

Research Article

Across Economics and Psychology: Development and Validation of the In-Game Purchase Motivation Scale

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This study is aimed at developing and validating a measurement scale for motivations behind in-game purchases, integrating economic and psychological aspects. Two separate samples of Italian gamers were used to develop a five-factor scale (utility, enjoyment, investment, reputation, and self-realization) capable of explaining a substantial portion of in-game spending behavior. In the first study, 573 gamers were recruited, and an initial four-factor scale measuring psychological motivations behind in-game purchases was internally and externally validated, explaining 5.4% of the variance in in-game purchases. In the second study, conducted with 284 gamers, the self-realization factor was added, increasing the scale's explanatory power to 8% for the amount of money spent on in-game purchases. When controlling for variability attributed to the game type (i.e., analyzing just participants who spent money over a specific game), we observed an increase in the explanatory power of the scale from 5.4% to 12% for the initial four-factor model in Study 1 and from 8% to 27.5% for the evolved five-factor model in Study 2. The results indicate that gamers who purchase virtual items are driven by diverse psychological motivations that play a critical role in their spending behavior. This study provides a tool for identifying risk factors for potentially problematic purchase behaviors and offers insights for game developers and marketing professionals interested in optimizing user engagement strategies.

Keywords: game motivation; hedonic motivation; in-game purchase; loot boxing; microtransactions; utilitarian motivation

1. Introduction

Video games are a long-term phenomenon in human life, appearing in various forms and evolving over time [1, 2]. Beginning in the early 1950s, this journey can be summarized as “an activity, often centered around a narrative, that relies on audiovisual peripherals” [3]. The rapid advancement of technology in the 21st century has seen video games successfully reach out to larger populations, integrating themselves into people's daily routines. Simultaneously, the increase in the

variety of game genres as a result of advancing technologies has facilitated the adaptation of many game mechanics—both social and in-game factors—to the modern world [4].

This evolving diversity of mechanics and platforms is also having a major impact on the economics of games [5]. Nowadays, the proliferation of the Internet has led to a significant decrease in the sale of physical games, while at the same time making online game shopping the mainstream [6]. With easy access to these games and the increase of multiplayer options on the Internet, individuals have embraced the popularity of

in-game shopping mechanics. Game producers have adapted by incorporating these features, combining factors to enhance the gaming experience. In this regard, the term “in-game purchase” (also including “microtransaction”), which has emerged in recent years, is the general name given to the purchase of virtual items or various services in video games [7].

In-game purchases involve different structures that can simultaneously attract different groups of players, with numerous types as outlined in Table 1. Although there is ongoing debate about these variations, they generally take the form of services or items that provide players with in-game benefits, such as leveling up or powering up [11]. Alternatively, they may take the form of purely cosmetic enhancements. In some cases, these purchases take the form of a “box” that gives players access to items that are characterized as rare, as determined by certain luck rates (Lootbox) [12].

For example, popular games such as *Counter-Strike*, *Dota 2*, *League of Legends*, *Apex Legends*, and *Genshin Impact* all implement microtransaction systems, including loot boxes and purchasable cosmetic or functional items. *Genshin Impact*, in particular, is an action role-playing game that employs a “gacha” mechanic, a loot box-like system, where players spend in-game currency (often bought with real money) to obtain randomized characters or weapons.

To frame a phenomenon like in-game purchases, economic models offer categories for decision-making distinct from those in psychology. The economic perspective, epitomized by the BPC model (beliefs, preferences, constraints) [13], encompasses variables such as economic preferences [14], self-regarding preferences [14], risk aversion [14], patience [14], trust [14], altruism [14], cognitive biases [15], and behavioral biases [16].

All these models fail to recognize the role of motivations in people’s behavior, especially in games [1]. Exploring the concept of motivation in economics poses significant challenges due to measurement issues [17, 18]. Motivations are often intricate, with factors that can be intertwined or not fully conscious [19] and thus violate the assumption of rationality (i.e., homo economicus).

Therefore, to create a comprehensive model for phenomena like in-game purchases, even as we recognize the valuable insights offered by economic models in explaining these occurrences, it is imperative to adopt a multidisciplinary approach. This approach should encompass contributions from the psychological field, which has, over the years, furnished evidence for explaining real-life purchases [20, 21]. Despite its somewhat fragmented nature, this field has also attempted to explore economic behaviors in virtual environments [22].

1.1. Possible Motivations for Purchasing Across Economics and Psychology. Psychological research highlighted that in-game purchases are often motivated by the desire for customization and advancement through the use of virtual items [23]. As suggested by Oh and Ryu, players are inclined to acquire functional virtual items and accumulate rare goods or money to enhance their characters or quickly progress through the game levels [24]. Guo and

Barnes confirm that the research and purchase of functional items positively influence purchasing behavior [25], while Lehdonvirta proposes three crucial attributes to satisfy the need for advancement: performance, functionality, and rarity [26]. Additionally, Shukla and Drennan indicate that the utility of a virtual good in performing specific tasks significantly contributes to the purchase [27]. Therefore, one of the areas of motivation that appears to have a significant influence on purchasing behavior can be attributed to a dimension of utility.

