The Impact of Game Live Streaming on In-Game Purchases of Chinese Young Game Users

LI JIAXIN
Shibaura Institute of Technology
307 Fukasaku, Minuma-ku, Saitama City, Saitama, Japan
mf22501@shibaura-it.ac.jp

KOYAMA YUHSUKE
Shibaura Institute of Technology
307 Fukasaku, Minuma-ku, Saitama City, Saitama, Japan
yuhsuke@shibaura-it.ac.jp

ABSTRACT

The gaming industry in China boasts a massive user base, with 654 million game users and 266 million game live stream viewers. This paper focuses on young gamers in China, exploring the impact of game live streaming on their spending behavior. Specifically, it examines in-app purchases in mobile games. Results show that watching game live streams influences both the amount and frequency of in-game spending by gamers. Platforms like TikTok and Bilibili surpassed dedicated game streaming platforms in popularity, with TikTok leading in user base.

The results of this study indicate that live stream viewing is a critical factor in promoting user spending behavior in game marketing and content creation. Notably, in popular genres such as MOBA and shooting games, live streaming strongly encourages spending behavior. This suggests that utilizing live streaming will become increasingly important in developing marketing strategies and monetization models within the gaming industry.

Keywords

game live streaming, in-game purchases, smartphone game, purchasing behavior, MOBA, Shooting game

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RESEARCH BACKGROUND

Growth and Future Outlook of the Global Gaming Market

According to Newzoo's report *The Global Games Market in 2023*[1], published in May 2024, the global gaming market is projected to generate $183.9 billion in revenue in 2023, a 0.5% increase compared to 2022. This growth in revenue is attributed to the solidification of games as a mainstream form of entertainment, with an expanding player base across a wide range of age groups. The number of players is expected to reach 3.31 billion, showing a year-on-year increase of 4.3%. The growth in the number of young players is especially notable, and as existing players age, the total number of players is expected to continue rising.

As shown in Figure 1, on a regional basis, the Asia-Pacific region accounts for more than half of the world's players, with major markets such as India and China, as well as game-interested countries like Japan and South Korea, at the forefront. Meanwhile, North America and Europe account for 21% of players, with the Middle East & Africa and Latin America showing growth rates of 11.3% and 6.0%, respectively. The increase in the number of players in these regions has been driven by factors such as the expansion of mobile internet infrastructure, the proliferation of smartphones, and the rise of the middle class.

In terms of revenue, smartphone games account for nearly half of the overall market but recorded a 2.1% year-on-year decrease, reaching only $90 billion in revenue. This decline is attributed to new privacy-related policies introduced by Apple and Google, which are expected to slightly limit the revenue growth of smartphone games. Nevertheless, smartphone games remain the most important segment in terms of consumer spending.

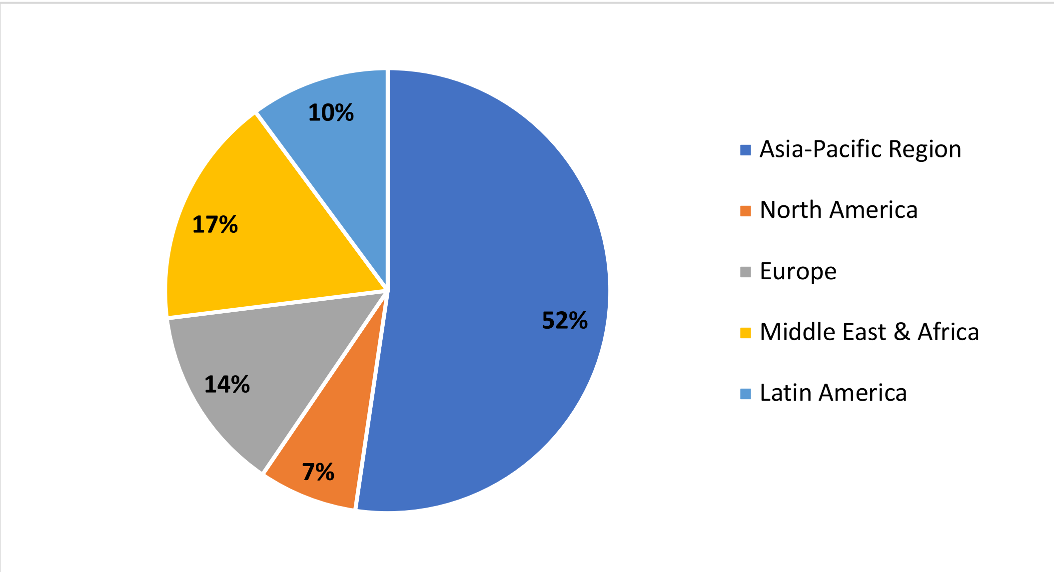

Figure 1: Global Game Players in 2023

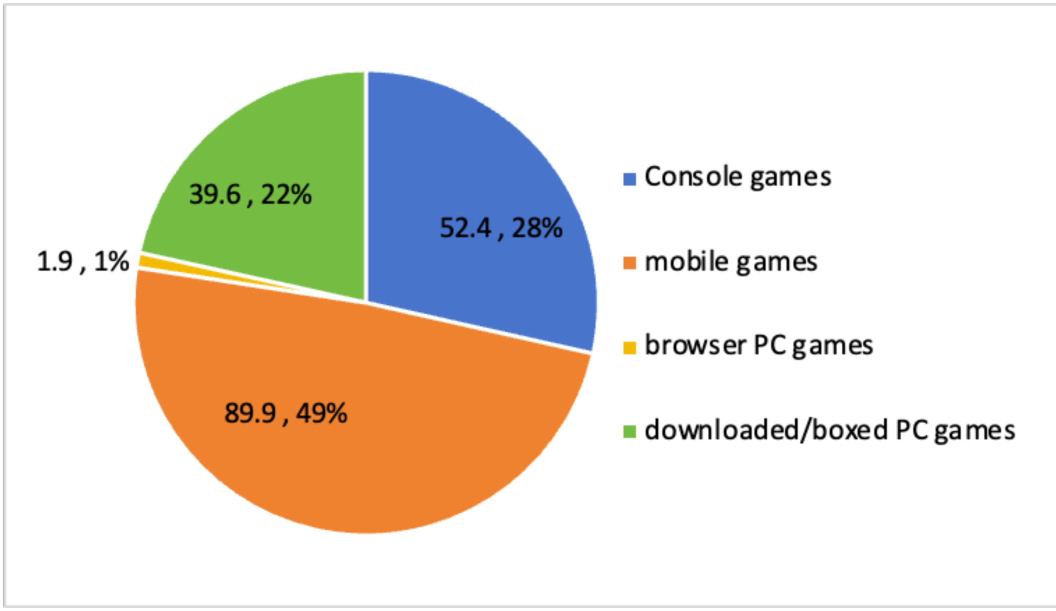

Figure 2: Global Game Market Revenue by Type in 2023 (Unit: Billion USD,%)

As shown in Figure 2, PC games, on the other hand, are projected to generate $39.6 billion in revenue in 2023, reflecting an 8.4% year-on-year growth, supported by the release of many major titles. Console games are expected to account for 28% of the market, with an anticipated 0.3% year-on-year growth, generating $52.4 billion in revenue. This growth is largely driven by the recovery from delays in development schedules due to the impact of COVID-19, resulting in the release of many major games in 2023.

