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Image Interactivity Technology and Online Consumptive Behavior: The Moderating Role of Financial Literacy among Islamic Boarding School Students

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Abstract

Consumptive behavior among Islamic boarding school students has become increasingly concerning with the widespread use of marketplaces featuring Image Interactivity Technology (IIT). This study examines the effects of IIT, perceived usefulness, perceived ease of use, perceived enjoyment, utilitarian and hedonic shopping orientations, and online shopping attitudes on consumptive behavior, with financial literacy as a moderating variable. A quantitative cross-sectional predictive design was employed using data from 200 students at Nurul Ummah Islamic Boarding School, Kotagede, Yogyakarta, selected through purposive sampling. Data were analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The findings indicate that 14 of the 16 proposed hypotheses were supported. IIT, perceived usefulness, and perceived enjoyment significantly influenced online shopping attitudes. However, perceived enjoyment did not significantly affect consumptive behavior ($\beta = 0.098$; $p = 0.138$), and perceived ease of use also did not significantly affect consumptive behavior. Utilitarian shopping orientation significantly influenced perceived usefulness and perceived ease of use, while hedonic shopping orientation significantly affected perceived enjoyment. Financial literacy significantly moderated the relationship between online shopping attitudes and consumptive behavior ($\beta = 0.215$; $p = 0.001$), with a positive coefficient indicating that financial literacy strengthens the attitude−behavior relationship. The study extends the Technology Acceptance Model (TAM) by incorporating IIT and financial literacy and highlights the importance of strengthening financial literacy in Islamic boarding schools alongside the development of marketplace features that promote responsible financial behavior among young users.

INTRODUCTION

Consumptive behavior has become an increasingly relevant phenomenon, particularly among adolescents and young consumers living in urban and digitally connected environments. The phenomenon is important because adolescents may engage in repeated purchasing despite having limited financial resources, potentially leading to excessive consumption (Lorenza and Lestari 2023). Andrade and Vieites (2025) describe consumptive behavior as purchasing that is not sufficiently based on actual needs and may be driven primarily by pleasure, thereby encouraging excessive consumption. Previous research has also shown that adolescents aged 16−18 years may allocate a substantial proportion of their spending to appearance and products associated with social recognition (Ali, Siraj, & Nisa, 2025). Such behavior can be influenced by social environments, self−esteem, emotional conditions, and lifestyle expectations, while religious values may serve as an important filter against consumption that is inconsistent with individual beliefs (Dhondt & Hudders, 2025; Aglozo &Cohen, 2025)..

This issue is particularly relevant in the context of Islamic boarding schools (pesantren), where students (santri) increasingly engage with digital consumption environments. Santri may purchase daily necessities not only according to functional needs but also in response to lifestyle influences, advertising, popular culture, and peer environments. As adolescents who often manage pocket money provided by their parents

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while living within the boarding—school environment, santri may face choices between needs and wants in their consumption decisions. Peer influence may further affect their ability to control consumption (Irfani et al. 2025).

Crucially, the pesantren context is not merely a demographic setting; it is theoretically distinctive in at least three ways. First, santri operate within a physically restrictive environment that limits access to conventional stores, making online marketplaces a functional substitute for direct product inspection. Second, the Islamic values of qana'ah (contentment) and israf (extravagance) provide a normative framework that may attenuate the translation of favorable shopping attitudes into actual purchasing behavior. Third, santri manage their own pocket money without direct parental supervision, creating a unique condition in which financial decision making autonomy coexists with limited financial experience. These three conditions, physical restriction, religious normativity, and autonomous yet inexperienced financial management, constitute the theoretical distinctiveness of the pesantren context and justify its selection as the empirical setting of this study.

The development of digital technology has further transformed this consumption environment by providing consumers with greater convenience and access to online shopping. Social media platforms and e—commerce services have facilitated online buying and selling by enabling consumers to access product information, visual displays, and purchasing services without visiting physical stores (Badran et al. 2025). At the same time, the convenience, variety of products, payment options, and promotional features offered by online marketplaces may encourage consumers to purchase products beyond their immediate needs (Demant, 2025). This development is particularly relevant for younger consumers. Data from the Indonesian Internet Service Providers Association (APJII) indicate that internet penetration among Indonesians aged 13—18 years reached 99.16% in 2021—2022, making this age group one of the most connected segments of the population. Internet use among this group also increased following the COVID—19 pandemic.

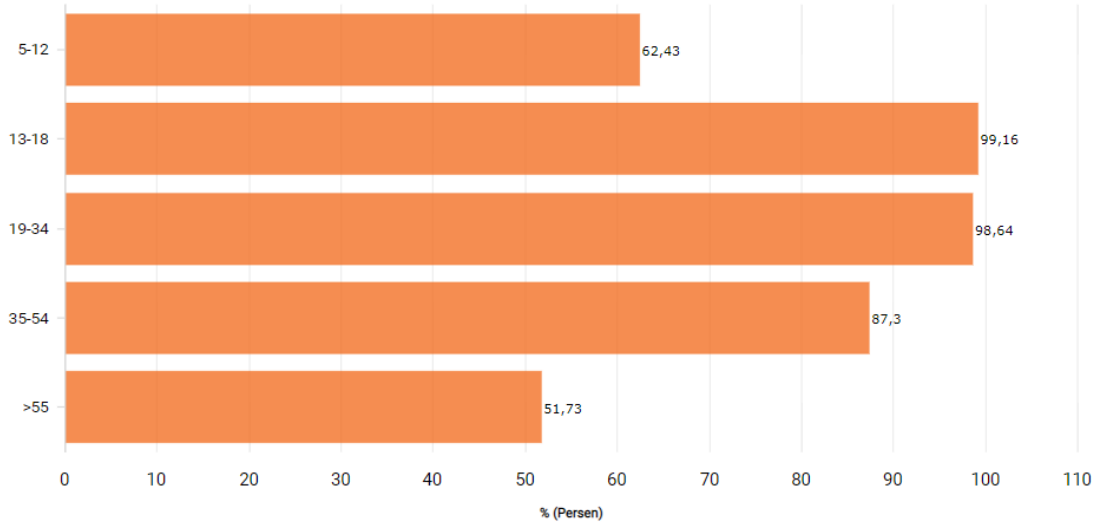


Figure 1. Percentage of Internet Use in Indonesia Based on Age (2022)

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The high level of internet use among younger Indonesians is accompanied by the rapid expansion of e−commerce. According to the Alvara Research Center, Shopee was the most preferred e−commerce service among Generation Z and millennials in Indonesia in March 2022, followed by Lazada, Tokopedia, and Bukalapak. These findings indicate that online marketplaces have become an important component of the shopping environment for younger consumers.

