Drivers for making in-app purchases in mobile games by users in emerging countries

Ekaterina Buzulukova[1], Alina Kobets[2]

1 *Faculty of Economics, Lomonosov Moscow State University*
2 *Graduate School of Business, NRU HSE*

Corresponding author: Ekaterina Buzulukova (buzulukovaev@gmail.com)

Abstract

The mobile games industry has become one of the most popular areas of mobile application development over the past five years. In-app purchases (IAP) are extremely valuable for developers/publishers, and they are interested in promoting them to users. However, previous research revealed differences between drivers of IAP for users from various countries. Authors compare drivers of Russian players and other emerging countries users. The design of the study consists of in-depth interviews with Russian users, followed by a quantitative survey that helps to identify the main drivers of in-app purchases. We found differences in the significance and the list of the drivers for Russian players. Cluster analysis allowed us to identify diverse segments with different priorities, so to be successful, game developers should dive into the peculiarities of the behavior of players in a particular country.

Introduction

The mobile games industry has become one of the most popular areas of mobile application development over the past 5 years (Hamid, Suzianti, 2020). This is one of the few industries that has been positively affected by the COVID-19 lockdown. According to GameAnalytics and Statista, the depth and time spent in games increased by 62%, in turn, this affected the number and frequency of internal purchases made daily, which increased from 5 to 30% (Game Analytics, 2020; Statista, 2022).

According to recent studies, large emerging markets such as Brazil, Indonesia, India, Russia and Vietnam are experiencing a high growth rate in attracting paying users (Appsflyer, 2021). The factors influencing the purchase can differ between representatives of different countries, e.g. for Chinese users, the most important drivers are the degree of satisfaction with the game and its quality, for Indonesian users — costs and the desire to continue the game (Lim et.al., 2015). The mobile games market entered the world's top five in terms of downloads of smartphone games in the first half of 2021, with more than 1.5 billion downloads, trailing behind China, Brazil, the United States, and India. For developers/publishers, users who generate income directly through internal purchases are extremely valuable — the average profit from each such user is $37.9 — $70.3 (Data.ai, 2022).

The spending of Russian players on the purchase of mobile games amounted to 949 rubles per purchase, which was 46% higher than in 2020. This also had a positive effect on the increase in the average check for domestic purchases, which showed an increase of 96% in just one year and amounted to 836.9 rubles (Data.ai, 2022). Statistics point towards the attractiveness of the Russian segment, but most of the research on identifying factors affecting purchases in mobile games so far has been carried out for other markets.

The purpose of this study is to identify drivers that influence preferences in APP purchases in mobile games by Russian users and compare them with users from China, Indonesia, Taiwan, and India.

The methodology of the study consists of two parts: in-depth interviews that help to identify the drivers of making internal purchases in mobile games by Russian users, followed by a quantitative survey with factor and cluster analysis.

1. Literature review

1.1. Motivating users to make in-aps in mobile games

Mobile applications are software designed to work on smartphones, tablets, and other mobile devices. Each application is developed for a specific platform: Android, iOS, Windows iPhone, etc. Depending on the type of platform, applications are published and are available in app stores: Play Market, App Store, Huawei Store, Samsung Store,

etc. In-app purchases or IAP- in-game purchases in mobile games or applications happen when a user buys a virtual item for real money. For example, in mobile games, such a purchase can be realized for the opportunity to get an additional life, improve or accelerate any progress in the game, cosmetic items for the character (clothing, weapons, jewelry), hints, etc. This is an additional way for developers and publishers to generate revenue that can be used instead of or in addition to advertising (Applovin, 2021).

Developers often resort to psychological tricks that motivate users to make in-aps in mobile games, for example, the so-called "impulse purchase", when the user is offered to purchase an additional life or upgrade their hero at a bargain price, but this decision is limited in time. The following trick is explained by the presence of illusory discomfort and was called "fun pain" — when players need to buy in-game currency to reduce the impact of an uncomfortable situation in the game or poor design. For example, the developers of FarmVille (Android, IOS) have created uncomfortable conditions in the game when the user has to perform monotonous actions for a very long time, but to speed up the process, you can purchase more workers, cars, livestock that will help you achieve the desired goal faster. In such cases, the user is more likely to pay for "not playing anymore". In both cases, we see that the players have some kind of gaming experience, some achievements that they do not want to lose and are willing to pay real money to be able to continue their session. The next trick is to provide players with resources that are subject to exhaustion, but without which it is impossible to continue the game. In this case players can be motivated to take actions that mitigate the loss. Another potential aggravation is the rating system, when the goal of users is not only to pass the level, but also to take a good position in the standings (Salehudin et.al., 2021). Many studies suggest that such motivation for the acquisition of in-aps by players can be explained by a psychological trait that is inherent in many people — rejection of losses.