In terms of regional revenue, the demand for console games is driving growth in the Western markets. North American game revenue is expected to increase by 0.3% year-on-year, reaching $49.9 billion, while Europe's revenue is forecast to grow by 1.3%, reaching $33.7 billion. As shown in Figure 3, these two regions will account for 45% of the global game market revenue in 2023.

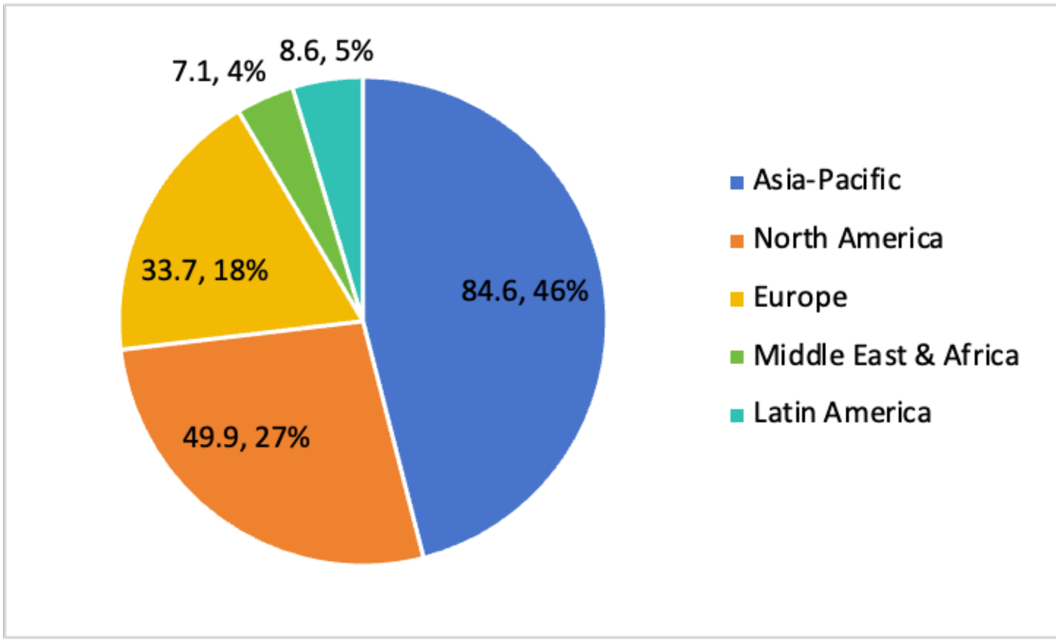

Figure 3: Global Game Market Revenue by Region in 2023 (Unit: Billion USD)

Meanwhile, the Middle East & Africa and Latin American markets show growth rates of 4.6% and 2.2%, respectively, accounting for less than 5% of total revenue, but continuing to grow. Factors contributing to this growth include improved mobile internet infrastructure, affordable internet access, low-cost gaming options, and the increasing number of smartphone users.

As shown in Figure 3, the Asia-Pacific region remains the largest game market in the world in 2023, accounting for 46% of global revenue. However, it is expected to see a 0.2% decline compared to the previous year. The slower growth rate in this region compared to others is due to a decline in revenue from Japan, South Korea, and China, which has dragged down the overall average. In particular, the Chinese market remains cautious because of lockdowns and restrictions on gaming time for minors. While game license approvals have increased, the previous freeze and the slow pace of license issuance continue to impact the overall market.

Furthermore, media content related to games, such as the *Super Mario Bros.* movie and *The Last of Us*, is expected to contribute to an increase in the number of players. By 2026, the global number of game players is projected to reach 3.68 billion, and annual revenue is expected to reach 207 billion USD. Growth in the Asia-Pacific region is particularly notable, as this region is leading the global game market.

In this way, the global game market is predicted to continue its growth, driven by diverse factors, and to experience significant development in terms of both player numbers and revenue. The introduction of new technologies and the release of new game titles are expected to further invigorate the industry.

Current Status of the Game Market in China

Internet Usage in China

According to the China Internet Network Information Center (CNNIC), the number of internet users in China reached 1.067 billion as of December 2022, an increase of 36.36 million compared to December 2021. The internet penetration rate reached 75.6%, a 2.6-point increase compared to the same period the previous year. As a result, China's internet environment has continuously improved, and internet users' experience has also enhanced. With the expansion of information accessibility services, the internet has evolved from widespread connection to high-quality development.

Smartphone Usage in China

According to the China Internet Network Information Center (CNNIC), the number of smartphone users in China reached 1.065 billion in 2022, an increase of 36.36 million compared to December 2021. Among internet users, 99.8% use smartphones to access the internet. The proliferation of smartphones has progressed alongside improvements in China's internet usage environment.

Game Market in China

According to a report by the China Audio-Visual and Digital Publishing Association, between 2011 and 2021, the size of China's game market (including PC online games, smartphone games, and PC standalone games) grew sixfold from 42.85 billion yuan(or roughly 5.89 billion USD)to 296.5 billion yuan(or roughly 40.73 billion USD).

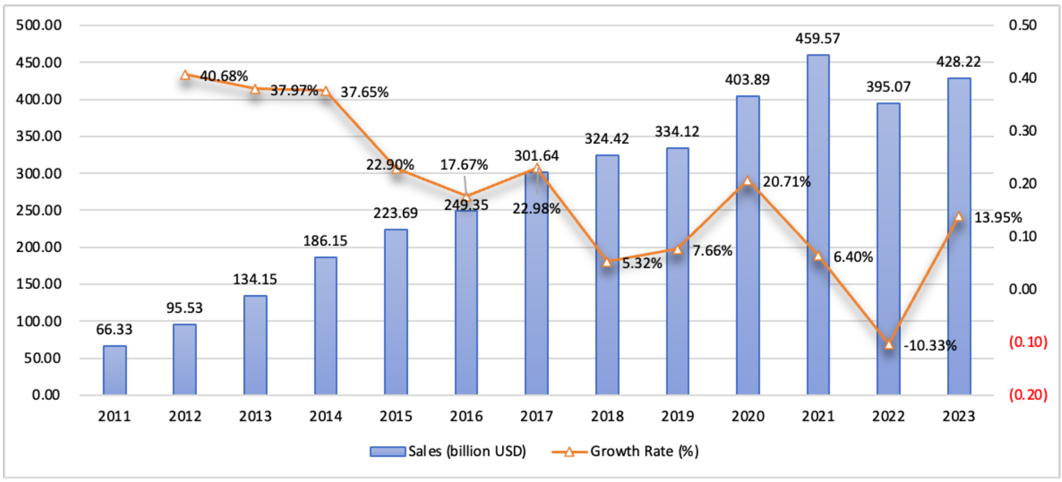

Figure 4: Sales Revenue of the Chinese Game Market (2011-2023)

In 2022, China's game industry faced many challenges due to the impact of Covid-19. Significant pressures were observed in various aspects such as production, consumption, and investment. Sales revenue, user size in the domestic game market, revenue from independently developed games, and smartphone game sales all decreased compared to the same period the previous year. As shown in Figure 4, the ales revenue of China's game market in 2023 was approximately 428.22 billion USD, an increase of 33.14 billion USD or 13.95% from the previous year.