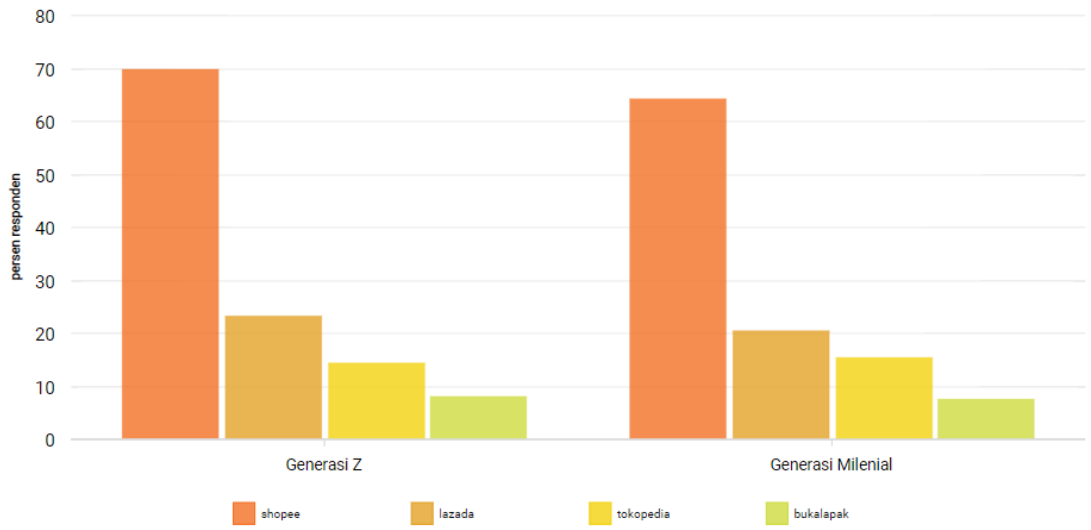


Figure 2. E−commerce platforms most in demand by Generation Z and Millennials (March 2022)

These patterns demonstrate the growing importance of digital marketplaces in shaping young consumers' shopping environments. The question, therefore, is not merely whether young consumers use online marketplaces, but why these platforms are attractive and how their technological characteristics shape consumer responses. This question is particularly relevant for Islamic boarding school students, who increasingly participate in digital consumption while remaining embedded within an educational and social environment shaped by religious values.

It is important to clarify at the outset that this study focuses on consumptive behavior as operationalized through online shopping intention indicators, specifically purchase intention, willingness to shop online, recommendation behavior, revisit intention, and future shopping likelihood. These indicators capture the intention to engage in online shopping, which is a proximal antecedent of consumptive behavior. This operationalization is maintained throughout the manuscript to ensure alignment between the construct definition, measurement, and theoretical claims.

One technological characteristic that may explain the attractiveness of online marketplaces is Image Interactivity Technology (IIT). IIT refers to interactive functions that enable users to manipulate, explore, and engage with product information and visual representations in an online environment. Interactive technologies can facilitate communication, customize information, enable image manipulation, and create an entertaining shopping experience (Fiore and Jin 2003). Previous studies have demonstrated that website interactivity can attract consumers to online stores, encourage purchasing, and support repeat visits (Gehrke and Turban 1999; Li, Daugherty, and Biocca 2001; Li, Daugherty, and Biocca 2002; Mathwick 2002). Other empirical studies have also shown that interactive technologies can positively influence consumer attitudes toward online shopping (Klein 2003; Schlosser 2003). Accordingly, IIT provides a relevant

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technological dimension for understanding how consumers respond to online marketplaces.

The Technology Acceptance Model (TAM) provides the primary theoretical foundation for this study. Although TAM was initially developed to explain technology acceptance in workplace settings, subsequent studies have successfully applied it to website use and online shopping (Davis 1989; Lim & Lai, 1999; Gefen &Straub 2000; Childers et al. 2001; Gillenson, & Sherrell, 2002; Chen and Tan 2004). Within TAM, perceived usefulness and perceived ease of use represent instrumental evaluations of a technology, while perceived enjoyment captures the hedonic dimension of technology use (Davis & Warshaw, 1992). These perceptions can shape consumers' attitudes and behavioral responses toward online shopping. This study adopts TAM as its core framework and extends it in three ways. First, IIT is positioned as an external technological antecedent that influences the three TAM constructs. Second, utilitarian and hedonic shopping orientations are introduced as individual—difference antecedents that shape how users perceive online shopping technologies. Third, financial literacy is incorporated as a moderating individual factor that conditions the translation of online shopping attitudes into consumptive behavior. Other theoretical perspectives—such as the Stimulus—Organism—Response (SOR) framework, the Theory of Planned Behavior (TPB), and the Theory of Reasoned Action (TRA)—are used only to interpret the findings, not to build the conceptual model. This parsimonious approach ensures that the theoretical argument remains focused and coherent.

Building on this perspective, shopping orientation provides an additional individual—level dimension for understanding consumer responses to online marketplaces. Utilitarian shopping orientation emphasizes the functional and goal—oriented aspects of shopping, whereas hedonic shopping orientation reflects enjoyment, excitement, escape, and pleasure derived from the shopping experience. Daugherty & Biocca (2002) suggest that these orientations warrant further investigation because individual shopping orientations may influence information—processing patterns when consumers interact with information technologies. Therefore, incorporating utilitarian and hedonic shopping orientations into the TAM framework provides an opportunity to explain how individual differences shape perceptions of online shopping technologies.

However, technological acceptance alone may not fully explain how positive shopping attitudes are translated into purchasing behavior. Financial literacy may represent an important individual factor because it reflects an individual's knowledge and ability to manage personal financial decisions. Suci & Santoso (2025) define financial literacy in terms of knowledge and the ability to manage personal finances, including understanding savings, insurance, and investment, while Elbanna, Eissa, and Armstrong (2025) emphasize its importance in supporting informed financial decision making. Individuals with stronger financial literacy may therefore evaluate the financial consequences of purchasing decisions differently from those with lower financial literacy. In the context of online shopping, financial literacy may therefore shape the extent to which favorable shopping attitudes translate into consumptive behavior.

