Factors Analysis Influencing the Switching Intention of Chinese Mobile Games based on Push-Pull-Mooring Model

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Abstract

   The Push-Pull-Mooring (PPM) model employ to explore the factors that affect the switching intention of mobile game players by analyzing the online survey data of 240 mobile game players in China.

   From the perspective of PPM model, Dissatisfaction with the current mobile game can promote players to leave the current mobile game, and other more attractive mobile games can pull players out of the current mobile game. As a mooring factor, habit can affect players' switching decisions. Players who have formed strong habits in current mobile games are more likely to resist or ignore the attractiveness of other mobile games and stay in the current mobile games rather than migrate to other mobile games. Another result shows that the more dissatisfied with the current mobile game, the higher the quality of alternative (relative challenge) mobile game, and the lower the investment size in the current mobile game, the more reluctant the players are to continue to maintain the relationship with the current mobile game. The higher the player's commitment to the current mobile game, the more likely it is to maintain the relationship with the current mobile game.

   The empirical results show that the framework of this study is highly consistent with the results of PPM model, and confirming that they can well apply to mobile game situations.

   Keywords : Mobile games, Conversion, Push-Pull-Mooring Model(PPM), Structural Equation Modeling

1. Introduction

With the development of smartphone and wireless communication technology, mobile games have also been favored by more and more people. By the end of 2020, global gaming revenue will be $159.3 billion, an increase of 9.33% over the same period last year, one of the important reasons is that the new coronavirus epidemic indirectly increases people's interest in games, and mobile games will top the global game revenue list with 40% of the total [Network, 2020]. Meanwhile, the number of global game players will reach 2.7 billion, including 2.5 billion mobile game users, accounting for 92.6 percent [Newzoo, 2020]. In 2019, the global mobile game market size was $68.16 billion, with China taking the first place at 31.6%, followed by the US (17.5%) and Japan (16.8%) [Forward, 2020]. It can be seen that China's mobile game industry occupies a very important position in the global mobile game market.

As of June 2020, the revenue of China's mobile game market was RMB 120.632 billion, a year-on-year increase of 40.85% [Analysis, 2020], one important reason was that the "housing economy" during the COVID-19 epidemic has increased interest in gaming. In the first half of 2020, the actual sales revenue of China's self-developed mobile games in foreign markets reached $7.589 billion, an increase of 36.32% year-on-year [China Internet Network Information Center, 2020]. By September 2020, the number of mobile game users in China reached 650 million, with a year-on-year increase of 3.2% [CGIGC, 2020]. Among them, 26.5% of mobile game players were 25~30 years old, 23.9% were 31~35 years old, 20.6% were 24 years old or below, and 20% were 36~40 years old [Iimedia,

2020]. In terms of market structure, as of June 2020, Tencent Games accounted for 54.46% of the total revenue of China's mobile game market, and Netease Games and 37 Mobile Games accounted for 15.29% and 10.51% respectively [Analysis, 2020]. Massively Multiplayer Online Role-playing Games (MMO-RPG) account for 54% of China's mobile game products, and its revenue accounts for 45.5% of China's mobile game market [Forward, 2020].

By June 2020, there are more than 22,000 new game companies in China, an average of 122 new games every day [China Internet Network Information Center, 2020]. During this period, 383 new mobile game products were released [Analysis, 2020], and an average of 2.13 new mobile games were launched every day. So many mobile games, players can widely accept only a few [Ramírez-Correa et al., 2019]. Faced with such a fiercely competitive market, how to survive and continue to develop is a problem that every mobile game developer and marketer must consider.

The mobile gaming industry also needs to carefully consider the distribution of its limited resources among multiple stakeholders and find a balance between the organization's long-term and short-term goals to achieve sustainable operation, and successful mobile gaming companies one of the characteristics is that they can meet the needs of players [Lebres et al., 2018] to achieve satisfaction and maintain existing customers as much as possible and reduce customer churn. A study found that 49.6% of the players think China's mobile games are homogenized seriously, while 37.8 percent think they are played in a single way [Iimedia, 2020].

Players tend to pursue fresh entertainment [Hou et al., 2009]. For mobile game develo-

pers and marketers, the switch of players will result in a reduction in market share, an increase in costs, and a loss of profitability [Bansal et al., 1999]. However, the current research literature on mobile game player switching are relatively small. In order to fill this gap, it is necessary to discuss the factors that affect player switching in the context of mobile games.

