



Implications of Online Shopping and Flash Sale Attitudes on Impulsive Buying: Financial Literacy as a Moderation Variable

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This study aims to analyze the influence of online shopping attitudes and flash sales on impulsive buying and test the role of financial literacy as a moderation variable in the millennial generation in Bandung. The Stimulus–Organism–Response (S-O-R) framework is used as a theoretical lens to explain how digital promotion stimulus and consumer evaluation of online shopping are related to impulsive purchase responses, while financial literacy is positioned as a cognitive resource that can act as a boundary condition. Data were collected through an online survey of 220 respondents using purposive sampling techniques and analyzed using Structural Equation Modeling–Partial Least Squares. The results showed that online shopping attitudes had a positive and significant effect on impulsive buying ($\beta = 0.182$; $p < 0.001$) and flash sales also had a positive and significant effect ($\beta = 0.305$; $p < 0.001$). Financial literacy significantly weakened the relationship between online shopping attitudes and impulsive buying ($\beta = -0.237$; $p = 0.007$), but did not moderate the relationship between flash sales and impulsive buying ($\beta = 0.258$; $p = 0.092$). The main finding of the study was an asymmetrical moderation pattern: financial literacy appeared to be more relevant as a cognitive buffer to general online shopping tendencies, while flash sales stimuli containing scarcity and urgency likely involved affective mechanisms that were less responsive to financial knowledge alone. The latter interpretation is theoretical because affective mechanisms are not directly measured in the model. These findings expand the understanding of the limits of the effectiveness of financial literacy in the context of digital consumer behavior.

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INTRODUCTION

The development of e-commerce has changed the way consumers search for information, evaluate products, and make transactions. Ease of access, payment speed, personalization of offers, and constant exposure to promotions make the buying process even shorter. On the other hand, the digital environment also increases the chances of impulsive buying, which is a purchase decision that arises spontaneously, relatively unplanned, and often accompanied by strong emotional impulses. The literature shows that impulse buying is influenced by a combination of individual characteristics, consumer resources, mood, and marketing stimuli (Chan et al., 2017; Iyer et al., 2020).

In the context of digital shopping, consumer attitudes towards online shopping are an important internal evaluation. Positive attitudes can be formed when consumers feel comfortable, trust the transaction process, and assess product searches, orders, and payments as easy. These evaluations can reduce friction in the purchase process and increase the frequency of consumer exposure to products and promotions. Previous research has also shown that attitudes towards online channels, trust, and ease of transactions are related to digital purchase intentions and behaviors (Kim et al., 2008; Seock & Norton, 2007; Shim et al., 2001).

In addition to attitudes towards online shopping, flash sales are becoming an increasingly prominent promotional stimulus in the e-commerce ecosystem. Flash sales combine price cuts, time constraints, and quantity limitations to create scarcity and urgency. Lamis et al. (2022) show that limited-time scarcity and limited-quantity scarcity can increase arousal in the context of flash sales, while Qu et al. (2023) affirm the importance of anticipated emotions in scarcity-triggered purchase decisions. More recent findings also suggest that scarcity persuasion and price perception can change consumer responses in livestreaming commerce (Feng et al., 2024).

This study uses Stimulus–Organism–Response (S-O-R) as a theoretical lens. The S-O-R framework explains that stimuli from the environment can influence an individual's internal state and then form a behavioral response (Mehrabian & Russell, 1974). In an online study of impulse buying, S-O-R has been widely used to classify digital stimulus, consumer cognitive or affective states, as well as purchasing responses (Chan et al., 2017). In this study, flash sales were positioned as external stimuli because they contain discounts, scarcity, and time pressures; online shopping attitudes were positioned as internal evaluative states; and impulsive buying was a behavioral response. Financial literacy is not an original component of S-O-R, but is positioned as an individual cognitive resource that has the potential to change the strength of the relationship between the digital shopping environment and impulsive responses. Because this study did not measure psychological mediators such as arousal, pleasure, flow, or anticipated emotions directly, S-O-R was used as a theoretical explanatory lens, not as a claim that the entire mechanism of S-O-R had been tested.

