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THE CAUSAL FACTOR INFLUENCING ON THE USERS' INTENTION IN PLAYING THE ONLINE GAME IN CHINA

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ABSTRACT

The market consumption of online game in 2001 was 310 million yuan and increased to 3.6 billion yuan in 2004. This number was higher 10 times in three years. By the end of December of 2014, the number of online game players reached 377 million which accounted for 58.1% of internet users in China. The statistics revealed that the online game has become the most important entertainment on the internet. 2015, the report of Chinese game industry showed that the number of online game players further increased to 534 million with market consumption reaching140.7 billion yuan. This growing demand enabled the industry of Chinese online game get more benefit. Due to this phenomenal growth in online game industry, it was greatly welcomed by average but diverse Chinese consumers. For this research, researchers want to study causal factor influencing the users' intention in playing the online game in China. The qualitative method and statistical analysis using PLS-SEM techniques were used in this study. The results of the research indicates that performance expectancy (PE), effort expectancy (EE), social influence (SI) significantly influence on behavioral intention (BI). Facilitating conditions (FC), behavioral intention (BI) significantly influence on usage behavior (UB). Moreover, performance expectancy (PE), effort expectancy (EE), social influence (SI) significantly influence on usage behavior (UB) via behavioral intention (BI).

Keywords: Performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention, usage behavior, online game, UTAUT model

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Introduction

At the beginning of 21st century, the industry of Chinese online game welcomed a high speed of adoption. From statistical report, the market consumption of online game in 2001 was 310 million yuan and increased to 3.6 billion yuan in 2004. This number was higher 10 times in three years. By the end of December of 2014, the number of online game players reached 377 million which accounted for 58.1% of internet users in China. The statistics revealed that the online game has become the most important entertainment on the internet (CNNIC, 2016). 2015, Chinese game industry report showed online game player number further increased to 534 million with market consumption reaching 140.7 billion yuan (CNNIC, 2016).

In this research, researchers want to study the online game users' behavioral intention. In earlier online game marketing researches, the focuses were mainly about population characteristics and customer behavior. In 2001, Dixon and Karboulonis conducted the research by players' gender, income and race in European market, the results show that players would gather to be groups by the same type of games. This situation suggested that game companies should design more types of game for different type of players.

From more researches of usage behavior about using information technology, several theories and models had been carried out. These theories included innovation diffusion theory (IDT) (Rogers, 1995), theory of reasoned action (TRA) (Fishbein, & Ajzen, 1975), theory of planned behavior (TPB) (Ajzen, 1991), technology acceptance model (TAM) and extended TAM (TAM2) (Venkatesh & Davis, 2000), combined TAM and TPB (C-TAM-TPB) (Taylor & Todd, 1995) and Social Cognitive theory (SCT) (Bandura, 1986). These theories and models studied usage behavior from different point of views and for the purpose of more comprehensive evaluation of usage behavior, Venkatesh, Morris, Davis, & Davis (2003) combine these eight models and theories in to UTAUT model.

The UTAUT model evaluates usage behavior by contracts and measurements from all eight models and theories. It would give a higher intact factors that would affect on usage behavior. This research would design conceptual framework based on this model.

Objective (s) of the study

To examine what kinds of causal factor influencing the Chinese online game users' intention in playing the Massive Multiplayer Online Role-Playing Game (MMORPGs) to promote MMORPGs customer's willing to play.

Literature review

Performance expectancy

Performance expectancy is the degree of individual belief. The belief about using the system will help users gain succeed in job performance (Venkatesh et al., 2003). Perceived usefulness, one of the two main constructs in TAM (Davis, Bagozzi, & Warshaw , 1989), was adapted into the UTAUT model.

Effort expectancy

Venkantesh et al. (2003) defined effort expectancy as the level of how easy to use an individual thinks a given technology is. This construct is sometimes referred to as perceived ease of use by Davis et al. (1989) in the TAM/TAM2 models or complexity in MPCU model or ease of use in the IDT model.