This study aims to solve these problems: First, what factors influence the switching intention of mobile game players? Second, will dissatisfaction affect the switching intentions of mobile game players? Many researchers think that one of the reasons for customer switching is dissatisfaction with current products or services, in other studies, satisfaction is not the reason users switched to other products or services. This is a thought-provoking impression, which reminds us that satisfaction is not the absolute standard for customers to stay or leave, and there may be some additional factors that affect users' decisions. Third, what role does commitment play in switching mobile games? When trying to understand the switch, the relationship between consumers and service providers should also consider. Customer commitment is one of the core concepts of the relationship marketing paradigm that reflects a customer's desire to maintain a valuable relationship.

2. Literature Review and Theoretical Background

2.1 Switching Intention

Intention can well predict the individual's behavior, because in general, individuals act according to their own intentions unless they are affected by unforeseen events [Ajzen, 1985, 1987]. Intention refers to the possibility of an individual's subjective perception of taking a certain behavior based on future actions, and it is a basic unit in the network plan of individual cognitive behavior [Listyarini et al., 2009], and it is a very important influencing factor for the individual to do some behavior [Choi, 2016]. Intention can change over time, and the longer the time interval, the greater the possibility that unforeseen events will change intention [Ajzen, 1985]. The intention of switching, determined by an individual's analysis of information about costs and benefits in the course of action, is a concept opposite to the customer's retention or repurchase intention [Choi, 2016], which indicates the possibility of switching to other products or services [Wirtz et al., 2014].

2.2 Push-Pull-Mooring Model

When Heberle [1938] was studying the reasons for the migration of agricultural labor force from rural to urban areas in the eastern provinces of Germany, it was found that the pushing factors were not only related to economic difficulties, but also related to higher living standards, rural social structure, and agricultural communities.

Although Push-Pull model [Heberle, 1938] to explain human migration behavior is generally recognized, some researchers have criticized them. Because these studies pay more attention to the immigrants who had already migrated, and pay less attention to those who had not migrated [Listyarini et al., 2009]. In addition, it seems that only relying on the negative factors from the original place of residence (regarded as the "push" variable) and the positive factors (regar-

ded as the "pull" variable) from the destination could not explain the causes of some phenomena. For example, in spite of the push of the original residence and the pull of the destination, why some families in the original residence had not moved, and why some people who had already moved again returned to their original place of residence [Moon, 1995].

Moon [1995] introduced the mooring factor into the push-pull model and proposed the push-pull-mooring (Short for "PPM") model combining motivation theory and behavioral cognition theory, which aimed to emphasize the influence of personal experience and institution on migration decision.

Push factors refer to factors that caused residents to be discontented or maladjusted in their previous place of residence [Bogus, 1977] and forced people to leave their original place of residence [Hou et al., 2011], it is also the negative evaluation of some aspects of the original residence [Moon, 1995], and it is a source of pressure to stimulate migration [Fu, 2011], for example, bad weather [Hou et al., 2014], racial discrimination [Bogue, 1977], political persecution, difficulty finding a spouse, lack of suitable job opportunities, frequent natural disasters, lack of natural resources, rising prices, etc. [Calvo-Porral et al., 2017].

Pull factors refer to the factors that attract people to a new destination, are positive evaluations of certain aspects of the destination. It may include a more comfortable climate and better educational resources, a better health care system [Bogue, 1977], more employment opportunities, higher income; better living environment, more opportunities to get in touch with new activities, new environment or new people, etc. [Fu, 2011].

Mooring factors refer to the subjective indicators [Moon, 1995] that are composed of personal, social and cultural factors that affect the stability (unstable) of individual migration decisions. These indicators can promote or restrict migration decisions, and were considered to be the most important factors in migration decisions, because which could bind a person to a specific place, or made him/her move to a new destination [Lai et al., 2012]. In other words, after subjective assessment, if a person think that the problem encountered in the place of origin cannot solve in another place, he/she will choose to stay instead of migrant. Mooring factors originate from the personal, cultural and social aspects, such as family structure, career development opportunities, family income, cultural issues, social networks, nearby entertainment venues [Moon, 1995], etc.

In the PPM model, the mooring effect is the most important factor that affects the migration decision, the interaction between the mooring effect and the push and pull effect can provide a more complete explanation for understanding the switching intention [Bansal et al., 2005]. Even if the push and pull effects perceived by the individual are strong, they may not migrate, this is due to the constraints of environmental or context [Bansal et al., 2005; Lee, 1966]. Although these constraints are subjective, and do not behave exactly the same in individuals, in general, their effects are similar [Bansal et al., 2005].

Push-Pull-Mooring have been applied in different situations by many researchers (See ⟨Table 1⟩), no matter in information technology [Fang and Tang, 2017], online games [Hou et al., 2009], or other contexts [Jung et al., 2017; Lai et al., 2012].