Smartphone Game Market in China

According to the China Audio-Visual and Digital Publishing Association, as shown in Figure 5, the actual sales revenue of China's smartphone game market in 2023 was roughly 320.65 billion USD, an increase of 17.51% compared to the previous year. This growth reverses the decline observed in 2022, which marked the first decrease in the market's history. Factors contributing to this recovery include the stabilization of the user base, an increase in new game releases, and improved market conditions post-COVID-19.

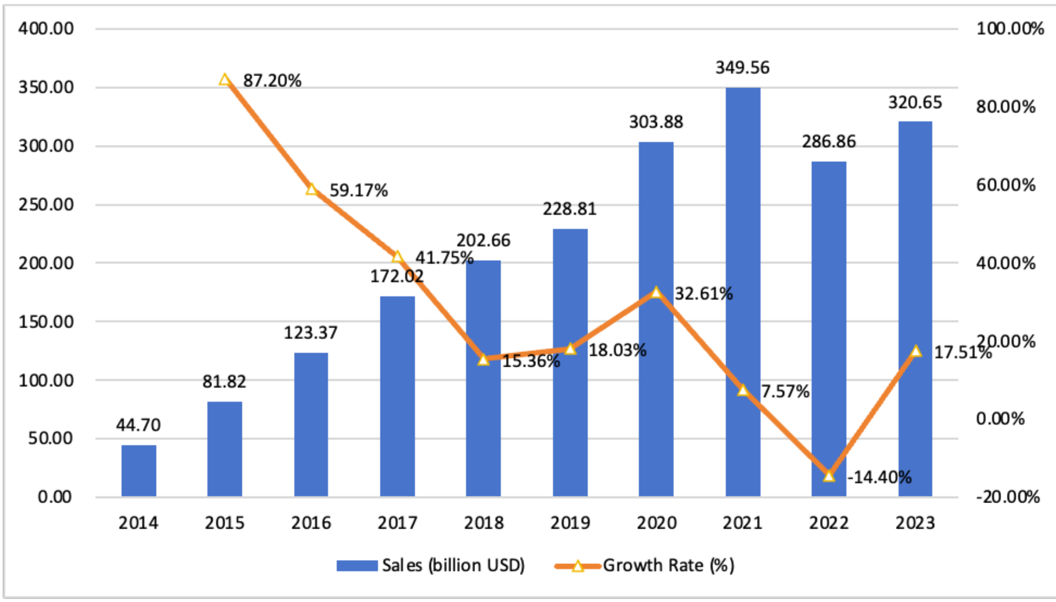

Figure 5: Sales Revenue of China's Smartphone Game Market (2014-2023)

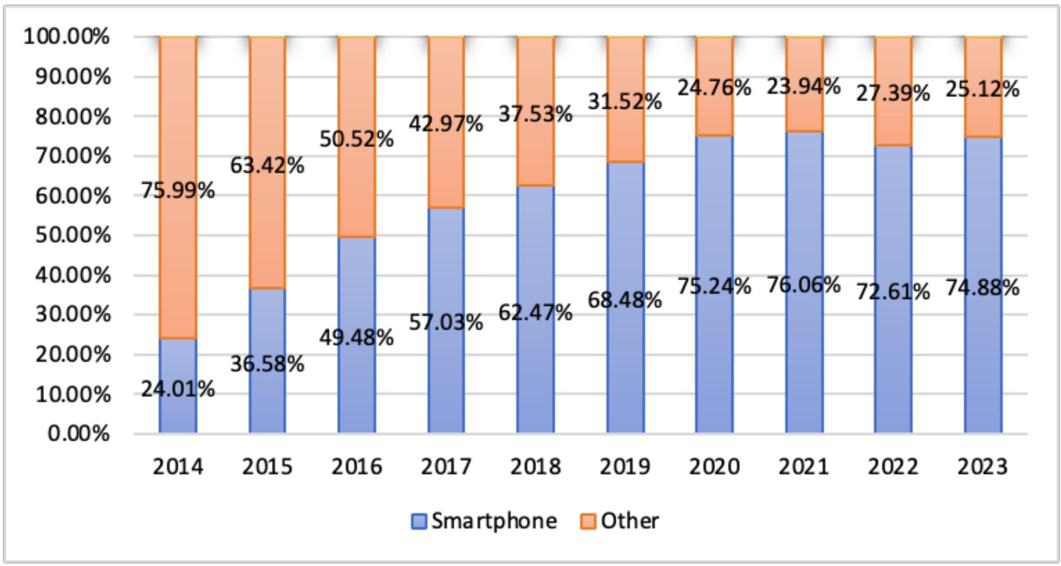

Figure 6: Market Share of China's Domestic Smartphone Game Market (2014-2023)

Additionally, as shown in Figure 6, in 2023, the proportion of sales revenue from China's smartphone game market accounted for 74.88% of the total game market, showing a slight recovery compared to the previous year. While smartphone games remain the dominant revenue source in China's game market, their share has stabilized after the decline in 2022 (72.61%) and remains below the peak of 76.06% in 2021.

As shown in Table 1, in 2022, role-playing games (24 titles), card games (12 titles), and strategy games (11 titles) were prominent among the top 100 smartphone games in China. Although role-playing games consistently ranked highest over the past three years, their overall share, along with card and strategy games, has been declining, reflecting increasing diversification in China's top smartphone games.