Financial literacy is relevant because spending decisions are not only influenced by marketing stimuli, but also by an individual's ability to understand the financial consequences of his or her actions. Individuals who have better financial knowledge and skills are theoretically better able to consider budgets, savings, loans, risks, and opportunity costs before making a purchase. However, the empirical evidence is not always consistent. Ningtyas and Vania (2022) found that financial literacy does not necessarily produce a significant moderation effect on online impulsive buying, while Amalia and Firmialy (2024) show that financial literacy can influence attitudes and perceived behavioural control which is then related to impulse buying. Recent studies

also place financial literacy as an important factor in digital shopping behavior and pay-later use (Widiastuti & Sumastuti, 2025).

Based on this analysis, there are three research gaps underlying this study. First, many previous studies have tested flash sales, scarcity, online shopping experiences, or social commerce characteristics as direct predictors of impulsive buying. Second, financial literacy is more often tested as a direct predictor of financial behavior or consumption than as a moderator that limits the effects of marketing stimulus. Third, testing financial literacy as a boundary condition on the relationship between digital shopping stimulus and impulsive buying is still relatively limited and produces inconsistent findings. This is important because different stimuli may work through different mechanisms: general evaluations of online shopping provide greater room for cognitive considerations, while flash sales can create time pressures and scarcity that encourage faster responses. The study of Yustisiana et al. (2026), for example, shows that financial literacy does not significantly moderate some live commerce stimuli and scarcity, so the limits of the effectiveness of financial literacy still need to be explained.

Based on this gap, this study aims to: (1) analyze the influence of online shopping attitudes on impulsive buying; (2) analyze the influence of flash sales on impulsive buying; (3) examine the role of financial literacy moderation on the relationship between online shopping attitudes and impulsive buying; and (4) examine the role of financial literacy moderation in the relationship between flash sale and impulsive buying in the millennial generation in Bandung. The theoretical contribution of the research lies in the use of S-O-R to interpret the character differences between digital shopping stimuli and consumer evaluative states as well as in the placement of financial literacy as a cognitive boundary condition. The empirical contribution is to compare two financial literacy moderation pathways in the same model. Practically, this study provides a basis for understanding when financial education has the potential to hold back spontaneous purchases and when additional interventions, such as strengthening self-control and managing responses to scarcity, may be needed.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Foundations of Stimulus–Organism–Response Theory

The Stimulus–Organism–Response framework describes the basic processes by which environmental stimuli affect an individual's internal state and subsequently generate behavioral responses (Mehrabian & Russell, 1974). In the context of digital commerce, stimuli can be in the form of platform design, interactivity, scarcity, promotion, price, or communication characteristics, while organisms include cognitive and affective processes such as evaluation, enjoyment, arousal, flow, consumption vision, and anticipated emotions. Responses can then emerge as purchase intention, urge to buy impulsively, or actual impulsive buying. Chan et al. (2017) show that S-O-R is one of the dominant frameworks in online impulse buying research, and more recent studies continue to use it in live-streaming and social commerce (Khoi et al., 2023; Lin et al., 2023; Hongsuchon et al., 2025).

This research model does not measure the entire S-O-R mediation pathway. Therefore, the framework is used to provide a theoretical explanation of the construct position. Flash sales represent external stimulus; attitudes towards online shopping reflect consumers' internal evaluations; impulsive buying is a response; while financial literacy is positioned as a cognitive resource that can change the strength of responses to digital shopping conditions. This moderation position is consistent with the notion of

boundary conditions, which are individual characteristics that determine when and how strong a particular stimulus or evaluation is translated into behavior.

Attitudes towards Online Shopping and Impulsive Buying

Attitudes towards online shopping describe consumers' evaluations of the extent to which digital shopping activities are perceived as convenient, trustworthy, easy, and useful. When the evaluation is more positive, consumers tend to return to the platform, browse products, and make transactions more easily. Kim et al. (2008) show the importance of trust and perceived risk in e-commerce decisions, while Seock and Norton (2007) and Shim et al. (2001) show that positive attitudes towards internet channels are related to information search and intention to purchase.