〈Table 1〉 Summary of Prior Studies on Push-Pull-Mooring (PPM) Model

| Source	Contexts	Push factors	Pull factors	Mooring factors
Hou et al. (2009)	Online games	Enjoyment, satisfaction, Perceived insufficient participant,	Alternative attractiveness	Switching costs, Social relationship, Prior experience
Fu(2011)	IT professional	Satisfaction, threat of professional obsolescence	Availability of career alternatives	Self-efficacy
Lai et al. (2012)	Mobile shopping	Inconvenience	Peer influence, Alternative attractiveness	High switching Cost, Low trust, Low security and Privacy
Chang et al. (2014)	Social networking sites	Regret, dissatisfaction	Alternative attractiveness	Switching costs
Jung et al. (2017)	Airline industry	Low service quality, Pricing problem, Low satisfaction, Low trust	Attractiveness of alternatives, Opportunity for alternatives, Pricing benefits	High switching cost, Low variety seeking, Low prior switching experience, Involuntary choice
Djusmin and Dirgahayu (2019)	Mobile instant Messaging	Low quality, Dissatisfaction	Subjective norm, Alternative attractiveness	Commitment affective (Perceived control, Perceived familiarity, Self-Investment)

3. Research Method

3.1 Research Model

The research model shown in 〈Figure 1〉 to explore the influence of push, pull, mooring factors and commitment on players' switching intention under the framework of PPM model.

3.2 Hypothesis

3.2.1 Push Effect

In his research, Kim et al. [2006] found that users' satisfaction in the stability, storage capacity and spam interception ability of e-mail service had a significant impact on switching intention.
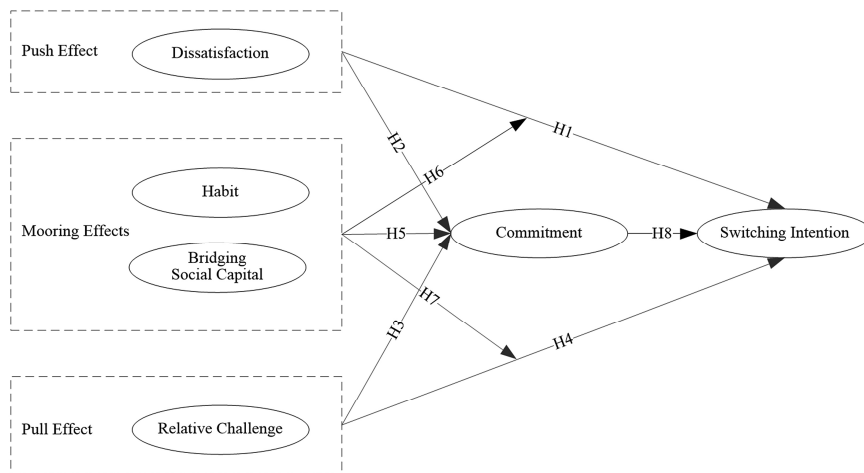
〈Figure 1〉 Research Model

A study aimed to explore the determinants of social network game users switching to other social network games and stopping using current social network games, and the results show that satisfaction, subjective norms, alternative attractiveness, and variation seeking behavior had significant influence on individual switching intention [Xu et al., 2013].

In a longitudinal study of heterosexual dating relationships, it was found that, over time, the increase in reward led to a corresponding increase in satisfaction, which in turn led to an increase in commitment [Rusbult, 1983]. In order to study the factors that affect players' commitment and intention to stay in the guild, 165 players of world of Warcraft (a Massively Multiplayer Online Role-Playing Game) participated in a study, and the results showed that satisfaction, quality of alternatives and investment scale had significant predictive effects on players' commitment level [Odrowska and Massar, 2014]. Similarly, Uysal [2016] tested the application of commitment in the context of multiplayer online games, and the results showed that players with higher satisfaction had stronger commitment to the game.

Based on the above-mentioned preliminary research on the relationship between push factors and commitments and switching intentions, this research proposes the following hypotheses:

H1: The more dissatisfied with the current mobile game, the more likely the players are to switch to another mobile game.

H2: The more dissatisfied with the current mobile game, the lower the player's commitment to the current mobile game.

3.2.2 Pull Effects

When Teng et al. [2012] studied the relationship among game challenge, interdependence and player loyalty, he found that game challenge positively correlates with interdependence and player loyalty.

Huang et al. [2017] found that the improvement of skills, challenges and immersion could stimulate online players' continuous participation, pursuit of novelty and reward dependence, and ultimately would improve their loyalty.

The balance between perceived challenges and individual skills allows players to get the best game experience. Kim et al. [2014] have proved that both skills and challenges can positively influence players' intention to continue using online games.

