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Principles of Designing Monetization Systems in Free Mobile Games

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Abstract

The article presents a comprehensive analysis of the principles underlying the design of monetization systems in free-to-play mobile games as a distinctive phenomenon of the digital economy, where behavioral psychology, game design, and user interaction ethics converge. The relevance of the topic lies in the fact that monetization in the free-to-play format has evolved beyond a purely technical function; it has become an independent design domain that shapes the longevity and reputation of gaming ecosystems. Despite a considerable body of research, there remain substantial discrepancies in the assessment of the ethical acceptability of microtransactions, the role of artificial intelligence in offer personalization, and the balance between commercial benefit and player autonomy. The purpose of this study is to identify the key patterns behind the creation of sustainable monetization systems that maintain harmony between the developer's economic interests and the player's psychological comfort. Drawing on academic literature, statistical data, and the author's own experience in designing F2P projects, a set of principles is formulated to support the development of transparent and non-intrusive monetization models. The article demonstrates that the effectiveness of such systems depends not on the number of transactions but on the quality of the trust-based relationship established between the player and the game. The author's contribution lies in the systematization of interdisciplinary approaches—economic, cognitive, and design-oriented—and in emphasizing the importance of long-term audience retention and the integration of commercial mechanisms into the game narrative. The conclusions are of particular interest to game designers, user behavior analysts, and researchers of digital markets.

Keywords: behavioral motivation; ethical design; free mobile games; game design; game economy; in-game economy; microtransactions; monetization; player experience.

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1.Introduction

Free-to-play mobile games occupy a special place in the modern digital industry. They have become both a form of leisure and part of a complex economic ecosystem that combines elements of behavioral psychology, marketing, and game design. Their "free" nature is merely an external characteristic. In reality, it conceals a well-thought-out system for stimulating purchasing activity, based on subtle mechanisms of motivation and user interaction. This is precisely why the study of the principles for designing monetization systems in this area is of particular importance for both researchers of the digital economy and practitioners in the gaming industry.

The free-to-play (F2P) model itself emerged in response to the rapid change in consumer habits. Users became more cautious about paid applications, preferring to test a product before investing their time and money in it. As a result, a need arose to create games where the basic functionality is accessible to everyone, and commercial revenue is generated through voluntary microtransactions, advertising, or subscriptions. However, despite its apparent simplicity, such a model requires complex design—both from an economic perspective and from the standpoint of the player experience.

The issue of monetization in this field is not limited to profit generation. It touches upon fundamental questions of fairness, trust, and the psychological comfort of the player. If a game's internal economy is improperly structured, it creates a sense of pressure or manipulation, which leads to a decrease in audience loyalty. Conversely, a harmoniously built system helps to stimulate interest and maintain a sense of natural progression, where the player perceives purchases as a voluntary and even pleasant action. Thus, monetization becomes part of the overall aesthetics and philosophy of the gaming space.

2.Materials and Methods

Upon reviewing the sources on the topic under discussion, it was noted that researchers and practitioners are mainly focused on three key areas: economic-analytical, psychological-behavioral, and design-ethical.

The first group includes the work of T. Bresnahan, J. Davis, and T. Jaconette [3], which examines mobile applications in the context of the digital economy and market mechanisms. This category also includes analytical reviews by A. Eser [5] and D. Ankit [1]—these authors provide statistical data on market dynamics and revenue models.The second area is formed by research focused on user behavior. For instance, E. Ascarza, O. Netzer, and J. Runge [2] analyze the impact of personalized design on player retention and their propensity to make purchases; A. Singh and A. Biswas [10] study the cognitive and emotional factors that trigger impulsive transactions; H. Lee, K. Imteyaz, and S. Savage [7] reveal the specifics of the relationship between monetization strategies and user loyalty using the example of Korean projects.

The third category consists of publications that emphasize socio-cultural and ethical aspects. Specifically, M.J. Lehtonen, J.T. Harviainen, and A. Kultima [8] view in-game purchases as a means of self-expression and expansion of digital identity, while G.K.S. Lee [6] highlights the importance of the gaming experience and game design as a mediator between commercial goals and player satisfaction. Industry sources (S. Dudar [4] and the Mobile Game Revenue Statistics 2025 report [9]) supplement the academic picture with current trends and

forecasts, highlighting the growing role of hybrid models (advertising + purchases) and personalized offers.

