee et al. [43] indicated that the convenience of operator had influence on flow in Japan, but not in Korea. This was because Japanese game users preferred to grow their characters at their convenience. This hypothesis was proven in the case of "Vandai's damakuchi", which is the game growing animal characters for a long time. KGDI indicated that it was sold a total of 15 million until 1997 [37].

Therefore, Korean online game companies should provide the diverse characters (Avatar) and items,

which are harmonized with customers needs and were manipulated conveniently. For example, 'Lineage' provided knight, wizard, elf, dark elf for male and female and prince/princess, total 10 Avatars and 1,150 items to play games.

H2 stated that the higher provision of information provides users positive influence to flow ($\beta > 0$). The path coefficient of the provision of information to flow indicated $\beta = -0.309$(p = 0.00), which contracted H2. Previous research indicated that giving information during the game could not only improve the game users' ability but also make them feel pleasure through achieving the goal, and then they would experience flow [13, 45]. This hypothesis was proven by Lee et al. [43], which indicated that providing precise information could influence on flow positively in Korea and Japan.



Note) [a] CN : China, KR : Korea, JP : Japan
* $p < 0.05$, ** $p < 0.01$

〈Figure 2〉 Comparison of structural model

However, Chinese sample did not support H2. We believed that the reason was that most of Chinese online game were foreign and could not provide correct information. Recently, Korea online games have occupied more than fifty percent on the market. However, they were made urgently so that they could not be indigenized [33]. Most information provided by these online games was mistranslated and incorrect so that game users had to obtain precise information from other channels, such as online game magazine and community sites [31].

Chinese game users did not like incorrect information provided when they played online game and showed negative attitude to the provision of information. This was proven by Jin [33], which indicated that Automation Electric Co., Ltd. (AEC) had to quit the online game "The King Kong Jak (KJKING)" because they could not receive necessary technical support and updated versions from Korean partners. Therefore, Korean online game companies should need to provide the indigenized information in order to retain customers and keep the market share. They should provide information both correctly and quickly.

H3 stated that the higher reality of design provides users positive influence to flow ($\beta > 0$). The path coefficient of the reality of design to flow indicated $\beta = 0.164$(p = 0.01), which supported H3. Online game is a place for many users to meet, and game users will experience flow more easily when it is designed much more like the real world [1, 49, 57]. This result was similar to Korea and Japan [40, 43]. Lee et al. [43] indicated that the convenience of operator had influence on flow in both Korea and Japan.

Therefore, Korean online game companies should make an interface where the game site looks real. For example, the interface of recent games changed 2D such 'Lineage' into 3D such as 'MU', 'Lagnarok' and 'Laghaim'.

According to H4 and H5, the higher involvement of virtual community provides users positive influence to flow and customer loyalty ($\beta > 0$). The path coefficient of involvement of virtual community to flow indicated $\beta = -0.03$(p = 0.64), which did not

supported H4. However, the path coefficient of involvement of virtual community to customer loyalty indicated $\beta = 0.30(p = 0.00)$, which supported H5. Previous research indicated that online game users exchanged their opinions and cooperated to solve the problems that they met in online games. Virtual community was an influential factor of flow directly [13]. This hypothesis was proven by Lee et al. [43], which indicated that the involvement of virtual community could influence on flow directly in Korea and Japan.

However, this result indicated that the involvement of virtual community did not influence on flow but on customer loyalty directly in China. This meant that Chinese online game users would revisit online game site, although they did not get flow experience. This was because many members of virtual communities used online game site as a place to communicate with others. Therefore, they had to play online games following other members' requests, although some members did not want to do. Additionally, they believed that online game gives them the opportunity to meet many kinds of person and obtain new experiences. This theory was proven by CNNIC [15], which indicated that one of the primary reasons for Chinese game users to play online game was to make friends and to communicate with them.

Therefore, Korean online game should provide the different villages and guilds which were harmonized with customer needs. For example, 'Lineage' provided 15 villages to satisfy the different game users' needs. Additionally, they would like to provide a Role Playing Game (RPG) where the game user cooperates with each other rather than shooting games where the game user compete with each other.

H6 stated that the higher flow experience provides users positive influence to customer loyalty ($\beta > 0$). The path coefficient of the flow to customer loyalty indicated $\beta = 0.30(p = 0.00)$, which supported H6. This meant that customer loyalty would increase when users obtain enjoyment and satisfaction from online game, and they might not easily switch to new game. This result was similar to Korea and Japan [40, 43]. However, the path coefficient was different from each nation. Lee et al. [43] indicated that the Japan ($\beta = 0.88$) had a high influence to customer loyalty than Korea ($\beta = 0.55$). Additionally, this result indicated that China had a lower influence ($\beta = 0.30$). This was because the main purposes to play online game was different the Chinese with the Japan and the Korean. As we explained for H5, the main purposes to play a game for Chinese game users were not only to get pleasure but to make friends.

6. Conclusion

The purposes of this research are to identify causalities among flow and customer loyalty in Chinese online games, and to identify the factors by which flow are influenced. The results indicated that significant path coefficients to flow were the convenience of operator, the provision of information, the reality of design. The results indicated that significant path coefficients to customer loyalty were the involvement of virtual community and flow. The involvement of virtual community to flow was not significant but to customer loyalty was significant. The provision of information was negatively influenced on flow.

In comparison between this result and Korea and Japanese result, we propose some strategies. Importantly, Korea online game companies need to develop the indigenized online game and to provide

the information to their Chinese partner correctly and quickly.

Even though the results of this research have several contributions and implications, it has also several limitations, which should be dealt with in future works. Since this research was conducted only on Chinese online game market, results of this research might not be generalized and directly applicable to other countries. Countries with different cultural and industrial background might have to be very careful about developing their own marketing strategies due to the difference in gaming population and perception of people toward games. Additionally, it is necessary to develop cultural variable to compare a difference directly.

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