If the player thinks that the current mobile game can no longer bring him the pleasure of challenging difficulties, he/she will lose his/her attention to the current game. In addition, if players think that other mobile games can make their game skills play better, or can get a higher sense of accomplishment in other mobile games, they are likely to choose a new and more interesting journey.

Based on the above literature research, the following hypotheses are proposed in this study:

H3: The higher the perceived challenge of other mobile games, the lower the player's commitment to the current mobile game.

H4: The higher the perceived challenge of other mobile games, the higher the probability that players will switch to other mobile games.

3.2.3 Mooring Effects

(1) Habit

Rusbult [1983] pointed out that increasing the size of investment could promote the individual's commitment to maintain a close relationship. Usage habits that result from

repeated use of a particular information system lead to user awareness and awareness of the cost of switching, and then "lock-in" individuals in the current system [Murray and Häubl, 2007]. Researchers found that some runners with exercise habits showed a high degree of loyalty to running [Parra-Camacho et al., 2020].

In order to study the influence factors of personal switching information technology, Ye and Potter [2011] analyzed the data of 414 users, and the results showed that habit was a key factor when users considered changing browser. Users who are already accustomed to using a particular technological product will be less likely to intentionally use another one, the stronger habits can also inhibit the individual's belief in other chooses, in other words, the habit can effectively serve as a mooring factor [Ye and Potter, 2011]. Talukder et al. [2019]'s research results suggest that habits, performance expectations, effort expectations, social impact, compatibility and innovation have significant direct and indirect influences on the adoption and recommendation intentions of wearable fitness devices.

In some situations, players want to play other mobile games because they are dissatisfied with current mobile games or think other mobile games are more attractive. But they are used to playing this one, and playing other mobile games requires relearning and adapting. So they may still stay and continue to play current mobile games.

Therefore, combining the views of previous researchers, we propose the following hypotheses:

H5-1: The stronger the habit of the current mobile game, the stronger the player's commitment to the current mobile game.

H6-1: The stronger habit of the current mobile game moderates the relationship

between dissatisfaction with switching intention.

H7-1: The stronger habit of the current mobile game moderates the relationship between attractiveness of other mobile games and switching intentions.

(2) Bridging Social Capital

Team participation can motivate online game players to comply with team norms, meet their social needs, and improve their loyalty to the game [Teng and Chen, 2014]. Social capital can increase trust between individuals and improve the accessibility and availability of resources. Therefore, the more social capital a player has in the game, the higher the loyalty to the game [Wei et al., 2017].

While enjoying online games, players can expand their influence through social interaction, so bridging social interaction in online games can influence the continuous use of online games [Kim et al., 2014]. Kim et al. [2018] discovered an interesting phenomenon that out-of-game gift-giving among neighbors promotes bridging social capital and, then affects intention to continue using it. Based on these observations, we develop the following hypothesis:

H5-2: The more bridging social capital that has been built in the current mobile game, the stronger the player's commitment to the current mobile game.

H6-2: The more bridging social capital that has been built in the current mobile game moderates the relationship between dissatisfaction with switching intention.

H7-2: The more bridging social capital that has been built in the current mobile game moderates the relationship between attractiveness of other mobile games and switching intentions.

3.2.4 Continuance Commitment

According to Kanter [1968], continuance commitment relates to maintaining members' cognitive orientation of social role or position in social system, decision making based on rewards and punishments, profits and costs, and participants would be forced to continue to participate when they believed that the sacrifice of leaving the organization is far higher than the cost of staying. Continuance commitment refers to the costs associated with leaving the organization that the individual is aware of [Meyer and Allen, 1991].

In a longitudinal study of heterosexual dating relationships, Rusbult [1983] found that, over time, the increase in reward led to a corresponding increase in satisfaction, which in turn led to an increase in commitment. Bansal et al. [2004] analyzes the survey data of 356 automobile repairs service customers, the results showed that the customer's commitment to the service provider can be based on desire, cost or obligation, and all three of these commitment can negatively affect the user's intention to switch service providers. Odrowska and Massar [2014]'s research results indicate that the level of commitment can predict the likelihood that participants in massively multiplayer online games will remain in their existing guilds. Uysal [2016] pointed out that the commitment of multiplayer online gamers showed greater adaptability to game problems, such as lower exit behavior, higher voice and more loyalty. Therefore, we have reason to think that:

H8: The higher the commitment to the current mobile game, the less likely the player will switch to another mobile game.

3.3 Operational Definition of Variables

This study aims to explore the factors that influence the switching intentions of mobile game players. Based on the previous literature and the characteristics of mobile games, six influencing factors are proposed, namely commitment, dissatisfaction, relative challenge, bridging social capital, habit and switching intention. Based on these, the relevant hypotheses are put forward and the research model is constructed. Then, the questionnaire designed by using operational definition (as shown in ⟨Table 2⟩). In order to better adapt to the context of mobile games, it was appropriately modified and measured using a 5-point Likert scale, from 1 to 5 representing "strongly disagree" to "strongly agree".