Table 1: Number of Top 100 Smartphone Game Products by Revenue (by Genre)

Game Genre	Number of Titles
Simulation (SLG) Games	4
MOBA Games[2]	3
Role-Playing Games	24
Card Games[3]	12
Strategy Games	11
Turn-Based RPGs	7
Board Games[4]	6
Incremental Games[5]	4
Casual Games	3
Fishing Games	3
Others	23

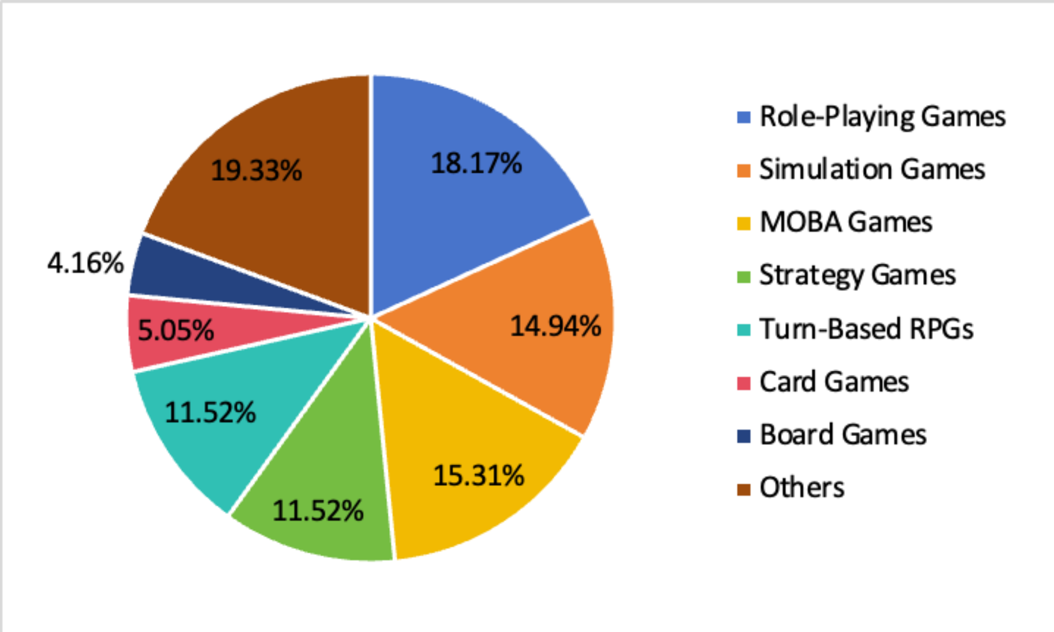

Figure 7: Revenue Share of Top 100 Smartphone Game Products by Genre

As illustrated in Figure 7, role-playing games accounted for the highest share of total revenue at 18.17%, followed by MOBA games (15.31%) and shooting games (14.94%). Together, these three categories contributed 48.42% of total revenue.

Role-playing games dominate the mobile gaming market, excelling in both number and revenue, demonstrating strong profitability. In contrast, MOBA and shooting games, despite fewer titles among top revenue games, show higher profitability compared to strategy and card games.

Game Users in China

Regarding game users, in 2022, the number of online game users in China reached 664 million, a decrease of about 2.2 million from December 2021. Among them, smartphone game users reached 654 million, accounting for 48.9% of the total internet users. In 2022, the Chinese game industry demonstrated stable development. Continued policy support has contributed to the stable growth of the online gaming industry. Furthermore, the increasing popularity of virtual reality (VR) devices and the expansion of gaming have made them an important part of the game industry.

Since the resumption of game license[6] issuance in April 2022, the National Press and Publication Administration (NPPA) approved 512 games in 2022, covering a wide range of platforms, including mobile, client-based, and console games. In the first half of 2023, a total of 522 games obtained license. On average, over 80 new games are released monthly, intensifying competition in the new game market.

The Current Status of Game Live Streaming In China

Live Streaming in China

China's internet broadcasting industry traces its origins back to 2005 when some platforms developed video chat services in the early stages, forming the prototype of the live broadcast model. Between 2009 and 2013, attention toward the live broadcast model increased, and several PC-based live streaming platforms entered the market.

During this period, live streaming platforms experienced remarkable growth between 2014 and 2016, with 2016 being dubbed "the first year of China's internet live streaming."

Live streaming has also been used for product promotion. In May 2016, Xiaomi, a Chinese smartphone manufacturer, conducted a live stream on Bilibili[7], a video-sharing website, to promote its Xiaomi Max smartphone. The live stream lasted for 19 days, attracting a total of 39.54 million viewers, and the number of comments (barrage) reached 317 million. In this way, live streaming has now penetrated the lives of internet users in various forms.

According to the 51st *Statistical Report on China's Internet Development* published by the China Internet Network Information Center (CNNIC), in 2022, the number of live streaming users in China reached 751 million, an increase of 47.28 million compared to December 2021, accounting for 70.3% of the total internet users. Live streaming is particularly popular among young and middle-aged users, and the number of users continues to grow each year.

Live Streaming of Smartphone Games in China

At the same time, live streaming of smartphone games has rapidly expanded, and its influence on marketing within the game industry has become increasingly noticeable, not just in China but worldwide.

China's game live streaming operates within its own ecosystem. The Chinese government imposes certain regulatory controls on the internet, preventing foreign platforms like YouTube and Twitch from operating normally in China[8]. As a result, domestic platforms such as Huya[9], Douyu[10], and Kuaishou[11] fill this gap, providing Chinese game players with channels to watch game live streaming. These platforms also offer a better game live streaming experience, including more stable streams, interactive features, and gift reward mechanisms.

By December 2022, the number of live streaming users in China reached 751 million, accounting for 70.3% of all internet users. Among them, concert live streaming and sports live streaming accounted for 19.4% and 35.0% of internet users, respectively, with increases of 64.91 million and 89.55 million compared to the end of 2021. Game live streaming had 266 million users, a decrease of 35.76 million from the end of 2021, accounting for 24.9% of internet users. Although game live streaming has seen a slight decline from its previous rapid growth phase, it still maintains a large user base. This study focuses on game live streaming viewers.

RESEARCH PURPOSE AND SIGNIFICANCE

This study examines the relationship between game live streaming and in-game purchases in China, specifically investigating how smartphone game live streaming among Chinese youth affects their spending behavior on smartphone games.

The purpose of this research is to identify the impact of game live streaming on in-game purchasing behavior among young Chinese game users. Specifically, it aims to understand the extent to which Chinese youth spend on smartphone games, the trends in their spending frequency and amount, and the factors influencing their purchasing behavior. Additionally, it seeks to examine the viewing habits of game live streams and how these habits influence the frequency and amount of spending. Furthermore, this study aims to reveal differences in the spending behavior of viewers and explore the psychological and behavioral factors influencing their purchasing behavior. Through web surveys and statistical analysis, this study comprehensively investigates the impact of game live streaming on the spending behavior of young people.

THEORETICAL BACKGROUND OF THE RESEARCH

Previous Studies

Previous Research on the Factors Influencing In-Game Purchases in Japan

Ogawa et al. (2019) conducted a survey on the actual spending behavior and reasons for spending on games among elementary, middle, and high school students. The results showed that about 24% of respondents had experience spending money on games. The most frequently cited reasons were “I wanted a specific character” (38% of those who spent money), “There was a sale, so it was a good deal” (35%), and “To enjoy playing with other players” (32%). On the other hand, less frequently cited reasons included “I wanted to win competitions with other players” (10%), “To prevent the game from disappearing” (10%), and “To speed up game progression” (13%).

