

THE EFFECT OF FINANCIAL LITERACY AND SOCIAL PROOF ON IMPULSE PURCHASES OF VIRTUAL ITEMS AMONG GENERATION Z

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Abstract

This study analyzes the influence of Financial Literacy and Social Proof on Impulsive Buying behavior of virtual items among Generation Z users on the Roblox platform, with Usage Intensity as a mediating variable. Employing a quantitative approach, data were collected from 105 active Gen Z Roblox users in Indonesia through purposive sampling and analyzed using Structural Equation Modeling (PLS-SEM). The results reveal a unique phenomenon where Financial Literacy and Social Proof do not directly trigger impulsive buying. Instead, both variables significantly increase Usage Intensity. Subsequently, Usage Intensity acts as a full mediator that effectively bridges the influence of cognitive and social factors on impulsive buying decisions. These findings confirm a financial literacy paradox in the virtual economy, where high engagement and screen time (Usage Intensity) effectively weaken rational control, bridging the gap between cognitive knowledge and impulsive purchasing decisions.

1. INTRODUCTION

The dominance of Generation Z in today's digital landscape has driven exponential growth in the online gaming industry. As a demographic group with near-universal internet penetration, Gen Z has made the virtual world their primary space for social interaction. Within this ecosystem, Roblox has successfully cemented its position as the leading sandbox platform that facilitates both creativity and social interaction among its users. The popularity of this platform is not just a passing trend, but is supported by solid year-on-year user base growth. This trend of increasing global user participation is clearly reflected in the company's operational statistics, as detailed in Table 1.1 below:

Table 1.1 Growth of Roblox Daily Active Users (DAU)

Year	Daily Active Users (in millions)	Description
Q1 2020	23,6	Start of the Pandemic
Q2 2024	79,5	Post-Pandemic Growth
Q2 2025	111,8	Latest Peak

Source: Adapted from *Business of Apps (2024)* and *Roblox Shareholder Letter (2025)*

The freemium business model implemented by Roblox has created a dynamic virtual economy. Although basic access is provided free of charge, users are encouraged to make microtransactions using the digital currency "Robux" to purchase virtual items such as skins, accessories, or premium features to enhance their avatars. This phenomenon triggers impulsive buying behavior, which is the tendency to make spontaneous purchases without planning, driven by momentary emotional urges caused by exposure to attractive visual stimuli. For Generation Z, owning virtual items is not just a matter of game functionality, but has become a symbol of identity and social status in the virtual world.

This impulsive buying behavior is influenced by complex interactions between internal and external factors within the Stimulus-Organism-Response (S-O-R) framework. From an external perspective, social proof plays a crucial role; individuals tend to adopt the buying behavior of their peers or follow community trends in order to gain social validation. However, there is an interesting gap in terms of internal factors, particularly related to Financial Literacy. Theoretically, high financial literacy acts as a cognitive shield that suppresses consumptive behavior by enabling individuals to make rational economic decisions. However, a paradox emerges in the context of virtual consumption: empirical evidence suggests that financial knowledge often fails to prevent impulsive buying in gaming environments. Existing studies indicate that the immersive nature of virtual worlds can override rational financial constraints. Addressing this inconsistency, this study introduces Usage Intensity not merely as a habit, but as a critical transformation mechanism. We posit that cognitive factors (financial literacy) and social drivers (social proof) do not directly trigger purchases; rather, they drive deeper platform engagement, which subsequently weakens rational control and amplifies the urge for impulsive buying.

2. LITERATURE REVIEW

2.1 Theoretical and Conceptual Background

2.1.1 Stimulus-Organism-Response (S-O-R) Framework

This study is based on the Stimulus-Organism-Response (S-O-R) framework developed by Mehrabian and Russell (1974) to analyze consumer behavior dynamics in virtual environments. The S-O-R model postulates that environmental stimuli (S) act as triggers that influence internal states or organisms (O), which then process this information into behavioral responses (R) that are either approach or avoidance. In the context of purchasing virtual items on Roblox, Financial Literacy and Social Proof are positioned as external and internal stimuli that provide initial information to users. These stimuli are then internalized by individuals through Intensity of Use as Organism which reflects the level of cognitive and affective engagement of users with the application. This internal process ultimately manifests itself as Impulsive Purchasing as a form of observable behavioral response.

