Analysis of Player Attitudes and Behaviors towards Different Mobile Games based on Variance

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Abstract. This article is based on a survey of farm games, MOBA arena games, women's games, asymmetric arena games, and open world games, all of which are mobile games. The data were collected through questionnaires. This paper analyzed player data for Obi Island, King of Glory, Shinning Nikki, Identity V, and Genshin Impact using analysis of Variance, One-way analysis of variance, and Pearson Analysis of Variance. The net result is a majority of women. The open-world game was the only one of the five where more than half of the players were male. Women's games require less time per day, but cost the most. Farming is a daily game that takes the most time but the least money. The conclusion of this article is that players can depend on the age of the player, the gender of the player, and the amount of time the player needs to spend per day. Players need to spend money these five aspects according to their own situation to choose suitable for their own games. Game developers can also adjust their publicity programs, plan programs, and improve their shortcomings according to the above factors.

Keywords: Mobile games; game players; game manufacturers.

1. Introduction

With the continuous development of science and technology, mobile phones become more and more popular, mobile games are becoming more and more popular. With the rapid development of mobile games, many interesting mobile games have been produced in China, such as King of Glory, Identity V, Shinning Nikki, Obi Island, Genshin Impact, Egg Party, etc. They are also great examples of the genre. There are games for women, multiplayer online battle arena (MOBA) games, open world games, commercial games, breakout games, asymmetric battle arena games, and more. Therefore, it is important to understand the attitudes of modern game players towards spending money on different types of games and the amount of time spent on these games.

According to scholars' thinking on the construction and operation of the industrial chain of similar networks, it was pointed out that with the rapid development of mobile Internet and the popularity of smart phones, the development of mobile games in recent years had shown a blowout state and became a promising emerging industry [1]. In 2013, China's mobile game market reached 14.85 billion yuan, an increase of 69.3% over 2012. In 2014, the size of China's game market was 23.64 billion yuan. Therefore, some scholars used the total revenue of online games to measure the development of China's online game industry. Through sorting out and analyzing the financial reports of the three major online game companies, this paper analyzed and explored the influence of the development of China's online game industry from four aspects: financing level, research and development intensity, market concentration and user based by using principal component analysis and regression analysis [2].

Because of the rapid development of China's mobile industry. Because mobile games in just four years to complete the online game industry from 2012 to 2015 industry reshuffle development process of more than 10 years. In such a rapid development, they sorted out and summarized the development of China's mobile industry from the perspective of the industrial chain [3,4], and learned from the problems exposed in the rapid development of the mobile game industry and the places worth learning. Based on the analysis of the development of the mobile games industry and the integration of the industrial chain, this paper summarized the whole industrial chain and the future development of the mobile games industry.

The gender difference of college students' mobile game market was studied by questionnaire survey, and the results were obtained according to the questionnaire [5]. The results showed that although most people thought mobile games were only for boys, the ratio of boys to girls playing mobile games was close to 1:1. Although the gender difference of players was not big, there were significant differences in all aspects of playing mobile games. What follows was an analysis of specific games, starting with the impact of gender on spending in League of Legends [6].Through this survey, it was obvious that different genders were affected by the same factors, which leaded to the differences in consumer behavior. The spending behavior of male players was influenced by the background story, the fluency of the game, and personal emotion. Female game players' spending behavior was influenced by the effects of the game and the popularity of in-game items. The consumption motivations of male players were mainly avoidance motivation and emotional compensation motivation at the social level, fantasy motivation, achievement motivation and self-motivation at the spiritual level. Female game players were driven purely by entertainment. There was also a survey on Honor of Kings, which was based on an analysis of player feedback questionnaires [7]. In this paper, SPSS data software was used to draw the conclusion through regression analysis that, to a certain extent, after people's desire to win or lose is satisfied, the overall satisfaction degree of King's Glory on tourism is improved. Mobile games were so popular because they could give players a sense of identity, honor, fun, and emphasize cooperation, sharing, and belonging [8]. At the same time, it also investigated the influence of MOBA mobile games on college students' offline social interaction. Through the interview [9], it was concluded that MOBA mobile games can strengthen self-identity, maintain offline social interaction and broaden social interaction. At the same time, mobile audiences were also investigated to clarify audience psychology and "bird cage effect" [10].

At present, there are not many researches on different game players, so in order to improve the differences between different games, we collect data through questionnaires to determine the consumption attitude of players, as well as their consumption amount, age, gender, and time spent in the study, and finally make comparison.