In another study, Morimoto (2018) conducted a survey among students at Tokyo International University and found that (1) time preference rates did not affect spending behavior, (2) those with a stronger present bias were more likely to spend, and (3) the more unaware people were of the inconsistency in their time preferences (naivety), the more likely they were to spend.

The Impact of Game Videos on Game Consumption In Western Countries

Maria T et al. (2020) conducted a survey on how game videos (Let’s Play videos, eSports, and commentary videos) influenced game purchases and gameplay.

The results showed that watching eSports and commentary videos promoted game-related purchases, whereas watching Let’s Play videos did not have the same effect.

Hypotheses in This Study

This study aims to clarify the impact of smartphone game live streaming on in-game purchasing behavior among Chinese youth. Based on previous research, the following hypothesis was tested:

H1: There is a correlation between game live streaming viewing time and in-game purchasing behavior.

H2: There is a correlation between game playtime and in-game purchasing behavior.

To test these hypotheses, a web-based survey and statistical analysis will be conducted to analyze the relationship between viewer purchasing behavior and live streaming viewing in detail.

RESEARCH METHODS

This study conducted a web-based survey to collect data on the spending habits and live streaming viewing behavior of young smartphone game users in China. The specific methods and procedures for the survey are as follows:

Questionnaire Design

Objective: The purpose of this survey is to investigate the relationship between the spending and viewing behaviors of game users who have experience watching game live streams.

Content: The questionnaire consists mainly of the following sections:

1) **Basic Information:** Demographic data such as age, gender, and region of the respondents.

2) **Game Usage:** Questions on smartphone game playtime (with a five-point scale from "less than 1 hour" to "more than 8 hours" for both weekdays and weekends), playing frequency, the names and genres of games being played, spending amount (total monthly spending on all games played, with a ten-point scale ranging[12] from "no spending" to "over 2000 yuan"), spending frequency, etc.

3) **Game Live Streaming Viewing:** Questions on viewing time (with a five-point scale from "do not watch" to "more than 4 hours" for both weekdays and weekends), viewing frequency, platforms used, types of content watched, etc.

4) **Other:** Questions on smartphone game usage time, gaming experience, game live streaming viewing experience, and spending behavior after watching live streams.

Distribution and Collection of the Questionnaire

Target Audience: The target audience for the survey is smartphone game users aged 20 to 40 who have experience watching game live streams.

Distribution Method: The questionnaire was distributed entirely online, and respondents were recruited using Wenjuanxing, a Chinese survey company (https://www.wjx.cn/).

Collection Period: The survey was conducted over a 40-day period from October 20, 2023, to November 30, 2023.

Number of Responses: A two-stage survey (screening survey) was conducted. First, screening questions were asked of a pool of respondents aged 20 to 40, asking whether they had experience watching game live streams. Those who answered "Yes" were invited to participate in the main survey. Ultimately, 1,190 people aged 20 to 40 responded, and the number of valid responses was 856.

Data Analysis

Data Cleaning: The collected questionnaire data underwent data cleaning to remove incomplete or clearly inappropriate responses.

Statistical Analysis: After cleaning the data, various statistical methods were applied, including basic demographic analysis, cross-tabulation analysis, and regression analysis.

Ethical Considerations

The survey was conducted anonymously, and no personal information of the respondents was collected.

RESULTS

Overview of the Data

Current Status of Smartphone Game Genres Watched in Live Streaming

Game Genre	Number of People
MOBA Games	307
Shooting Games	162
Role-Playing Games	112
Casual Games	46
Action Games	24
Sandbox Games	11
Tower Defense Games	7
Auto Chess Games	6
Card Games	10
Party Games	3
Others[13]	168

Table 2: Number of Game Live Streaming Viewers by Game Genre

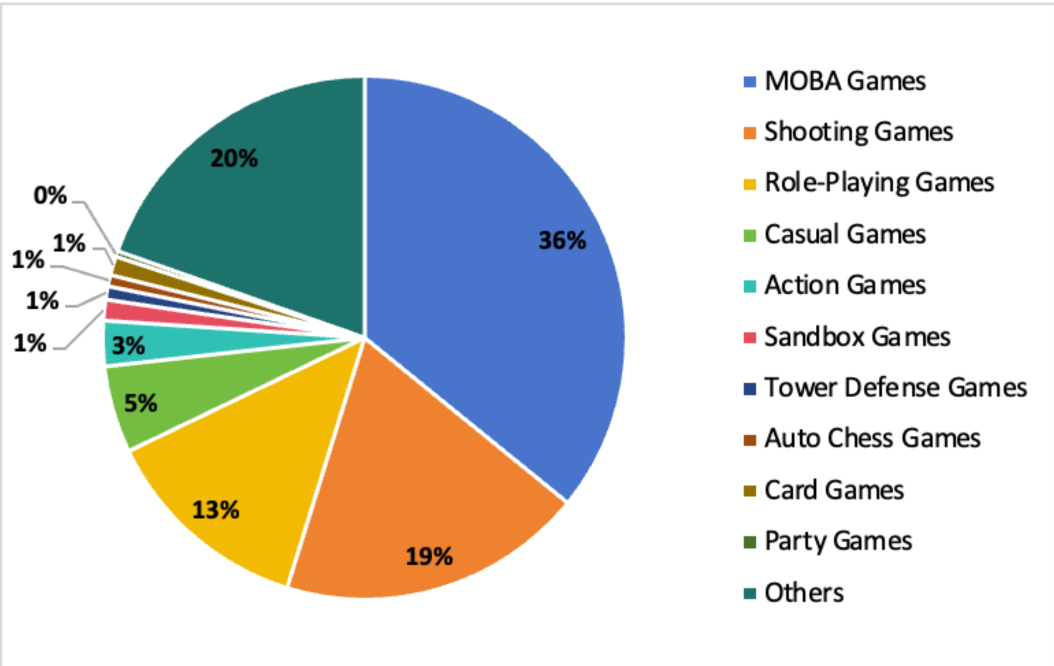

Figure 9: Number of Game Live Streaming Viewers by Game Genre

As shown in Table 2 and Figure 9, viewers primarily prefer to watch MOBA games and shooting games. MOBA games are the most popular, accounting for most of the total views (307 viewers). Shooting games also show a high proportion, with 162 viewers, indicating significant attention to these genres. Role-playing games also have a certain level of popularity, with 112 viewers.

Casual games (46 viewers) and action games (24 viewers) are also watched, but their viewership is notably lower compared to MOBA and shooting games. Other genres, such as sandbox games, tower defense games, auto chess games, card games, and party games, have fewer viewers, though a variety of game genres are being watched. Particularly, party games have only 3 viewers.

Based on these results, further analysis of viewers' genre preferences and trends will be conducted to clarify the influence of game live streaming on in-game purchasing behavior.

Distribution of Game Video Viewership by Age Group

As shown in Figure 10, the total number of individuals in the 20-25 age group is 200, with the highest proportion of game live stream viewers, accounting for 35.5% (71 people). In the 35-40 age group, the total number is 195, with the highest proportion of game live stream viewers, accounting for 45.64% (89 people).

