

Analysis of the market structure and development trend of China's mobile game industry

Zhang Ling

School of Management, University of Shanghai for Science and Technology, Shanghai, 200940, China

Abstract: *In recent years, the rapid development of China's smart phone and mobile network business has laid the foundation for the development of the mobile game industry, and the sales revenue of China's game industry market in 2021 reached 296.513 billion yuan, an increase of 17.826 billion yuan over last year, a year-on-year increase of 6.4%, and a foreign growth of 16.6%. From 2014 to 2020, the average annual compound growth rate of the game industry market size was as high as 40.3%. The high profit margin and low entry threshold of the mobile game industry have also quickly attracted a large number of high-quality Internet companies to lay out the track, and the head Internet companies Tencent and NetEase occupy nearly seventy percent of the market share, and the oligopoly trend is becoming more and more obvious. This paper analyzes the efficiency and future development trend of the market behind the high concentration by studying the current situation, market structure and competition pattern of the game industry, and the results show that China's mobile game market is huge in scale, high concentration, obvious trend of games going overseas, and under the strict policy supervision environment, many giant enterprises have chosen the development strategy of high-quality products to promote the healthy development of the game industry.*

Keywords: *Mobile gaming industry; Market structure; Development trends*

1. Introduction

The "Strategic Emerging Industries Classification (2018)" statistical catalogue released by the National Bureau of Statistics officially included the game industry in the "Strategic Emerging Industries Classification", which belongs to the general category of digital creative industries.^[1]In 2008, the actual sales revenue of China's game market was 18.56 billion yuan, and by 2021, the actual sales revenue of China's game market will reach 296.513 billion yuan, an increase of nearly 16 times. Thanks to the upgrading of smartphones and mobile devices, the iteration of mobile communication technology, and the comprehensive coverage of mobile networks, the mobile game market has developed rapidly. This article starts from the market structure of the mobile game industry, discusses the new development trend of the mobile game industry, and the direction of the development of the industry under strict regulatory conditions.

2. The development status of China's mobile game industry

2.1. Market size

With the continuous development of mobile devices, mobile communications and related technologies, the overall scale of mobile games has grown rapidly in recent years. Mobile games refer to game works that use mobile phones and other mobile intelligent terminals as the operating carrier and are available for public download or online interactive use through information networks. Smartphones are their mainstream mobile terminals, so they are also called mobile games, or simply mobile games.^[1]Common mobile games are divided into the following types: tactical competitive games, role-playing games, strategy games, action games, racing games, board games, simulation management games, shooting games.

In recent years, with the accelerated development of infrastructure and network technology construction such as urban WIFI in the 5G era, as well as the continuous innovation and development of intelligent and mobile terminal technology, mobile terminals can provide users with entertainment and information services anytime, anywhere. The popularity of global mobile terminals continues to grow and develop, and the mobile game industry with smart phones, tablets, etc. as the carrier has

blown a whirlwind in the world, with its unique characteristics such as portability, low development cost and wide user groups, it has become a dark horse in the game market, and has gradually become the mainstream game type with the largest number of users and the strongest profitability in the Chinese game market.

According to the data released by the Game Working Committee of the China Phonological Association, the scale of the mobile game market continues to grow. Although the growth rate of China's mobile game market declined in 2021, the actual sales revenue was 225.538 billion yuan, an increase of 15.862 billion yuan over last year. Mobile games still occupy the mainstream of the domestic game market, and since 2014, sales revenue has increased year by year, and in 2016, it surpassed client games, and the position of the mobile game market has been further consolidated.