The concept of diminishing sensitivity and loss aversion (Tversky & Kahneman, 2000) illustrates the fact that the decision about a person's subsequent actions can be based on an imaginary sense of ownership. This feeling is used by many free mobile games, only instead of certain things, the user gets the experience earned in the game, which, unfortunately, may disappear due to lack of time or lives to complete the level. For example, in one of the most popular mobile hyper casual games Candy Crush Saga (Android, iOS), users may find themselves in a situation where they cannot win the game literally due to the lack of a couple of moves. The game offers two options: either pass the level again and lose experience or buy extra time or the number of moves and win safely.

In one of the largest studies, which involved more than 10,000 respondents from 15 countries (Lim et.al., 2015), discovered that users from countries that have a high-rate power distance indicator were less affected by the price when choosing applications. Such users believed that paid applications were better in quality than free ones, and such users were more likely to be ready to rate the application if they liked it in order to let other users know about the high quality and the benefits of this product. This attitude

towards paid applications is inherent in representatives from China, Russia, Mexico, and India. Representatives of these countries, on average, consider paid applications to be of higher quality than users from Canada, Australia, Germany, and the UK.

Users from countries which have a high level of individualism, such as Canada, Australia, the USA and the UK are more exposed to the price factor, prefer not to rate them in stores, even if they liked the application. This is because cultures that are characterized by individualism, in principle, are less willing to share information within their group. In individualistic countries, the main source of information is the media, in countries with a high level of collectivism – social networks and personal interactions between people. Users from countries with a high index of uncertainty avoidance — Russia, Japan, France are less likely to be ready to download applications that are first in the list at their request in the store (Lim et.al. 2015). Users from China are on average 2.5 times more affected by the name and icon of the application in the store than users from Canada, Australia, and the UK. The researchers also noted the uniqueness of Japanese users in relation to ASO applications — this is the only country that has shown a positive correlation associated with the design of application icons in a "cute" style, even among an adult audience, since Japan has a special positive attitude to such design.

The study of cultural differences comparing the USA, Brazil, Thailand proved that interest in inn-app purchases in the USA is more related to the desire to have fun and strengthen a sense of self-importance, since during the game you can improve your own performance and receive awards. Players from Thailand also need to have fun, they pay attention to the presence of paid content, evaluate ways to promote their hero. For respondents from Brazil, the most important factors of inn-app purchases are possibility of entertainment, fun and the presence of social interaction (Ratan et al., 2021).

1.2. Drivers for inn-app purchases by players from China, Indonesia, Taiwan, and India

To conduct a cross-cultural study of drivers of in-app purchases in mobile games, we we examined the existing literature on emerging markets of China, Brazil, Indonesia, and Taiwan, in order to subsequently identify differences from the behavior of Russian users.

China

The main drivers of in-app purchases in China according to the research of Gao et.al. (2022) and Cheung et.al. (2021) were:
- flow — a temporary unconscious experience when a person makes a purchase with pleasure, while being in full concentration and control,
- satisfaction — cumulative feelings that arise from repeated interaction with the game,

- trust — understanding that developers put a lot of effort, extreme amount of knowledge and skills to create a high-quality game,
- honesty — relationships with developers, which also applies to the quality of the game benevolence — an objective ratio of the purchase fee and the benefits from it, the pursuit of developers of not only personal gain, but also taking into account the interests of users.

In addition to the three identified criteria, the authors also considered the correlation between other indicators: the quality of the game, the quality of the information provided for receiving the purchase, the quality of service, concerns about the protection of personal data with the previously described drivers. To one degree or another, all additional indicators have a positive correlation with drivers, except for concerns about the protection of personal data, this criterion has a negative correlation with each of the three drivers at the appropriate level of significance (Gao et.al ., 2022; Cheung et.al., 2021),

Indonesia

For Indonesian respondents the greatest contribution to the probability of making an internal purchase (Hamid & Suzianti, 2020; Ericska et.al., 2022) is made by:
- monetary value — the value perceived by the user associated with the ratio of the purchase price and its usefulness during the game;
- intention to continue the game — the user's willingness to continue playing the same game in the future;
- the quality of the game — the value perceived by the user, related to the quality of the game, its performance: gameplay, the competence of the characters, etc.

Such factors as satisfaction (positive emotions associated with activity in the game) and the social aspect (the value perceived by the user associated with the social orientation of the game, community, competitiveness), despite the positive result, do not correspond to the acceptable p-value (0.81 and 0.719, respectively), which means that neither one of those factors has a direct impact on the probability of making in-apps, however, they both have a significant positive impact on the user's intention to continue the game (Hamid & Suzianti, 2020; Ericska et.al ., 2022).