2.1.2 Financial Literacy and Consumptive Behavior

Financial literacy is a fundamental cognitive modality for Generation Z in navigating the digital marketplace. This variable is not limited to knowledge about money, but includes dimensions of financial knowledge, financial behavior, and financial attitudes that shape an individual's ability to make economic decisions. Theoretically, individuals with high financial literacy are assumed to have better self-control in managing expenses, including resisting unnecessary spending. However, in the online gaming ecosystem, financial literacy faces unique challenges. Although users have an understanding of financial risk, the deep mechanics of gaming often obscure this rationality, creating a paradox where knowledge does not always correlate with frugal behavior.

2.1.3 The Social Proof Phenomenon in Virtual Communities

As social beings, Gen Z users' purchasing decisions are greatly influenced by their peer groups, a phenomenon known as social proof. This variable is defined as the tendency of individuals to adopt the actions or opinions of others, especially in situations of uncertainty or ambiguity. On the Roblox platform, social proof works through mechanisms such as peer pressure, user reviews, and community trends. Users feel the need to purchase certain skins or items not solely for their utility, but to gain social validation, a sense of belonging, and to avoid being left behind (Fear of Missing Out) by their reference group.

2.1.4 Intensity of Use as an Intervening Variable

The intensity of application usage is a crucial factor that determines the extent of user exposure to marketing stimuli. This variable is measured through the dimensions of duration (length of play) and frequency (how often users log in). A high level of intensity indicates strong emotional attachment and habit formation towards the platform. The more often users interact with the Roblox interface, the more likely they are to be exposed to limited-time offers and attractive visual items. In this study, usage intensity is proposed as a mediator, with the assumption that financial knowledge and social pressure do not directly trigger purchases, but must first go through a process of active engagement within the application.

2.2 Empirical Review and Hypothesis

A number of empirical studies have mapped the determinants of consumptive behavior in the digital age. Hatta et al. (2025) and Jaman et al. (2025) highlight that Generation Z is highly vulnerable to online shopping due to their digital lifestyle, despite having been exposed to financial education. These findings are reinforced by Wahyuandari et al. (2025) and Jessica and Soesanto (2024), who found inconsistencies in the influence of financial literacy on impulsive decisions, indicating the presence of other intervening factors. On the other hand, the role of social factors is confirmed by Thamara and Pambudi (2025) and Nawari (2025), who prove that social proof and community reviews are the main drivers of trust. Complementing this perspective, Utami et al. (2021) emphasize that the interactivity aspect in mobile applications is the key to building customer engagement. This study adopts the concept of engagement as 'Intensity of Use' and integrates it into the S-O-R model adapted from Rahmawati and

Setyowibowo (2025) to fill the research gap on how app engagement mediates literacy and social factors in the impulsive purchase of virtual items.

By synthesizing the Stimulus-Organism-Response (S-O-R) framework with digital behavior theories, this study argues that the virtual environment creates a unique loop of influence. While Financial Literacy provides internal rational control and Social Proof exerts external pressure, continuous exposure through high Usage Intensity tends to erode these boundaries. We propose that the duration and frequency of engagement act as the primary catalyst (Organism) that converts latent financial knowledge and social pressure into actual impulsive purchasing behavior (Response), effectively bridging the gap between intention and action in the virtual economy.

First, regarding individual factors, financial literacy is assumed to have a dual role. Logically, individuals with high literacy tend to be more rational and able to exercise self-control, so it is predicted to have a negative effect on impulsive buying (**H1**). However, on the other hand, financial knowledge can also motivate individuals to use the application more intensively in order to maximize the entertainment value obtained, thereby affecting the intensity of use (**H4**). Second, social pressure (social proof) is predicted to be a strong motivator. The desire for social conformity not only triggers direct purchase intent (**H2**), but also encourages users to spend more time in the game in order to remain relevant to their community (**H3**).