Overall, many people watch game live streams directly. However, it is surprising that in the 20-25 age group, a significant number of people prefer to watch edited segments of live streams, making it the highest among all age groups. On the other hand, in the 30-35 age group, most people watch live game streams directly.

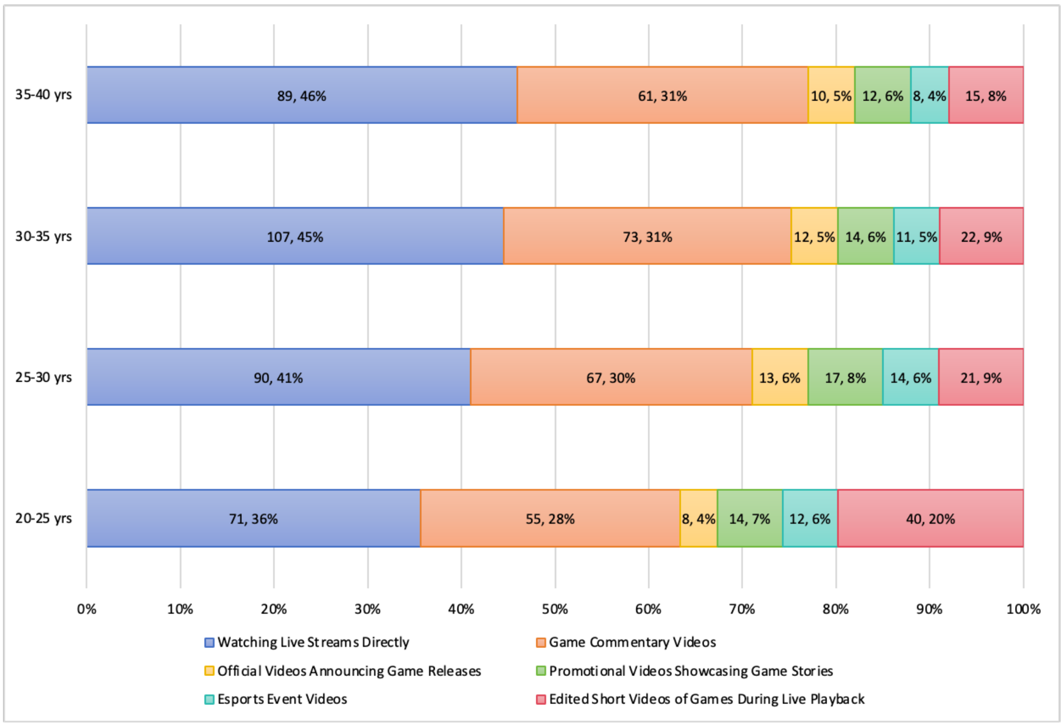

Figure 10: Distribution of Game Video Viewership by Age Group（Unit: Number of People, %）

This trend can be analyzed as follows:

The 20-25 age group is likely to have busy lives and face time constraints, making them more inclined to prefer edited segments of live streams that allow them to grasp the key points in a short amount of time. Moreover, the widespread use of smartphones has contributed to the popularity of shorter content. Conversely, the 30-35 age group tends to have more stable life rhythms, allowing them to watch live game streams for extended periods. This age group may also value the immediacy of live gameplay and the ability to interact in real-time, making live streams more appealing to them.

These results highlight content consumption trends across different age groups, offering valuable insights for game video creators and platforms to develop more effective content strategies.

Usage of Game Streaming Platforms

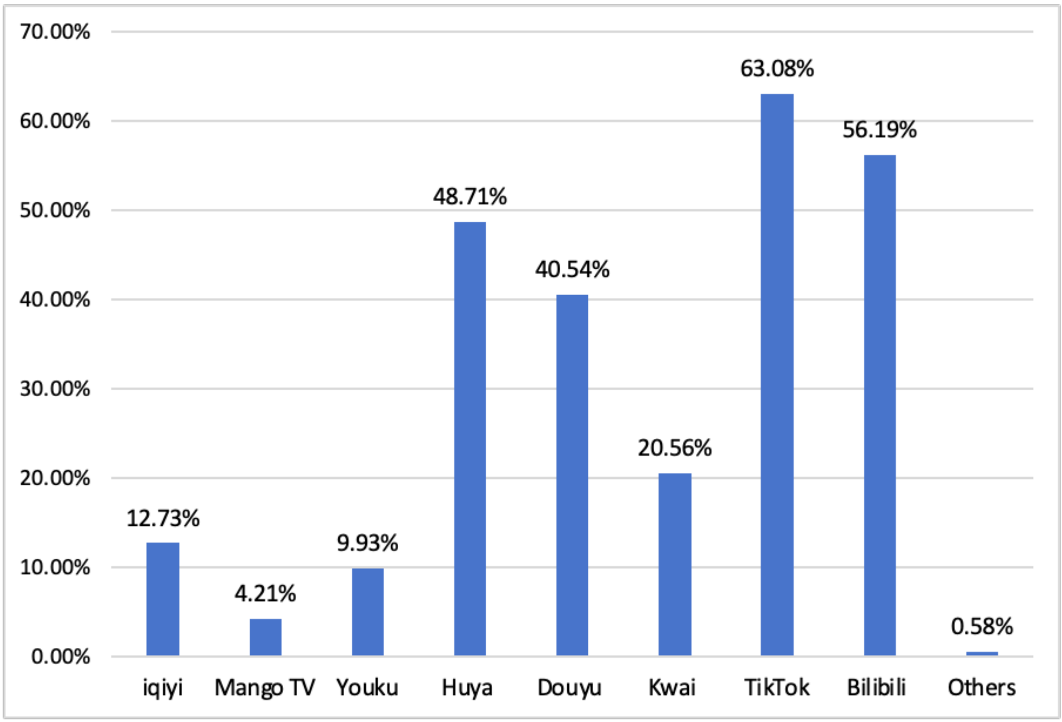

Figure 11: Distribution of Users Across Platforms

Platform	Number of People
iqiyi	109
Mango TV	36
Youku	85
Huya	417
Douyu	347
Kwai	176
TikTok	540
Bilibili	481
Others	5

Table 3: Number of Users on Each Platform

As shown in Table 3 and Figure 11, respondents use multiple platforms. Among them, Douyu and Huya are dedicated game streaming platforms in China and have significantly impacted the development of gaming culture and the live streaming market both domestically and internationally. However, it is surprising that the platforms most used by respondents in this survey were TikTok and Bilibili, which are comprehensive video sites rather than dedicated game streaming sites. (It is possible that respondents may have conflated live game streaming with edited game streaming videos or eSports videos in their responses.)

In conclusion, while Douyu and Huya hold an important position in the market as dedicated game streaming platforms, the survey results indicate that TikTok (Douyin, the Chinese version) and Bilibili have a higher number of users. This suggests that respondents tend to watch game-related videos on these comprehensive platforms. These platforms provide not only game streaming but also a variety of entertainment content, which meets the diverse needs of users.