Taiwan

The greatest influences on the probability of making an in-app purchase for Taiwan users are:
- the in-app price — the value perceived by the user associated with the ratio of the purchase price and its utility during the game;
- loyalty to the game — the user's willingness to continue or resume the session for a long time and their willingness to recommend it to other users;
- Presence of incentives or rewards in the game — rewards for daily play or reaching a certain level so that the user has the motivation to return and

continue the session for as long as possible. Additional encouragement in the form of coins or bonus points gives users the feeling that this game is worth its price;

- Playfulness — the feeling of pleasure that a person gets while playing or interacting with other users during this game;
- Communication and interaction with other players — the ability to network, the desire to share their experiences and results (Hsiao & Chen, 2016; Hsiao et.al., 2020; Hsu & Lin, 2016).

India

Among Indian users the most important factors influencing in-app purchases were:
- loyalty — function that mediates purchasing behavior, WOM (word of mouth-word of mouth), user-generated content, in relation to the game;
- dependence on the game, that includes significance, tolerance, mood modification, withdrawal into oneself and a sense of conflict

Other factors that were considered but didn't show statistically reliable results are: user's intention to continue the game if they decided to stop playing it before, the mood of the respondents, and the significance of the game (Balakrishnan & Griffiths, 2018).

Let's sum up the considered differences between users' intentions to make in-app purchases (IAP) in the table:

Table 1. Comparison of drivers for making IAP purchases by users of some emerging countries

Ranks of the drivers	China	Indonesia	Taiwan	India
1	Flow	Monetary value (price)	Price	Loyalty
2	Satisfaction	Intention to continue the game	Loyalty	Dependence on the game
3	Trust	Quality of the game	Incentives or rewards	User's intention to continue the game if
4	Honesty of developers	satisfaction	Playfulness	The mood of the respondents
5		Social interactions	Communication and interaction with other players	The significance of the game

As can be seen from the table, monetary value is of particular importance for users from Indonesia and Taiwan. For players from India, loyalty to the game is in the first place in terms of importance, and this indicator is also important for players from Taiwan. For users from China, the momentary pleasure of making a purchase (flow) turned out to be an important indicator. The factor associated with involvement in the game is also observed among respondents from Taiwan — playfulness but occupies only the 4th position. The user's intention to continue the game ranks second in importance for

players from Indonesia and third for India. For players from China, satisfaction with the game itself was second in importance, for representatives from India — dependence on the game. Chinese respondents also highlighted the importance of having confidence in the game, the authors included high quality gameplay in this criterion, which also turned out to be necessary for users from Indonesia. If we are talking about the unique factors that are inherent only in individual countries, then for respondents from Taiwan the availability of free incentives to stimulate the desire to continue playing again and social interaction with other players — the opportunity to share experiences or just chat during the game – were important. In India, the probability of making inn-app purchases is also influenced by the mood of respondents and the significance of the game.

2. The mobile games industry overview

Over the past 5 years, the mobile games industry has become one of the most popular branches in mobile application development (Hamid et.al., 2020). With the popularity of mobile games, the revenue of this segment is growing from 2019 to 2022, the increase was 51%, reaching $ 103.5 billion (Statista, 2022).

On average, each user spends 10% of the total time on their mobile phones or tablets on games. it can be from 2 to 5 games per device in a month (Statista, 2021). According to Data.ai (2022), hyper casual games dominate the mobile games market, the most popular genres in 2021 by the number of downloads were:

- Action (hyper casual) — 4.01 billion.
- Puzzles — 3.78 billion.
- Simulation (hyper casual) — 3.15 billion.
- Children's games (hyper casual) — 2.57 billion
- Driving simulation — 1.63 billion
- Games .io (hyper casual) — 1.41 billion.
- Runners (action) — 1.20 billion.
- Sports simulations — 1.10 billion
- Simulation of pets — 0.90 billion.

China, the USA and Japan are among the top 3 countries in terms of generated profits, in 2021, income from these countries accounted for more than half of the spending on mobile games of the entire market. For example, Chinese users spent more than $56 billion, users from the USA — $43 billion, Japan — $20 billion (Data.ai, 2022).

According to Statista (2022), more than half of mobile game users are people over 34 years old, 55% of whom are women, 45% are men. 43% of the female audience and 38% of the male audience play more than 5 times a week. Their main motives for playing mobile games are:

1. Stress relief.
2. The desire to "kill" time.
3. Immersing yourself in another world or the life of a character.

4. The desire to achieve and accomplish something difficult.
5. Improving some of your own skills.
6. Communication with other people.
7. Acquiring a unique experience.
8. Communication with interests that users are passionate about outside of the game.