⟨Table 2⟩ Operational Definition of Independent, Parameter, And Dependent Variables

		Variables	Definition	Source
Independent Variables	Push	Dissatisfaction	The evaluation and emotional response of the player to the overall experience of the current mobile game.	Oliver [1980]
	Pull	Relative challenge	The degree to which players perceive the difficulty level of other mobile games as matching their own game skills.	Hsu et al. [2009]
	Mooring	Bridging Social Capital	A strong heterogeneity and loose social relationship between players and other players in mobile games.	Granovetter [1973]
		Habit	The player's automatic reaction to a certain mobile game based on long-term experience.	Hull[1943]
Parameter Variable	Commitment		Players' awareness of the costs associated with leaving the current mobile game.	Meyer and Allen [1991]
Dependent Variable	Switching intention		The subjective possibility of mobile game players switching to other mobile games.	Listyarini et al. [2009]

4. Empirical Results

The survey method of this study is online survey, which is using the Internet to issue and collect questionnaires, and the scope of the sample was expanded by snowballing. A total of 276 electronic questionnaires were collected, and the number of valid questionnaires after excluding 36 invalid questionnaires (such as highly repeated options) was 240.

4.1 Demographic Characteristics of the Sample

In this survey, the proportion of female respondents was 54.6%, slightly higher than that of male (45.4%). Since the survey was mainly concentrated in a university in China, the responders were mainly staff (61.2%) and students (38.8%). Therefore, the age distribution of responders is basically over 31 years old (40.0%) and 18~25 years old (34.6%). The educational background of responders was

mainly graduate and undergraduates, accounting for 55% and 31.3% respectively. The monthly average disposable income less than 2000 yuan was 30.8%, and that of 4001~6000 yuan was 25.8%.

4.2 Reliability Analysis and Validity Analysis

In order to test the stability of the measurement, AMOS 24.0 and SPSS 26.0 were used for reliability testing. The Cronbach alpha values (see ⟨Table 4⟩) of each component in this study ranged from 0.897 to 0.930, all greater than 0.7, indicating that each component of this study has a high reliability.

The criteria for measuring models that are considered to have good convergent validity [Hair et al., 2009] usually include: standardized factor loading value is greater than 0.5, average variance extracted (AVE) is greater than 0.5, and construct reliability (CR) is greater than 0.7.

⟨Table 3⟩ Description of the Responses(N = 240)

Variable	Category	Frequency	Percent	Cumulative Percent
Sex	Male	109	45.4	45.4
	Female	131	54.6	100.0
	Total	240	100.0	100.0
Age	18~25	83	34.6	34.6
	26~30	61	25.4	60.0
	31 and above	96	40.0	100.0
	Total	240	100.0	100.0
Education	College and below	33	13.8	13.8
	Undergraduate	75	31.3	45.0
	Graduate	132	55.0	100.0
	Total	240	100.0	100.0
Profession	Student	93	38.8	38.8
	Staff	137	61.2	100.0
Income	Less than 2000	74	30.8	30.8
	2000~4000	40	16.7	47.5
	4001~6000	62	25.8	73.3
	6001~8000	37	15.4	88.8
	More than 8000	27	11.3	100.0
	Total	240	100.0	100.0

<Table 4> Reliability and Convergent validity

Construct			Loading	AVE	CR	Cronbach's α
Dissatisfaction(DSA)	→	DSA1	0.798	0.760	0.904	0.901
	→	DSA2	0.924			
	→	DSA3	0.888			
Habit(HA)	→	HA1	0.869	0.793	0.920	0.921
	→	HA2	0.914			
	→	HA3	0.888			
Bridging Social Capital(BSC)	→	BSC1	0.897	0.746	0.898	0.897
	→	BSC2	0.853			
	→	BSC3	0.840			
Relative Challenge(RC)	→	RC1	0.865	0.823	0.933	0.932
	→	RC2	0.938			
	→	RC3	0.917			
Commitment(CO)	→	CO1	0.879	0.796	0.921	0.920
	→	CO2	0.869			
	→	CO3	0.927			
Switching Intention(SI)	→	SI1	0.882	0.784	0.916	0.914
	→	SI2	0.851			
	→	SI3	0.922			

Loading: Standardized factor loading; AVE: Average variance extracted; CR: Construct Reliability.