In the context of impulse buying, convenience and convenience can reduce friction and deliberation time. An easy-to-use digital shopping environment increases the chances of consumers being exposed to products and promotions before a mature purchase plan is formed. S-O-R-based live-streaming research also shows that convenience, interactivity, and perceived enjoyment can encourage impulsive purchase intention (Lin et al., 2023). Thus, a positive attitude towards online shopping is expected to increase the tendency to spontaneous purchases.

H1. Attitudes towards online shopping have a positive effect on impulsive buying.

Flash Sales and Impulsive Buying

Flash sales are promotional strategies that offer discounts for a very limited period and are often accompanied by a quantity limit. This characteristic combines economic benefits with scarcity and urgency. Consumers not only see lower prices, but also face the possibility of losing opportunities if decisions are delayed. In such situations, the evaluation process can be shorter and consumers' attention shifts from actual needs to opportunities that are considered rare.

Lamis et al. (2022) found that limited-time scarcity and limited-quantity scarcity affect arousal in flash sales, while arousal and pleasure are related to impulse buying. Qu et al. (2023) emphasize the role of anticipated emotions in scarcity-induced purchase decisions, and Feng et al. (2024) show that scarcity persuasion can amplify impulse buying dynamics in livestreaming. This literature shows that flash sales are external stimuli that can activate cognitive and affective responses quickly. Therefore, the stronger the appeal of flash sales, the higher the impulsive buying tendency.

H2. Flash sales have a positive effect on impulsive buying.

Financial Literacy as a Moderator of Attitudes towards Online Shopping

Financial literacy includes the knowledge, skills, and ability of individuals to understand and manage financial decisions. Financial knowledge and financial skills are related to more informed financial attitudes (Loza et al., 2024), while financial self-efficacy has also been shown to be related to personal financial management behaviors (Farrell et al., 2016). In the context of consumption, such cognitive resources can help individuals assess needs, budgets, savings, and long-term consequences before turning positive attitudes toward spending into purchasing actions.

As a moderator, financial literacy does not have to directly eliminate impulsive buying. Its role is more accurately understood as a boundary condition that can reduce the strength of the influence of online shopping attitudes on impulsive responses. Previous empirical evidence is still mixed. Ningtyas and Vania (2022) show that financial literacy does not always moderate materialism and online impulsive buying, while Amalia and Firmialy (2024) show the relationship between financial literacy and

the attitude process and perceived behavioural control on live selling platforms. This inconsistency actually strengthens the need to test whether financial literacy is able to function as a cognitive buffer when consumers have a positive attitude towards online shopping.

H3. Financial literacy weakens the positive influence of online shopping attitudes on impulsive buying.

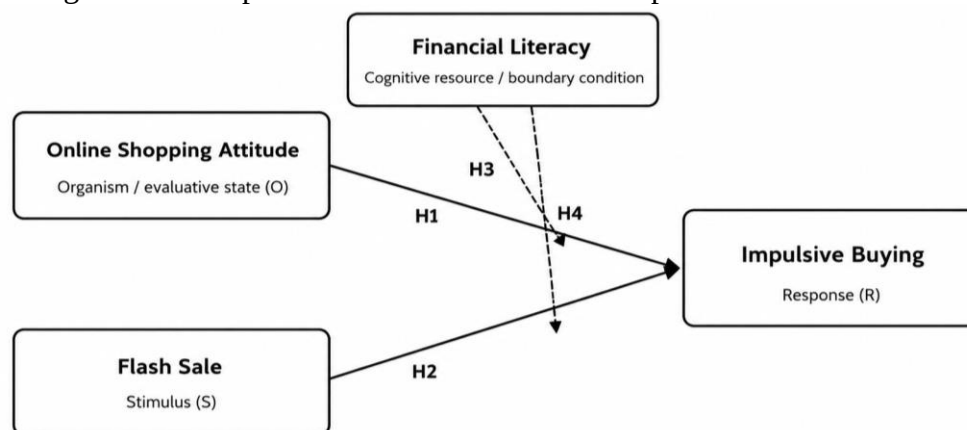
Financial Literacy as a Moderator of Flash Sales

The role of financial literacy can be different when consumers are dealing with flash sales. In contrast to online shopping attitudes which are more general and relatively stable, flash sales present immediate stimuli through countdowns, large discounts, limited stock, and scarcity messages. This condition can narrow evaluation time and increase arousal or anticipated emotions. Therefore, cognitive capacity in the form of financial knowledge may face limitations when decisions occur under time pressure.