The expansion of online games has given rise to virtual communities formed by individuals who, despite not physically meeting, feel connected by shared interests [27, 28]. These communities, similar to real groups, influence the intentions of purchasing virtual goods through the construction of social networks and the sharing of values [27, 29]. In MMORPGs, virtual communities not only impact online gaming but also have complex implications in real life [30, 31]. Over time, players develop a stronger sense of belonging to the online community, thus striving to align with the expectations of significant others, even through the purchase of virtual items [32]. This can be viewed/interpreted as an enhancement dynamic, as outlined in the model proposed by the Electronic Gaming Motives Questionnaire (EGMQ; [33]). The evolution of virtual communities over time intensifies the interaction between group and individual variables, influencing purchasing intentions [34–36]. Therefore, an aspect of social reputation appears to drive in-game purchase behavior across a range of scenarios.

These premises related to social identification and the group and community nature present in virtual communities have introduced an additional social dynamic associated with personality traits that may be evident in purchasing behaviors, and the literature has confirmed the relevance of the fear of missing out (FoMO). The FoMO emerges as a relevant construct, indicating the FoMO on gratifying social experiences [37]. This psychological aspect, related to social needs, plays a fundamental role in problematic technology use [38]. FoMO is expressed in trait–state and personal–social models [39, 40], influencing in-game purchasing behaviors, especially in limited-time offers [41].

Enjoyment plays a key role in online purchases of virtual goods, providing a positive experience and motivating users to repeat interactions with the game [42–46]. Additionally, investment in virtual properties emerges as a significant motivation for buyers of virtual services and products, especially in digital worlds [47, 48]. The advent of Web 3.0 has heightened the motivation for in-game investment.

Recent work by Bäcklund et al. [33] highlighted escape as a key gaming motivation, which may partially overlap with our self-realization dimension. Similarly, constructs such as enhancement in the EGMQ show conceptual similarities with our reputation factor.

Finally, previous literature also pointed to self-related constructs, such as self-esteem, identity building, and personal fulfillment, as potentially relevant to in-game purchasing behaviors. These motivational aspects were not included in the initial scale but were reconsidered and further explored following the results of Study 1.

TABLE 1: Form of in-game purchases.

Types of in-game purchases	Description	Examples from games	References
In-game currency	The form of credit associated with a particular video game is used to purchase items within the game environment. Mostly, they are not changeable to real money.	PUBG: Battlegrounds (Credits); FIFA Series (FUT coins)	[8–10]
Loot boxes	A loot box is a digital container in a video game that players can purchase. When opened, it reveals a random choice of virtual items, which can include any type of item. In general, game companies have to share the chance of dropping items with players due to legal obligations.	Counter-Strike Series, Dota 2, League of Legends, Apex Legends, Genshin Impact	[8–10]
In-game items	It is the general name given to the virtual items game producers sell through the systems they create within the games. These items are usually objects that change various in-game appearances and activities, such as skins, avatars, and celebrations.	Counter-Strike Series, Dota 2, League of Legends, Apex Legends, Overwatch Series	[8–10]
Seasonal items	Seasonal items share a similar definition with virtual items, but they typically have a temporal limitation. For instance, benefits acquired for a specific duration or features accessible only during a designated time frame can be classified as seasonal items.	Counter-Strike Series, Dota 2, League of Legends, Apex Legends, Overwatch Series	[8–10]
Pay-to-win items	These items are used to give players an advantage in the in-game competition, such as extra life, extra time, and extra power.	Candy Crush Saga, Scrabble Go, Dungeon Keeper	[8–10]

2. Aim of the Studies

The primary objective of this study was to develop and validate a measurement scale that seamlessly integrates insights from both economic and psychological literature, as well as refining the modeling of in-game purchases—specifically focusing on monthly expenditures in euros. In the initial phase, Study 1 concentrated on internally and externally validating a scale encompassing five potential motivations: utility, enjoyment, FoMO, reputation, and investment. Building upon the outcomes of Study 1, the scale underwent meticulous refinement and was subjected to further testing in Study 2, adopting a research action paradigm. The evolved scale, now enriched with the dimension of self-realization, underwent rigorous scrutiny and testing. These two studies combined were aimed at providing a sophisticated understanding of the diverse motivations underpinning in-game purchases, harmonizing insights from the realms of economics and psychology.

3. Methods

3.1. Participants. For our research, we employed two distinct samples, each tailored to a specific study. The participants in the first study were recruited between late December 2021 and mid-April 2022, totaling 1003 Italian people engaged in online gaming. From this cohort, 573 participants were identified as those who invested real money in virtual goods within online games, making them eligible for exploratory factor analysis (EFA). The subset subjected to EFA ranged from 14 to 62 years, with an average age of 23.25 years (standard deviation: 6.60). Within this subset, the gender distribution exhibited an imbalance, comprising 377

cisgender male participants (65.8%) and 164 cisgender female participants (28.6%). Additionally, one male transgender, one female transgender, 17 nonbinary individuals, and 13 respondents who preferred not to disclose their gender were included. Notably, 136 participants mentioned Genshin Impact, a widely played action role-playing game developed by miHoYo that features extensive microtransaction systems, including gacha-based loot boxes, as one of the top three games on which they spent money and thus were used as a case study.

The participants in the second study were enlisted between November 2022 and late February 2023, comprising a total of 613 Italians involved in online gaming. Among them, 284 participants acknowledged using real money to acquire virtual goods and currency within online games, forming the subsample used for confirmatory factor analysis (CFA). This subgroup consisted of 73.6% cisgender males, 23.6% cisgender females, 1.4% male transgenders, 1.1% non-binary individuals, and 0.4% participants who preferred not to specify their gender. Within the 284 participants, 51 reported spending money specifically on League of Legends to procure virtual goods and currency, thus constituting a distinct subset for a second case study.