In this study, AMOS 24.0 was applied to perform confirmatory factor analysis on six common factors: dissatisfaction, relative challenge, bridging social capital, habit, commitment and switching intention. The results show that the values of standardized factor loads in this study are 0.798~0.938, which are greater than 0.5; the average variance extracted are between 0.746~0.823, greater than 0.5, the values of construct reliability are between 0.898~0.933, greater than 0.7. Therefore, it can consider that the constructs of this study satisfy the condition of convergence validity.

In order to test the discriminant validity, as suggested by [Hair et al., 2009], the square root of the average variance extraction of each structure should be greater than its correlation coefficients with other structures.

In <Table 5>, the elements on the diagonal (the AVE square root of each component) are larger than the other elements in the matrix (the correlation coefficient between each component and other components), so the results show that the components in this study show good discriminant validity.

<Table 5> Discriminant validity

Construct	1	2	3	4	5	6	VIF
Dissatisfaction	**0.872**						1.268
Habit	-.308**	**0.891**					1.279
Bridging Social Capital	-.279**	.200**	**0.864**				1.222
Relative Challenge	.200**	-.129*	0.012	**0.907**			1.153
Commitment	-.405**	.445**	.374**	-.319**	**0.892**		1.634
Switching Intention	.397**	-.253**	-.153*	.452**	-.475**	**0.885**	

The diagonal elements (in bold) are the square root of the extracted average variance (AVE), and the other matrix elements are the Pearson correlation coefficients.
*p < .05, **p < .01, ***p < .001(Bootstrapping = 5000, Confidence Level = 95%)

Moreover, in order to avoid the increase of standard error caused by multi collinearity, Hair et al. [2009] considered that the value of variance inflation factor (VIF) should be less than 10. SPSS 26.0 was applied to regression analysis with switching intention as dependent variable, dissatisfaction, habit, bridging social capital and commitment as independent variables. The results (see 〈Table 5〉) showed that the VIF values are between 1.153 and 1.634, which are all less than 10. Therefore, there is no significant multi collinearity in this study.

4.3 Analysis of Research Model

The fitness index can reflect the degree of conformity between theoretical and sample data. The results (see 〈Table 6〉) of other fitting indices (GFI = 0.945, AGFI = 0.923, CFI = 0.997, TLI = 0.997, RMSEA = 0.017, RMR = 0.047) in this study are all higher than the recommended threshold, showing a good model fit.

4.4 Hypothesis Test Results

The estimated results (see 〈Table 7〉) of the direct effect parameters of the model in this study reached a statistically significant level. From the perspective of the PPM model, players with high commitment to current mobile games are reluctant to switch to other mobile games; Players will be more willing to switch to other mobile games if they are not satisfied with their current mobile games or find other mobile games more challenging. Therefore, H1, H2 and H5 are all supported.

For the prediction of commitment, when players have a high level of dissatisfaction with their current mobile games or consider other mobile games to be of high quality (relatively challenging), they show a low level of commitment to their current mobile games, that is, they are unwilling to maintain the same relationship. Players are more likely to maintain a relationship with current mobile games when they believe that the size of investment in the current mobile game (habits and bridging capital) is high. In other words, H3, H4, and H8 are supported.

〈Table 8〉 shows that habit moderates the relationship between relative challenges and switching intentions (β = -0.150, p = 0.022 〈 0.05).

〈Table 6〉 Fit indices for the Structural Model

χ^2	df	χ^2/df	p	GFI	AGFI	CFI	TLI	RMSEA	RMR
130.693	122	≤ 3.00 1.071	≥ 0.05 0.279	≥ 0.90 0.945	≥ 0.90 0.923	≥ 0.90 0.997	≥ 0.90 0.997	≤ 0.08 0.017	≤ 0.05 0.047

〈Table 7〉 The Result of Direct Effects

Structural Path		B	S.E.	p
H1	DSA → SI	0.204	0.063	0.001
H2	DSA → CO	-0.168	0.064	0.008
H3	RC → CO	-0.261	0.060	***
H4	RC → SI	0.330	0.063	***
H5-1	HA → CO	0.328	0.062	***
H5-2	BSC → CO	0.343	0.076	***
H8	CO → SI	-0.305	0.066	***

***p < .001.

⟨Table 8⟩ The Result of Moderating Effects

Hypotheses	B	S.E.	C.R.	p	b	95% CI		Result
						Lower	Upper	
H6-1	0.006	0.051	0.111	0.912	0.007	-0.107	0.115	Not supported
H6-2	0.027	0.073	0.371	0.711	0.027	-0.138	0.198	Not supported
H7-1	-0.150	0.065	-2.288	0.022	-0.146	-0.280	-0.021	Support
H7-2	-0.064	0.062	-1.030	0.303	-0.063	-0.196	0.062	Not supported