2.2. User scale

From the perspective of user scale, the scale of mobile game users has increased year by year, exceeding the 600 million mark in 2018, a year-on-year increase of 7.38%. By 2021, the scale of domestic game users will be 666 million, a year-on-year increase of 0.22%, and since 2020, the outbreak of the epidemic and the resulting more leisure time at home are also a major reason for the increase in the scale of mobile game users. At this stage, the number of mobile game users increased significantly and gradually became saturated. Stricter policies and supervision, such as the implementation of new anti-addiction regulations and the gradual deepening of juvenile protection, will further make the user structure of the mobile game industry more healthy and reasonable.^[2]

2.3. Overseas market size

With the increasingly stringent requirements for version numbers in the domestic game market in recent years, the number of version number approvals has decreased year by year, and overseas markets without version number requirements have become a new choice for many game manufacturers. Looking at the entire game industry, the revenue of game companies in overseas markets is small, but its scale growth rate is much higher than the sales scale of the game industry most of the time, indicating that China's games are growing rapidly in overseas markets. In 2020, the sales scale of overseas games will grow by 33.25%, and the sales scale of the entire game industry will grow by 20.71%, with the strict supervision of the domestic market, the restrictions on version approval, and the refinement of game types and diversified themes in China, games going overseas will maintain the current development momentum.^[3]

3. The market structure of China's mobile game industry

Market structure refers to the combination of the number of enterprises within an industry and their size distribution, the level of product differentiation and the ease with which new enterprises can enter the industry. This section will analyze the market structure of China's mobile game industry from three aspects: absolute concentration, relative concentration and Herfindhal-Hirschman index.

3.1. Absolute concentration analysis

Table 1: Top 10 enterprises in China's mobile game market share from 2015 to 2020

2015		2016		2017	
Enterprise	Market Share	Enterprise	Market Share	Enterprise	Market Share
Tencent Games	41.39%	Tencent Games	37.80%	Tencent Games	43.65%
NetEas Games	15.33%	NetEase Games	17.70%	NetEase Games	18.21%
Qihoo360	4.37%	Perfect World	2.10%	Perfect World	2.10%
Baidu Games	3.60%	Kunlun Wanwei	1.80%	Interactive Entertainment	2.21%
Fun Games	3.05%	Interactive Entertainment	1.60%	Kunlun Wanwei	2.07%
Kunlun Wanwei	2.86%	Palmfun Technology	1.50%	Youzu Network	1.46%
Sohu Changyou	2.57%	Kaiying Network	1.40%	Palmfun Technology	1.11%
CMGE	2.57%	Youzu	1.30%	Sohu Changyou	1.03%
Kaiying Network	2.53%	Giant Network	0.90%	Giant Network	0.97%
Perfect World	2.23%	Gigabit	0.90%	Kaiying Network	0.81%

By collating the data in IR's research report, it can be found that in the five years from 2015 to 2020, the market share of the top ten enterprises in China's mobile game market is shown in the table 1:

2018		2019		2020	
Enterprise	Market Share	Enterprise	Market Share	Enterprise	Market Share
Tencent Games	47.26%	Tencent Games	49.68%	Tencent Games	52.60%
NetEase Games	17.33%	NetEase Games	20.11%	NetEase Games	19.60%
Interactive Entertainment	3.39%	Interactive Entertainment	5.19%	Interactive Entertainment	4.77%
Zhimingxingtong	1.86%	Perfect World	1.68%	Perfect World	2.19%
Kunlun Wanwei	1.82%	bilibili	1.56%	bilibili	1.72%
bilibili	1.78%	CMGE	1.11%	Youzu Network	1.35%
Perfect World	1.65%	Xindong Company	1.03%	CMGE	1.07%
Youzu	1.56%	Youzu	0.98%	Gigabit	0.94%
Palmfun Technology	1.14%	Gigabit	0.94%	Xindong Company	1.03%
Kaiying Network	1.07%	Friendship Time	0.73%	Friendship Time	0.78%

Absolute concentration is the most commonly used and simplest concentration indicator, also known as concentration. It is usually expressed as the sum of the market shares of the top companies in terms of market share, and is calculated as follows:

$$CR_n = \sum_{i=1}^n S_i$$

Among them, S_i is the market share of the i -ranked company.