As was discussed earlier, there are cultural differences related to the popularity of different genres in a particular region. For example, it was discovered that in cultures that are more characterized by collectivism, have a high indicator of power distance and femininity there are more downloads of family applications and educational games. People from cultures that are more focused on building long-term relationships are interested in verbal educational games, and people from cultures with a short-term orientation download RPG (role playing) game more (App Magic, 2019). According to the App Magic (2019), in the USA, Great Britain, Canada, Australia, France, Germany, the top 3 most popular genres of mobile games include: hyper-casual, arcade, puzzles; in Russia and Korea — they are hyper-casual, arcade and shooters; in Japan — party fights, hyper-casual, three in a row (game consists of a table or grid of elements, and the player's task is to manipulate the elements in such a way that the template combinations set by the game match, and after the condition is met, the collected elements disappear); in China — arcade games, shooters, MMORPG (Massively multiplayer online role-playing game- a computer game in which the genre of role-playing games is combined with the genre of mass online games); in Taiwan — MMORPG, party fights, hyper-casual mobile games. More details are illustrated in Figure 1.
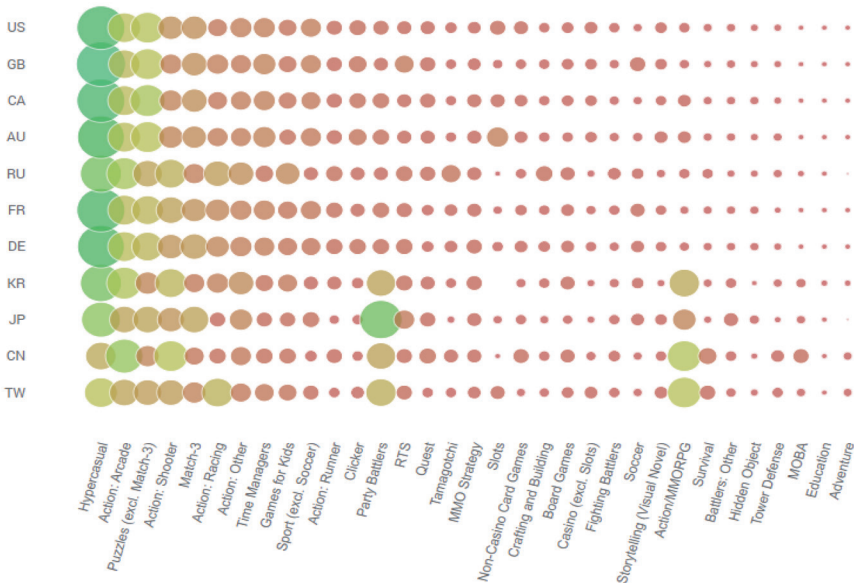

Figure 1. The number of downloads of mobile games by genre in major markets, 2019. *Source:* App Magic, 2019

According to Data.ai (2022) 43% of mobile game revenue was generated by internal purchases. Even though the average cost of attracting a user is $86.61 (Android: $86.72, IOS: $77.45), for developers/publishers such users are extremely valuable — the average daily profit from each such user is about $37.9–70.3 (Game Analytics, 2020; Data.ai, 2022). The cost of attracting a user varies depending on the region, for example: in North America — $112.22 with a conversion of 3.4%, in Europe — $56.15 with a conversion of 2.6%, in Latin America — $27.13 with a conversion of 1.8%, in the Asia-Pacific region — $67.68 with a conversion of 1.6% (Liftoff, 2019).

In Russia the mobile games segment in 2021 amounted to 76.5 billion rubles (+14%). By the number of downloads, the most popular genres were hyper casual games, and by revenue RPGs and strategy games. Millennials, 25-34 years old, are the most likely to make internal purchases in mobile games. Men bring in 5.5 times more income from in-app purchases than women. Also, most often, users play mobile games at home — 95% of respondents, in public transport — 46% and at work — 34% (My.Games, 2021; Statista, 2020).

In order to identify the drivers influencing the making of in-app purchases in mobile games by Russian users, we have conducted field research in the form of in-depth interviews, and online survey, the purpose of which is to confirm the reliability of assumptions.

3. Methodology

The first qualitative research includes 6 in-depth interviews, the purpose of which was to identify the drivers that influence the desire to make in-app purchases in mobile games by Russian users. The sample includes residents of cities from 18 to 44 years old, who are active users of mobile games and have experience in making in-app purchases.