Social influence

Social influence was described as the extent of which a person recognizes that other people accept as true that he should utilize a certain innovation (Venkatesh et al., 2003). It is a belief that people at the highest status, such as managers, supervisors or even co-workers expect an individual to use a certain technology. Similarly, prior research by Moore and Benbasat (1991) had also supported this same claim that social influence had a significant influence on an individual's intent to use a given innovation.

Facilitating conditions

The direct determinant of behavioral intention was proposed by Venkatesh et al. (2003) and incorporated in the UTAUT model that was facilitating conditions. It was described as the extent

of which an individual thinks that their organization has all the necessary procedural communications and technological support to carry on the adoption and use of a certain system or technology.

Behavioral intention

Behavioral Intentions are "indications of how hard people are willing to try, of how much of an effort they are planning to exert in order to perform a behavior" (Ajzen, 1991). As intention becomes stronger, people are more likely to perform the behavior (Ajzen, 1991). Thus, behavioral intention is an antecedent of action. Numerous studies have shown that behavioral intention use the system that has an impact on the actual usage of the system (Davis, et al., 1989; Taylor & Todd, 1995, Venketesh, et al., 2003).

Conceptual framework

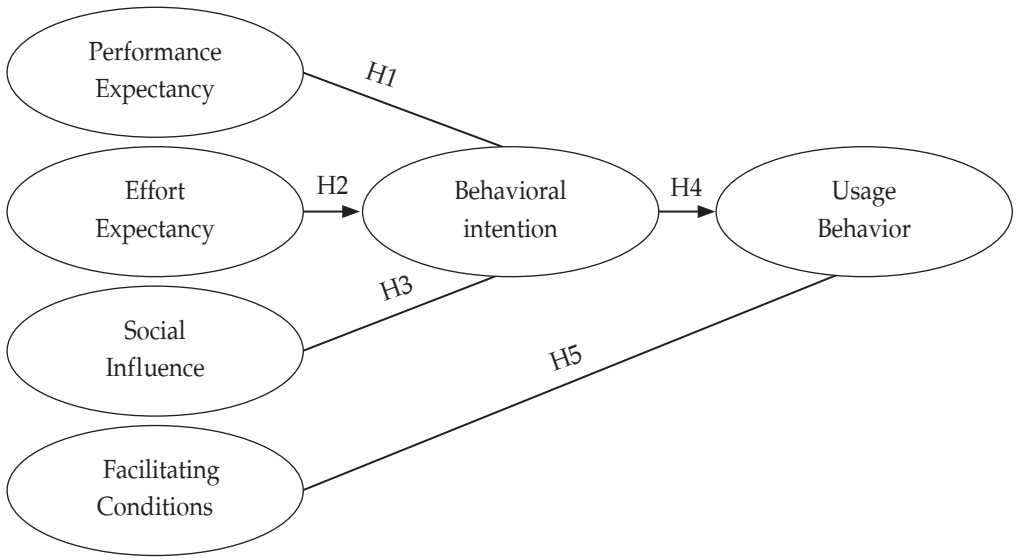

Figure 1 Conceptual framework

Hypotheses

1. Performance expectancy is positively affected on behavioral intention.
2. Effort expectancy is positively affected on behavioral intention.
3. Social influence is positively affected on behavioral intention.
4. Behavioral intention is positively affected on usage behavior.
5. Facilitating conditions is positively affected on usage behavior.
6. Behavioral intention mediates the relation between performance expectancy and usage behavior.
7. Behavioral intention mediates the relation between performance expectancy and usage behavior.
8. Behavioral intention mediates the relation between social influence and usage behavior.

Methodology

The collective data sets are analyzed in three parts. For the first part, researchers used SPSS statistical package to run out the data in order to describe the demographics of respondents' characteristics. The other part is partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0 program to descriptively analyze latent variables and validate the measurement model, structural model and test hypothesis.