Furthermore, intensity of use is positioned as a central variable in this model. The higher the frequency and duration of users interacting with the application, the greater their exposure to marketing stimuli that trigger impulsive purchases (**H5**). Based on this logic, this study postulates the existence of an indirect (mediating) mechanism. It is suspected that financial literacy and social proof work to influence impulsive buying through Intensity of Use. This means that high intensity of play can be a pathway that weakens financial literacy control (**H6**) while strengthening the pressure of social proof (**H7**) in triggering impulsive buying behavior.

2.3 Conceptual Framework

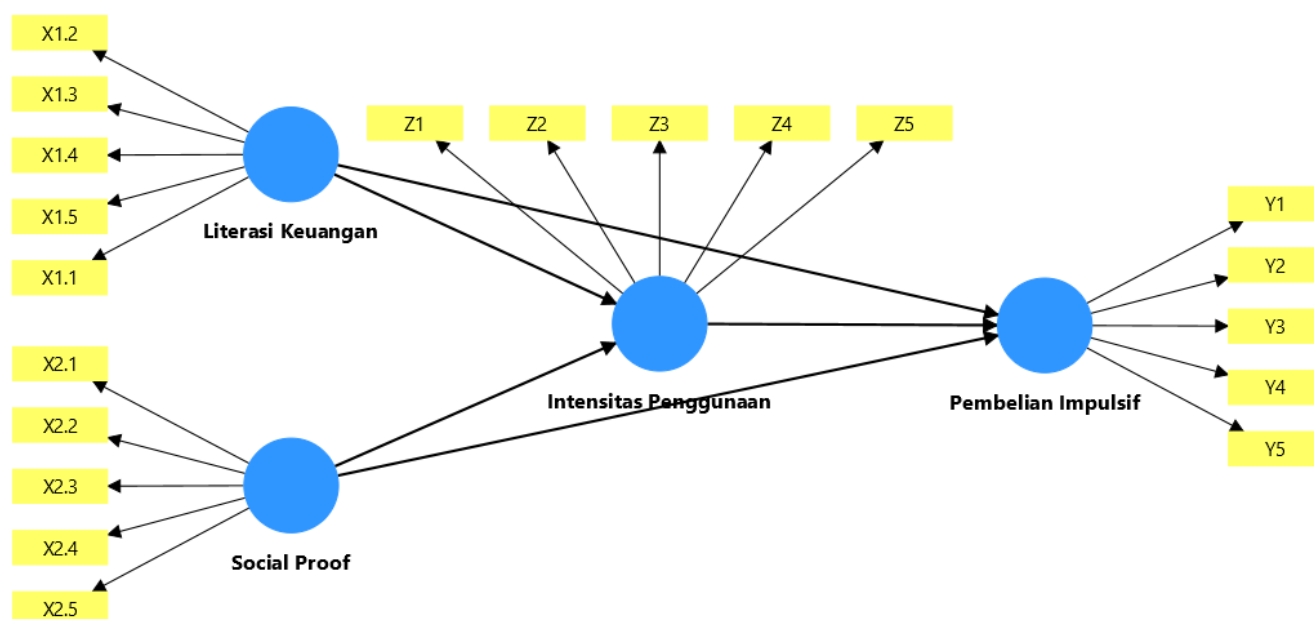


Figure 1. Research Framework
Source: Authors (2025)

3. RESEARCH METHODOLOGY

3.1. Time and Place of Research

This research was conducted online. The research location refers to the digital platform where the questionnaire was distributed to reach relevant respondents, which in this study included the social media platforms WhatsApp, Twitter, and Discord. The research period, which refers to the period when the data was collected, was from November 5, 2025, to November 12, 2025.

3.2. Research Design

This study applies a quantitative approach with a causal associative design to examine the structural relationship between the proposed variables. Survey methods were used as the main data collection strategy to obtain an objective picture of user behavior. The main focus of this study was to analyze the influence of exogenous

variables (Financial Literacy and Social Proof) on endogenous variables (Impulsive Purchasing) through mediating variables (Intensity of Use) in the context of the Roblox gaming platform.