Top Three Game Genres Played

The results of the survey regarding the three most frequently played game genres (MOBA games, shooting games, and role-playing games) by the respondents are as follows.

A total of 856 people participated in the survey, of whom 93.8% (803 people) have experience with at least one of the three main game genres: MOBA, shooting games, or role-playing games. The proportion of respondents who play MOBA games is 79.32% (679 people), while 44.86% (384 people) play shooting games, and 40.65% (348 people) play role-playing games.

Among the 803 respondents, 230 play both MOBA and shooting games, 155 play both MOBA and role-playing games, and 25 play both shooting and role-playing games. Additionally, 99 people play all three genres simultaneously.

MOBA players not only constitute the largest group but also show a strong interest in other genres. Although the number of players focused solely on shooting or role-playing games is relatively small, the number of people who play both is even smaller. Cross-players between MOBA and shooting games are the most numerous, suggesting that there may be shared incentives between these genres.

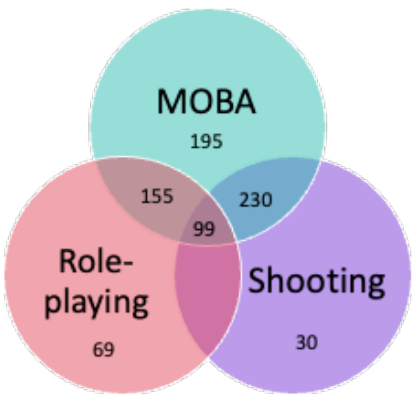

Figure 12: Number of Players for the Top Three Game Genres

In Japan, role-playing games (RPGs) are very popular. This genre, in which players advance the story by taking on character roles, is known for its rich storylines and character development elements. Japanese RPGs are highly regarded worldwide, with notable series such as *Final Fantasy* and *Dragon Quest* serving as representative examples.

On the other hand, the most popular game among the Chinese respondents is the representative Chinese MOBA game *Honor of Kings*. In China, multiplayer online battle arena (MOBA) games are extremely popular. This genre involves players forming teams to compete in real-time battles, emphasizing strategy and teamwork. *Honor of Kings*[14] is particularly popular, boasting hundreds of millions of players. The game also incorporates some role-playing elements, such as character settings and background stories.

Due to its popularity, *Honor of Kings* has expanded to overseas markets, including Japan. For the Japanese market, it was released as *Arena of Valor*, the international version of *Honor of Kings*. *Arena of Valor* retains the core gameplay and characters of the original game but has been localized for the Japanese market.

Correspondence Between Smartphone Game Play Status and Viewing Behavior

Of the 856 survey participants, 98.83% have recently played smartphone games, and many of them reported playing the same games that they watch in live streams. Additionally, 32.01% stated that they play smartphone games, but the games they play differ from the games they watch in live streams. Meanwhile, 1.17% of participants reported that they have not played smartphone games recently.

These results indicate that many participants have recently played smartphone games, and a certain number of them play the same games they watch in live streams. This suggests a tendency for interest in games watched in live streams to lead to actual gameplay. Furthermore, the presence of players who watch one game while playing another indicates that both game live streaming and gameplay are diverse experiences.

Behavior	Number of People	Percentage (%)
Playing, and it is the same game as the one being live-streamed	572	66.82%
Playing, but it is different from the game being live-streamed	274	32.01%
Recently not playing smartphone games	10	1.17%
Never played smartphone games before	0	0.00%

Table 4: Relationship Between Smartphone Game Play Status and Viewing Behavior

		Spending Frequency	Spending Amount
Viewing Time	Weekday	0.362	0.407
	Weekend	0.243	0.332
Play Time	Weekday	0.338	0.369
	Weekend	0.247	0.342

Table 5: Correlation Between Game Live Streaming Viewing Time, Play Time, and In-Game Spending Behavior

STATISTICAL ANALYSIS RESULTS

Viewing Time, Play Time, and Spending Behavior

Table 5 presents the correlation coefficients between game live streaming viewing time, play time, and spending frequency and amount. Four different results exist, as both frequency and amount were asked for both weekdays and weekends. The values in the table represent the correlation coefficients for each combination of questions.

There was a moderate positive correlation between weekday viewing time and spending frequency ($r = 0.362$) and amount ($r = 0.407$). On weekends, these correlations were slightly lower, with spending frequency ($r = 0.243$) and amount ($r = 0.332$). A similar trend was observed for play time, with a positive correlation on weekdays between play time and spending frequency ($r = 0.338$) and amount ($r = 0.369$). However, on weekends, the correlations were slightly lower, with spending frequency ($r = 0.247$) and amount ($r = 0.342$).

Additionally, a logistic regression analysis was conducted using gender, age, playtime, and live streaming viewing time as explanatory variables. The results are shown in Table 6. Age was found to be a significant predictor of in-game spending behavior (regression coefficient = 0.362, $p < .001$), and live streaming viewing time on weekdays was identified as the strongest predictor of spending likelihood (regression coefficient = 0.704, $p < .001$).

On the other hand, gender did not have a significant effect on predicting spending behavior (regression coefficient = -0.008, $p = .967$). Generally, previous studies suggest that men tend to spend more on games than women. However, in this study, no significant difference in spending behavior was observed between genders, which is noteworthy. This result suggests that watching game live streams may influence spending behavior regardless of gender. Viewing game live streams might increase interest and enthusiasm for games among both men and women, leading to spending behavior. In this regard, this study provides a new perspective on the impact of game live streaming on the overall game market, especially highlighting the lack of significant differences in spending behavior between genders. Based on these results, the importance of targeting both men and women in game streaming marketing strategies and content creation is underscored.

These findings suggest that in-game spending behavior is strongly associated with live streaming viewing and tends to increase with age. It also reveals that live streaming content has a greater impact on spending behavior than regular gameplay.