Note: Bootstrapping = 5000

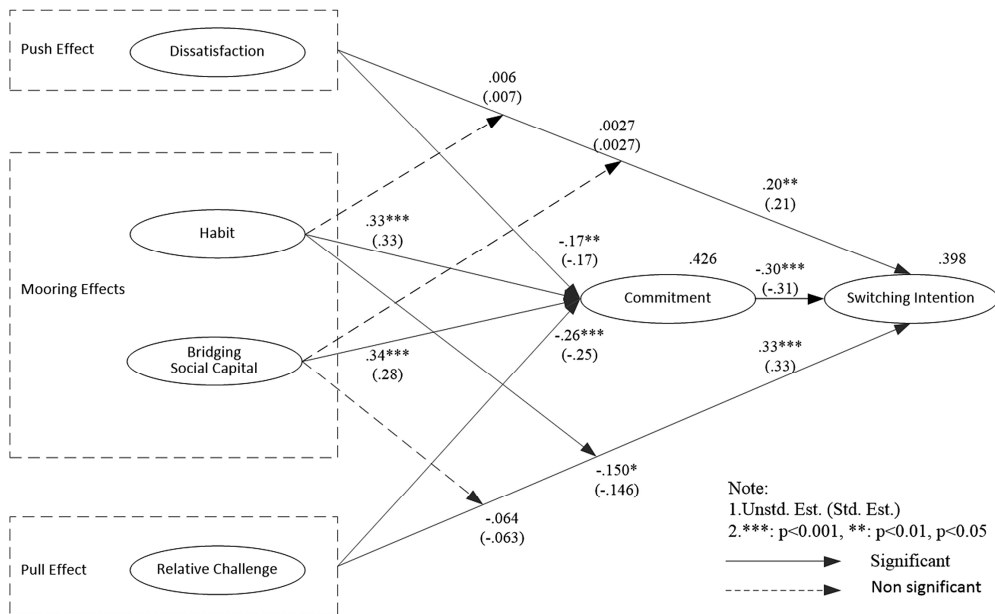⟨Figure 2⟩ The Moderating Effect of Habit on Relative Challenge and Switching Intention

⟨Figure 2⟩ further illustrates a simple slope analysis. When players think that the attractiveness of other mobile games is low, players are reluctant to switch to other mobile games, regardless of whether there is a difference in their habits in the current mobile game (e.g., new players and old players) (β1 = -0.372, β2 = -0.404).

However, even though players think that other mobile games are more attractive, players who are less accustomed to the current mobile games (e.g. new players) are more likely to switch due to the attraction of other mobile games (β = 0.404). On the contrary, players who are more accustomed to current mobile games (such as older players) are less active in switching to other mobile games (β = 0.158).

Because they often play, they have adapted to the current mobile game, and have a certain degree of game skills. Unconsciously, playing the game has become a habit of them. So, compared to new players, they are more resistant to the attractiveness of other mobile games, and are more willing to maintain relationships with current mobile games. This is consistent with the results of previous studies [Wang et al., 2020]. Despite the attractiveness of the destination, the migrants intend to stay in their original place of residence, given that they are used to their current place of residence (Lee, 1966).

In this study, those players who intend to switch because they are dissatisfied with the current mobile game, their decision will not be affected by the degree of habituation in the current mobile game. One possible explanation is that even if players are used to the current mobile game, they can't tolerate the various unsatisfied experiences in the current mobile game, and prefer to switch to other mobile games to start a new relationship. This is similar to previous studies [Ye and Potter, 2011]. It also proves that the factor of push of the original place is a very important reason for the migration.

⟨Figure 3⟩ Hypotheses Test Results

Bridging social capital failed to predict the relationship between push and pull effects and switching intentions. If players are not satisfied with the current mobile games, or think other mobile games are more challenging, they will be more likely to play other mobile games. Moreover, the decision will not be affected by the level of bridging social capital in the current mobile game. The bridging social capital established in the virtual world of mobile games is different from that in the real world. It offers very limited reciprocity and doesn't provide much power to keep players in the current mobile game. This supports the notion of a consistent line of action, namely that while each course has something to be commend, the actor will still reject some alternatives and choose a course that best serves his/her purposes to maximize personal needs [Becker, 1960]. As a result, H6 does not support and H7 only partially support. ⟨Figure 3⟩ shows the whole results of the hypothesis test in this study.

5. Conclusions

5.1 Discussion of Results

This research aims to extend the push-pull-mooring model to mobile game scenarios to explore the factors that affect players' switching intentions.