2. Method

The data was collected using a questionnaire posted online between January 15 and 17, 2023. A total of 285 questionnaires were collected, and 273 were valid. There are a total of five representative questionnaires of games, which can represent the corresponding category of games and are very popular in the Chinese market. Among them, King of Glory can represent a MOBA game, Shining Nikky can represent the game that faces women, the Identity V can represent an asymmetric battle arena game, Genshin impact can represent an open world game, and Obi Island can represent a farm game. Because it was published on a network platform, and it was published on multiple platforms, so it is universally representative. There were six questions, the first of which was the gender of the person filling out the form. The second problem is the age of the players. The third question is how much money players have already spent in the game. The fourth question was about the attitude of the person filling out the form towards spending money in the game. The fifth question was about the average amount of time a person filling out the form spent playing the game each day.

Chi-square test, single factor analysis of variance, Pearson analysis of variance and frequency analysis were used in this paper. In order to test whether there are gender differences between different games, Chi-square test is used for analysis. To test whether there was a difference in time spent between games, one-way analysis of variance was used. To test whether the total amount of money spent varies between games, one-way analysis of variance was used. To test whether there is a difference in player age between different games, one-way analysis of variance was used. To test whether there is a correlation between consumption amount and single consumption amount, Pearson correlation is used for analysis. Finally, to explore people's attitudes towards spending money in games, I used frequency analysis.

3. Results and Discussion

3.1. Basic Information of Frequency

First, data from five games will be aggregated and analyzed. According to Table 1, we can see that the proportion of female players in these five games has exceeded 50 percent. This shows that there is a large proportion of female game players in the gaming market today. At the same time, we can see that the time spent in the game is generally concentrated between ten minutes and two hours. It can be seen that games have gradually entered many people's lives and become an important form of entertainment for them. Finally, the attitude of players to spend money in the game is that it doesn't matter whether they spend money or not, and they spend money if they want to. It follows that the continuous development of society and economy leads people to have more money to spend on entertainment.

Table 1. Basic stats for five games

Dimension	Option	Frequency	Percentage
Game	Obi Island	57	20.9
	Identity V	59	21.6
	Shining Nikki	51	18.7
	King of Glory	53	19.4
	Genshin Impact	53	19.4
Gender	male	91	33.3
	female	182	66.7
The cost time	<10min	27	9.9
	10min-60min	88	32.2
	60min-120min	91	33.3
	>120min	67	24.5
The attitude of use money in games	objection	46	16.8
	support	32	11.7
	else	18	6.6
	don’t care	177	64.8

3.2. Analysis of Differences in Gender

In order to test whether there is a significant difference in gender ratio between different games, Chi-square test is used for analysis. As can be seen from the Table 2, the significance of the difference is 0.000<0.05, and there is a significant difference. The proportion of females is Shining Nikky > Obi Island > King of Glory> Identity V > Genshin impact. This shows that games aimed at women still have the largest number of female players in this category. And farming games are second only to games aimed at women. Then there are MOBA arena games and asymmetric battle arena games, both of which are around 50 percent female. Finally, open world games have the fewest women, accounting for 35.8 percent, as Figure 1 shows.

Table 2. The gender data in five games

Game	Male	Female	χ^2	P
Obi Island	8(14.0%)	49(86.0%)		
Identity V	30(50.8%)	29(49.2%)		
Shining Nikki	5(9.8%)	46(90.2%)	51.527	0.000
King of Glory	22(41.5%)	31(58.5%)		
Genshin Impact	34(64.20%)	19(35.8%)		

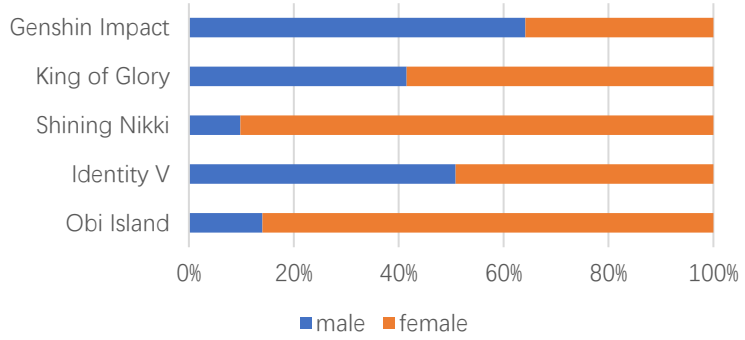

Fig. 1 The percentage of each gender

3.3. Analysis of Differences in Costing Time

Table 3 shows the time spent each day in each of the five games. First of all, in order to facilitate one-way analysis of variance, data less than 10 minutes is denoted as 1, data greater than 10 minutes and less than one hour is denoted as 2, data greater than one hour and less than two hours is denoted as 3, and data greater than two hours is denoted as 4. Finally, the significance of the difference is 0.000<0.05, there is a significant difference. According to the mean value, it can be seen that Obi Island > Identity V > King of Glory > Genshin impact > Shining Nikky. This shows that farming takes the most time. Asymmetric competitive games take the second highest amount of time, followed by MOBA competitive games and open world games. Games aimed at women require the least amount of time.

