



Consumer's Willingness to Buy In-Game Virtual Goods—The Influence of Gaming Motivation

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Abstract. As part of the virtual economy, the gaming industry has continued to grow in the context of the recent epidemic and has made a significant contribution to world economic growth. Therefore, the study of consumer behaviour and willingness to buy has an important role to play in the development of the virtual economy. This paper conducts an empirical study basing on Nick Yee's Gaming motivation model to examine the characteristics and differences in willingness to buy in-game virtual products across player types. As the result, the study uncovers the traits and variances in propensity to buy displayed by various player types, as well as offering a fresh theoretical viewpoint on virtual goods consumption.

Keywords: willingness to buy · virtual goods · game industry · gaming motivation · virtual economy

1 Introduction

With the advancement of technology and the spread of digital devices, the video game industry is growing faster and faster and has become the main form of entertainment for a large proportion of the younger generation. According to Mordor intelligence's report, Global gaming revenue stands at USD 173.70 billion in 2020 and is projected to grow at a CAGR of 9.64% through 2026, reaching USD 314.40 billion [1]. The game industry also facilitates creative content and competition, resulting in unique gameplay moments, which are shared and viewed by millions of people. In the past few years, Twitch and Youtube have been the most popular live streaming platforms for games that Twitch viewers watched a total of more than 17 billion hours in 2020, reflecting an 83% increase over 9 billion hours in 2019 [1]. In addition, due to the covid-19 lockdown, Player investment has reached new heights for companies like Microsoft, Nintendo, Twitch, and Activision. As of April 2020, Microsoft announced that it had surpassed 10 million subscribers to Xbox Game Pass, a Netflix-like subscription service [1]. Additionally, Microsoft reported a 130-percent increase in multiplayer engagement across March and April among those subscribers [1].

As the gaming industry continues to evolve, different scholars have conducted research on the motivations of players and whether there are different kinds of players. In 1996, Bartle completed a player classification model based on the MUD games(Multiple User Domain games), classifying players into four categories: Socializers, Achievers,

Killers and Explorers, and Bartle's classification model quickly became one of the most popular and important models of player motivation [2]. In his model, a socializer enjoys interacting with other players, an achiever looks to get ahead, a killer tries to ruin another's experience, and an explorer enjoys exploring a virtual world. Although his model lays the foundation for a player motivation model, Yee notes that Bartle's model is not empirically studied and that Player Types can overlap with each other [3]. Therefore Yee further developed player motivations, and eventually classifying players into three categories: achievement, social, and immersion [4].

However, as more and more different types of games emerged and the model may no longer be accurate, Nick Yee adapted his model after surveying 250,000 players, resulting in one of the most widely known and accurate models of player motivation today. In this model, three old categories were retained and three new categories were added, resulting in a model of player motivation consisting of six categories - Action, Social, Mastery, Achievement, Immersion, Creativity - that can be applied to a wide variety of games.

There are many different ways for game companies to gain revenue. And selling virtual goods is currently one of the most important way of generating revenue for many games, especially free-to-play games. Therefore, studying the consumption behaviour of virtual products can provide more concrete data and references for marketing and game design in the gaming industry. But what exactly are virtual goods? According to VanDremien, virtual goods in games are game props or game related services [5]. For example, virtual currency or items that enable or enrich game play [5].

In the past, there has been many studies about virtual goods consumptions, and has focused so far on predicting purchase intentions. For example, desire for self-representation in virtual world [6, 7]. Perceived enjoyment, character competency, gaming achievement [8]. Furthermore, multiple theoretical perspectives have been applied to the topic such as technology acceptance [9–11], expectancy-disconfirmation model [12], as well as transaction cost theory [8]. In addition, there are also discussion focusing on game designs and game mechanics [13].

As can be seen, the motivations for purchasing virtual products have been relatively clear in previous studies, but there has been few researches into the factors influencing players' willingness to buy, and it is clear that there are many types of players based on different player motivation models, and there may be some bias in analyzing players only as a complete group. This paper argues that there may be differences in players' attitudes towards virtual products based on their different motivations for playing. In this paper, I would like to conduct an empirical study of the willingness to buy for virtual goods of different players based on the player motivation model proposed by Nick Yee to give a different perspective on the marketing of virtual goods in the gaming industry.