3.2. Materials. The survey structure was consistent across Study 1 and Study 2. In both studies, participants completed a sociodemographic form, where they reported their gender and age. Additionally, they were asked whether they spent real money on in-game transactions and, if so, to specify the game on which they had spent the most in the past month and the amount spent in euros. Therefore, this financial data was thus obtained via a self-report measure. Following this, the in-game purchase motivation scale was

administered. In Study 1, participants completed the original 24-item scale comprising five dimensions: utility, enjoyment, reputation, FoMO, and investment. In Study 2, based on the findings from Study 1, an evolved 23-item version of the scale was administered. This revised version included 23 items covering the four dimensions identified from the analyses in Study 1 (utility, enjoyment, reputation, and investment), along with new items pertaining to an added self-realization dimension. In both studies, items were rated on a 5-point Likert scale (from 1 = “strongly disagree” to 5 = “strongly agree”).

3.3. Procedure. The recruitment methodology remained consistent across all studies to prevent the introduction of biases. Participants were enlisted through a variety of non-random, voluntary sampling methods, including the use of the nonprobabilistic snowball sampling technique. This method initiates recruitment with a small group of known individuals, expanding the sample through the collaboration of initial participants who, in turn, identify others interested in joining the study. Initially, participants were identified within online gaming communities and approached through instant messaging systems, where they received invitations to participate in the survey via text messages. These invitations provided transparent and detailed information about the research objectives, explained the survey process and its duration, and assured participants of privacy and anonymity protection. No incentives were provided for participant recruitment. Overall, the snowball sampling technique allows researchers to recruit participants with minimal effort by leveraging their proximity networks. By encouraging participants to share the invitation to complete the survey within their own social circles, researchers can maximize the likelihood of participation without the need for external incentives. Subsequently, when the sample recruitable through gaming communities was depleted, social media platforms such as Facebook, Instagram, Discord, Reddit, Telegram, and Twitch were leveraged to identify individuals more closely aligned with the study’s target population in virtual environments. Data in both studies were collected in compliance with Italian data protection regulations (Legislative Decree DL-101/2018) and EU regulations (2016/679).

3.4. Data Analysis. For internal validity purposes, we relied on EFA in Study 1 and CFA in Study 2. For EFA (SPSS Software), we anticipated the representation of five factors for the 24 items in Study 1. Accordingly, a sample size of approximately 400 was deemed adequate for the execution of EFA, even when accounting for factor loadings assumed to be quite low ($\lambda = 0.4$), as guided by the insights from de Winter et al.’s research [49]. Since 573 participants who spent money on in-game purchases were recruited, our sample size was deemed adequate. To validate the structure identified in Study 1 through EFA, a CFA was employed (JASP Software). The evaluation of this model encompassed the utilization of diverse indices assessing goodness of fit. These indices encompassed the chi-square to degree of freedom ratio (χ^2/df) [50], the Tucker–Lewis index (TLI) [51],

the standardized root mean square residual (SRMR) [52], the root mean square error of approximation (RMSEA) [53], and the comparative fit index (CFI) [54]. Criteria delineating the adequacy of the models were predefined as follows: TLI and CFI values approximating 0.95 (with a range of 0.90–0.95 denoting a satisfactory fit), an SRMR value below 0.08, and an RMSEA less than 0.06 (within the range of 0.06–0.08 for a commendable fit) [55]. For conducting CFA, it is advised to adhere to specific guidelines, such as maintaining a participant-to-item ratio of at least 10:1, as recommended by Comrey, and having a sample size exceeding 200 [56–58]. Since we secured 284 participants for conducting the CFA, we deemed our sample size enough.

For testing external validity, we used correlation and regression analysis (JASP Software). For both types of analysis, a power analysis was performed and the required sample size was defined based on the type of statistical analysis requiring the bigger number of observations. The power analysis showed that a sample size of 273 would be required to achieve a statistical power of 0.80 while being able to capture effect sizes ranging from relatively small to typical ($r = 0.15$ and $f^2 = 0.05$) and assuming a significance level of 0.05. In both studies, our sample size exceeded 273. Unfortunately, for case studies (i.e., Genshin Impact in Study 1 and League of Legends in Study 2), we were unable to secure a sample size to ensure the same level of statistical power. Therefore, only relatively large effects (especially in Study 2) were detectable. Both Study 1 and Study 2 datasets are freely available through OSF at the following link: <https://osf.io/u5qt9/>.

4. Study 1 Results

4.1. EFA, Reliability Analysis, and Factor Intercorrelations. The principal axis factoring method with Promax (oblique) rotation was applied to the 24 survey items, considering the potential interdependence among factors. The determination of the number of components to extract was guided by examining the scree plot [59] and applying the Kaiser criterion (i.e., retaining factors with eigenvalues greater than one) [60]. Items were retained based on factor loadings exceeding 0.50 and exhibiting cross-loadings below 0.20 [61] (see Table 2).

Items with inadequate factor saturations were systematically removed, resulting in an improved version comprising a minimum of four items per dimension. Through an iterative process, six items were excluded from the original set of 24 items, specifically Items 1 (utility), 4 (utility), 13 (FoMO), 14 (FoMO), 15 (FoMO), and 20 (reputation seeking). The final solution consisted of 18 items organized in four dimensions. The analysis indicated a four-factor structure explaining 73.369% of the total variance of the construct. The first factor, labeled “utility,” encompasses four items (2, 3, 5, 6), possesses an alpha coefficient of 0.88, and accounts for a single explained variance of 28.399%. The second factor, termed “enjoyment,” aggregates six items (7, 8, 9, 10, 11, 12), has an alpha coefficient of 0.92, and demonstrates a single explained variance of 21.388%. The third factor, labeled

TABLE 2: EFA results: In-game purchase motivation scale factor structure and loadings.