Variable Name	Partial Regression Coefficient	p-value
Gender	-0.008	0.967
Age	0.362	<.001
Play Time (Weekday)	0.393	0.009
Live Stream Viewing Time (Weekday)	0.704	<.001
Constant	-2.436	<.001

Table 6: Logistic Regression Analysis of In-Game Spending After Watching Live Streams

Path Analysis of Influences

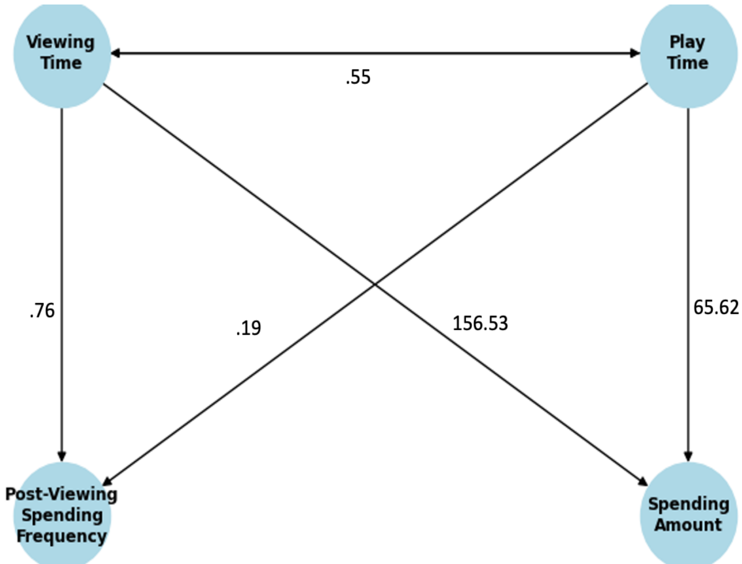

Figure 13: Impact of Viewing Time and Play Time on Spending

Variable	Estimate	Standard Error	p-value
Viewing Time→Spending Frequency	0.759	0.111	***
Play Time→Spending Amount	65.615	22.426	0.003
Play Time→Spending Frequency	0.192	0.076	0.011
Viewing Time→Spending Amount	156.528	32.756	***
Play Time ↔ Viewing Time	0.545	0.037	***

Table 7: Main Estimation Results of the Structural Equation Model

Model Fit Index	Value	Degrees of Freedom (DF)

Chi-Square (χ^2)	39.972	1
p-value	0	-
RMSEA	0.213	-
GFI	0.978	-
CFI	0.931	-

Table 8: Model Fit Indices for Path Analysis

1) Relationship Between Viewing Time and Spending Behavior

According to Figure 13 and Table 7, the impact of viewing time on spending frequency and amount is significant. Specifically, the estimated effect of viewing time on spending frequency is 0.759 ($p < 0.001$), indicating a very strong positive correlation. Similarly, the estimated effect of viewing time on spending amount is 156.528 ($p < 0.001$), also showing a strong positive correlation. These results indicate that as viewing time increases, users tend to spend more frequently and in greater amounts within games.

2) Relationship Between Play Time and Spending Behavior

Play time also has a positive impact on spending frequency and amount. Notably, the estimated effect of play time on spending frequency is 0.192 ($p = 0.011$), suggesting that longer play time is associated with higher spending frequency. Additionally, the estimated effect of play time on spending amount is 65.615 ($p = 0.003$), indicating that users with longer play time tend to spend larger amounts.

3) Model Fit

Looking at the fit indices in Table 8, the RMSEA value is 0.213, which is somewhat high and exceeds the ideal fit range (below 0.05). On the other hand, the GFI value is 0.978, indicating that the model fits the data well. However, the high RMSEA value suggests that the model may not fully fit the data, implying a need for additional variables or model refinement.

These results confirm the significant impact of both viewing time and play time on spending behavior, with viewing time having a particularly strong influence. Moreover, these effects extend beyond mere interest, indicating that game live streaming is an important factor in promoting users' spending behavior.

DISCUSSION AND CONCLUSION

Discussion

This study aimed to examine the impact of live streaming of smartphone games on in-game spending among young people in China. The analysis results revealed a positive correlation between live streaming viewing time, playtime, and spending behavior. Specifically, live streaming viewing time had a strong positive impact on spending frequency, and playtime also positively influenced both spending frequency and amount. However, these correlations represent ordinal relationships rather than absolute values, so no definitive conclusions can be drawn about the quantitative aspect of spending behavior.

Furthermore, age was found to be an important factor influencing spending behavior, with a trend of increased spending as age increased. Additionally, gender analysis suggested that women may be more proactive in spending behavior than men.

Future Challenges

This study has several limitations:

First, as the survey was limited to young people in China, it is difficult to generalize the results to other age groups or countries. Future research should examine user behavior across broader age groups and different countries or regions to allow for comparative analysis, which would lead to more comprehensive conclusions.

Second, as the survey data were self-reported, there may be biases in respondents' memory or perceptions. Future research should consider approaches that utilize actual data collection and behavior-tracking technology to obtain more accurate data.

Third, other factors influencing spending behavior (such as in-game advertisements, rewards, and social influence) should also be considered. This would lead to a deeper understanding of the mechanisms underlying spending behavior.

Finally, to further investigate the relationship between live streaming viewing and spending behavior, qualitative research methods (such as interviews and focus groups) would be beneficial. This approach would provide a deeper understanding of users' motivations for viewing and their psychological backgrounds.

In summary, this study sheds light on an aspect of the smartphone game market in China and provides data useful for future gaming industry and marketing strategies. However, further research is needed, and analyses from more diverse perspectives are required.

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1 The data provided by Newzoo shows discrepancies between the total revenue by region and by game genre. These discrepancies are due to rounding adjustments during data processing. The revenue for each region and game genre is rounded individually,

resulting in slight differences when summing up the totals. Therefore, the total revenue by region and by game genre does not match perfectly.

2 MOBA Games (Multiplayer online battle arena) is a subgenre of strategy video games where two teams of players compete on a predefined battlefield, each controlling a single character with distinctive abilities.

3 Card Games: Games centered around cards, such as playing cards, Hanafuda, and UNO.

4 Board Games: Games centered around a board and pieces, such as Go, Shogi, Othello, Chess, Backgammon, and Sugoroku.

5 Incremental Games also known as a clicker game, tap game or idle game, is a video game whose gameplay consists of the player performing simple actions such as clicking on the screen repeatedly.

6 A "game license " is a license issued by the government. To officially release a game in China, approval from the National Press and Publication Administration (NPPA) and the issuance of a " game license " are required.

7 Bilibili(https://www.bilibili.com/):Bilibili is a Chinese video-sharing website.

8 The Chinese government enforces strict regulations on internet usage, primarily motivated by concerns for national security, social stability, and maintaining public order. Foreign platforms and websites that fail to pass China's internet monitoring and censorship system, often referred to as the "Great Firewall," are restricted from access.

9 Huya (https://www.huya.com/): Huya is a leading Chinese live-streaming platform focused on gaming and esports content.

10 Douyu (https://www.douyu.com/): Douyu is a popular Chinese live-streaming platform specializing in gaming, esports, and entertainment.

11 Kuaishou (https://www.kuaishou.com/new-reco): Kuaishou is a short-video platform in China known for its diverse content, including gaming and live streaming.

12 The results presented in the following analysis indicate ordinal correlations rather than absolute correlations. Therefore, while trends can be observed, it is important to note that these do not reflect quantitative relationships.

13 The 168 responses categorized as "Others" include those who mentioned multiple different types of games, those who answered "I watch anything" without specifying a particular game, those who provided streamer names instead of specific game titles, and those who mentioned games other than smartphone games.

14 Honor of Kings is a popular MOBA game developed by Tencent Games. Released in 2015, the game features a variety of heroes inspired by Chinese history and mythology, each with unique abilities. Players engage in team-based battles, strategizing to destroy the enemy's base.