2 Methodology

2.1 Questionnaire Design

This paper designed a structure questionnaire to be answered by various type of gamers for an empirical study of the willingness to buy towards virtual goods based on gaming

Table 1. Descriptive Statistics of Respondent Characteristics (n = 207)

Demographic variables	Groups	Frequency	Percent
Gender	Male	138	66.7
	Female	69	33.3
Age	Under 18	48	23.2
	18–25	70	33.8
	25–35	60	29
	35–45	24	11.6
	45+	5	2.4
Average daily hours	0.5 h or less	55	26.6
	0.5–1 h	33	15.9
	1–2 h	50	24.2
	2–4 h	36	17.4
	4 h or more	33	15.9
Types of virtual products	Game equipment	150	72.8
	Game card packs	94	45.6
	Skill upgrades	96	46.6
	Character skins	108	52.4
	Equipment skins	111	53.9
	Other	42	20.4
Average monthly spend	\$50 or less	91	44
	\$50–100	54	26.1
	\$100–300	27	13
	\$300–500	18	8.7
	\$500 or more	17	8.2

motivation. The questionnaire items were adopted from previous studies [4]. Each question was measured using a 5-point Likert scale with 1 (strongly disagree) to 5 (strongly agree). Participants were asked about gender, age, frequency of playing games and their investment on virtual goods and the validity of the questions were examined by 5 game experts.

The questionnaire was posted on online social medias, gaming forums in China. From 250 respondents, excluding the 43 invalid questionnaires, a total of 207 valid questionnaires were collected (Table 1).

Table 2. Reliability checks for constructs

Scales	Items	Cronbach's alpha	
Actions	3	0.755	0.894
Social	3	0.756	
Mastery	3	0.884	
Achievements	3	0.806	
Immersion	3	0.801	
Creativity	3	0.816	
Willingness to buy	4	0.791	

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.825
Bartlett's Test of Sphericity	Approx. Chi-Square	2015.730
	df	231
	Sig.	0.000

2.2 Result

2.2.1 Reliability Test

The Cronbach alpha coefficient, also known as Cronbach's coefficient, was primarily used in the reliability test in this study.

Cronbach's alpha coefficient is normally in the range of 0 to 1, and if it is greater than 0.8, the scale's internal consistency reliability is excellent, and the scale can be considered to have passed the reliability test.

According to the reliability test results (Table 2), the scale part of this questionnaire's reliability values are good and pass the reliability test.

2.2.2 Validity Test

The Bartlett's spherical test and the KMO test were run in SPSS 21.0. The study's findings (Table 3) revealed that the 22 questionnaire items had a Bartlett's spherical test 2 value of 2015.730 (degree of freedom 231, sig = 0.000), showing that the information suggested by the 22 questions had some overlap and was required for factor analysis. The stronger the bias correlation between variables and the better the factor analysis impact, the closer the KMO score is to 1. The KMO score for this study is 0.825, suggesting that it qualifies for factor analysis.

Seven public components were extracted according to theoretical research, in line with the eigenvalues larger than 1 extraction, with a cumulative explained variance of 71.240%, fulfilling the condition that the amount of explanation is greater than 60%. The results are listed in Table 4.

Table 4. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.883	31.287	31.287	6.883	31.287	31.287	2.446	11.117	11.117
2	1.881	8.548	39.835	1.881	8.548	39.835	2.424	11.020	22.138
3	1.753	7.968	47.803	1.753	7.968	47.803	2.217	10.076	32.213
4	1.505	6.841	54.644	1.505	6.841	54.644	2.195	9.975	42.188
5	1.431	6.504	61.148	1.431	6.504	61.148	2.191	9.959	52.148
6	1.129	5.132	66.280	1.129	5.132	66.280	2.121	9.643	61.790
7	1.091	4.960	71.240	1.091	4.960	71.240	2.079	9.450	71.240
8	0.769	3.493	74.734						
9	0.681	3.095	77.829						
10	0.598	2.719	80.548						
11	0.553	2.513	83.062						
12	0.519	2.359	85.420						
13	0.498	2.264	87.685						
14	0.412	1.873	89.557						
15	0.397	1.807	91.364						
16	0.362	1.645	93.009						
17	0.338	1.536	94.545						
18	0.305	1.389	95.934						

(continued)