The analysis of data consists of three sections as follows:

1. The descriptive demographics of respondents
2. The descriptive analysis of latent variables
3. Evaluation of the measurement model
   - 3.1 Assessment of Reliability
     - 3.1.1 Consistency reliability

In the current study, the results indicated that no matter which particular reliability coefficient was used, the criteria to evaluate the internal consistency reliability value should be above 0.7 in early stages of research and above 0.8 or 0.9 in more advanced stages of research. These are regarded as satisfactory, whereas a value below 0.6 indicates a lack ofreliability (Hair, Ringle, & Sarstedt, 2014).

3.1.2 Indicator reliability

The reliability of questionnaire was evaluated by using Cronbach's Alpha. Hulland (1999) found that the Cronbach's Alpha of each variable or dimension was more than 0.6.

3.2 Assessment of Validity

The assessment of validity through the determination of convergent validity (average variance extracted, AVE), and discriminant validity (Fornell-Larcker criterion, cross-loadings) were described by Hair et al. (2014).

3.2.1 Convergent validity (average variance extracted)

To check convergent validity, each latent variable's Average Variance Extracted (AVE) should greater than the acceptable threshold of 0.5. (Hair, Black, Babin, & Anderson, 2010).

3.2.2 Discriminant validity

Fornell & Larcker (1981) suggested that the square root of AVE in each latent variable can be used to establish discriminant validity if this value is larger than other correlation values among the latent variables.

4. Evaluation of the structural model

4.1 Assessment of the structural model for collinearity statistics (VIF)

Collinearity of indicators: Each indicator's tolerance (VIF) value should be higher than 0.2 (lower than 5). (Hair et al., 2014).

4.2 Assessment of the significance and relevance of the structural model relationships

According to Bartlett (1937), the factors ($p<0.05$) are acceptance and show the significant relation with dependent variable. In PLS-SEM, item reliability is determined with the loadings of the measures with their respective construct. In general, researchers accept items with loadings equal or higher than 0.7.

4.3 Assessment of the level of R^2

The coefficients of determination (R^2) were analyzed by observing its sizes and comparing them with the standard evaluation criteria that indicates that the R value ranges from 0- 1. High values indicate high levels of predictive accuracy (Hair et al., 2014).

4.4 Assessment of the effect sizes f^2

The effect sizes f^2, researcher use effect sizes value to ascertain whether the effects indicated by path coefficients are small, medium, or large. The values are 0.02, 0.15, and 0.35 (Cohen, 1988).

Sample size and population

The target population of this research are the players who play the MMORPGs in Yunnan Province of China. The research method is the quantitative, through sending the questionnaires to get the quantitative data. There are totally 22 questions into a questionnaire of this research. The ideally outcome of this study is that finally would able to collecting more than 400 validity copies (Kim, 2016). Thus, researcher collect data 503 set and chooses completely 448 set of the questionnaires, as 89.1% of the questionnaires.

Instrument

The questionnaire of all data set was developed from the conclusion of some researchers. The questionnaire was divided into two parts. The first part of the questionnaire was personal information. It includes gender, marital status, age, highest level of education, monthly income (USD), occupation and playing game frequency. The second part of the questionnaire was to analyze factors consisted of performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention and usage behavior. The answer in each questions using the 5-point scale in this study.

Data analysis

The collective data sets are analysis in three parts the first part researcher used SPSS statistical package to run out the data in order to describe

the demographics of respondents characteristics, The other part is partial least squares structural equation modeling (PLS-SEM) Which is suitable for small sample(Kim, 2016). Using SmartPLS 3.0 program to descriptive analysis of latent variables and validates the measurement model, structural model and test hypothesis.