According to the formula of industry concentration, the specific results are shown in Table 2:

Table 2: Industry concentration index of China's mobile game market from 2015 to 2020

year	2015	2016	2017	2018	2019	2020
CR ₄	64.7%	59.4%	66.5%	69.8%	76.7%	79.2%
CR ₈	75.7%	65.2%	72.1%	76.7%	81.3%	84.2%

As can be seen from Table 2, CR₄ increased from 64.7% in 2015 to 79.2% in 2020, and CR₈ increased from 75.7% in 2015 to 84.2% in 2020. According to the classification of Bain's market structure, China's mobile game market structure in 2020 is oligopolistic.

3.2. Relative concentration analysis

The relative concentration can reflect the scale distribution of manufacturers in the industry. Lorenz curves and Gini coefficients are commonly used to indicate the relative concentration of markets. The deviation of the Lorenz curve from the diagonal reflects the uniformity of the scale distribution of the enterprise, and the more the deviation from the lower right corner, the more uneven the distribution of the scale of the enterprise, the higher the industrial concentration.

The value range of the Gini coefficient is between 0 and 1, the smaller the value, the more uniform the distribution of the scale of manufacturers, and vice versa, the larger the value, the more concentrated the distribution of manufacturers. The Gini coefficient is 1, which means that a single manufacturer completely monopolizes the market.

According to the data in the "China Mobile Game Industry Research Report", by the end of 2020, there were about 1 million mobile game companies in the country, with the top 3 companies in market share accounting for 74.89% of the market share, and the top 10 companies in market share accounting for 83.01% of the market share. This shows that the scale distribution of online game enterprises in China is very uneven, and the concentration of online game industry is relatively high. By calculating the Gini coefficient by formula, it can also be seen that the concentration of China's online game industry is relatively high.

3.3. Helfindhal-Hirschman index

The Helfindhal-Hirschman index, or HHI index, refers to the sum of squares of the total revenue or total assets of all companies in the industry. Its calculation formula is:

$$HHI = \sum_{i=1}^n X_i^2 \quad (i=1, 2, 3, \dots)$$

Among them: X_i represents the market share of the number one company in the industry, and n

represents the total number of companies in the industry.

The value of this indicator ranges from 0 to 1. When the infinite tends to be, it indicates that all enterprises in the market have the same market share; When $HHI=1$, it indicates that the market is completely monopolized by one company; The larger the HHI value, the more uneven the distribution of enterprise scale, the higher the industrial concentration, and vice versa.

The value of the HHI index of China's mobile game market from 2015 to 2020 can be calculated, and the specific results are shown in the table 3:

Table 3: HHI index of China's mobile game market from 2015 to 2018

year	2015	2016	2017	2018	2019	2020
HHI	2022.27	1759.86	2257.83	2562.87	2909.38	3186.95

From Table 3, we can see that from 2015 to 2020, the HHI index of China's mobile game market also showed a downward trend, and the HHI index rose from 2015 to 2022.37 to 3186.95 in 2020, and the structure of China's mobile game market in 2020 is a high oligopoly type.

From the absolute concentration, relative concentration and the measurement of the Herfindahl-Hirschman index, it can be seen that China's mobile game market presents an oligopoly pattern. Several giant game companies account for eighty percent of the market share. Among them, Tencent Games has an increasing share of the market with its perfect industrial chain structure, high-quality technical conditions, and strong bargaining power. NetEase Games, with its high-quality customer resources and operation and research and development experience, also occupies a large share in the mobile game market.

Overall, the concentration of the game market has been increasing in recent years, and the high profit margin and low entry threshold of the game industry have also quickly attracted a large number of companies to enter the market. But the quality of the game and the user's reputation really determine the value of a game. When faced with a huge group of games in the market, consumers often choose games with better design, clearer graphics, more interesting gameplay, and more challenging playthroughs. Friends have also become a new social platform in today's society. For example, "Honor of Kings" has more than 200 million registered users and is jokingly called the third largest social software after WeChat and QQ. With the game R&D capabilities accumulated over the years and the excellent channels mastered, leading enterprises can better attract users and further compress the living space of small and medium-sized enterprises. [4]

4. The development trend of China's mobile game industry

4.1. Enterprise competition pattern

In the rapid development of mobile games, many high-performing listed companies have emerged, such as Tencent Games and NetEase Games. At present, the major listed mobile game companies in China include Tencent Games, NetEase Games, 37 Interactive Entertainment, etc., [5] of which the proportion of Tencent Games and NetEase Games further increased in 2020, exceeding 70% and reaching 72.2%.