Item	Utility	Final model after EFA		
		Enjoyment	Reputation	Investment
Item 2	0.848			
Item 3	0.852			
Item 5	0.800			
Item 6	0.719			
Item 7		0.821		
Item 8		0.802		
Item 9		0.833		
Item 10		0.846		
Item 11		0.801		
Item 12		0.798		
Item 16			0.658	
Item 17			0.765	
Item 18			0.749	
Item 19			0.891	
Item 21				0.874
Item 22				0.826
Item 23				0.863
Item 24				0.740
Explained total variance	28.399%	21.388%	14.849%	8.733%
<i>Varianza totale cumulativa</i>		73.369%		

Note: N = 573; ENG = English version of the item not yet validated; IT = Italian version of the items that are validated by EFA.

TABLE 3: Correlation matrix among factors composing the first version of the in-game purchase scale.

Factor	Utility	Enjoyment	Reputation	Investment
Utility	1.000			
Enjoyment	0.080	1.000		
Reputation	0.362***	0.216***	1.000	
Investment	0.145**	0.051	0.429***	1.000

Note: N = 573.

*** $p < 0.001$; ** $p < 0.01$.

“reputation,” comprises four items (16, 17, 18, 19), possesses an alpha coefficient of 0.85, and elucidates a single explained variance of 14.849%. The final factor, denoted as “investment,” is composed of four items (21, 22, 23, 24), has an alpha coefficient of 0.89, and accounts for a single variance of 8.733%.

As discernible from Table 3, it becomes apparent that reputation consistently exhibits associations with all other dimensions of the scale. In contrast, the remaining factors manifest a relatively independent relationship among themselves, except for utility and investment. The latter two factors still display a positive association, albeit with a modest effect size.

4.2. External Validity. To explore potential associations between our four factors and the expenditure amount, inde-

pendent of the specific game, we chose to log-transform the variable “money spent in the last month.” This decision was motivated by the nonnormal distribution of the variable, evident from skewness and kurtosis values that markedly deviated from canonical thresholds. Results are presented in Table 4.

The correlation analysis suggested a typical positive association between the amount of money spent in in-game transactions and both reputation and investment motivations. At the same time, enjoyment exhibited a relatively small positive association. To explore the joint contribution of the four dimensions of the in-game purchase scale in predicting the amount of money spent by participants, we used simple regression modeling. The model was able to explain 5.4% of the money used for in-game purchases ($F_{(4,572)} = 8.10$; $p < 0.001$).

TABLE 4: Descriptive statistics, correlation, and regression analysis for the subset engaged in in-game purchases.

Variables	Min	Max	Media	s.d.	Log_money spent (regression st. beta)
Euros spent per month	1	1000	24.90	65.72	—
Utility	4	20	11.06	4.20	0.05 (−0.01)
Enjoyment	6	30	21.20	5.24	0.13** (0.10*)
Reputation	4	20	7.76	3.56	0.18*** (0.11*)
Investment	4	16	7.36	3.77	0.18*** (0.13**)

Note: $N = 573$. Between brackets is reported the standardized beta of the regression model predicting the amount of money spent based on the in-game purchase dimensions.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

TABLE 5: Descriptive statistics, correlation, and regression analysis for the subsample expending money on Genshin Impact last month.

Variables	Min	Max	Media	s.d.	Log_money spent (regression st. beta)
Euros spent per month	1	700	29.54	75.378	—
Utility	4	20	12.96	3.411	0.13 (−0.09)
Enjoyment	6	30	20.80	5.432	0.19* (0.17*)
Reputation	4	20	7.65	3.348	0.30*** (0.23**)
Investment	4	16	6.55	3.025	0.19* (0.10)

Note: $N = 136$. Between brackets is reported the standardized beta of the regression model predicting the amount of money spent based on the in-game purchase dimensions.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

4.3. Genshin Impact Case Study. The investigation extended to participants who explicitly identified Genshin Impact as their primary platform for in-game purchases, as detailed in Table 5. The identical analytical procedures were re-executed within this specific subsample, unveiling a significant—indeed, relatively large—association between participants' expenditures on Genshin Impact in the last month and the reputation factor. Furthermore, noteworthy correlations were discerned with both enjoyment and investment, each demonstrating a typical effect size.

The subsequent regression modeling process partially validated the findings derived from univariate analyses. The model incorporating the four dimensions of in-game purchases demonstrated an explanatory power of 12% regarding the monetary expenditures made by participants in Genshin Impact ($F_{(4;135)} = 4.46$; $p = 0.002$).

5. Study 2—Evolution of the Scale Through the Concept of Self-Realization

Building on the results of Study 1 and the limitations of the four-factor model, we re-examined relevant theoretical contributions that emphasized the importance of self-related motivations in gaming contexts. In particular, self-realization emerged as a potentially important fifth dimension, encompassing aspects of fulfillment, identity, and self-esteem. The following theoretical framework guided the development of new items to assess this construct.