Results

Demographic information of the respondents

Table 1 Descriptive statistics of demographic variables of the 448 respondents

Measure	Item	Frequency	Percentage
Gender	Male	229	51.1
	Female	219	48.9
Age (year)	Less than 20 or equal	76	17.0
	21-30	261	58.2
	31-40	74	16.5
marital status	More than 41 or equal	37	8.3
	Single	279	62.3
	Married	145	32.3
	Others	24	5.4
Highest level of education	Secondary school	39	8.7
	Junior college	109	24.3
	Undergraduate degree	242	54.0
	Master degree	50	11.2
	Doctor degree	8	1.8
Income (USD)	Less than 200 or equal	146	32.6
	201-500	82	18.3
	501-800	109	24.3
	801-1100	60	13.4
	1101-1400	27	6.0
	More than 1400	24	5.4
Occupation	Student	177	39.5
	Labor	35	7.8
	Teacher	19	4.2
	Public employee	32	7.1
	Private employee	115	25.8
	Others	70	15.6
Playing game frequency	Less than 1 hour a week or equal	71	15.8
	1-3 hours a week or equal	111	24.8
	3-5 hours a week or equal	84	18.8
	More than 5 hours a week	182	40.6

Among the 448 respondents, 229 (51.1%) respondents were male and 219 (48.9%) were female. The majority of the respondents were 21-30 years old (58.2%), single status (62.3%), undergraduate degree (54.0%), monthly income was less than or equal 200 USD (32.6%), Occupation was student (39.5%) and playing game frequency was more than 5 hours a week (40.6%).

Table 2 Results of Mean and Standard deviation

Dimension	Mean	S. D.	Interpret	Dimension	Mean	S. D.	Interpret
PE1	4.00	0.82	High Level	FC1	3.80	1.06	High Level
PE2	4.05	0.83	High Level	FC2	3.85	0.97	High Level
PE3	3.85	0.98	High Level	FC3	3.86	0.94	High Level
PE4	4.00	0.85	High Level	FC4	3.82	0.97	High Level
EE1	3.94	0.86	High Level	BI1	3.88	0.94	High Level
EE2	3.88	0.91	High Level	BI2	3.93	0.97	High Level
EE3	3.87	0.91	High Level	BI3	3.93	0.93	High Level
EE4	3.90	0.88	High Level	UB1	3.88	0.97	High Level
SI1	3.94	0.92	High Level	UB2	3.82	1.05	High Level
SI2	3.79	0.96	High Level	UB3	3.79	1.21	High Level
SI3	3.87	0.92	High Level				
SI4	3.80	0.93	High Level				

Table 2 shows mean score and standard deviation for the PE1 (4.00, 0.82), PE2 (4.05, 0.83), PE3 (3.85, 0.98), PE4 (4.00, 0.85). EE1 (3.94, 0.86), EE2 (3.88, 0.91), EE3 (3.87, 0.91), EE4 (3.90, 0.88). SI1 (3.94, 0.92), SI2 (3.79, 0.96), SI3 (3.87, 0.92), SI4 (3.80, 0.93). FC1 (3.80, 1.06), FC2 (3.85, 0.97), PE3 (3.86, 0.94), PE4 (3.82, 0.97). BI1 (3.88, 0.94), BI2 (3.93, 0.97), BI3 (3.93, 0.93). UB1 (3.88, 0.97), UB2 (3.82, 1.05), UB3 (3.79, 1.21). All of the variables are ranked in the level of high Level.

Table 3 Results of convergent validity

Latent Variable	Dimension	Loadings	Average variance extracted(AVE)	Composite Reliability (CR)	Cronbach's Alpha
Performance Expectancy	PE1	0.807	0.686	0.897	0.847
	PE2	0.849			
	PE3	0.850			
	PE4	0.805			
Effort Expectancy	EE1	0.859	0.742	0.920	0.884
	EE2	0.862			
	EE3	0.857			
	EE4	0.868			

Latent Variable	Dimension	Loadings	Average variance extracted(AVE)	Composite Reliability (CR)	Cronbach's Alpha
Social Influence	SI1	0.824	0.694	0.901	0.853
	SI2	0.841			
	SI3	0.831			
	SI4	0.835			
Facilitating Conditions	FC1	0.860	0.748	0.922	0.888
	FC2	0.879			
	FC3	0.879			
	FC4	0.842			
Behavioral intention	BI1	0.896	0.806	0.926	0.879
	BI2	0.910			
	BI3	0.887			
Usage behavior	UB1	0.886	0.823	0.933	0.892
	UB2	0.927			
	UB3	0.908			

Table 3 shows the measurement model analysis for Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) latent variable in this research includes four measurement items. Behavioral intention (BI) and Usage behavior (UB) latent variable in this research includes three measurement items.