It is important to note that the direction of this moderating effect is treated as an empirical question in this study. While financial literacy is often assumed to weaken the attitude—behavior link by functioning as a "cognitive filter," it is equally plausible that financial literacy strengthens the relationship by enabling more confident and informed purchasing decisions. The present study therefore tests the moderating role of financial literacy without presupposing its direction, and the interpretation of the moderation coefficient is based on the empirical results rather than on a priori assumptions.

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Despite the growing literature on TAM, IIT, and online consumer behavior, the integration of these perspectives with financial literacy remains limited, particularly in the context of Islamic boarding school students. Existing studies have examined the role of interactivity and TAM in explaining consumer attitudes and responses to online retailers, while other studies have considered the role of individual differences in technology acceptance. However, the extent to which financial literacy moderates the relationship between online shopping attitudes and online shopping intention has received comparatively limited attention. This gap is particularly relevant for santri because they operate within a distinctive educational and social environment while increasingly participating in digital marketplaces.

Based on the research gap and conceptual framework outlined above, this study addresses five research questions: RQ1. How does Image Interactivity Technology (IIT) influence perceived usefulness, perceived ease of use, perceived enjoyment, online shopping attitudes, and consumptive behavior among students of Nurul Ummah Islamic Boarding School? RQ2. How do perceived usefulness, perceived ease of use, and perceived enjoyment influence online shopping attitudes and online shopping intention? RQ3. How do utilitarian and hedonic shopping orientations influence the corresponding TAM constructs, particularly perceived usefulness and perceived enjoyment? RQ4. How does online shopping attitude influence online shopping intention among students of Nurul Ummah Islamic Boarding School? RQ5. Does financial literacy moderate the relationship between online shopping attitude and online shopping intention among students of Nurul Ummah Islamic Boarding School? Accordingly, this study aims to extend the Technology Acceptance Model by integrating technological interactivity, shopping orientations, and financial literacy to explain online shopping intention in the context of Islamic boarding school students.

LITERATURE REVIEW

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is one of the most influential frameworks for explaining user acceptance of information technology. Rooted in the Theory of Reasoned Action (Ajzen & Fishbein 1970), TAM was originally designed to explain why users accept or reject computer−based technologies in workplace settings. Since its introduction, TAM has been widely applied to various technologies, including email, word processing, spreadsheets, and voice messaging (Venkatesh and Davis, 2000).

TAM posits two primary determinants of technology adoption: perceived usefulness and perceived ease of use. Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance their performance, while perceived ease of use refers to the degree to which a person believes that using a particular system will be free from effort. These constructs shape users' attitudes toward the technology, which in turn influence behavioral intentions and actual use. In later extensions, perceived enjoyment was added as a third determinant to capture the hedonic dimension of technology use (Davis, & Warshaw, 1989).

TAM has been successfully applied to online shopping contexts. Chen & Tan (2004), in their study titled "Technology Adaptation in E−Commerce: Key Determinants of Virtual Stores Acceptance," found that perceived usefulness and perceived ease of use significantly influenced consumers' attitudes toward virtual stores. Similarly, (Childers et al. 2001; Yaqub et al. 2026), in "Hedonic and Utilitarian Motivations for Online Retail Shopping Behavior," demonstrated that perceived usefulness and perceived ease of use

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were strong predictors of attitudes toward online shopping, with enjoyment playing a particularly important role in hedonic shopping environments. These findings suggest that TAM provides a robust foundation for understanding consumer responses to online marketplaces.

Despite its widespread adoption, TAM has been criticized for being too parsimonious and for neglecting contextual and individual factors. Venkatesh and Davis (2000) extended TAM by incorporating social influence and cognitive instrumental processes. More recently, O'Dea et al. (2025) questioned whether TAM remains fit for purpose in rapidly evolving digital environments. These critiques highlight the need to extend TAM with additional constructs such as IIT, shopping orientation, and financial literacy, to better explain consumer behavior in contemporary online shopping contexts.

2.2 Image Interactivity Technology (IIT)

Image Interactivity Technology (IIT) refers to interactive functions that enable users to manipulate, explore, and engage with product information and visual representations in an online environment. Fiore & Jin (2003), in their study titled "Influence of Image Interactivity on Approach Responses towards an Online Retailer," found that IIT can facilitate communication, customize information, enable image manipulation, and create an entertaining shopping experience.

Previous studies have demonstrated that website interactivity can attract consumers to online stores, encourage purchasing, and support repeat visits ((Gehrke and Turban 1999; Li, Daugherty, and Biocca 2001; Li, Daugherty, and Biocca 2002; Mathwick 2002). Daugherty & Biocca (2002) found that the use of IIT in marketing various products positively influenced perceived product knowledge, brand attitude, and purchase intention during online shopping. These findings suggest that IIT is a relevant technological antecedent for understanding consumer responses to online marketplaces.

2.3 Shopping Orientation

Shopping orientation provides an individual, level dimension for understanding consumer responses to online marketplaces. Utilitarian shopping orientation emphasizes the functional and goal−oriented aspects of shopping, whereas hedonic shopping orientation reflects enjoyment, excitement, escape, and pleasure derived from the shopping experience (Babin & Griffin 1994). Childers et al. (2001) found that enjoyment was a stronger predictor of attitudes in hedonic shopping environments, whereas usefulness was a stronger predictor in utilitarian oriented shopping experiences

Daugherty & Biocca (2002) suggest that shopping orientations warrant further investigation because individual shopping orientations may influence information processing patterns when consumers interact with information technologies. Therefore, incorporating utilitarian and hedonic shopping orientations into the TAM framework provides an opportunity to explain how individual differences shape perceptions of online shopping technologies.

2.4 Financial Literacy

Financial literacy refers to the knowledge and ability to manage personal finances effectively, including understanding savings, insurance, investment, and financial decision making (Lusardi & Mitchell 2008). It encompasses not only knowledge of financial concepts but also the skills and confidence to apply that knowledge in real−life situations

Financial literacy comprises several dimensions: financial knowledge, financial attitude, and financial behavior. Financial knowledge includes understanding of basic financial concepts such as inflation, interest rates, and risk diversification. Financial attitude refers to an individual's beliefs and preferences regarding financial matters.