In this study, dissatisfaction can actively push players to leave the current mobile game, and negatively affected players' commitment to the current game. The degree of satisfaction with the current relationship will affect by the player's perception of the benefits and pleasure gained in the game. The cost to the player of a mobile game (time and effort) is rewarded over time (e.g., the increase of game level and more and more optimized virtual items), and the increased rewards increases the player's level of satisfaction and commitment [Rusbult, 1983].

At the same time, the conflict between the player and the current mobile game will lead

to the decrease of perceived satisfaction, such as slow update, expensive cost, unfairness in the game, etc. Players show lower levels of commitment when they think that these unpleasant experiences become a fairly stable behavior cost due to the responsibility of the game provider rather than external environment or accidental reasons [Rusbult and Martz, 1995].

The player will react according to the level of optimism about the future happiness and pleasure in the current mobile game. When they believe that the current environment cannot provide them with a reasonable future prospect, the relationship between the player and the current mobile game will be reduced to a lower level of threat. In this case, it is very easy to understand that the player migrates to a new mobile game that may bring him/her higher satisfaction.

The results of this study also show that relative challenge is the strongest positive predictor of switching intentions, and which negatively affected players' commitment to current mobile games. For the current mobile games, players will feel out of balance if their skills and perceived challenges do not maintain at an appropriate level. In order to achieve higher functionality and profitability, players with highly specific skills will continue to look for specific mobile games that are more challenging and attractive to better utilize their capabilities, although it is quite uncertain whether this attraction will match their expectations.

The influence of habit and bridging social capital on switching intentions also explored. The research results show that the habit of mooring factors and bridging social capital positively affect the player's commitment to the current mobile game. The experience of reusing the product enables consumers to acquire product-specific skills, which is a key driver of consumer preferences [Murray and Häubl, 2007]. Since they are already familiar with the current mobile game, players who are not sensitive to changing environments will repeat their previous beliefs and rely on the stronger habits they have formed to guide their behavior [Venkatesh, 2012], which means that players will be stuck with the current mobile game. Habit is a powerful force that makes players unconsciously continue to maintain the relationship with the current mobile game rather than switch to other mobile games.

5.2 Theoretical and Practical Contribution

There are at least two differences between this study and previous studies. Firstly, this study focuses on the factors that may affect players' switching intention. Most researchers focus on the motivation of playing mobile games, the antecedents of satisfaction and the prevention of game addiction. Few researchers have noticed the phenomenon that players switch from one mobile game to another. This research not only focuses on the player's feelings in the current mobile game, but also the possible impact of competitive games on the player, thus extending the research perspective from the current mobile game to a wider range of competitors.

Secondly, the push-pull-mooring model based on migration theory applies to the research of mobile games switching. For players, switching means that they need to leave the mobile game they have played for a while and choose another new mobile game. This is just like the aborigines moving from their original place where they have lived for many years to another new place of residence. The results of this study show that the higher the

push factor (dissatisfaction) from the current mobile game and the pull factor (relative challenge) from other mobile games, the more likely players are to switch to other mobile games. The player's mooring factor (habit) moderates the relationship between the pull factor (attractiveness of other mobile games) and the player's switching intention, which proves that the PPM model can well apply to mobile game situations.

The framework of this study combined with PPM model for mobile game providers and related policy makers to provide some potential important insights. Firstly, understanding the positive impact of push and pull factors on switching intentions can help marketers focus on both players' current experience and competitors' products in order to develop more effective customer acquisition/retention plans. Mobile game providers should be customer-oriented, and they improve the channels of contact with players, and shorten the time to respond to players' requests, and timely understand players' experience and evaluation, and make corresponding adjustments to improve player satisfaction.

Secondly, the difficulty of mobile games should gradually increase so that players' game skills are commensurate with the challenge level. The existence of excellent competitors can accelerate the development of enterprises. Therefore, mobile game providers should closely follow competitors and learn the performance and characteristics of their products. Mobile game providers should also enhance their core competitiveness, and increase the difficulty of competitors' imitation [Chang et al., 2014].

Finally, since the degree of automation of habit will be strengthened over time, as the degree of automation of habits will be strengthened with the passage of time, game mobile

providers should establish incentive system to provide appropriate rewards for players who visit the game regularly at different times of the day, and set up a task system that is less difficult and takes less time to help players form the habit of repeated regular visits, because the players who form habits are more willing to maintain this stable behavior rather than switch to other mobile games (Hsu, 2014).

5.3 Limitation and Future Research

In interpreting the results of this study, it is necessary to consider the following limitations. Since the samples in this study are mainly from a university, the distribution of samples may deviate from that of the general population, if future researchers can expand the sample range, they may get a more general explanation. And this study examines the antecedents of commitment and switching intention from the cross-sectional perspective, future researchers may find more interesting findings if they can conduct a longitudinal analysis of switching intentions and actual switching behaviors.

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