Modern literature demonstrates a trend towards a comprehensive understanding of the monetization phenomenon, yet contradictions remain in the interpretation of its boundaries and ethical admissibility. Some researchers see microtransactions as a form of economic freedom, while others see them as a risk of exploiting cognitive vulnerabilities.

In developing the topic of this article, the following methods were used: content analysis of publications, a comparative-analytical method (to compare different monetization approaches), elements of systemic analysis (to identify the interconnections between economic, psychological, and design aspects), and expert interpretation based on the author's practical experience in designing F2P games.

Within the methodology, an analytical review of the key principles for designing monetization systems in free-to-play mobile games was conducted, including cohort analysis, layered in-game economies, value-framing strategies, and aligning user acquisition costs with lifetime value. To demonstrate the practical applicability of these concepts, a sample LTV calculation was presented using the well-known formula (LTV = ARPU / churn) based on model data [11]. This approach allowed for both the theoretical foundations to be outlined and their use illustrated in evaluating the effectiveness of a monetization model.

3.Results and Discussion

Referring to the statistical summary, it is worth noting that according to Statista, the global mobile gaming market volume in 2024 was $98.74 billion. It is expected that the compound annual growth rate (CAGR) of revenue from mobile games will be 6.39% from 2024 to 2027 (Fig. 1) [1].

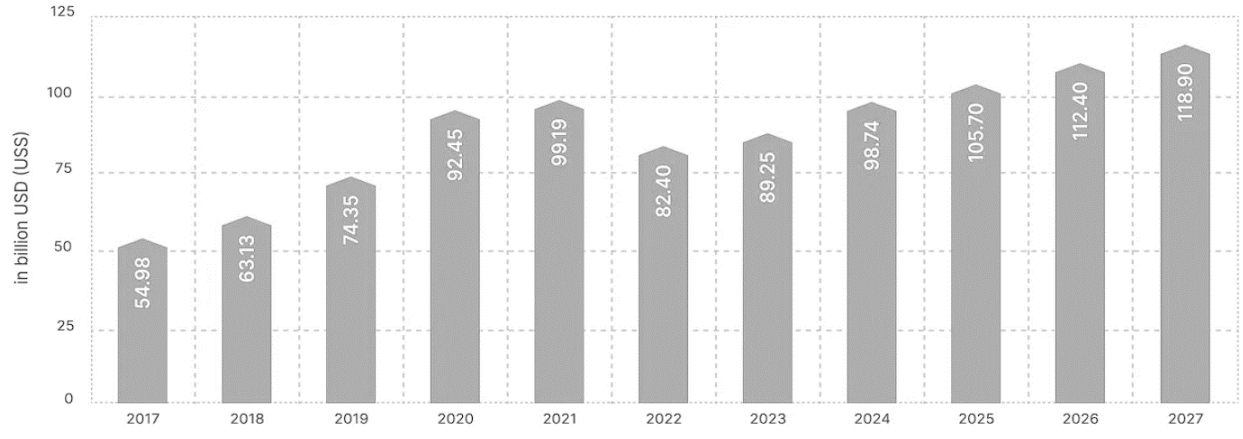

Figure 1: Dynamics of the global mobile gaming market volume with a forecast for 2025–2027 [1]

A monetization system in free-to-play games is a set of mechanisms aimed at stimulating user spending without requiring a mandatory payment for access to content. Unlike traditional models where revenue is generated from

a single purchase, here the profit is distributed over time; it depends on audience engagement [3, 5-8].It is appropriate to identify three basic principles for designing monetization systems: ethical stability, psychological balance, and interactive integration.

The first principle implies maintaining transparency—the user must be aware of what they are paying for and what benefits they receive. The second is related to understanding the player's cognitive characteristics—excessive pressure or manipulative techniques lead to rejection. Finally, the third principle reflects the need to organically embed monetization into the gameplay so that it is not perceived as an external imposition but appears as a natural extension of the experience.