Performance Expectancy (PE) outer loadings were from 0.805 to 0.850. Effort Expectancy (EE) outer loadings were from 0.857 to 0.868. Social Influence (SI) outer loadings were from 0.824 to 0.841. Facilitating Conditions (FC) outer loadings were from 0.842 to0.879. Behavioral Intention (BI) outer loadings were from 0.887 to 0.910. Usage Behavior (UB) outer loadings were from 0.886 to 0.927.

Average Variance Extracted (AVE) of Performance Expectancy (PE) was 0.686. Average Variance Extracted (AVE) of Effort Expectancy (EE) was 0.742. Average Variance Extracted (AVE) of Social Influence (SI) was 0.694. Average Variance Extracted (AVE) of Facilitating Conditions (FC) was 0.748. Average Variance Extracted (AVE) of Behavioral Intention (BI) was 0.806. Average Variance Extracted (AVE) of Usage Behavior (UB) was 0.823.

Cronbach's Alpha of Performance Expectancy (PE) was 0.847. Cronbach's Alpha of Effort Expectancy (EE) was 0.884. Cronbach's Alpha of Social Influence (SI) was 0.853. Cronbach's Alpha of Facilitating Conditions (FC) was 0.888. Cronbach's Alpha of Behavioral Intention (BI) was 0.879. Cronbach's Alpha of Usage Behavior (UB) was 0.892.

Composite reliability (CR) of Performance Expectancy (PE) was 0.897. Composite Reliability (CR) of Effort Expectancy (EE) was 0.920. Composite reliability (CR) of Social Influence (SI) was 0.901. Composite reliability (CR) of Facilitating Conditions (FC) was 0.922. Composite reliability (CR) of Behavioral intention (BI) was 0.926. Composite reliability (CR) of Usage behavioral (UB) was 0.933.

Table 4 Results of Discriminant validity

	BI	EE	FC	PE	SI	UB
BI	0.898					
EE	0.759	0.861				
FC	0.827	0.817	0.865			
PE	0.721	0.751	0.736	0.828		
SI	0.800	0.791	0.809	0.746	0.833	
UB	0.837	0.796	0.851	0.707	0.798	0.907

Table 4 shows the square root of AVE in each latent variable is larger than other correlation values among the latent variables.

Table 5 Results of hypotheses testing

Hypothesis	β	S.D.	t-statistics	p-values	f^2	Effect Size	Supported
PE→BI (H1)	0.187	0.077	2.437	0.015	0.043	small	Yes
EE→BI (H2)	0.255	0.071	3.581	0.000	0.067	small	Yes
SI→BI (H3)	0.460	0.058	7.930	0.000	0.223	medium	Yes
BI→UB (H4)	0.423	0.048	8.897	0.000	0.258	medium	Yes
FC→UB (H5)	0.502	0.048	10.367	0.000	0.363	large	Yes
PE→BI→UB (H6)	0.079	0.034	2.327	0.020			Yes
EE→BI→UB (H7)	0.108	0.034	3.161	0.002			Yes
SI→BI→UB (H8)	0.194	0.032	6.056	0.000			Yes