The total revenue scale of mobile games among the major listed companies also increased from 80.29% in 2019 to 83.30% in 2020, and the industry concentration has increased, and the monopoly of Tencent Games and NetEase Games is even stronger.

From the perspective of market structure, the market share of the mobile game industry is concentrated, and Tencent's market share ranking first in recent years shows its heritage as a leading Internet enterprise. The upstream of the game industry chain (developers) has low barriers to entry, low technical requirements for the company, and the promotion of products mainly depends on the quality of channels and the product itself, which attracts a large number of enterprises to enter the market or invest, and the huge performance flexibility of game companies also attracts a large number of talents to enter. However, with the country's restrictions on game version numbers and the implementation of anti-addiction policies, the game development link will face great obstacles, small and medium-sized competitors will be gradually washed out, and high-quality developers will be vertically acquired or enter the game publishing field.

From the perspective of input and output, large game companies have stronger bargaining power in the market, and their position will be more solid. There are two elements required for game research

and development, one is technical developers such as IT engineers, and labor production factors such as game concept art designers and content creators; The second is capital production factors such as software engines and mobile terminals.

4.2. Game product features

In May 2017, the national "13th Five-Year Plan" for cultural development and reform clearly pointed out that it is necessary to vigorously support the creation of excellent cultural and creative products that embody the spirit of Chinese culture and conform to contemporary social values, and at the same time clearly pointed out that the transformation and upgrading of the animation and game industry should be accelerated. The state will make every effort to promote the development of the game industry, take the boutique strategy as the lead, pay attention to content creation, change the way of relying on scale efficiency growth in the past, and realize the transformation of quality and benefit growth.

The mobile gaming industry has fast product replacement and short product life cycles. In 2013, China's mobile game market entered the fast lane, and product design became the key to many game products standing out. According to CNNIC's report statistics, the main reason why users uninstall mobile games is that the game content is not interesting, accounting for 53.1%. In the gaming sector, the homogenization of content has always been serious. With the development of the game field, users have also put forward higher requirements for game content, and the game content is not new, which is easy to cause the loss of users. In the context of the increasing number of games, it is obviously not enough to rely on quantity and marketing to win, and new themes and new ideas are the magic weapon that sticks to users for a long time.^[6]

4.3. Strict government supervision

Many studies have shown that excessive gaming is not conducive to people's intellectual development and physical and mental health. The state has introduced a series of measures to prevent minors from indulging in games. In July this year, the kick-off meeting of the national standard "Technical Requirements for the Guardianship System of Minors in Information Technology Online Games" was held in the form of an online conference, and the first national standard for the guardianship of minors in games was officially launched. 21 representatives from China Electronics Standardization Institute, Guangdong Game Industry Association, Tencent, NetEase, Perfect World, Baidu, Shenzhen Internet Police Detachment, Shenzhen Dentsu, Hengan Jiaxin, Chinese Academy of Medical Sciences and other enterprises and institutions attended the meeting. A number of companies have set an example and strictly implemented anti-addiction policies. The introduction of anti-addiction policies has also caused the stock prices of many game companies to plummet overnight. On June 27 this year, Tencent Games held its annual conference online, at which more than 40 game products and brands were released. According to reports, the future layout of Tencent Games is divided into three aspects, first, it will continue to spare no effort, regardless of the cost, and more systematically do a good job in the protection of minors; Secondly, it has built a global cooperation system with more than 100 game manufacturers and studios at home and abroad; Third, build a game "production, education and research" system with major universities, and launch the "Fireworks Program" to improve the talent and creativity incubation mechanism in the game industry.^[7]In the policy environment of strong government supervision, large game companies are paying more and more attention to the cultivation of talents and the output of ideas, and the game industry will also develop in a healthier direction.