3.3 Population and Sample

The target population in this study is active Roblox users who belong to Generation Z. Given the large and unknown population size (infinite population), the sampling technique used a non-probability sampling approach with the Purposive Sampling method. The inclusion criteria for respondents are: (1) Aged between 12-27 years (Gen Z), (2) Active Roblox users who have been playing for at least 6 months, and (3) Have made at least one virtual item purchase. Based on these criteria, a total of 105 valid samples were obtained for data analysis.

3.4 Research Instruments and Operational Variables

Data was collected through a structured electronic questionnaire using a 5-point Likert scale, ranging from “Strongly Disagree” (1) to “Strongly Agree” (5). The instrument was developed by adapting indicators from relevant previous literature to ensure the validity of the measurement content. The Financial Literacy variable was adopted from Wahyuandari et al. (2025), Social Proof was developed from Thamara and Pambudi (2025), Intensity of Use referred to Utami et al. (2021), and Impulsive Purchasing was adapted from Rahmawati and Setyowibowo (2025). Complete details regarding the dimensions, indicators, and sources of adoption for each variable are presented in Table 3.1 below:

Table 3.1. Operationalization of Variables

Variable	Operational Definition	Indicator	Quesioner Statement	Code	Scale	Source
X1 Finansial Literacy	Respondents' level of understanding and caution in managing expenses (including digital/virtual spending), such as understanding the value of money, limiting spending, and evaluating needs before purchasing.	Understanding virtual-real exchange rates	I understand the exchange rate between Robux and real money.	LK1	Likert 1–5	Wahyuandari et al. (2025)
		Spending limits	I set a spending limit before purchasing items on Roblox.	LK2		
		Real money awareness	I am aware that purchasing virtual items also reduces my real money.	LK3		
		Considerations before buying	I always think twice before purchasing items on Roblox.	LK4		
		Needs assessment	I evaluate whether the purchase of virtual items is really necessary.	LK5		

Variable	Operational Definition	Indicator	Questioner Statement	Code	Scale	Source
X2 Social Proof	The urge to buy influenced by social proof from others (friends/community/influencers) and popularity signals (trends) that encourage confidence to buy and the need for social acceptance.	Peer influence	I tend to buy items that my friends also buy on Roblox.	SP1	Likert 1–5	Thamara & Pambudi (2025)
		Community trends	I follow the trends of virtual items that are popular in the Roblox community.	SP2		
		Influencers	I am interested in buying items used by Roblox creators or influencers.	SP3		
		Social acceptance	I feel more accepted when I have the same items as my friends.	SP4		
		Fear of missing out (FOMO)	I feel left out if I don't buy trending items.	SP5		
Y Impulsive Purchasing	The tendency to purchase virtual items spontaneously, unplanned, quickly, and triggered by emotions/situational triggers (e.g., limited-time promotions), including potential buyer's remorse after purchase.	Impulse buying	I often buy items on Roblox without thinking twice.	PI1	Likert 1–5	Utami et al. (2021)
		Emotional triggers	I buy virtual items when I feel happy or curious.	PI2		
		Lack of planning	I rarely plan my item purchases in advance.	PI3		
		Limited-time promotions	I often buy items because of limited-time promotions.	PI4		
		Regret	After buying an item, I	PI5		

Variable	Operational Definition	Indicator	Questioner Statement	Code	Scale	Source
			sometimes regret it because I don't need it.			
Z Intensity of Use	The level of respondent engagement in using Roblox as seen from the frequency, duration, social engagement/activity, and difficulty in stopping use.	Frequency	I play Roblox almost every day.	IP1	Likert 1–5	Rahmawati & Setyowibowo (2025)
		Duration	I spend a lot of time playing Roblox every time I open the app.	IP2		
		Interaction	I actively interact with friends or communities on Roblox.	IP3		
		Difficulty stopping	I find it difficult to stop playing Roblox even though I've been playing for a long time.	IP4		
		Purchasing Robux/items for gaming experience	I often buy Robux or virtual items to enrich my gaming experience.	IP5		