The latest literature provides a reason to test these limits. Ningtyas and Vania (2022) found that financial literacy is not always an effective moderator in online impulsive buying. Yustisiana et al. (2026) also reported that financial literacy does not significantly moderate the influence of some live commerce stimulus, scarcity, and double-date discounts on impulsive buying. However, theoretically, individuals who are more financially literate are still expected to be better able to evaluate the benefits of discounts against the budget and actual needs. On that basis, this study still proposes a moderation hypothesis that is weakening.

H4. Financial literacy weakens the positive influence of flash sales on impulsive buying.

Figure 1. Conceptual Framework of S-O-R Perspective-based Research



METHODS

This study uses a quantitative approach with a survey method to obtain primary data from respondents through an online questionnaire. Each item was measured using a five-point Likert scale, namely 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The analysis was carried out using Structural Equation Modeling–Partial Least Squares (SEM-PLS) according to the analysis design in the initial study.

The research population is the millennial generation who reside in the Bandung area. The sampling technique used non-probability sampling with purposive sampling. The study obtained 220 respondents. The respondent profiles were recorded based on gender, age, marital status, education, occupation, and monthly income. The number of 220 respondents followed the adequacy of the sample set in the initial research design based on the number of indicators and constructs used.

The research model includes four constructs: online shopping attitudes (X1) and flash sales (X2) as independent variables, impulsive buying (Y) as dependent variables, and financial literacy (Z) as moderation variables. The operationalization of the constructs is presented in Table 1. To maintain consistency with the research instruments, the indicators used were not changed in the manuscript revision process; improvements were focused on theoretical positioning, hypothesis development, interpretation of results, and discussion according to the reviewer's notes.

Table 1. Variable Operationalization

Variable	Operational definition	Indicator	Source
Online Shopping Attitude (X1)	Consumer evaluation of the convenience, trust, and ease of the online shopping process.	X1.1 Convenient and love online shopping	Kim et al. (2008); Seock & Norton (2007); Shim et al. (2001)
		X1.2 Trust the transaction process	
		X1.3 Easy ordering procedure	
		X1.4 Easy product search	
		X1.5 Easy payment procedure	
Flash Sale (X2)	Promotions with discounts that apply for a short time and/or a limited number of products.	X2.1 Discount level	Lamis et al. (2022)
		X2.2 Limited-time scarcity	
		X2.3 Limited-quantity scarcity	
		X2.4 Promotion attractiveness	
		X2.5 Frequency of flash sale	
Financial Literacy (Z)	Knowledge and skills related to personal financial management.	Z1 Financial knowledge	Farrell et al. (2016); Loza et al. (2024)
		Z2 Savings and loans	
		Z3 Insurance	
		Z4 Investments	
Impulsive Buying (Y)	Spontaneous and unplanned purchases accompanied by strong impulses and limited evaluation of consequences.	Y1 Spontanitas	Aragoncillo & Orús (2018); Iyer et al. (2020)
		Y2	
		Power/compulsion/intensity	
		Y3 Excitement/stimulation	
		Y4 Indifference to consequences	

Validity tests were performed to assess the accuracy of the instrument indicators. As per the initial research procedure, the item was declared valid when the probability value was less than the significance level of 5%. The reliability of the construct was evaluated using Cronbach's alpha, with values above 0.60 treated as an indicator of adequate internal consistency in this study design.