The guide interview had 4 parts and 12 questions related to the experience of using mobile games and making in-app purchases:

1) introduction — the profile of respondent and their preferences in mobile games: age, place of residence, occupation, position, level of education, favorite games and genres, reasons for interest in the listed games, where did they learn about the games.
2) The description of experience of making internal purchases — the respondent describes their last case of making internal purchases, the emotions associated with making an internal purchase, the frequency and examples of games where they make in-apps.
3) Factors influencing the making of internal purchases in mobile games — which drivers are important to respondents and why.
4) Comparison with the identified factors of respondents from other countries — if there are drivers that were not mentioned by the respondent from Table 1 — the respondent specifies how important the presented criteria are to them.

The second part of the research was an online survey in Google Forms. The questions were related to the assessment of the importance of the drivers of making internal purchases identified in the first step. The first part of the survey consists of questions concerning respondent profile and experience in in-app purchases, the second part was about preferences in games and why the user made in-app purchases. The third part included 33 questions about different situations in games and readiness to make purchases. A factor analysis was made to reveal the drivers of in-app purchases. A cluster analysis was performed, which helped to identify user segments and develop recommendations for publishers and game developers. The sample for the survey: residents of cities of Russia, from 18 to 44 years old, active users of mobile games who have experience in making in-app purchases. Facebook, Instagram, and VK social networks were used to collect data among game developers and gaming communities.

4. Data analysis

The content analysis of the interviews identified several drivers, which positively affect the likelihood of making internal purchases:

1. Time-limited offer) — a condition when the offer of an internal purchase is limited in time
2. Honesty — fair terms of the transaction, when the game offers the purchase of the necessary number of resources, diamonds or game currency, the developers do not aim to force the user to constantly make purchases.
3. Involvement is a high level of interest in the game, the desire to continue playing it in the future.
4. Quality — the quality of the game itself, the absence of bugs, excellent gameplay, and design.
5. Monetary value is the value perceived by the user, related to the ratio of the purchase price and its usefulness during the game.
6. Availability of free promotion — free reward that motivates the user.
7. Diversity — providing different options for improving characters, additional skins that can diversify both game characters and the game space itself.
8. The value of time is the value perceived by the user, related to the ratio of the purchase price and the time that will remain if the purchase is made.
9. Developer support — the desire to support and give developers a game they liked.
10. Uniqueness or desire to stand out — the ability to stand out from other characters or competitors by making an internal purchase.
11. Aesthetics — satisfaction of your own desire to improve your character or game space.
12. Social interaction is a value perceived by the user, associated with the social orientation of the game, community, competitiveness.

13. Loyalty — the user's willingness to continue the session in the game for a long time and their willingness to recommend it to other users.
14. The value of the purchase and its criticality is the value perceived by the user associated with the need to make an internal purchase, when there is no opportunity to uncover the plot or even continue the game without making a purchase.

The frequency analysis shows that the driver most often mentioned by respondents was related to engagement in the game (5 out of 6 respondents). 4 out of 6 respondents think that: quality, monetary value, the value of time are important factors for in-app purchases. 3 out of 6 participants were motivated by time-limited offers, honesty, and diversity. 2 out of 6 respondents noted the availability of free incentives, uniqueness or desire to stand out, social interaction, loyalty, the value of the purchase itself and its criticality. And only 1 respondent identified the opportunity to support developers and aesthetics as drivers for in-app purchases.

On the basis of conducted interviews 5 hypotheses were developed:

- H1: The drivers influencing the making of in-app purchases in mobile games by Russian users differ from the drivers of users from other analyzed countries
- H2: Monetary value is one of the most important factors of making internal purchases in mobile games by Russian players
- H3: The quality of the game affects the making of an in-app purchase
- H4: Social interaction affects the making of an in-app purchase
- H5: Loyalty affects the making of an in-app purchase in mobile games by Russian players.

In total, we had 325 respondents to the questionnaire. The profiles of respondents: 56.9% played mobile games every day, 24.3% played at least once a week, 6.8% played at least once a month, 10.5% played less than once a month and 1.5% didn't play mobile games at all. 225 respondents made in-app purchases in mobile games: at least once a month — 43.1%, 38.2% made internal purchases several times per month, 17.8% of respondents made IAPs at least once a week and only 0.9% spend on purchases in games every day.