Source: Authors (2025)

3.5 Data Analysis Techniques

Data analysis was conducted using Structural Equation Modeling with the Partial Least Squares approach (PLS-SEM) via SmartPLS 4.0 software. This method was specifically selected for its robustness in handling complex structural models that involve mediating variables specifically Intensity of Use within a relatively limited sample size (n=105). The analysis focuses on testing the direct relationships between variables and, crucially, the indirect mediating effects to unravel the mechanism behind Gen Z's impulsive buying decisions, without relying on the restrictive assumption of data normality.

4. RESULT AND DISCUSSION

4.1 Result

Respondent Demographic Profile

The survey results from 105 respondents show that the majority of Roblox users are dominated by the late teenage age group (17–20 years old) with a percentage of 72.4%. The dominance of this age group confirms that the research subjects are a valid representation of Generation Z. In terms of gaming experience, most respondents (65.7%) are new users with less than one year of gaming experience. However, their level of engagement is very high, with 61.9% of respondents accessing the Roblox app regularly between 3 and 5 times a week or even every

day. This indicates that despite their relatively short playing time, the intensity of respondents' interaction with the platform is very strong.

Convergent Validity and Reliability Test

Table 4.1 Validity and Reliability Test Results

Variable & Indicator	Outer Loadings	VIF	Cronbach's alpha	Composite Reliability	AVE
Financial Literacy			0.908	0.931	0.730
LK1	0.894	2.525			
LK2	0.853	3.660			
LK3	0.853	2.800			
LK4	0.827	2.556			
LK5	0.844	2.004			
Social Proof			0.922	0.941	0.763
SP1	0.862	2.647			
SP2	0.834	2.301			
SP3	0.859	2.806			
SP4	0.891	3.230			
SP5	0.917	4.008			
Impulsive Purchasing			0.874	0.908	0.663
PI1	0.860	2.203			
PI2	0.771	1.838			
PI3	0.793	1.839			
PI4	0.815	2.253			
PI5	0.830	2.313			
Intensity of Use			0.920	0.940	0.756
IP1	0.882	3.199			
IP2	0.876	3.151			
IP3	0.865	2.630			
IP4	0.863	2.564			
IP5	0.862	2.533			

Source: Authors (2025)

Discriminant Validity Test

Table 4.2 Results of Discriminant Validity Test (HTMT)

Variabel	Intensity of Use	Financial Literacy	Impulsive Purchasing	Social Proof
Intensity of Use				
Financial Literacy	0.410			
Impulsive Purchasing	0.670	0.316		
Social Proof	0.595	0.160	0.475	

Source: Authors (2025)

Coefficient of Determination

Table 4.7 R-Square Values (R^2)

Dependent Variable	R-Square	R-Square Adjusted
Intensity of Use	0.520	0.505
Impulsive Purchasing	0.248	0.233

Source: Authors (2025)

Hypothesis Test Results (Direct & Indirect Effects)

Table 4.8 Summary of Hypothesis Test Results

Hypothesis	Relationship Path	Original Sample (O)	T-Statistics	P-Values	Decision
H1	Financial Literacy (X1) > Impulsive Purchasing (Y)	0.064	0.675	0.500	Rejected
H2	Social Proof (X2) > Impulsive Purchasing (Y)	0.161	1.753	0.080	Rejected
H3	Social Proof (X2) > Intensity of Use (Z)	0.505	6.901	0.000	Accepted
H4	Financial Literacy (X1) > Intensity of Use (Z)	0.315	3.847	0.000	Accepted
H5	Intensity of Use (Z) > Impulsive Purchasing (Y)	0.500	5.856	0.000	Accepted
H6	Financial Literacy (X1) > Intensity of Use (Z) > Impulsive Purchasing(Y)	0.158	2.890	0.004	Accepted
H7	Social Proof (X2) > Intensity of Use (Z) > Impulsive Purchasing (Y)	0.253	4.611	0.000	Accepted

Source: Authors (2025)

This section contains the results of data analysis, testing instruments and hypotheses (if any), answers to research questions, findings and interpretation of findings.