An international survey of video game developers worldwide, conducted in 2023, showed that games with monetization are one of the most relevant trends (Fig. 2). Many respondents stated the demand for such a system.

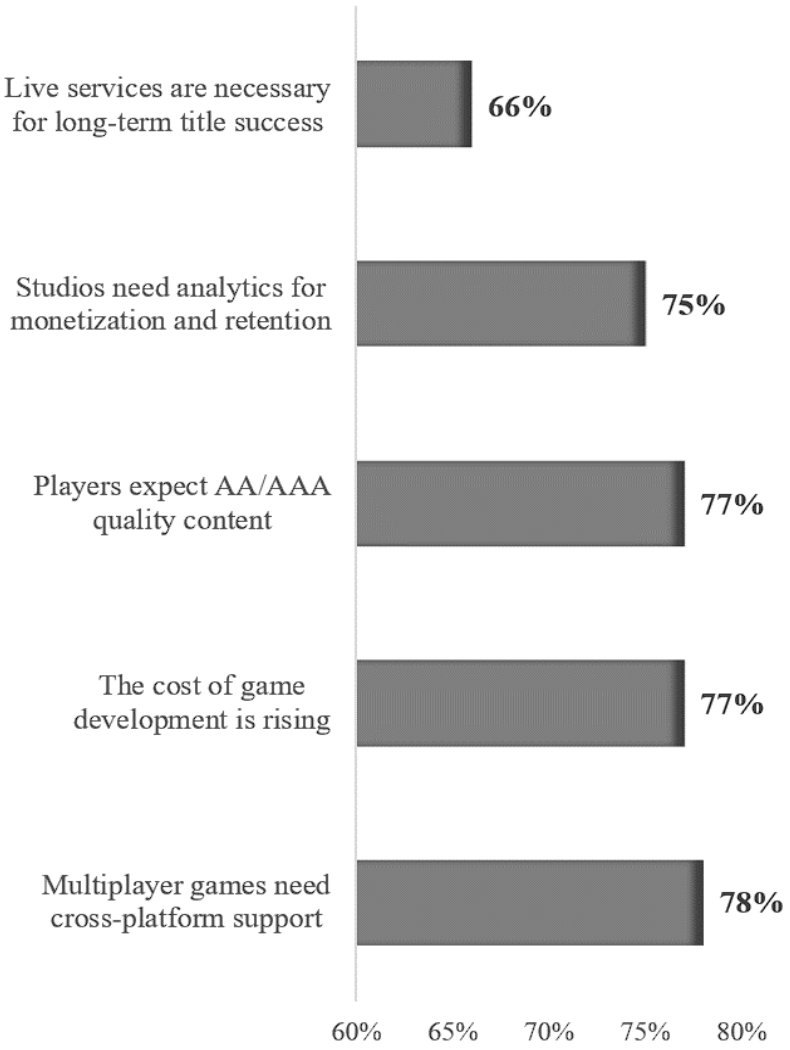

Figure 2: Respondents' opinions on possible development paths of free mobile games [4]

From an ethical point of view, monetization should be built on the principle of voluntariness. The player should not feel that success is impossible without payments. This is especially important for games with competitive

elements, where an imbalance between paying and non-paying users can destroy the sense of fairness.

Some developers introduce hybrid models that combine in-game purchases with advertising. However, a dilemma arises here—an excessive number of ad placements negatively affects engagement, while their complete absence limits revenue. The most effective solution is the implementation of rewarded advertising, where watching a video brings the player an in-game bonus. This approach combines the interests of both parties without disrupting the game dynamics [2, 10].

It should be noted that in recent years, attention to the ethical regulation of microtransactions has increased. For instance, the use of "loot box" mechanics is controversial, as the line between a random reward and elements of gambling remains blurred. In this regard, it is reasonable to assume that the future development of monetization systems will move towards greater transparency and personalized offers instead of randomized rewards [5, 7].

When designing a monetization system, the developer works primarily with motivation. Several key factors influence the decision to purchase: a sense of progress, resource scarcity, and social approval.

Mechanisms based on time limitations (e.g., special promotions or limited-edition items) create a sense of urgency, prompting action. However, overuse of this tool naturally leads to user burnout. Therefore, an effective system is built on an alternation of pressure and encouragement, where periods of activity are followed by "breathers."