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Financial behavior encompasses actual practices such as budgeting, saving, and comparing prices before purchasing (Suci & Santoso, 2025).

Financial literacy has been shown to influence consumer behavior in various contexts. Mutlu and Цzer (2022), in their study titled "The Moderator Effect of Financial Literacy on the Relationship between Locus of Control and Financial Behavior," found that financial literacy moderates the relationship between locus of control and financial behavior among individual investors. Similarly, Elbanna & Armstrong (2025) emphasized that financial literacy supports informed financial decision making and helps individuals avoid poor financial planning.

Financial literacy has been conceptualized as a moderating variable that conditions the relationship between attitudes and behavior. Individuals with higher financial literacy are more likely to evaluate the financial consequences of their purchasing decisions carefully. However, the direction of this moderating effect remains an empirical question. While some studies suggest that financial literacy weakens the attitude, behavior link by acting as a "cognitive filter," others suggest that it strengthens the relationship by enabling more confident and informed decisions. The present study therefore tests the moderating role of financial literacy without presupposing its direction.

2.5 Previous Studies

Prior research has examined IIT, TAM, and financial literacy separately, but rarely in an integrated framework. Fiore & Jin (2003), in "Influence of Image Interactivity on Approach Responses towards an Online Retailer," found that IIT significantly increased consumers' attitudes and purchase intentions. Childers et al. (2001), in "Hedonic and Utilitarian Motivations for Online Retail Shopping Behavior," demonstrated that perceived usefulness, ease of use, and enjoyment predicted online shopping attitudes, with enjoyment stronger in hedonic contexts and usefulness stronger in utilitarian ones. Chen & Tan (2004) further confirmed TAM's robustness in e−commerce and mobile shopping contexts. However, these studies did not incorporate IIT as an external antecedent or financial literacy as a moderating factor.

On the financial literacy side, Mutlu and Цzer (2022), in "The Moderator Effect of Financial Literacy on the Relationship between Locus of Control and Financial Behavior," found that financial literacy significantly moderated the link between locus of control and financial behavior among investors. Suci & Santoso (2025) similarly confirmed that financial literacy influenced financial management practices. Yet neither study examined consumptive behavior, nor integrated TAM with IIT. Three gaps therefore emerge: (1) IIT has rarely been integrated into TAM as a technological antecedent, (2) shopping orientation remains underexplored as an individual−difference factor in online marketplace contexts, and (3) financial literacy's moderating role on the attitude−behavior link has received limited empirical attention. This study addresses these gaps by extending TAM with IIT, shopping orientations, and financial literacy to explain consumptive behavior among students of Nurul Ummah Islamic Boarding School.

2.6 Hypothesis Development

The hypotheses are developed based on the extended TAM framework presented in Figure 3. Each hypothesis is derived from prior empirical findings and theoretical reasoning:

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IIT and Online Shopping Attitudes and Consumptive Behavir

Interactive website features have been found to positively enhance consumers' attitudes toward online stores, their willingness to browse, and their online purchase intentions ((Fiore & Lee 2005; Wu 1999; Udo and Marquis 2000). Fiore & Jin (2003) found that consumers' attitude ratings, willingness to purchase, and willingness to return to an online retailer significantly increased after using a "mix and match" feature. Accordingly:

H1a. IIT positively influences online shopping attitudes.

H1b. IIT positively influences online consumptive behavior

IIT and TAM Constructs

IIT has been credited with enhancing consumer responses to online retailers (Wu 1999) by providing information necessary for confidence in online product evaluations. IIT enriches product information, enabling consumers to evaluate quality, variety, and suitability more comprehensively. Therefore:

H2a. IIT positively influences perceived usefulness.

H3a. IIT positively influences perceived ease of use.

H4a. IIT positively influences perceived enjoyment.

TAM Constructs and Online Shopping Attitudes

Perceived usefulness, perceived ease of use, and perceived enjoyment are key determinants of attitudes toward online shopping (Childers et al., 2001). Perceived usefulness reflects the belief that using a marketplace enhances shopping performance, while perceived ease of use reflects the belief that using it requires minimal effort. Perceived enjoyment captures the hedonic dimension of technology use. Therefore:

H2b. Perceived usefulness positively influences online shopping attitudes.

H3b. Perceived ease of use positively influences online shopping attitudes.

H4b. Perceived enjoyment positively influences online shopping attitudes.

TAM Constructs and Online Shopping Intention

Perceived usefulness and perceived ease of use directly influence behavioral intention (Davis, & Warshaw, 1989). Perceived enjoyment has also been shown to influence intention in hedonic shopping contexts. Therefore:

H2c. Perceived usefulness positively influences consumptive behavior.

H3c. Perceived ease of use positively influences consumptive behavior.

H4c. Perceived enjoyment positively influences consumptive behavior.

Attitude and Online Shopping Intention

Attitude is a primary predictor of behavioral intention (Chen & Sherrell 2002). A favorable attitude toward online shopping is expected to increase the intention to shop online. Therefore:

H5. Online shopping attitudes positively influence consumptive behavior.

Shopping Orientation and TAM Constructs

Utilitarian shoppers seek efficiency and convenience, whereas hedonic shoppers seek enjoyment and emotional stimulation (Babin & Griffin 1994). Utilitarian orientation is therefore expected to shape perceived usefulness and perceived ease of use, while hedonic orientation is expected to shape perceived enjoyment. Therefore:

H6a. Utilitarian shopping orientation positively influences perceived usefulness.

H6b. Utilitarian shopping orientation positively influences perceived ease of use.

H6c. Hedonic shopping orientation positively influences perceived enjoyment.

Moderating Role of Financial Literacy

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Financial literacy shapes how individuals evaluate the financial consequences of purchasing decisions ((Mutlu and Цzer 2022). The direction of this moderating effect is treated as an empirical question in this study. Therefore:

H7. Financial literacy moderates the relationship between online shopping attitudes and consumptive behavioramong Islamic boarding school students.