Self-realization proves to be particularly significant in online gaming, where spending money is perceived not only as a social demonstration of one's status within the commu-

nity but also as a realization of the self. Literature reviews have highlighted that the self-esteem construct is especially relevant for analyzing the purchasing behaviors of virtual goods in online games. A threat to self-esteem might lead individuals to invest more money, resulting in greater financial loss [62]. Players are thus compelled to derive their self-esteem from online gaming and the possession of prestigious virtual goods, seeking to build their identity through mastery, accomplishment, and autonomy mechanisms within the game itself. Online gaming and in-game purchases may also serve as an escape from negative emotional states [63]. Victories and ownership of an avatar with specific attributes provide players with a sense of self-worth. Individuals with low self-esteem interact differently with the gaming process, including avatar creation: in contrast to those with high self-esteem, they tend to rely more on others' perceptions and on prestige-based choices rather than on personal taste [64].

6. Study 2—Results

6.1. CFA, Reliability Analysis, and Factor Intercorrelations. Despite the incorporation of an additional dimension (i.e., self-realization) and its corresponding subset of new items into the scale, given that the overall framework remained unchanged for 4/5 of the components, we opted to conduct a CFA. Consequently, CFA was employed to evaluate the five-factor structure. Maximum likelihood estimation (MLE) was utilized for parameter estimation.

All items previously identified through EFA were confirmed, except for Item 11 within the reputation dimension,

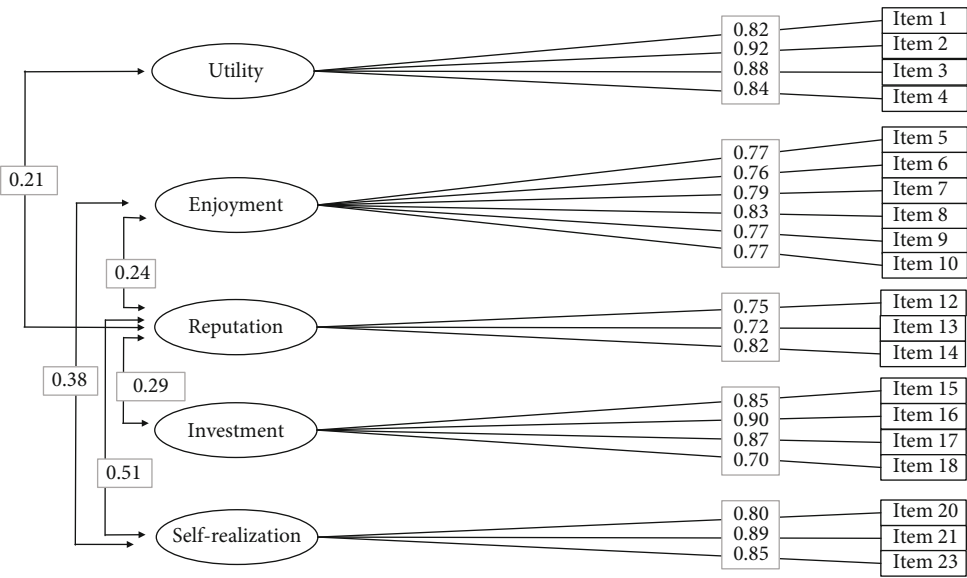


FIGURE 1: In-game purchase motivation scale.

TABLE 6: Descriptive statistics, correlation, and regression analysis for the subsample reporting in-game purchases with real money in the last month.

Variables	Min	Max	Media	s.d.	Log_money spent (regression st. beta)
Euros spent per month	1	500	24.00	59.93	—
Utility	4	20	10.79	4.69	0.02 (0.01)
Enjoyment	6	30	20.22	5.45	0.21*** (0.16**)
Reputation	3	15	5.46	2.64	0.11 (−0.03)
Investment	4	20	6.23	3.34	0.16** (0.16**)
Self-realization	3	15	6.09	3.03	0.19** (0.14*)

Note: $N = 284$. Between brackets is reported the standardized beta of the regression model predicting the amount of money spent based on the in-game purchase dimensions.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

TABLE 7: Descriptive statistics, correlation, and regression analysis for the subsample expending money on League of Legends last month.

Variables	Min	Max	Media	s.d.	Log_money spent (regression st. beta)
Euros spent per month	1	50	14.02	12.86	—
Utility	4	18	7.43	4.04	0.07 (−0.01)
Enjoyment	6	30	21.12	5.15	0.34*** (0.32*)
Reputation	3	13	5.75	2.96	−0.06 (−0.37*)
Investment	4	16	5.78	2.21	0.26 (0.38*)
Self-realization	3	14	7.04	3.46	0.21 (0.22)

Note: $N = 51$. Between brackets is reported the standardized beta of the regression model predicting the amount of money spent based on the in-game purchase dimensions.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

which exhibited cross-loading with the utility factor. Additionally, two other items, namely, 19 and 22 (associated with the new dimension of self-realization), were excluded due to their low factor loading (< 0.50). Following these adjustments, the CFA demonstrated an optimal fit for the

hypothesized five-factor structure of the in-game purchase scale (Figure 1) ($\chi^2/\text{df} = 2.15$; $p > 0.001$; TLI = 0.94; CFI = 0.95; RMSEA = 0.064; SRMR = 0.054). The final item pool of the in-game purchase motivation scale is presented in the Appendix (Table A1).

As for reliabilities of the five dimensions, we obtained good results: $\omega(\text{utility}) = 0.92$; $\omega(\text{enjoyment}) = 0.90$; $\omega(\text{reputation}) = 0.81$; $\omega(\text{investment}) = 0.90$; $\omega(\text{self-realization}) = 0.88$.

6.2. External Validity. We decided to test the association between the five dimensions of the scale and the amount of money spent in the last month disregarding the type of game people spent money on (Table 6). As in the previous study, we had to log-transform the variable “money spent in the last month” due to its nonnormal distribution.