Table 3. The cost time in different games

Game	Average	Standard deviation	minimum	maximum	F	P
Obi Island	3.21	0.940	1	4		
Identity V	2.98	0.820	1	4		
Shining Nikki	2.02	0.735	1	4	14.586	0.000
King of Glory	2.70	0.911	1	4		
Genshin Impact	2.62	0.882	1	4		

3.4. Analysis of Differences in Costing Money

Table 4 shows the money spent each day in each of the five games. In order to test whether there are differences in the total cost of different games, one-way analysis of variance is used to test. As can be seen from Table 4, the significance of the difference is 0.000<0.05, and there is a significant difference. According to the mean value, it can be seen that Shining Nikky > King of Glory > Genshin impact > Identity V > Obi Island. First of all, it's easy to see that the highest spend in the Shining Nikky sample is 40,000, which is much higher than the other four games, while Obi Island's highest spend is 2,666, which is much lower than the other four games. It can be concluded that in the face of female games need to spend more money. Farming, on the other hand, doesn't cost that much money.

Table 4. The cost money in different games(yuan)

Game	Average	Standard deviation	minimum	maximum	F	P
Obi Island	297.89	498.404	0	2666		
Identity V	969.73	2563.459	0	18000		
Shining Nikki	3921.67	7697.794	0	40000	6.347	0.000
King of Glory	2889.40	3817.929	0	20000		
Genshin Impact	1898.74	3700.710	0	20000		

3.5. Analysis of Differences in Age

Table 5 shows the difference in age of play. In order to test whether there are differences in the age of players in different games, one-way analysis of variance is used to test. As can be seen from the table below, the significance of difference is 0.007<0.05, and there is a significant difference. According to the mean value, it can be seen that Obi Island > King of Glory > Shining Nikky > Genshin impact > Identity V. This shows that the players in the farming game are older, while the fifth personality group is younger. And one of the oldest of the original gods is 47 years old, which suggests that it has a wide range of players.

Table 5. The age in different games

Game	Average	Standard deviation	minimum	maximum	F	P
Obi Island	20.09	3.781	12	29		
Identity V	17.58	2.914	10	25		
Shining Nikki	19.10	3.390	10	27	3.593	0.007
King of Glory	19.30	2.693	9	23		
Genshin Impact	18.92	5.087	10	47		

3.6. The Relationship between Total Cost and Maximum Single Consumption

Table 6 shows the relationship between the total amount spent in the game and the maximum amount spent in a single session. Therefore, in order to test whether there is a correlation between consumption amount and single consumption amount, Pearson correlation is used for analysis. According to the following table, the correlation significance is less than 0.05, indicating a significant correlation. According to the coefficient, it can be seen that there is a strong positive correlation between the two. This shows that the higher the total amount of money in it, the more money will be spent in a single session.

Table 6. Correlation

Name		Total consumption amount	Single amount
Total consumption amount	Pearson correlation	1	0.760**
	Significance (two-tailed)		0.000
Single amount	Pearson correlation	0.760**	1
	Significance (two-tailed)	0.000	

4. Conclusion

Based on the results of the survey, players can choose a game that suits them based on the amount of money they spend, their age, and the time they spend. Game manufacturers can also improve their publicity programs and planning programs according to the above five aspects. Here are some tips for manufacturers.

According to gender data, half of mobile games such as MOBA games, farming games and games aimed at women are female, and nearly half of mobile games featuring asymmetric competition are female. So these four types of game makers can increase their revenue by catering to the needs of female game players.

Also, the overall age of game players is very young. Game makers can lower the barrier to entry, increase the appeal and attract a wider range of players, depending on the game concept. In terms of time spent on games, games targeted at women had the lowest time spent per day. In order to increase player viscosity, game manufacturers can diversify their games. If it's hard to diversify, then they have to increase their appeal level. For example, Shinning Nikky game makers need to improve the sophistication of their costumes and the amusement of their stories.

Based on player attitudes towards charging money, it is clear that among all players, the majority do not care about the amount of money spent in the game. This shows that with the rapid development

of social economy and the continuous improvement of people's living standards, people are more willing to meet their entertainment needs.

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