Table 5 shows relationship between performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention, and usage behavior. H1: the performance expectancy effecting on behavioral intention was significant ($p<0.01$ β: 0.187). H2: the effort expectancy effecting on behavioral intention was significant ($p<0.01$ β: 0.255). H3: the social influence effecting on behavioral intention was significant ($p<0.01$ β: 0.460). H4: the behavioral intention effecting on usage behavior was significant ($p<0.01$ β: 0.423). H5: the facilitating conditions effecting on usage behavior was significant ($p<0.01$ β: 0.502). H6: the performance expectancy effecting on usage behavior through behavioral intention was significant ($p<0.01$ β: 0.079). H7: the effort expectancy effecting on usage behavior through behavioral intention was significant ($p<0.01$ β: 0.108). H8: the social influence effecting on usage behavior through behavioral intention was significant ($p<0.01$ β: 0.194). The effect size f^2 of the endogenous variables was defined in the research model. Size of effect on the five hypothesis were followed. H5 was large. H3 and H4 were medium. H1 and H2 were small.

Table 6 Results of the coefficients of determination

Latent Variable		Adjusted
Behavior Intention (BI)	0.696	0.694
Use Behavior (UB)	0.781	0.780

Table 6 shows the coefficients of determination. This indicated that the values is 0.694 for behavioral intention. It suggests that the modeled variable can explain 69.4% of the variance of the behavioral intention. Also it indicated that the coefficients of determination values is 0.780 for usage behavior. This suggests that the modeled variable can explain 78% of the variance of the usage behavior.

Discussion

The researcher studied other researchers and found that performance expectancy is positively related to intention to behavioral intention at ($p<0.05$) with path coefficient at 0.412 and it is consistent with Song (2010), study of factors that influence consumer's adoption behavior in M-commerce.

The researcher studied other researchers and found that effort expectancy had a significant effect on behavioral intention. The PLS-SEM analysis determined the path coefficient as 0.27 and significant ($p<0.05$) and it is consistent with Martey (2014), study of IPv6 acceptance in U.S. enterprise networks: An investigation with structural equation modeling.

The researcher studied other researchers and found that the relationship between social influences correlated the strongest with a positive correlation between the behavioral intention at ($p<0.05$) with path coefficient at 0.582 and it is consistent with Gibson (2015), study of user acceptance of new technology-based cross-domain solutions in the department of defense: a quantitative study.

The researcher studied other researchers and found that the coefficients indicate facilitating conditions are significant predictors of behavioral intention at ($p<0.05$) with path coefficient at 0.05 and it is consistent with Guo (2016), study of exploring Chinese international students' acceptance of mobile learning.

The researcher studied other researchers and also founded that behavioral intention to Use positively affects users' usage behavior of actually using English E-learning websites (β = .098, $p<0.05$) and it is consistent with Juinn and Tan (2013), the study of applying the UTAUT to understand factors affecting the use of English e-learning websites in Taiwan.

Recommendations

The findings from this study provide companies and manufacturers the causal factor influencing on the users' intention in playing the online game in China. The results obtained from this study suggest the following:

1. Manufacturers or management should continue perfection and improve the MMGRPGs customer helpdesk (service system). The customers can be convenient to find the way to solve the problems in the game manual (guide), and it can be easy for customers to solve the problem by themselves. If they can't solve the problems by themselves, also customers can solve the problems and get more details from the help center in time.
2. Manufacturers or management should design unique and wonderful publicity and advertising of the MMORPGs in order to attract more and more customers to play MMGRPGs. Also manufacturers or management can set more invite incentives in order to let the customers be willing to recommend and share the MMORPGs that they are playing.

Limitations and recommendations for further study

Firstly, in this study the questionnaires were sent to Yunnan Province. This study focused solely questionnaires that were sent in Yunnan Province. It didn't cover overall cities in China. Future research could study the participants from other countries in China.

Secondly, the participants of this study are mostly 21-30 years old which is not focused on other age ranges. Future research could study with other age ranges.

Thirdly, this study only utilized a quantitative approach. Future studies may use both qualitative and quantitative research in order to obtain more detailed results on causal factor influencing on the users' intention in playing the online game in China.

Finally, this study did not examine the moderating effect of age, gender, experience, and voluntariness of use on behavioral intention. Future studies may further investigate the impacts of these four moderators in the UTAUT model.

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