The average monthly amount spent, calculated as an arithmetic mean, was approximately €24. Due to the high variability and positive skewness of the distribution (range: 1–500 euros; SD = 59.93), the log transformation ensured a more robust estimation of associations between motivational dimensions and purchase behavior.

In this sample, the dimensions of enjoyment and self-realization were typically and positively associated with the amount of money spent on in-game purchases. The investment dimension was also positively associated but with a lesser effect size, while reputation and utility appeared to be independent. The same result emerged from the simple regression analysis ($F_{(5,283)} = 4.93$; $p < 0.001$). The model in this case was able to explain approximately 8% of the amount of money spent.

6.3. League of Legends Case Study. In Study 1, similar to our exploration of Genshin Impact, we broadened the inquiry to participants who specifically designated League of Legends as their principal platform for in-game purchases. Despite the constraint posed by a notably limited sample size—resulting in reduced power for detecting effect sizes below the threshold of relatively large—we successfully identified a positive association between enjoyment and monetary expenditure in in-game transactions (Table 7). Additionally, trends toward statistical significance were noted for the self-realization and investment dimensions.

Nevertheless, we sought to assess, via simple regression, the extent to which all five factors of the in-game purchase scale could elucidate the variance in the amount of money spent. The regression analysis unveiled that our factors accounted for 27.5% of the variance in money spent ($F_{(5,50)} = 3.42$; $p = 0.011$). Particularly noteworthy was the observation that reputation, within the specific context of League of Legends, exhibited a negative association. To assess whether this effect was influenced by potential multicollinearity with self-realization, we reran the regression model excluding this dimension. The effect of reputation remained negative and statistically significant, indicating that the association was not driven by its inclusion. This finding suggests that, in the specific context of League of Legends, reputation-seeking motivations may not translate into higher monetary investment. One possible interpretation is that status within the game community can be achieved through skill, ranking, or gameplay performance rather than through the purchase of cosmetic or functional items. Consequently, players driven by reputation may rely more on their in-game achievements to gain recognition rather than spend-

ing money. This contrasts with other games, such as Genshin Impact, where progression and visibility are more closely tied to in-game purchases. Overall, the obtained result suggests that individuals motivated by reputation-seeking tendencies tend to spend less in League of Legends. To model in-game purchasing behavior, it is insufficient to rely solely on economic or rational motivations; the model must also account for behaviors driven by individuals' psychological needs. Accordingly, in our study, we developed a scale that incorporates both economic and psychological motivations. Analysis of data collected using this scale across two distinct samples (573 participants in the first study and 284 in the second) reveals a notable consistency: individuals who make in-game purchases spend an average of €24 per month, regardless of the specific game. Despite the differences between the samples, the inclusion of a self-realization dimension in the model significantly improved its predictive power regarding expenditure.

In the first study, the model comprised four dimensions—utility, enjoyment, reputation, and investment—and accounted for 5.4% of in-game spending variance. In the second study, we introduced an additional dimension: self-realization. This new factor was positively associated with the amount spent on in-game purchases, aligning with existing literature and enhancing the model's explanatory power to approximately 8% of spending variance. These findings suggest that the amount spent on virtual goods in games is influenced by the motivations a game facilitates, which depend on both the game's features and the in-game items available for purchase. Furthermore, certain motivations appear more salient, potentially strengthening the relationship with the amount spent. These predictive percentages are noteworthy given that expenditure is typically viewed as an objective measure influenced by demographic factors such as gender, household income, and employment status [65, 66], as well as age [65], ethnicity [66, 67], education, and marital status [65]. In developing our model, we deliberately excluded these demographic variables due to privacy concerns, as many of these factors constitute sensitive personal data. Our model, independent of these variables, provides a psychological framework for understanding in-game purchasing behaviors that can be readily applied by companies and software developers in the field, while fully respecting user privacy.

7. Discussion

The games industry has reached a broader and more diverse audience than in previous years due to the rapid development of technology and the widespread availability of games [68]. This proliferation has led game producers to seek additional revenue opportunities beyond the sale of games [5]. As a result, “in-game purchases” have become a standard feature in a variety of game genres, often with a significant impact on gameplay. In some cases, these purchases enhance game performance, for example, by providing players with more powerful tools or abilities [69], while in others they are limited to cosmetic changes that alter the visual appearance of characters, environments, skins, etc., without affecting the gameplay mechanics [70, 71].

The intersection of psychology and economics has become a focal point for researchers seeking to understand the multifaceted nature of decision-making. While classical economic theories often assume rational behavior driven solely by self-interest, recent studies have emphasized the importance of psychological motivations in shaping economic preferences. This paper delves into the nuanced connections between psychological factors and economic decision-making, exploring how individual motivations may influence preferences. Through an analysis of self-reported player's transactions, we contribute valuable insights into the intersection of psychology and economics in the rapidly evolving landscape of digital gaming. The first is the increase in the explicatory power of the scales with five factors, including self-realization. The scale showed a five-factor structure in both studies, although in the first study it was reduced to four factors. In the first study, although FoMO has theoretical relevance, it does not emerge as a distinct factor in the factorial structure, likely because its variance is absorbed by the reputation construct.

The advent of virtual economies within video games has introduced a novel arena for exploring the interplay between psychological motivations and economic preferences. In-game purchasing, where players use real currency to acquire virtual goods or enhance their gaming experience, presents a unique context to examine the factors influencing consumer decisions. In this case, we want to shed light on the psychological drivers that impact economic preferences in virtual economies and their broader implications. Our findings indicate a multifaceted interplay between psychological motivations and economic preferences in the context of in-game purchasing. In our findings, the mechanics of the game and what it allows you to do with the money can moderate the strength of relationships with the amount spent and make dimensions more salient than others.