Hypothesis testing uses a significance limit of $\alpha = 0.05$. H1 and H2 evaluate the immediate effect, while H3 and H4 evaluate the effect of the interaction between the respective predictors and financial literacy. Since H3 is formulated as a weakening moderation, the negative and significant interaction coefficients are interpreted as support for the hypothesis. For H4, the interaction effect must be significant in order to conclude that there is moderation.

RESULTS AND DISCUSSION

Results

The number of respondents was 220 people. Based on gender, 92 respondents (41.82%) were male and 128 respondents (58.18%) were female. Based on age, 121 respondents (55%) were aged 29–36 years and 99 respondents (45%) were aged 37–44 years. Based on marital status, 71% of respondents were married, 25% were unmarried, and 4% were married. In terms of education, 62 respondents (28.18%) had a high school education/equivalent, 120 respondents (54.45%) were Diploma 1 to Bachelor 1, and 38 respondents (17.27%) had postgraduate education. Based on occupation, 127 respondents (57.73%) were private employees, 27 respondents (12.27%) were entrepreneurs, 28 respondents (12.73%) were civil servants, 19 respondents (8.63%) had other jobs, and 19 respondents (8.63%) were students. In terms of monthly income, 33 respondents (15%) had an income of less than IDR 3,500,000, 82 respondents (37.27%) were in the range of IDR 3,500,001 – IDR 7,000,000, and 105 respondents (47.72%) earned an income above IDR 7,000,001.

The test results of the instrument showed that all items had correlation coefficients that were within an adequate range in the research design and that each construct had a reliability value above 0.60. To avoid inconsistencies in the numbering of items in the source table, the test results of the instrument were summarized at the construct level without changing the minimum, maximum, and reliability values reported in the initial manuscript.

Table 2. Summary of Construct Validity and Reliability Tests

Construct	Correlation coefficient range	Cronbach's alpha
Online Shopping Attitude (X1)	0,647–0,776	0,759
Flash Sale (X2)	0,649–0,726	0,739
Financial Literacy (Z)	0,728–0,765	0,760
Impulsive Buying (Y)	0,731–0,788	0,774

The results of the model fit test as reported in the original manuscript are shown in Table 3. Based on the cut-off used in the initial study, the indicators presented are categorized as goodness of fit.

Table 3. Results of Structural Model Feasibility Test

Goodness of Fit Index	Cut-off value	Analysis results	Verdict
Chi-square	Smaller	0	Goodness of fit
RMSEA	< 0.08	0,06	Goodness of fit
GFI	> 0,90	1	Goodness of fit
NFI	> 0,90	1	Goodness of fit
CFI	> 0,90	1	Goodness of fit
YOUTH	> 0,90	1	Goodness of fit

Hypothesis testing used a significance level of 5%. The results showed that H1, H2, and H3 were supported by data, while H4 received no statistical support. In particular, the interaction coefficient of H3 was negative, so financial literacy weakened the influence of online shopping attitudes on impulsive buying. At H4, the value of $p = 0.092$ exceeded 0.05, so it cannot be concluded that financial literacy moderates the relationship between flash sale and impulsive buying.

Table 4. Hypothesis Testing Results

Hypothesis	Relationships	b	p-value	Verdict
H1	Online Shopping Attitude → Impulsive Buying	0,182	< 0.001	Positive significant; hypothesis supported
H2	Flash Sale → Impulsive Buying	0,305	< 0.001	Positive significant; hypothesis supported
H3	Online Shopping Attitudes × Financial Literacy → Impulsive Buying	-0.237	0,007	Moderation weakens significantly; hypotheses are supported
H4	Flash Sale × Financial Literacy → Impulsive Buying	0,258	0,092	Insignificant; unsupported hypotheses

Discussion

H1 – The Influence of Online Shopping Attitudes on Impulsive Buying

The results showed that online shopping attitudes had a positive and significant effect on impulsive buying ($\beta = 0.182$; $p < 0.001$), so H1 was supported. This means that the more positive the consumer's evaluation of the convenience, trust, and ease of online transactions, the higher the tendency for spontaneous purchases. This relationship not only reflects the frequency of platform use, but also the low friction in the purchase journey. When product searches, orders, and payments can be made quickly, consumers have fewer obstacles that would normally leave room for deliberation.