38.7% of respondents spend from 201-500 rubles in mobile games for each internal purchase, slightly fewer respondents 36.9% spend 501-1000 rubles., 19% — up to 200 rubles., and 5.3% spend from 1001-2000 rubles. Puzzles and riddles turned out to be the most popular genres, followed by role-playing games, shooters and strategies, and card games. The top 5 motivating factors for making internal purchases (in descending order) were aesthetic value (improving the appearance of a character, weapons, game space), the need to purchase additional time or moves or special hints, improving combat qualities, the desire to possess unique artifacts, the desire to get rid of advertising.

According to socio-demographic characteristics of respondents who made internal purchases in mobile games, 44% of women and 56% of men passed the survey. Most respondents live in Moscow and the Moscow region — as much as 73.3%, 16.4% — live in St. Petersburg, 5.8% — other cities with a population of more than 1 million, 2.2% —

large cities with a population of 200 thousand — 1 million people and small cities with a population of up to 200 thousand people each. Most respondents (78.7%) work, 17.3% combine work and studies, 3.1% do not work and do not study, and only 0.9% are just studying.

The factor analysis was made using the method of principal components with orthogonal rotation (Varimax). The Cronbach's Alpha coefficient is 0.924, which indicates a high level of reliability of the variables selected for analysis, the measure of the adequacy of the Kaiser-Mayer-Olkin sample is 0.766, which indicates that the sample is suitable for analysis. Also, the Barlett sphericity criterion indicates that the hypothesis of sphericity of data can be rejected at 99% significance level. 10 factors were selected which described 80.4% of variances.

The identified drivers can be interpreted as follows:
1. Satisfaction with creative potential — the opportunity to stand out from other characters or competitors by making an internal purchase.
2. Variety of offers — providing different options for improving characters, additional skins that can diversify both game characters and the game space itself.
3. The crucialness of the purchase is the value perceived by the user, associated with the need to make an in-app purchase, when without making a purchase there is no opportunity to uncover the plot or even continue the game.
4. Utility for the player — the usefulness of an in-app purchase perceived by the user.
5. Engagement — a high level of interest in the game, the desire to continue playing it in the future.
6. Quality — the quality of the game itself, not only the absence of bugs, but also excellent gameplay, design, and plot.
7. Willingness to continue the game — the user's willingness to continue or resume the session in the game for a long time.
8. Risks — external risks independent of users- anti-driver, limiting the possibility of making internal purchases or continuing the game.
9. Developer support- the desire to support the developers of the game that users like.
10. Value or usefulness of the purchase — perception of the value of the internal purchase by the user, an assessment of the usefulness of its acquisition for the game.

Some factors that were identified during the theoretical research and interviews appeared in the results of factor analysis. For example, factors such as a time-limited offers, honesty, monetary value, the availability of free incentives, the value of time, aesthetics and the presence of social interaction were not directly highlighted.

As the factor analysis shows, the drivers influencing in-app purchases by Russian users differ from such in representatives of other countries that were considered earlier, which confirms the first hypothesis. For example, Russian players do not focus on the price like users from Indonesia and China, they also do not care about the possibility

of social interaction and communication with other players, as, for example, players from Taiwan, etc. Russian players also value quality and the intention to continue the game. The unique drivers are the assessment of the utility of the purchase, the desire to support the developers of your favorite game, the necessity of the purchase, the availability of a variety of offers and the opportunity to stand out and create a unique c or game space.

Developers should consider the unique features of Russian mobile game players to promote games and in-app purchases. Drivers such as the quality of the game, interest in the game and the desire to continue sessions are necessary even for games whose purpose is not to generate profit through internal purchases, but drivers related to the variety of offers, the criticality of the purchase and the opportunity for users to realize their creative abilities and ideas can be used to improve mobile games and integrate internal shopping. Since these drivers can directly affect the player's interest, which means increasing loyalty to the game, motivating donations to developers, which means improving LTV (Life Time Value = Lifetime (the total period in the game since the beginning of its use) and ARPPU (Average Revenue Per Paid User= Revenue (revenue) / Paying Users (number of paying players) indexes.

To test hypotheses 2, 3, 4, and 5, we conducted a regression analysis that would illustrate the influence of the identified factors on the dependent variable — making an internal purchase. The analysis was carried out on all observations that were included in the survey (325). It is worth noting that the adjusted R^2 is 0.592, the Durbin-Watson criterion is 2.197, which indicates the absence of autocorrelation. Regression results are presented in table 2.