When controlling for variability attributed to the game type (i.e., analyzing just participants who spent money over a specific game), we observed an increase in the explanatory power of the scale from 5.4% to 12% for the initial four-factor model in Study 1 and from 8% to 27.5% for the evolved five-factor model in Study 2.

The integration of psychological motivations and economic preferences in the discussion of in-game purchasing highlights the need for a nuanced understanding of virtual consumer behavior.

Recent innovations in the gaming industry have introduced systems in which players can earn real-world rewards, such as gift cards or cash, by “simply playing,” often through third-party apps. In reality, this model is frequently tied to additional mechanisms that involve some form of spending or microtransactions. These systems effectively turn gaming into a form of indirect gambling, where in-game purchases can facilitate access to tangible economic rewards. As highlighted by Turner and Shi [72], such schemes incentivize in-game spending by offering monetary rewards, although actual payouts are generally much lower than advertised and raise important regulatory and consumer protection concerns.

A comparison with the literature on gambling motivations [73, 74] reveals partial overlap with some dimensions of our scale, particularly with regard to *enhancement* (e.g., reputation-seeking) and *economic* motives (e.g., investment). However, one of the core components of gambling motivation—*emotion regulation*, typically associated with coping and relief from negative affect—did not emerge as a distinct factor in our model. Instead, related psychological needs appear to be expressed through the self-realization dimension, which reflects identity-building and the pursuit of positive self-related outcomes, rather than the management of distress. This distinction suggests that while certain motivations may cut across different forms of virtual behavior, others are more context-specific and rooted in the identity-driven and aspirational nature of the gaming experience.

The findings suggest that game developers and marketers can leverage psychological insights to design more compelling in-game purchase incentives. Recognizing the role of emotions, social interactions, and virtual identity in economic decision-making within games is crucial for developing effective monetization strategies and creating engaging virtual economies. As the gaming industry continues to evolve, understanding the dynamics of virtual economies becomes essential for stakeholders aiming to optimize player experiences and financial outcomes. By unraveling the intricate web of motivations that underlie in-game purchases, this research provides valuable insights into the convergence of psychology and economics in the context of virtual environments. We argue that acknowledging the role of psychological motivations in economic preferences enhances the predictive accuracy of economic models, offering a more realistic depiction of human behavior.

Although in-game purchases do not yield tangible or productive outcomes, the enjoyment they provide may still represent a meaningful form of utility. As evidenced in gambling research, such as the work by Marfels [75], hedonic consumption can be considered rational when the behavior is voluntary, affordable, and under psychological control. Our findings suggest that motivations such as enjoyment and self-realization reflect value-oriented behaviors that may not align with classical economic rationality but are meaningful within broader, psychologically informed frameworks. Conversely, in-game spending becomes irrational when driven by emotional dysregulation or when it results in negative psychological or financial consequences. Therefore, the rationality of in-game purchases should be assessed in relation to psychological control and the impact on well-being.

8. Limits and Future Perspectives

A limitation that can be found in both of the studies regards the sample size. It would be beneficial to address this aspect in future research. Specifically, it is necessary to expand the female sample and the sample of those who actively purchase virtual goods within online games.

With these interventions, the study could be more easily extended to the general population.

Additionally, it is necessary to extend the sample to include those who play different types of games. In the first study, two games in particular, League of Legends and Genshin Impact, were analyzed. This was not possible in the second study due to the lack of a sufficient sample of players for a specific game.

Moreover, although in-game purchases were analyzed independently of the specific game, we acknowledge that differences in spending behavior across games were not tested statistically. This was due to the limited number of participants per game, which prevented us from conducting robust comparative analyses. Furthermore, no information was collected regarding the platform or device used to play (e.g., mobile, PC, and console), which may have influenced access to in-game purchases and related motivations. The increasing prevalence of mobile gaming, particularly through free-mium models and gambling-like mechanics, is changing the dynamics of gameplay and purchasing behavior and should be considered in future research. Future studies with larger, game-specific samples could explore whether motivational profiles interact with game-specific spending patterns.

Therefore, it would be interesting to extend the study to players who engage in other games beyond those already investigated in the first study.

Another limitation found in both studies concerns the homogeneity of the age group investigated. Most of the data was obtained from a population of young adults. Thus, it would be interesting to extend the study to other age groups, as some responses were recorded from people of different ages in both studies, although not in a large enough number to make inferences about them.

Beyond sampling aspects, other methodological considerations also emerge.

Another limitation concerns the scope of external validity examined in the present studies. Specifically, we focused on a single behavioral outcome—monthly spending on in-game purchases—as the external criterion. While this choice was coherent with the aims of the research, future studies could expand the validation process by including additional psychological or socio-demographic variables. For instance, associations with constructs such as gaming disorder symptoms, income, self-esteem, loneliness, anxiety, or other individual differences could provide a broader understanding of how motivational dimensions relate to psychological functioning and behavioral patterns.

It is also desirable for the scale to be translated and validated in other languages to make the scale available for populations with different languages and cultures. In this regard, it would be interesting to conduct cross-cultural analyses on the subject.

Finally, future research could also explore the expansion of the scale by introducing new motivational dimensions. Particular emphasis should be placed on aspects related to communities, given the numerous findings in the literature concerning the social dynamics of virtual gaming environments.