The findings can be explained through the S-O-R perspective. A positive attitude towards online shopping represents an internal evaluative state that makes product exposure and promotions more easily translated into purchase responses. Lin et al. (2023) show that convenience and perceived enjoyment in live-streaming can drive impulsive purchase intention, while Hongsuchon et al. (2025) show that social commerce stimuli can work through consumers' psychological states to form impulse buying. Thus, the meaning of H1 is not simply that consumers who like online shopping buy more, but that a digital environment that is considered easy and convenient can shorten the evaluation process before purchase.

H2 – The Effect of Flash Sale on Impulsive Buying

Flash sales have a positive and significant influence on impulsive buying ($\beta = 0.305$; $p < 0.001$), so H2 is supported. The greater coefficient than the influence of online shopping attitudes suggests that in this model flash sales are a strong direct trigger. Discounts, limited time, and limited stock create a perception of opportunities that can be lost if consumers do not make a decision sooner.

Lamis et al. (2022) showed that limited-time and limited-quantity scarcity are associated with arousal in flash sales, while Qu et al. (2023) emphasized the role of anticipated emotions in scarcity-induced purchase decisions. Feng et al. (2024) also showed that scarcity persuasion can moderate impulse buying behavior in livestreaming. The literature helps explain why flash sales can accelerate purchase responses: consumers face a combination of economic benefits and the threat of losing opportunities. However, since this study did not measure arousal, FoMO, anticipated emotions, or perceived scarcity as mediators, the mechanism should be read as a literature-backed theoretical interpretation, not as a causal pathway that has been proven by this research model.

H3 – Moderation of Financial Literacy on the Relationship between Online Shopping Attitudes and Impulsive Buying

The interaction between online shopping attitudes and financial literacy had a negative and significant coefficient ($\beta = -0.237$; $p = 0.007$). Thus, H3 is supported and financial literacy weakens the positive influence of online shopping attitudes on impulsive buying. These results need to be distinguished from the statement that financial literacy directly eliminates impulsive buying. The findings show a moderation function: at higher levels of financial literacy, the relationship between positive attitudes towards online shopping and impulsive responses becomes weaker.

Theoretically, financial literacy can provide a cognitive buffer through the ability to evaluate budgets, savings, debt, and long-term consequences. Financial knowledge and skills are related to the formation of more informed financial attitudes (Loza et al., 2024), while financial literacy is also related to attitude processes and perceived behavioural control in the context of live selling (Amalia & Firmialy, 2024). In other words, consumers can still like and enjoy online shopping, but stronger cognitive resources allow for an evaluative pause before these attitudes translate into spontaneous purchases.

The H3 findings also clarify the novelty of the research. Financial literacy is not simply treated as a direct predictor, but as a boundary condition that changes the strength of the relationship between online shopping evaluation and impulsive responses. These results expand on the study of Ningtyas and Vania (2022) which shows that the effect of financial literacy moderation can depend on the context and construct being tested.

H4 – Moderation of Financial Literacy in the Relationship between Flash Sale and Impulsive Buying

The interaction of flash sale and financial literacy had a coefficient of 0.258 with $p = 0.092$. Since the probability value exceeded 0.05, H4 was not supported. These findings suggest that studies have not obtained sufficient statistical evidence that the level of financial literacy changes the strength of the relationship between flash sale and impulsive buying. The results should not be interpreted as being completely irrelevant to consumption behavior; the correct conclusion is that the moderation effect is not confirmed on the flash sale–impulsive buying pathway in this sample and model.

One possible theoretical interpretation is the difference in the nature of the mechanism between general attitudes towards online shopping and flash sale stimulus. Online shopping attitudes provide relatively greater room for cognitive evaluation processes, whereas flash sales contain scarcity and urgency that can activate arousal or anticipated emotions more quickly. Under these conditions, financial knowledge alone may not always be enough to change spontaneous responses. This explanation is in line with the literature on scarcity and S-O-R (Lamis et al., 2022; Qu et al., 2023; Feng et al., 2024) and with the findings of Yustisiana et al. (2026) that financial literacy does not necessarily moderate the influence of live commerce stimulus, scarcity, and discount programs on impulse buying. However, since this study did not measure affective mechanisms, the interpretation remains theoretical and needs to be tested in subsequent studies.