4.4. The trend of games going overseas is obvious

In the past two days, the domestic supervision of the game industry has become more and more stringent, the strict anti-addiction new regulations have been implemented and the number of game version approvals has been tightened, which has slowed down the growth rate of the domestic game market, and domestic enterprises have sought new growth points, while under the policy call of cultural going out, a number of high-quality Chinese game companies have expanded their markets overseas by virtue of the advantages of self-organized research and development. Mobile gaming "going global" is the trend and the pace is accelerating.

From the perspective of countries where games go overseas (Table 4), China's games mainly flow to the United States, Japan and South Korea, and in 2020, 27.55% of the revenue came from the United States, 23.91% from Japan, and 8.81% from South Korea. The top three countries in terms of income

accounted for 60.27% of total revenue in 2020, down 7.33 percentage points from 67.6% in 2019, indicating that China's games going overseas are welcomed by more countries.

Table 4: Distribution of China's overseas game revenue from 2019 to 2020 (unit: %)

	2019	2020
United States	30.9%	27.55%
Japan	22.4%	23.91%
Korea	14.3%	8.81%
Germany	7.0%	3.93%
France	4.2%	2.07%
United Kingdom	-	2.70%
Indonesia	3.4%	0.89%
Turkey	3.0%	0.91%
Saudi	2.5%	1.75%
Brazil	2.2%	0.89%
Thailand	2.2%	-
India	1.3%	0.61%

5. Conclusion

Thanks to the upgrading of smart phones and mobile devices, the iteration of mobile communication technology, and the comprehensive coverage of mobile networks, mobile games have flourished and formed a large-scale industry, which has become a new economic growth point to promote the game industry and plays an important role. [8] With the rapid development of the game industry, local governments have introduced industry development and support policies; Especially under the impact of the new crown epidemic on many traditional industries (such as traditional sports), games highlight the advantages of the industry with their online characteristics. Through the analysis of the structure and future development trend of China's game market, this paper mainly has the following conclusions:

(1) From the perspective of the development of the mobile game industry, the attributes of games are gradually diversified. China's mobile game industry began to emerge in 1997, initially based on built-in stand-alone machines, and later developed from word games to Java games to illustrated games; Since 2009, with the development and popularization of smart phones, mobile games have also developed rapidly. At present, China's mobile games are not only entertainment-based, but also add social and competitive attributes. The variety of games shows a diversified development trend.

(2) From the perspective of market structure, China's mobile game market concentration is relatively high, and the concentration is gradually increasing, the degree of product differentiation is low, the types of mobile games are more concentrated, and market barriers are gradually increasing. Tencent NetEase alone accounts for nearly seventy percent of the mobile game market, partly because the development of the game market requires a lot of financial support, and on the other hand, the strict policy environment has forced some shoddy companies to withdraw from the market. The mobile gaming industry is also becoming increasingly competitive. And an oligopoly pattern has been formed. The export of games has also become a new growth direction that game companies seek in a strict policy environment. Moreover, the United States, Japan and South Korea are the main exporters of games, and China's games going overseas are welcomed by more countries.

(3) As an entertainment and leisure project, the development of the mobile game industry is becoming more and more standardized, various creative IDs are more and more in line with the interests of young people, and games have become an important way for people to relieve the pressure of life; At the same time, due to the high floating population in China, more young people who go out to study and work live in rental houses/school dormitories, and there are certain restrictions on the contact between console games and client games, and mobile games can get more choices for young groups in this context.

(4) Measures for the protection of minors have been further strengthened, and the protection of minors is one of the policy priorities of the online game industry, requiring game products to carry out more standardized and healthy responsibility management for minors in various aspects such as game duration and payment behavior. Regulation will promote the standardized and healthy development of the industry. In terms of version approval, since the State Administration of Radio and Television

issued the Notice on the Management of Mobile Game Publishing Services in May 2016, the approval of mobile games has become stricter, and the number of mobile games that have been reviewed has shown a downward trend. In this environment, the number of new companies in the mobile game industry has also declined year by year, forcing the development strategy of more high-quality products in the industry.

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