Table 5. Rotated Component Matrix^a

	Component						
	1	2	3	4	5	6	7
Q2A1	0.103	0.067	0.065	0.212	0.134	0.830	0.066
Q2A2	0.126	0.116	0.252	0.102	0.216	0.673	0.042
Q2A3	0.093	0.216	0.125	0.101	0.050	0.755	0.048
Q2A4	0.026	0.196	0.038	0.070	0.085	0.117	0.785
Q2A5	0.174	0.050	0.174	0.075	0.146	-0.029	0.772
Q2A6	0.172	0.159	0.160	0.108	0.077	0.074	0.764
Q2A7	0.864	0.178	0.082	0.119	0.012	0.195	0.077
Q2A8	0.838	0.070	0.155	0.075	0.088	0.122	0.190
Q2A9	0.862	0.194	0.131	0.096	0.066	0.026	0.117
Q2A10	0.091	0.073	0.200	0.826	0.125	0.110	0.025
Q2A11	0.118	0.125	0.109	0.796	0.011	0.164	0.031
Q2A12	0.064	0.190	0.091	0.790	0.016	0.122	0.224
Q2A13	0.054	0.188	0.089	0.065	0.819	0.119	0.126
Q2A14	0.058	0.105	0.215	0.025	0.802	0.093	0.073
Q2A15	0.042	0.215	0.033	0.059	0.777	0.156	0.111
Q2A16	0.126	0.218	0.773	0.125	0.062	0.181	0.105
Q2A17	0.076	0.068	0.824	0.136	0.163	0.111	0.143
Q2A18	0.172	0.098	0.765	0.158	0.124	0.131	0.141
Q2A19	0.123	0.736	0.161	0.102	0.160	-0.003	0.079
Q2A20	0.158	0.744	0.133	0.075	0.183	0.099	0.106
Q2A21	0.075	0.719	0.043	0.230	0.115	0.181	0.147
Q2A22	0.165	0.628	0.077	0.051	0.162	0.363	0.210

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

^a Rotation converged in 6 iterations

The index was orthogonally rotated using the maximum variance approach to further elucidate the structure of each common element. Table 6 displays the outcome (Table 5).

2.2.3 Correlation Analysis

A statistical tool for assessing the closeness of a link between variables is correlation analysis. In terms of development, change direction, and size, it mostly shows if there is a correlation between two types of variables or two phenomena. Willingness

to buy and Actions, Social, Mastery, Achievements, Immersion, Creativity had connection coefficients of 0.446, 0.410, 0.400, 0.376, 0.449, 0.387, respectively, according to the correlation coefficient (Table 6). And the significance is all 0.000 smaller than 0.05, indicating that the correlation coefficient is significant, indicating that Willingness to Buy and Actions, Social, Control, Achievements, Immersion, and Creativity have a significant positive link.

2.2.4 Regression Analysis

The results of a multiple regression linear equation model with Actions, Social, Mastery, Achievements, Immersion, and Creativity as the independent variables and Willingness to buy as the dependent variable to investigate the effects of Actions, Social, Mastery, Achievements, Immersion, and Creativity on Willingness to buy are shown in Table 7.

The measurements for model fit are listed in Table 7. The model's complex correlation coefficient R is 0.635, the adjusted coefficient of determination R -squared is 0.385, and the independent variable's explanatory power to the dependent variable is 38.5%, all of which indicate a strong model fit (Table 8).

The regression equation model's F -statistic is 22.532, and its significance is 0.000, which is less than 0.05, indicating that it is statistically and explanatorily significant, as shown in Table 9.

The VIF values of each variable are less than 5, suggesting that multicollinearity is not an issue, as shown by the regression coefficients (Table 9). The regression coefficient for the independent variable Actions is 0.167, with a significance of 0.004, which is less than 0.05, indicating that the regression coefficient is significant and that Actions has a significant positive effect on Willingness to buy, with the higher the motivation of Actions, the higher the Willingness to buy. The independent variable Social has a regression coefficient of 0.151, with a significance of 0.006, less than 0.05, indicating that the regression coefficient is significant and that Social has a significant positive effect on Willingness to Buy; the higher the Social motivation, the higher the Willingness to Buy. The regression coefficient for the independent variable Mastery is 0.129, with a significance of 0.007, which is less than 0.05, indicating that the regression coefficient is significant and that Mastery has a significant positive effect on Willingness to buy, with the higher the Control motivation, the higher the Willingness to buy. The independent variable Achievements has a regression coefficient of 0.113 and a significance of 0.030, which is less than 0.05, showing that the regression coefficient is significant and Achievements has a substantial positive influence on Willingness to buy. The more the drive to achieve, the greater the willingness to purchase. Immersion has a significant positive effect on Willingness to Buy, with a regression coefficient of 0.202 and a significance of 0.000 (less than 0.05), indicating that the regression coefficient is significant and Immersion has a significant positive effect on Willingness to Buy, with the higher the Immersion motivation, the higher the Willingness to buy. The regression coefficient for the independent variable Creativity is 0.038, with a significance of 0.468, which is greater than 0.05, indicating that the regression coefficient is not significant and Creativity has no effect on Willingness to Buy. Write the following regression equation model based on the table of regression coefficients.