The aesthetic component plays a significant role. Players are inclined to purchase items not only for functional advantages but also for the purpose of self-expression—changing a character's appearance, customizing the interface, collecting rare objects, etc. In this context, it is appropriate to speak of the formation of a virtual status, which becomes an analogue of social capital.

From an economic perspective, the monetization system must be carefully balanced. Errors in economic design can destroy even the most attractive game mechanic. Accumulating resources too quickly makes purchases meaningless, while excessive scarcity causes frustration.

An effective strategy is based on the principle of equilibrium between effort and reward. The user must feel that the in-game currency has value, but at the same time, achieving goals without payments remains possible. Developers often use a two-tiered economy, where one currency is earned in the game, and the other is purchased with real money. With proper and correct configuration, such a system helps to organically distribute motivation and avoid the feeling of being "forced to buy."

Modern monetization systems are increasingly designed with an emphasis on user behavior analytics. Machine learning tools make it possible to identify patterns in player behavior and predict the likelihood of payments. Based on this data, dynamic pricing offers and personalized promotions are formed.

It seems that the role of adaptive systems will strengthen in the future. The game economy will become more flexible—the cost of items, the difficulty of levels, and the volume of offers may change depending on individual

play style. Such "smart" monetization will require both technical and ethical elaboration to ensure that personalization does not turn into manipulation.

The visual-emotional aspect is also important. The way an offer is presented—the design of buttons, the color scheme, the font type, the placement of elements—has a direct impact on the purchase decision. At the same time, excessive visual aggression (bright banners, pop-up windows) causes irritation and destroys trust.

A well-thought-out system is built on the principle of non-intrusive persuasion: the user should perceive the offer as a logical extension of the gaming experience. In successful projects, monetization elements are integrated into the narrative or mechanics—for example, in the form of an in-game shop run by a character, or a quest where a purchase becomes part of the plot. The genre component is also very significant. Table 1 reflects the relevant data with specific examples.

Table 1: Features and monetization opportunities in mobile games by genre [9]

Genre	**Projected Revenue in 2025 ($ billion)**	**Examples**	**Key Monetization Factors**
RPG	24+	*Genshin Impact, Fate / Grand Order*	High monetization level, loyal audience, gacha game mechanics
Strategy	19	*Clash of Clans, Rise of Kingdoms*	Long game cycles, expensive in-game purchases, competitive gameplay
Casual Games	16	*Candy Crush Saga, Township*	Mass audience, revenue from ads and micro-purchases for game bonuses
Shooters	11	*Call of Duty: Mobile, PUBG Mobile*	Battle Pass, sale of cosmetic items (skins), regular seasonal content
Simulators	9	*The Sims Mobile, Hay Day*	Time-based mechanics (timers), monetization of convenience, strong community
Sports Games & Racing	6	*FIFA Mobile, Asphalt 9*	Loyal niche audience, monetization through licensed content, events

Monetizing a free-to-play (F2P) product is a matter of balancing two commitments: securing a sustainable revenue stream and simultaneously preserving meaningful value for different segments of players. Effective monetization design should not stem from the desire to "extract more" from each transaction; it must be grounded in an understanding of the user lifecycle, engagement patterns, and the psychology behind purchase decisions. The key principles include:

- Cohort-based analytics and metrics. Monetization decisions should rely on cohort analysis (retention, ARPU/ARPDAU, conversion to payers, LTV) rather than aggregated averages. This ensures a correct link between early-stage behavior and long-term revenue, enabling optimization of offers across segments;

- Layered in-game economy. A robust system combines multiple revenue streams — in-app purchases (IAP), rewarded advertising, season passes, and subscriptions — with each having its own access points and minimal internal cannibalization. This layered approach reduces vulnerability to abrupt market changes;

- Value framing and offer design. A purchase must feel like a gain (saving time, accessing exclusive content, gaining social status). Price points and offer bundles should be tested through A/B experiments, with attention not only to conversion but also to retention and LTV;

- Managing churn and user acquisition (UA) payback. The cost of acquiring a user (CPI) must be aligned with their expected lifetime value. Although practitioners often use simplified empirical LTV formulas (see below), such estimates should be adjusted for margins and the time value of money.