4.2 Discussion

Data Description and Model Validity

This study involved 105 respondents, predominantly late adolescents (aged 17–20 years) at 72.4%, representing the characteristics of Generation Z as digital natives. Prior to hypothesis testing, evaluation of the measurement model (Outer Model) ensured that the data used was valid and reliable. All research instrument indicators showed outer loadings > 0.70 and Average Variance Extracted (AVE) > 0.50, as well as Cronbach's Alpha and Composite Reliability values above 0.70, confirming the internal consistency of the instrument.

The Financial Literacy Paradox (H1 & H4)

Empirical findings reveal interesting results regarding the role of financial literacy. Statistically, financial literacy does not have a significant direct effect on impulsive buying ($P=0.500 > 0.05$), so H1 is rejected³. This finding refutes the common assumption that financial knowledge automatically acts as a “brake” on consumptive behavior. On the contrary, Financial Literacy has a positive and significant effect on Intensity of Use ($O=0.315$, $P=0.000$), so H4 is accepted⁴. This phenomenon indicates that financially literate Gen Z users tend to allocate their resources to maximize entertainment utility (value for money). They play more intensely to take advantage of features or events in the game, which ironically increases their exposure to shopping stimuli.

The Dynamics of Social Proof and FOMO (H2 & H3)

Similar to literacy, Social Proof has been proven to have no significant direct influence on Impulsive Purchasing ($P=0.080 > 0.05$), thus rejecting H2⁵. Social pressure from peers or community trends does not necessarily prompt individuals to immediately purchase virtual items. However, Social Proof has a very strong and significant influence on Intensity of Use ($O=0.505$, $P=0.000$), supporting H3. This explains that social validation works through the Fear of Missing Out (FOMO) mechanism; users feel compelled to keep logging in and interacting on the platform to remain relevant to their community, rather than directly making purchases.

Intensity of Use as the Main Determinant (H5)

Intensity of Use proved to be the most dominant predictor of Impulsive Purchasing with a large path coefficient ($O=0.500$) and high significance ($P=0.000$), thus H5 is accepted. The longer the duration and frequency of user interaction with the Roblox platform, the higher the likelihood of impulsive purchasing. This confirms that in a freemium ecosystem, engagement is the key to monetization. Repeated exposure to visual stimuli and limited time offers during play breaks down users' rational defenses. This model's ability to explain the variance in Intensity of Use is quite strong ($R\text{-Square} = 52.0\%$), while for Impulsive Purchases it is 24.8%.

Full Mediation Role (H6 & H7)

The most pivotal finding of this study is the full mediating role of Usage Intensity. The results clarify why financial literacy alone is insufficient to curb impulsivity in virtual settings. Interestingly, we found that higher financial literacy correlates with increased usage intensity, likely driven by a desire to maximize entertainment value which ironically exposes users to more spending triggers. Similarly, social proof primarily drives users to play more to maintain relevance, rather than buying immediately. It is this heightened engagement and screen time that ultimately serves as the bridge, transforming both financial rationalization and social pressure into impulsive purchasing actions.

5. CONCLUSION

This study concludes that in the Generation Z virtual economy, rational financial knowledge is often overshadowed by the intensity of platform engagement. The empirical results demonstrate that Financial Literacy and Social Proof do not directly drive impulsive purchases. Instead, high Usage Intensity acts as a powerful mediator that weakens rational control. The more intensely users engage with the platform whether driven by social FOMO or the rational desire to maximize game value the more susceptible they become to impulsive buying, rendering their financial literacy less effective in the face of continuous visual stimuli. The following are the detailed conclusions:

A. Financial Literacy Does Not Directly Suppress Impulsivity

A high level of financial literacy has been proven to have no significant direct effect on impulsive purchasing behavior. This shows that knowledge about the value of money and financial management is often overlooked or becomes irrelevant when users are faced with the temptation to purchase virtual items in the game.