Table 2. Results of regression analysis with the dependent variable – making in-app purchases in mobile games

	Unstandardized Regression coefficient		Standardized Regression coefficient	t Stat	p-Value
	Coefficient	Standart Error	Coefficient		
(Constant)	0,692	0,016		42,27	0
Social interaction	0,092	0,016	0,199	5,621	0
Loyalty	0,231	0,016	0,499	14,053	0
Criticality	0,032	0,016	0,07	1,98	0,049
Variety of offers	0,085	0,016	0,183	5,152	0
Risks	0,003	0,016	0,006	0,171	0,864
Special offer	0,15	0,016	0,324	9,143	0
Quality	-0,122	0,016	-0,265	-7,466	0
Honesty	0,067	0,016	0,145	4,092	0
Readiness to continue the game	0,132	0,016	0,285	8,028	0
Developer Support	0,001	0,016	0,003	0,085	0,932
Dependent variable: Do you make internal purchases in mobile games?					

The regression coefficients show that at the proper level of significance the quality of the game negatively affects the purchase, which rejects the H3 hypothesis. In contrast, social interaction and loyalty have a positive effect on the dependent variable, which confirms the hypotheses H4 and H5.

Regression analysis illustrates a significant positive impact of the following drivers on making an internal purchase: criticality, variety of offers, special offer, honesty, willingness to continue the game. Risks and developer support also have a positive impact on the dependent variable, but these results are not significant.

Cluster analysis.

To develop recommendations for developers and publishers of mobile games, we conducted a cluster analysis, which would allow us to identify sample segments with special requests. Cluster analysis was made by K-means method. The optimal number of clusters is 5: for the 1 cluster there are 68 observations, for the second – 94, for the third – 25, for the fourth – 5, and the last cluster consists of 32 users. ANOVA variance analysis was made to understand differences between clusters. The description of clusters can be seen in the Table 3.

Table 3. Description of revealed clusters

Active Players	Young mobile game players (up to 35 years old), with average and above average income levels, willing to spend from 200-1000 rubles for purchase, make purchases at least one time a week, preferred genres: shooters, strategies, simulators, role-playing games, the main motives for making an internal purchase: the desire to possess unique artifacts, improvement of combat qualities, aesthetic value, which corresponds to the selected genres, most of them play every day, the rest at least once a week.
	It is important for them to be able to distinguish their character from competitors (uniqueness), so they are also more likely to make an internal purchase, if the game has a variety of offers for improving heroes, game space or weapons, they also need the purchase to be useful for them, for example, how much it will save their time, but they do not appreciate the usefulness of the purchase itself for progressing in the game. They are more likely to make a purchase only if the game interesting, while this segment does not focus on the quality of the game, does not worry about external risks associated with the possibility of losing purchases. They won't make purchases in mobile games just to support developers.
Rational players	Young players of mobile games (up to 35 years old), average income, this cluster is similar to 1, but they are willing to spend less – up to 500 rubles per purchase, and make purchases much less often – at least 1 purchase per month, men a are predominant in this category, preferred genres: shooters, role-playing games, the main motives for making internal purchases: the desire to possess unique artifacts, the improvement of combat qualities, aesthetic value, most play every day, the rest at least once a week.
	Uniqueness, variety of offers and purchase value are not as important for them as for Cluster 1. The usefulness of the purchase, interest in the game have a positive effect on making an internal purchase. However, criticality on the contrary negatively affects the desire to make a purchase, perhaps they perceive it as pressure, this segment is also more serious than cluster 1 refers to external risks and is ready to make a purchase to support developers

Table 3. Continued

Skeptics (play exclusively for their own interest)	Players under 25 years of age, most of whom also play every day, but there are also those who play a couple of times a week or a month, above average and high income levels, are willing to spend up to 1000 rubles on the purchase, preferred genres: puzzles, shooters, logic games, strategies, the main motives for making an internal purchase: improving combat qualities, the need to purchase additional time or moves or special hints, make purchases less than once a month.
	Their desire to make an in-app purchase in a mobile game is influenced only by their interest in the game, the desire to continue the game, they may also be somewhat interested in uniqueness. However, the criticality of the purchase, as well as external risks, negatively affect the probability of making a purchase. The other drivers have no effect
Erudite	Adult mobile game players (36-42 years old), mostly men, play every day, but they rarely make purchases – at least once a month, the income level is above average, they are ready to spend from 500-1000 rubles on purchases, preferred genres: puzzles and riddles, the main motives for making an internal purchase: the need to purchase additional times or moves or special hints.
	Presumably, due to the specifics of genres, such drivers as uniqueness, diversity, usefulness, interest, willingness to continue the game do not affect the desire to make an in-app purchase in any way. But, the criticality of the purchase, the quality of the game, external risks and especially usefulness are important for the desire to make a purchase. They are more likely to be willing to make an in-app purchase to support developers.
Gambling (they want to get results quickly, saving their time)	Adult mobile game players (36-42, over 42 years old), women predominate, play every day, make purchases at least once a week, the income level is average, mostly willing to spend up to 200 rubles for the purchase, preferred genres: puzzles and riddles, card games, the main motives for making an in-app purchase: the need of acquisition of additional time or moves or special hints.
	As for the previous cluster, these users are not interested in uniqueness, diversity, interest, but they are also ready to support developers. However, when making an internal purchase, they pay attention to personal usefulness and its criticality. Also, these players differ from cluster 4 as they do not care about the quality of the game and external risks.