A widely used simplified formula for estimating a user's lifetime value (LTV) expresses it through ARPU and churn [11]:

LTV = ARPU / churn.

ARPU and churn must be measured over the same period — for instance, monthly ARPU and monthly churn.

Example:

Suppose:

Average revenue per user (ARPU) = $1.50 per month

Monthly churn = 25% = 0.25

Then:

LTV = 1.50 / 0.25 = $6.00

Thus, with these parameters it would be unreasonable to spend more than $6 on acquiring a new user (CPI) unless additional monetization or retention measures are expected to increase their value. Adjusting for gross margin

further refines the figure; for example, at a 70% margin, the effective economic value becomes $6 × 0.7 = $4.20.

Monetization does not exist outside of a cultural context. The motivation for spending in Asian countries, for example, is often associated with collective values and the desire to support the community, while Western audiences are more often oriented towards individual achievements. Therefore, universal models do not exist. An effective system takes into account regional differences and the socio-cultural attitudes of the audience.

In addition, the age characteristics of players influence the design. A younger audience is more responsive to visual stimuli and time-limited promotions, while mature users value stability, clear rules, and the ability to predict expenses.

The analysis conducted is supported by the author's own experience as a specialist in the field of game design and monetization systems, and as a leader of game teams with more than ten years of experience in international studios. This professional path covers key areas of the industry—from gameplay and UX design to building live operations systems and free-to-play economic models.

While leading game design in large companies, I had the opportunity to participate in the development of dozens of commercially successful projects, including Joykis, Rocket Buddy, My Little Pony: Magic Princess, and Littlest Pet Shop. These became platforms for testing innovative approaches to monetization, balancing economic systems, and integrating educational elements into the gaming space.

Within my activities, I oversaw the development of behavioral retention models and adaptive monetization scenarios that use user data analytics. It was noted that the effectiveness of such systems is determined not by the number of transactions, but by the quality of the interaction between the player and the game. The deeper the developer understands the psychology of choice, the more harmoniously the internal economy of the project is formed.

Among the researcher's professional interests are the longevity of game ecosystems, issues of integrating educational content into commercial models, and the use of artificial intelligence for predictive modeling of player behavior.

Based on many years of practice, a series of recommendations are proposed for specialists developing monetization systems in F2P projects:

- It should be a consequence, not a goal. The player experience and emotional engagement always precede commercial mechanisms.
- The economic system must be transparent. Any in-game purchase should have a clearly defined value, leaving no room for uncertainty or manipulation.
- A balance between gameplay and financial progression is the foundation of long-term loyalty. The player should feel that achieving goals is realistic both through time and effort, and, if desired, through purchases.
- Aesthetics and monetization should interact. Visual design and narrative motifs can make a commercial

offer part of the game's artistic world, rather than an intrusive insert.

- Data is a tool for understanding, not control. Analytics helps to build a dialogue with the audience, discover behavioral patterns, and adjust the design based on the actual needs of the players.

The author's professional position is based on the conviction that the future of the gaming industry lies in the synthesis of humanistic and technological approaches, where the design of monetization becomes an extension of the art of creating meaning.

4.Conclusion

Designing monetization systems in free-to-play mobile games is a complex task where psychology, economics, aesthetics, and technology merge. An effective model must be both efficient and humane, stimulating but not pressuring, engaging but not manipulative.

Thus, the principles of sustainable monetization can be summarized into three foundations: transparency, motivational balance, and organic integration into the gameplay. Only by adhering to these is it possible to create systems that ensure not short-term profit, but a long-term interaction between the player and the game world.

It seems that future trends will be associated with a synthesis of gamification and the economy of experiences. Monetization will cease to be just a commercial function, transforming into a part of the artistic and interactive design. Virtual subscriptions, meta-game events, cross-platform bonuses—all of this creates a new field for design, where retaining attention is more important than immediate profit.

On the other hand, the strengthening of public control over digital practices requires greater transparency from developers. Consequently, the key vector will be the search for ethical monetization that is based on trust and long-term engagement.

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