2.7 Conceptual Framework

Building on the theoretical foundation of TAM, this study proposes an extended framework that integrates three additional components. Image Interactivity Technology (IIT) is positioned as an external technological antecedent influencing perceived usefulness, perceived ease of use, and perceived enjoyment. Utilitarian and hedonic shopping orientations are introduced as individual−difference antecedents shaping these three TAM constructs. Financial literacy is incorporated as a moderating variable that conditions the relationship between attitude toward online shopping and consumptive behavior. Figure 3 presents the conceptual model and the hypothesized relationships among these variables. The model is tested using PLS−SEM to examine both direct and moderating effects.

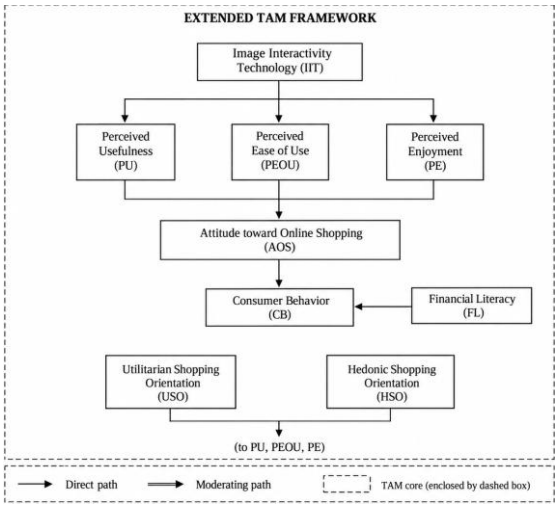


Figure 3. Research Conceptual

Note: Note: Direct path (→) represents hypothesized direct relationships. Moderating path (⇒) represents H7, in which financial literacy moderates the effect of attitude toward online shopping on consumptive behavior. TAM core (dashed box) encloses the core TAM variables (PU, PEOU, PE, AOS, CB). Hypothesized relationships: H1a: IIT → AOS; H1b: IIT → CB; H2a: IIT → PU; H2b: PU → AOS; H2c: PU → CB; H3a: IIT → PEOU; H3b: PEOU → AOS; H3c: PEOU → CB; H4a: IIT → PE; H4b: PE → AOS; H4c: PE → CB; H5: AOS → CB; H6a: USO → PU; H6b: USO → PEOU; H6c: HSO → PE; H7: FL moderates AOS → CB. Note: H2c, H3c, and H4c are not drawn in the figure to preserve visual clarity but are reported in Table 5. H2c is accepted; H3c and H4c are rejected. Source: Created by Author.

METHOD

Reseach Design

This study employs a cross sectional predictive design using survey data. A cross, sectional design is appropriate because the study aims to examine structural associations among variables at a single point in time, rather than to establish causality. The predictive approach is consistent with the use of PLS−SEM, which is designed for prediction and theory development rather than confirmatory causal inference. This design allows the study to test the hypothesized relationships among IIT, TAM constructs, shopping orientations, financial literacy, and consumptive behavior.

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Population and Sample

The population of this study comprises students (santri) of Nurul Ummah Islamic Boarding School, Kotagede, Yogyakarta. Purposive sampling was used based on the following criteria: (1) active santri or mahasantri at Nurul Ummah, (2) have made online purchases through marketplace applications at least twice, and (3) have received financial literacy education at school, pesantren, or university. A total of 200 respondents participated in this study. The sample size was determined using the formula of multiplying the number of indicators by 5 (Hair 2009), resulting in a minimum required sample of 220. However, 200 valid responses were obtained, which is considered acceptable for PLS−SEM analysis given the model complexity.

Data Collection

Primary data were collected through an online questionnaire distributed to respondents. The questionnaire used a 5−point Likert scale (1 = strongly disagree to 5 = strongly agree). Secondary data were obtained from APJII and Alvara Research Center reports to describe the digital consumption context. The questionnaire was distributed over a period of four weeks, and all responses were anonymized to ensure confidentiality. The variables, measurement scales, and data sources are summarized in Table 1, while the specific questionnaire indicators are presented in Table 2.

Table 1. Variable & Measurenment

Variable	Code	Items	Scale	Source
Image Interactivity Technology	IIT	6	1−5	Fiore & Jin (2003)
Perceived Usefulness	PU	5	1−5	Davis (1989)
Perceived Ease of Use	PEOU	5	1−5	Davis (1989)
Perceived Enjoyment	PE	6	1−5	Davis et al. (1992)
Attitude toward Online Shopping	AOS	7	1−5	Ajzen (1985)
Utilitarian Shopping Orientation	USO	2	1−5	Childers et al. (2001)
Hedonic Shopping Orientation	HSO	7	1−5	Reynolds et al. (2023)
Consumptive Behavior	CB	5	1−5	Fiore & Jin (2003)
Financial Literacy	FL	4	1−5	Lusardi & Mitchell (2008)

Source: Created by Authors

Operational Definitions of Variables

The variables in this study are operationally defined as follows. Image Interactivity Technology (IIT) refers to interactive functions that enable users to manipulate product images and information, such as zooming, rotating, and mix−and−match features. Perceived usefulness is defined as the belief that using a marketplace enhances shopping performance, while perceived ease of use refers to the belief that using a marketplace requires minimal effort. Perceived enjoyment captures the pleasure derived from using a marketplace. Attitude toward online shopping is defined as the evaluation of online shopping as good, superior, pleasant, and valuable. Utilitarian shopping orientation refers to goal−oriented shopping to achieve functional needs, whereas hedonic shopping orientation refers to shopping for pleasure, escape, and emotional stimulation. Consumptive behavior is operationalized through five indicators: purchase intention, willingness to shop online, recommendation behavior, revisit intention, and future shopping likelihood. These indicators capture the intention to engage in online shopping, which is a proximal antecedent of consumptive behavior. Finally, financial literacy refers to knowledge of inflation, interest rates, price comparison, and financial management.

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The constructs, measurement scales, and sources are summarized in Table 1, while the specific indicators are listed in Table 2.

Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS−SEM) with SmartPLS 4.0. The analysis followed two stages: outer model assessment and inner model assessment. In the outer model assessment, convergent validity was evaluated through loading factors greater than 0.7, while discriminant validity was assessed using the Fornell−Larcker criterion and cross−loadings. Composite reliability was required to exceed 0.7, Cronbach's alpha was required to exceed 0.6, and the Average Variance Extracted (AVE) was required to exceed 0.5. In the inner model assessment, the coefficient of determination (R−square) was classified as substantial (0.67), moderate (0.33), or weak (0.19). The effect size (F−square) was interpreted as small (0.02), moderate (0.15), or large (0.35), while predictive relevance (Q−square) followed the same thresholds. Hypothesis testing was conducted using bootstrapping with a t−statistic threshold of 1.96 and a p−value threshold of 0.05.