Table 6. Correlations

	Willingness to buy	Willingness to buy	Actions	Social	Mastery	Achievements	Immersion	Creativity
Willingness to buy	Pearson Correlation	1	0.446**	0.410**	0.400**	0.376**	0.449**	0.387**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
Actions	N	207	207	207	207	207	207	207
	Pearson Correlation	0.446**	1	0.239**	0.326**	0.385**	0.361**	0.405**
Social	Sig. (2-tailed)	0.000		0.001	0.000	0.000	0.000	0.000
	N	207	207	207	207	207	207	207
Mastery	Pearson Correlation	0.410**	0.239**	1	0.351**	0.285**	0.309**	0.369**
	Sig. (2-tailed)	0.000	0.001		0.000	0.000	0.000	0.000
Achievements	N	207	207	207	207	207	207	207
	Pearson Correlation	0.400**	0.326**	0.351**	1	0.287**	0.210**	0.359**
Immersion	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.002	0.000
	N	207	207	207	207	207	207	207
Creativity	Pearson Correlation	0.376**	0.385**	0.285**	0.287**	1	0.207**	0.386**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.003	0.000
Creativity	N	207	207	207	207	207	207	207
	Pearson Correlation	0.449**	0.361**	0.309**	0.210**	0.207**	1	0.348**
Creativity	Sig. (2-tailed)	0.000	0.000	0.000	0.002	0.003		0.000
	N	207	207	207	207	207	207	207
Creativity	Pearson Correlation	0.387**	0.405**	0.369**	0.359**	0.386**	0.348**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(continued)

Table 6. (continued)

	Willingness to buy	Actions	Social	Mastery	Achievements	Immersion	Creativity
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	
N	207	207	207	207	207	207	207

*** Correlation is significant at the 0.01 level (2-tailed)

Table 7. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.635 ^a	0.403	0.385	0.78737

^a Predictors: (Constant), Creativity, Immersion, Mastery, Achievements, Social, Actions

Table 8. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83.813	6	13.969	22.532	0.000 ^b
	Residual	123.992	200	0.620		
	Total	207.805	206			

^a Dependent Variable: Willingness to buy

^b Predictors: (Constant), Creativity, Immersion, Mastery, Achievements, Social, Actions

Table 9. Coefficients^a

Model		Unstandardized Coefficients	Standardized Coefficients		t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.837	0.234		30.582	0.000		
	Actions	0.167	0.058	0.188	20.899	0.004	0.709	1.410
	Social	0.151	0.054	0.173	20.772	0.006	0.769	1.301
	Mastery	0.129	0.047	0.170	20.742	0.007	0.779	1.284
	Achievements	0.113	0.052	0.136	20.185	0.030	0.765	1.307
	Immersion	0.202	0.050	0.247	40.022	0.000	0.792	1.263
	Creativity	0.038	0.053	0.048	0.728	0.468	0.680	1.470

^a Dependent Variable: Willingness to buy

2.3 Willingness

$$\begin{aligned}
 \text{Buy} = & 0.837 + 0.167 * \text{Actions} + 0.151 * \text{Social} \\
 & + 0.129 * \text{Mastery} + 0.113 * \text{Achievements} \\
 & + 0.202 * \text{Immersion} + 0.038 * \text{Creativity}
 \end{aligned}
 \tag{1}$$

According to the regression coefficients, we can know that the degree of influence on Willingness to buy is, in descending order, Immersion, Actions, Social, Mastery, Achievements, and Creativity.

3 Conclusion

This paper demonstrated how Yee's player motivation contributes to virtual consumption and the player motivation model can be meaningful in marketing and game designs. As the result, the paper conducted that there is a significant differences on willingness to buy towards virtual goods based on player motivation. Each kind of player shows a different attitude to virtual products. This can give the gaming industry a new point of view when selling virtual goods, and ultimately contributes more to virtual economic growth. However, this paper only took a small size sample in China that might be biased and inaccurate. In addition, the result could be different on various platforms and game types. Therefore, conducted a worldwide survey with larger sample size on different platform would be a great direction in the future.

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