Moreover, although the present study focused on the most common and structurally defined forms of in-game purchases, we recognize that other monetization strategies are becoming increasingly widespread, especially in mobile gaming. These include payments to skip advertising interruptions, to unlock additional content (e.g., new maps or characters), or to continue playing after running out of in-game resources (e.g., lives, energy). While some of these behaviors may be partially captured by existing dimensions such as enjoyment and utility, they also introduce nuances that are not fully covered by the current scale. Given the dynamic nature of game monetization, future work should consider expanding the typology of in-game purchases and developing new items to account for these evolving motivational targets.

These evolving forms of in-game purchases may also interact with well-known cognitive and behavioral biases that influence spending decisions in virtual environments.

Moreover, insights can be drawn from behavioral economics, which highlights the influence of cognitive biases on spending behavior. Mechanisms such as *loss aversion* [76], the *endowment effect* [77], and *nudge theory* [78] help explain why limited-time offers, ownership cues, and subtle interface choices can drive in-game purchases. These frameworks complement psychological theories by clarifying how context and decision architecture shape economic behavior in virtual environments.

Additionally, it is worth considering that, in some emerging contexts, not only in-game purchases but also gameplay itself may be perceived as a form of investment, particularly when it enables access to real-world rewards. This aspect is not currently reflected in the proposed scale and should be addressed in future research to account for the evolving nature of player motivations and monetization dynamics.

9. Implications

From the analysis of the results obtained from the studies analyzed above, these prove to be pioneering in proposing a new psychological tool capable of measuring some psychological characteristics of individuals in relation to in-game purchase. Specifically, five dimensions were identified.

Thanks to the results of these studies, it will be possible to predict the main aspects that drive individuals to purchase virtual goods within online games, as well as estimate how much money a person might be willing to spend on them. This knowledge is extremely useful for companies, which can better understand the aspects of how to encourage players to spend more money within online games.

Another important field where these studies could be applied is the identification of predisposing risk factors for problematic gaming and purchasing behaviors. This would be helpful for the early detection of these issues, providing a greater margin for intervention and support.

Appendix A

TABLE A1: Items of the in-game purchase motivation scale–final version.

ID	Item	Dimension
1	ITA: Gli acquisti in gioco mi permettono di ottenere un vantaggio. ENG: In-game purchases allow me to gain an advantage.	Utility
2	ITA: Gli acquisti in gioco rendono più facile la mia progressione nel gioco. ENG: In-game purchases make my progression in the game easier.	Utility
3	ITA: Se acquisto in gioco faccio molta meno fatica. ENG: If I make in-game purchases, I have much less difficulty.	Utility
4	ITA: Acquistare in gioco mi facilita nel raggiungere obiettivi e achievements. ENG: Making in-game purchases helps me achieve goals and gain achievements.	Utility
5	ITA: Gli acquisti in gioco rendono la mia esperienza di gioco più divertente. ENG: In-game purchases make my gaming experience more fun.	Enjoyment
6	ITA: Gli acquisti in gioco rendono la mia esperienza di gioco più piacevole. ENG: In-game purchases make my gaming experience more enjoyable.	Enjoyment
7	ITA: Gli acquisti in gioco rendono la mia esperienza di gioco più coinvolgente. ENG: In-game purchases make my gaming experience more engaging.	Enjoyment
8	ITA: Gli acquisti in gioco rendono la mia esperienza di gioco più interessante. ENG: In-game purchases make my gaming experience more interesting.	Enjoyment
9	ITA: Gli acquisti in gioco rendono la mia esperienza di gioco più eccitante. ENG: In-game purchases make my gaming experience more exciting.	Enjoyment
10	ITA: Gli acquisti in gioco rendono la mia esperienza di gioco più soddisfacente. ENG: In-game purchases make my gaming experience more satisfying.	Enjoyment
12	ITA: Faccio acquisti in gioco per essere sempre al centro dell'attenzione. ENG: I make in-game purchases to always be in the limelight.	Reputation
13	ITA: Quando acquisto in gioco ottengo un prestigio maggiore. ENG: When I make in-game purchases, I gain greater prestige.	Reputation
14	ITA: Acquistando in gioco divento più popolare nella mia community di gioco. ENG: By making in-game purchases, I become more popular in my gaming community.	Reputation
15	ITA: Acquisto in gioco per trarne profitto economico. ENG: I make in-game purchases to gain economic profit.	Investment
16	ITA: Acquisto in gioco come forma di investimento. ENG: I make in-game purchases as a form of investment.	Investment
17	ITA: Acquisto in gioco per guadagnare soldi veri (incluse le criptomonete). ENG: I make in-game purchases to earn real money (including cryptocurrencies).	Investment
18	ITA: Acquisto in gioco per rivendere più in là nel tempo ciò che ho precedentemente acquisito (per esempio oggetti virtuali). ENG: I make in-game purchases to later resell what I have previously acquired (for example virtual items).	Investment
20	ITA: Possedere oggetti in gioco per i quali si paga mi fa sentire realizzato. ENG: Owning paid in-game items makes me feel accomplished.	Self-realization
21	ITA: Acquisto in gioco perché mi permette di sentirmi speciale. ENG: I make in-game purchases because it allows me to feel special.	Self-realization
23	ITA: Tramite gli acquisti in gioco posso sentirmi maggiormente realizzato. ENG: Through in-game purchases, I can feel more accomplished.	Self-realization

Note: ENG = English version of the item not yet validated; ITA = Italian version of the items that are actually validated.

Data Availability Statement

The data that support the findings of this study are openly available in Open Science Framework at <https://osf.io/u5qt9/>.

Consent

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

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