Thus, we see that even within the same country, the preferences of different segments of players differ. Therefore, it should be emphasized that although there are common patterns within one culture, developers should look deeper and find target audiences, adapting to their needs.

5. Managerial implications

Socio-demographic characteristics (age, income, gender), genres, and drivers can be used by developers and marketers creating promotion campaigns aimed at attracting new players. The motives for making in-app purchases can be used to create attractive plots, visuals, messages, CTA (Call to Action). For example, active players may be

attracted by videos that illustrate a variety of offers, the possibility of customizing their character or weapons; erudite segment may be interested in a high-quality display of gameplay and detailed text descriptions of the game's logic.

In addition, mobile game publishers and developers should pay attention to:

1. "Active users", who bring more profit, can be interested in the design and plot of the game: a lot of characters, weapons, the ability to interact with other players, so that they can stand out from competitors and stress their uniqueness through their character, which can also be used as positioning and promotion of the game.

2. For "rational players", utility is important, making an internal purchase should free them from performing monotonous work, however, you should not abuse the criticality of the purchase or the illogical relationship of the requested action and the time for their implementation, since these players can assess such a request as pressure, stop playing, and not make an in-app purchase.

3. "Skeptics" need to be personally interested and to have a desire to continue the game, so for these players interesting gameplay is necessary, a large number of levels with gradual increase in difficulty. Since this segment of users very rarely makes in-app purchases, promotion and product development can be combined with other clusters.

4. "Erudite" segment users pay attention to the utility of the purchase, its criticality, strictly relate to the quality of the game, this means that it is worth integrating in-app purchases into the game, which would allow you to save the user's time, or without which they wouldn't be able to continue the game or go to the next level. these players are more likely to make donations, so there is no need to stress the criticality of the purchase, but rather encourage the player with new free features or resources, talk about the developers' team, the work that was done to improve the game, eliminated bugs, improved design, so that the user feels like part of the team that develops his favorite games.

5. "Gamblers" are less critical to the quality of the game, but all other characteristics related to the gameplay are similar to the "erudite".

Conclusions

The mobile game market is attractive for many developers and publishers. The Russian mobile games market has entered the world's top five in terms of downloads of smartphone games in the first half of 2021, with more than 1.5 billion downloads. Drivers influencing the making of in-app purchases in mobile games by users from China, Indonesia, Taiwan, and India were similar but not identical. For players from India, loyalty to the game is in the most important. For users from China, the momentary pleasure of making a purchase (flow) turned out to be an important indicator. For Indonesian users, the most important driver is monetary value — the value perceived by the user, related to the ratio of the purchase price and its utility during the game.

A similar factor, like the price for in-apps, is also important to players from Taiwan, but they do not tend to evaluate the usefulness of this purchase.

For Russian users 10 drivers were identified that affect the probability of making in-app purchases: the usefulness of the purchase, developer support, risks, willingness to continue the game, quality, involvement, utility to the player, crucialness of the purchase, variety of offers, satisfaction of creative potential. These drivers set Russian players apart from users from China, India, Indonesia, and Taiwan. However, the cluster analysis detected 5 segments of mobile game users, depending on the factors influencing the making of in-app purchases. This led us to the assumption that a generalized view of cultural differences within one country may not be sufficient for the successful implementation of marketing campaigns. The identification of these clusters made it possible to develop detailed recommendations to developers and publishers of mobile games both in terms of attracting new users and developing mobile games in Russia.

There are several limitations to this study. First, the sample size of online survey, though the statistics showed reliability, increasing the number of participants can influence the regression coefficients. Second, the cross-cultural comparison that is made on the basis of previous research and different questionnaires used in respective countries. The time of the study and the wording of the questions may lead to distortions in the description of the drivers of in-app purchases. Also, cross-cultural comparison, as shown by cluster analysis, does not reflect the differences in segments within the same country, so generalization of the results may lead to an inaccurate understanding of user characteristics.

Therefore, the direction of future research may be the development of a universal methodology with the same questionnaire for conducting reliable cross-cultural research. On its basis, we can see the similarity and differences of the identified clusters between various countries. If the differences are insignificant, it will indicate a low level of cross-cultural effect and the prevailing importance of other factors.

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