The composition of respondents showed that women amounted to 58.18% and men 41.82%. This proportion cannot be used as an empirical explanation for the insignificance of H4 because this study did not conduct a gender moderation test or multigroup analysis. Therefore, gender can only be referred to as a sample characteristic and a possible source of heterogeneity that is worthy of testing in future studies.

Theoretical, Practical, and Novelty Implications

The study's most important finding was the asymmetric moderating role of financial literacy. Financial literacy significantly weakened the relationship between online shopping attitudes and impulsive buying, but did not significantly moderate the relationship between flash sales and impulsive buying. The pattern suggests that the effectiveness of financial literacy as a cognitive resource likely depends on the characteristics of the antecedent that trigger the purchase response. When the antecedent is a general evaluation of online shopping, financial knowledge appears to provide room for cognitive regulation. When the antecedent is an intense, rare, and time-limited flash sale, the response may involve a more immediate affective process.

Theoretically, these results expand the use of S-O-R by including financial literacy as an external boundary condition for the basic mechanism of stimulus–organism–response. The study does not claim that financial literacy is an original part of S-O-R, but rather shows that individual characteristics can determine the strength of behavioral responses to the digital shopping environment. In practical terms, the results suggest that financial literacy programs remain important to strengthen rational evaluations of online shopping, but may need to be complemented by self-control strategies, real-time budgeting, cooling-off periods, and education on scarcity persuasion so that consumers are better able to deal with promotions that cause urgency.

CONCLUSION

This study shows that online shopping attitudes and flash sales have a positive and significant effect on impulsive buying in the millennial generation in Bandung. Financial literacy significantly weakens the relationship between online shopping attitudes and impulsive buying, while its moderation on the relationship between flash sale and impulsive buying does not receive statistical support. Thus, the main contribution of the research lies not only in testing the direct effects of the digital shopping environment, but also in the discovery of different patterns of financial literacy moderation in two types of antecedents.

In the S-O-R perspective, the results indicate that individual cognitive resources may be a boundary condition on some of the relationships that form impulse buying responses. Financial literacy appears to be more effective as a buffer when consumers evaluate general tendencies toward online shopping, but the evidence of this study is insufficient to suggest that financial literacy also alters responses to flash sales. Theoretically, the difference could be explained by the possible dominance of affective processes when consumers face scarcity and urgency, but these mechanisms have not been directly tested in the model.

In practical terms, the results support the importance of digital financial literacy programs that not only emphasize basic financial knowledge, but also the skills of budgeting, evaluating needs, and recognizing scarcity persuasion techniques. Digital platforms and service providers also need to consider promotional transparency as well as consumer protection so that promotional design does not encourage excessive decisions.

Limitations and Future Research Agenda

This study has several limitations. First, the sample is limited to the millennial generation in Bandung, so generalizations to other age groups and regions need to be done carefully. Second, the model does not measure psychological mechanisms such as

arousal, pleasure, FoMO, anticipated emotions, shopping enjoyment, or self-control which can theoretically explain why flash sales remain influential even though consumers have different levels of financial literacy. Third, the gender composition in the sample was not tested as a moderator; therefore, this study cannot use gender as an empirical explanation for the H4 results. Fourth, the cross-sectional design limits temporal inference about the process of changing consumer responses.

Future research is suggested to test a more complete model by including affective and cognitive mediators, comparing high and low financial literacy groups, and using multigroup analysis for gender or generation. Variables of self-control, saving behaviour, FoMO, debt attitude, and the use of pay-later can also be added to explain the conditions when financial knowledge succeeds or fails to resist impulsive buying. Experimental design on flash sale stimulus will be very useful to distinguish the effects of discount level, limited-time scarcity, and limited-quantity scarcity more convincingly.

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