All respondents provided informed consent before participating in the study. Participation was voluntary, and respondents were assured that their responses would remain confidential and used only for research purposes. No personally identifiable information was collected, and all data were anonymized prior to analysis.

RESULT AND DISCUSSION

Results

This section presents the respondent profile, measurement model assessment, discriminant validity assessment, and hypothesis testing, with particular emphasis on the moderating role of financial literacy.

Table 2. Questionnaire Instrument

Variable	Code	Indicator	References
Image Interactivity Technology	IIT1−IIT6	Graphic design, navigation, product display, thumbnails, enlarged images, product information	(Fiore & Jin 2003)
Perceived Usefulness	PU1−PU5	Productivity, effectiveness, usefulness, ability, experience	(Davis 1989)
Perceived Ease of Use	PEOU1−PEOU5	Clarity, mental effort, ease of use, flexibility, ease of learning	(Davis 1989)
Perceived Enjoyment	PE1−PE6	Entertainment, comfort, attractiveness, enjoyment, excitement, desire to use	(Davis et al., 1992)
Attitude toward Online Shopping	AOS1−AOS7	Good, superior, pleasant, excellent, appealing, valuable, useful	(Ajzen 1985)
Utilitarian Orientation	USO1−USO2	Achievement, finding desired items	(Childers et al. 2001)
Hedonic Orientation	HSO1−HSO7	Enjoyment, escape, delight, intrinsic enjoyment, excitement, forgetting problems, adventure	(Reynolds et al. 2023)
Consumptive Behavior	CB1−CB5	Intention to buy, willingness, recommendation, revisit, future likelihood	(Fiore and Jin 2003)
Financial Literacy	FL1−FL4	Inflation, price comparison, price/performance ratio, financial management	(Lusardi & Mitchell 2008)

Source: Data Processed

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Table 2 presents the questionnaire instrument used to measure the nine constructs in the proposed research model. Each construct was operationalized through a set of indicators adapted from previous studies. Image Interactivity Technology (IIT) was measured using six indicators. In contrast, perceived usefulness, perceived ease of use, perceived enjoyment, and attitude toward online shopping were measured using five, five, six, and seven indicators, respectively. Utilitarian shopping orientation and hedonic shopping orientation were measured using two and seven indicators, respectively. Consumptive behavior was assessed using five indicators related to purchase intention, willingness to shop online, recommendation behavior, revisit intention, and future shopping likelihood. Finally, financial literacy was measured using four indicators covering inflation, price comparison, price−performance evaluation, and financial management. Using established measurement sources provides a theoretical basis for operationalizing the constructs examined in this study.

Table 3. Respondent Profile

Characteristic	Category	Frequency	Percentage
Age	17 – 25 years	200	100%
Gender	Male	72	36.0%
	Female	128	64.0%
Education Level	High School	87	43.5%
	Diploma/Bachelor's Degree	103	51.5%
	Master's Degree	10	5.0%
Occupation	Islamic Boarding School Student	134	67.0%
	Private Employee	32	16.0%
	Entrepreneur	18	9.0%
	Others	16	8.0%
Island of Domicile	Java	82	41.0%
	Sumatera	48	24.0%
	Sulawesi	36	18.0%
	Kalimantan	20	10.0%
	Nusa Tenggara & Papua	14	7.0%
Online Shopping Experience	≥ 2 times	200	100%
Monthly Income	< Rp 1,500,000	127	63.5%
	Rp 1,500,001 – Rp 3,000,000	38	19.0%
	Rp 3,000,001 – Rp 5,000,000	22	11.0%
	> Rp 5,000,000	13	6.5%

Source: Data Processed (2025).

Table 3 presents the demographic and socioeconomic characteristics of the 200 respondents included in the analysis. All respondents were aged 17 to 25 years and had at least two previous online shopping transactions, consistent with the study's sampling criteria. Female respondents accounted for 64.0% of the sample, while male respondents represented 36.0%. Regarding educational attainment, 51.5% held or were pursuing a diploma or bachelor's degree, 43.5% had a high school education, and 5.0% were at the

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master's degree level. By occupation, Islamic boarding school students were the largest group (67.0%), followed by private employees (16.0%) and entrepreneurs (9.0%). Respondents were distributed across several Indonesian island groups, with Java accounting for the largest proportion (41.0%). Monthly income data show that 63.5% of respondents reported income below Rp 1,500,000. Overall, the profile indicates that the sample was predominantly young, with many respondents being boarding school students and having relatively limited monthly income. These characteristics provide the demographic context for examining online shopping attitudes, consumptive behavior, and the moderating role of financial literacy.

Table 4. Validity and Reliability Test

Construct	Items	Loading Factor	Cronbach's Alpha	CR	AVE
IIT	IIT1 – IIT6	0.768 – 0.847	0.889	0.917	0.651
Perceived Usefulness	PU1 – PU5	0.824 – 0.863	0.892	0.922	0.705
Perceived Ease of Use	PEOU1 – PEOU5	0.793 – 0.841	0.876	0.909	0.668
Perceived Enjoyment	PE1 – PE6	0.798 – 0.871	0.910	0.931	0.693
Attitude	AOS1 – AOS7	0.796 – 0.834	0.906	0.927	0.647
Utilitarian Orientation	USO1 – USO2	0.817 – 0.833	0.805	0.897	0.717
Hedonic Orientation	HSO1 – HSO7	0.798 – 0.871	0.915	0.933	0.693
Consumptive Behavior	CB1 – CB5	0.796 – 0.834	0.906	0.927	0.647
Financial Literacy	FL1 – FL4	0.793 – 0.841	0.876	0.909	0.668

Source: Data Processed

Table 4 reports the convergent validity and reliability assessment of the measurement model. The outer loadings ranged from 0.768 to 0.871 across the constructs, exceeding the commonly applied threshold of 0.70. This indicates that the observed indicators adequately represent their respective latent constructs. Cronbach's alpha values ranged from 0.805 to 0.915, while composite reliability (CR) values ranged from 0.897 to 0.933, indicating satisfactory internal consistency. Furthermore, the average variance extracted (AVE) values ranged from 0.647 to 0.717, exceeding the recommended minimum of 0.50. These results indicate that the constructs satisfy the reported criteria for indicator reliability, internal consistency, and convergent validity. Accordingly, the measurement model demonstrates satisfactory measurement properties to proceed with assessing discriminant validity and the structural relationships among the study constructs.