B. Social Influence Does Not Directly Trigger Purchases

Social proof or pressure from the social environment (friends and community trends) does not have a significant direct effect on purchasing decisions. Seeing friends buy items does not necessarily make individuals buy at that moment without further involvement in the game.

C. Factors Driving Gameplay Intensity

Both social proof and financial literacy have been proven to have a positive and significant effect on usage intensity. Social pressure (FOMO) encourages individuals to play more often in order to remain relevant. Interestingly, individuals with good financial literacy also tend to play more intensely, possibly to maximize their gaming experience (value for money) or make optimal use of free features.

D. Usage Intensity as the Main Trigger

Intensity of Use has a very strong positive influence on impulsive buying behavior. The longer the duration and frequency of a person's logins, the higher their exposure to visual marketing stimuli, which drastically increases the tendency for impulsive shopping.

E. Full Mediation Role

The key finding of this study is the role of Intensity of Use as a full mediator. The influence of Financial Literacy and Social Proof on impulsive buying only occurs through the intermediary of playing intensity. This means that social and literacy factors first shape intense playing habits, and it is these habits that ultimately trigger impulsive spending.

5.1 Research Implications

5.1.1 Theoretical Implications

This study contributes to the development of digital consumer behavior theory, particularly the Stimulus-Organism-Response (S-O-R) model. The results confirm that the Organism variable (in this case, Intensity of Use/Engagement) plays a vital role in bridging the relationship between external stimuli (Social Proof) and behavioral responses (Impulsive Buying). This study also refutes the common assumption that financial literacy always acts as a “brake” (negative control); in the context of virtual goods, literacy can actually correlate positively with platform usage intensity.

5.1.2 Practical Implications

- A. For Gen Z users and parents, these findings provide important insights into spending control strategies:
- B. Screen Time Management is More Important than Financial Advice: Since financial literacy does not directly affect impulsivity, parents are advised to focus more on limiting their children's screen time. Reducing play intensity has proven to be more effective in breaking the chain of impulsive purchases than simply educating children about the value of money.

- C. Awareness of Social Triggers: Users need to be aware that fear of missing out (FOMO) is a gateway that causes them to spend too much time on apps, which ultimately leads to wasting money.

5.2 Research Limitations and Suggestions

5.2.1 Research Limitations

Although this research has been conducted in accordance with applicable scientific principles, the author recognizes several limitations that may affect the results of the study, including:

Model Predictive Ability (R-Square)

The coefficient of determination (R-Square) for the Impulsive Purchasing Behavior variable is 24.8%. This indicates that the variables in this study can only explain a small part of the phenomenon of impulsive purchasing. There are still 75.2% of other factors outside this model (such as UI/UX design, hedonistic motivation, or ease of payment) that also influence purchasing decisions.

A. Sample Size and Scope

This study used a sample of 105 respondents collected online. Although it meets the minimum requirements for PLS-SEM analysis, generalizing the results to the entire population of Roblox players in Indonesia needs to be done with caution due to the specific characteristics of the community.

B. Data Collection Methods

The use of self-reported questionnaires has the potential to cause normative response bias, especially in the financial literacy variable, as well as perception bias in measuring playing duration that does not use real-time tracking data.

5.3.2 Recommendations

Based on the above findings and limitations, the researchers propose the following recommendations for future research:

A. Addition of Psychological and Technical Variables

Future researchers are advised to add variables such as Self-Control, Hedonic Motivation, or Dark Patterns (manipulative interface design) to improve the model's predictive ability regarding impulsive purchasing behavior.

B. Expansion of Respondent Demographics

Given Roblox's very young user base, future research could target Generation Alpha (ages <13) by involving parents' perspectives to obtain a more comprehensive picture.

C. Qualitative Approach

The use of qualitative methods through in-depth interviews can help uncover specific reasons why high play intensity strongly drives purchases, whether due to competition, visual aesthetics, or social validation that are not revealed through quantitative surveys.

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