Table 5. Discriminant Validity

Construct	IIT	PU	PEOU	PE	AT	UT	HE	CB	LK
IIT	0.807								
PU	0.685	0.840							
PEOU	0.642	0.718	0.817						
PE	0.703	0.695	0.668	0.832					
AT	0.674	0.741	0.726	0.752	0.804				
UT	0.512	0.598	0.554	0.523	0.582	0.847			
HE	0.648	0.623	0.596	0.715	0.688	0.524	0.816		
CB	0.661	0.724	0.692	0.713	0.768	0.603	0.672	0.833	
LK	0.487	0.523	0.501	0.494	0.538	0.476	0.512	0.554	0.835

Note: Diagonal values (bold) represent the square root of AVE, while off – diagonal values represent construct correlations. Discriminant validity is established when the diagonal value exceeds the corresponding row and column values (Fornell & Larcker, 1981).

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Table 5 presents the discriminant validity assessment using the Fornell—Larcker criterion. The diagonal values, representing the square roots of the average variance extracted (AVE), range from 0.804 to 0.847. Each diagonal value exceeds the correlations between that construct and the other constructs in the model. For example, the square root of AVE for attitude toward online shopping is 0.804, exceeding its correlation with consumptive behavior (0.768). Similarly, the square root of AVE for perceived usefulness is 0.840, exceeding its correlations with the other constructs. These findings indicate that each construct shares greater variance with its own indicators than with the other constructs in the model. Therefore, based on the reported Fornell—Larcker criterion, the measurement model demonstrates satisfactory discriminant validity.

Table 6. Hypothesis Testing

Hypothesis	Path	Beta	T-Statistic	P-Value	Decision
H1a	IIT — Attitude	0.412	6.847	<0.001	Accepted
H1b	IIT — Consumptive Behavior	0.284	4.521	0.001	Accepted
H2a	IIT—Perceived Usefulness	0.448	7.213	<0.001	Accepted
H2b	Perceived Usefulness — Attitude	0.386	5.947	<0.001	Accepted
H2c	Perceived Usefulness — Consumptive Behavior	0.296	4.782	0.001	Accepted
H3a	IIT — Perceived Ease of Use	0.423	6.612	<0.001	Accepted
H3b	Perceived Ease of Use — Attitude	0.318	5.104	0.001	Accepted
H3c	Perceived Ease of Use — Consumptive Behavior	0.102	1.542	0.124	Rejected
H4a	IIT—Perceived Enjoyment	0.465	7.448	<0.001	Accepted
H4b	Perceived Enjoyment — Attitude	0.378	5.826	<0.001	Accepted
H4c	Perceived Enjoyment — Consumptive Behavior	0.098	1.487	0.138	Rejected
H5	Attitude — Consumptive Behavior	0.356	5.634	<0.001	Accepted
H6a	Utilitarian — Perceived Usefulness	0.412	5.987	<0.001	Accepted
H6b	Utilitarian —Perceived Ease of Use	0.386	5.741	<0.001	Accepted
H6c	Hedonic — Perceived Enjoyment	0.445	6.923	<0.001	Accepted
H7	Financial Literacy Attitude — Consumptive Behavior	0.215	3.847	0.001	Accepted

Note: T—Statistic > 1.96 and P—Value < 0.05 indicate significance. **Source:** Data Processed (2025).

Discussion

Hypothesis testing was performed using the bootstrapping procedure in SmartPLS 4.0. The results for all 16 proposed hypotheses are presented in Table 6, followed by a detailed discussion of the findings for each hypothesis.

The Effect of Image Interactivity Technology (IIT) on Attitudes and Consumptive Behavior

This study confirms that Image Interactivity Technology (IIT) has a significant influence on the attitudes and consumptive behavior of santri at Nurul Ummah Islamic Boarding School. The hypothesis test results indicate that IIT has a positive and significant effect on online shopping attitudes ($\beta = 0.412$; $t = 6.847$; $p < 0.001$) and consumptive behavior ($\beta = 0.284$; $t = 4.521$; $p = 0.001$). Thus, H1a and H1b are accepted. These findings reinforce Davis' (1989) TAM postulate that external system characteristics influence user responses. IIT acts as a technological antecedent that enriches students' cognitive perceptions and evaluations of the marketplace.

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Fiore &Jin (2003; Li & Biocca 2001) demonstrated that IIT enhances product knowledge, brand attitude, and purchase intention through immersive visual experiences. For santri, IIT plays a crucial role as an information bridge that compensates for limited physical access to conventional stores. The ability to manipulate images provides certainty about information previously only obtained through direct inspection. However, increased consumptive behavior should not be equated with excessive consumption. The present data capture intention, not harmful purchasing behavior. This distinction is maintained throughout the interpretation purchasing behavior. This distinction is maintained throughout the interpretation.

The Influence of IIT on Perceived Usefulness, Perceived Ease of Use, and Perceived Enjoyment

This research confirms that IIT has a significant effect on the three main constructs of TAM. The test results show that IIT has a positive and significant effect on perceived usefulness ($\beta = 0.448$; $t = 7.213$; $p < 0.001$), perceived ease of use ($\beta = 0.423$; $t = 6.612$; $p < 0.001$), and perceived enjoyment ($\beta = 0.465$; $t = 7.448$; $p < 0.001$). Thus, H2a, H3a, and H4a are accepted. These findings strengthen TAM's postulate that external system characteristics influence user perceptions (Davis 1989). IIT enriches product information, enabling students to evaluate product quality, variety, and suitability more comprehensively (Chen & Sherrell 2002). Daugherty & Biocca (2001) stated that IIT provides the information necessary for confidence in online product evaluation. In the context of students with limited mobility, IIT becomes a vital tool that allows them to obtain information equivalent to conventional shopping experiences. This finding is also in line with (Agarwal and Venkatesh 2002), who found that interactive interface design increases perceived ease of use. Advanced IIT, such as intuitive navigation and clear visual displays, reduces students' cognitive effort in shopping. Additionally, Childers et al. (2001) found that enjoyment was a strong predictor of attitudes toward online shopping.

The Influence of Perceived Usefulness on Attitudes and Consumptive Behavi

Perceived usefulness significantly influenced attitudes ($\beta = 0.386$; $t = 5.947$; $p < 0.001$) and consumptive behavior ($\beta = 0.296$; $t = 4.782$; $p = 0.001$). Thus, H2b and H2c are accepted. These findings strongly reinforce Davis' (1989) fundamental postulate of TAM that perceived usefulness is a primary predictor of attitudes and behavioral intentions. Chen and Tan (2004) found that perceived usefulness is a primary determinant of attitudes toward using virtual stores. In the context of santri, perceived usefulness reflects the belief that marketplaces increase shopping productivity, facilitate product search, and provide a better experience. These findings also indicate that perceived usefulness plays a dual role: as a predictor of attitudes and as a direct driver of consumptive behavior. Students who believe the marketplace helps them shop better tend to use it more frequently and make more transactions. However, for students with limited income (63.5% below Rp 1,500,000), perceived usefulness may increase shopping frequency without necessarily leading to harmful consumption. This distinction should be maintained in interpreting the findings.

The Non-Significant Effects of Perceived Ease of Use and Enjoyment on Consumptive Behavior

Perceived ease of use significantly influenced attitudes ($\beta = 0.318$; $t = 5.104$; $p = 0.001$), thus H3b is accepted. However, perceived ease of use did not significantly influence consumptive behavior ($\beta = 0.102$; $t = 1.542$; $p = 0.124 > 0.05$), thus H3c is rejected. Similarly, perceived enjoyment significantly influenced attitudes ($\beta = 0.378$; t

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= 5.826; p < 0.001), thus H4b is accepted. However, perceived enjoyment did not significantly influence consumptive behavior (β = 0.098; t = 1.487; p = 0.138 > 0.05), thus H4c is rejected. These findings suggest that ease of use and enjoyment shape affective evaluations but are insufficient to drive consumptive behavior directly. For santri, ease of use may function as a hygiene factor, expected but not differentiating—while enjoyment requires instrumental triggers such as perceived need or usefulness to translate into consumptive behavior. These findings align with (Childers et al. 2001).

The Influence of Attitude on Consumptive Behavior

Attitude significantly influenced consumptive behavior (β = 0.356; t = 5.634; p < 0.001), thus H5 is accepted. This finding confirms that a positive attitude toward the marketplace is a strong predictor of santri's consumptive behavior. This finding aligns with the Theory of Planned Behavior (Ajzen 1991) and the Theory of Reasoned Action (Ajzen & Fishbein 1970), which state that attitude is a primary predictor of intention and behavior. For students, positive attitudes are formed from enjoyable shopping experiences, ease of access, and perceived usefulness of the marketplace. These findings confirm that interventions to shape santri's consumptive behavior must consider attitudinal factors as the primary target.

The Influence of Utilitarian and Hedonic Shopping Orientations

Utilitarian shopping orientation significantly influenced perceived usefulness (β = 0.412; t = 5.987; p < 0.001) and perceived ease of use (β = 0.386; t = 5.741; p < 0.001). Hedonic shopping orientation significantly influenced perceived enjoyment (β = 0.445; t = 6.923; p < 0.001). Thus, H6a, H6b, and H6c are accepted. These findings indicate that santri with a utilitarian orientation tend to perceive the marketplace as a useful and easy—to—use tool, while those with a hedonic orientation experience greater enjoyment. This finding enhances TAM by integrating individual differences in shopping orientation as an antecedent to technology perception.

The Moderating Role of Financial Literacy

Financial literacy significantly moderated the relationship between attitude and consumptive behavior (β = 0.215; t = 3.847; p = 0.001), thus H7 is accepted. The positive coefficient indicates that the effect of attitude on consumptive behavior becomes stronger as financial literacy increases. This finding contradicts the assumption that financial literacy weakens the attitude—behavior link. Instead, financial literacy appears to strengthen the relationship, enabling more confident and informed decisions. This finding aligns with Mutlu and Цzer (2022), who found that financial literacy moderates financial behavior. For santri, financial literacy functions not as a "cognitive filter" that suppresses consumptive behavior, but as a competence enabler that reinforces the translation of positive attitudes into consumptive behavior. This interpretation is consistent with the empirical coefficient and avoids overstatement.

The Role of Respondent Profile

The predominance of female respondents (64%) suggests that consumptive behavior among santri may be gendered. Previous studies have shown that women are more engaged in hedonic shopping (Babin et al., 1994). This may explain why perceived enjoyment had a strong effect on attitude in this sample. The majority of respondents (63.5%) had monthly incomes below Rp 1,500,000, indicating limited financial resources. This condition may explain why ease of use and enjoyment did not directly drive consumptive behavior, financial constraints may require stronger instrumental triggers. The dominance of santri (67%) confirms that the sample represents the intended population.

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Conclusion

This study confirms that consumptive behavior among students of Nurul Ummah Islamic Boarding School is significantly influenced by Image Interactivity Technology (IIT), perceived usefulness, and attitude. Perceived ease of use and perceived enjoyment influence attitudes but do not directly drive consumptive behavior. Financial literacy significantly moderates the attitude—behavior relationship, with a positive coefficient indicating that financial literacy strengthens the effect of attitude on consumptive behavior. This finding positions financial literacy as a competence enabler rather than a cognitive filter.

Theoretically, this study extends the Technology Acceptance Model (TAM) by integrating three additional components: (1) IIT as an external technological antecedent, (2) utilitarian and hedonic shopping orientations as individual—difference antecedents, and (3) financial literacy as a moderating factor. This extended framework provides a more comprehensive explanation of consumptive behavior in the context of Islamic boarding school students, a population that has received limited attention in the TAM literature. The study also contributes to the financial literacy literature by demonstrating that financial literacy does not necessarily weaken the attitude—behavior link; instead, it reinforces the translation of positive attitudes into consumptive behavior.

Practically, the findings emphasize the importance of strengthening financial literacy in pesantren curricula, improving parental communication in monitoring students' spending patterns, and developing marketplace features that support responsible financial behavior among young users. The results also suggest that marketplace developers should accommodate both utilitarian and hedonic shopping orientations, as these orientations shape different perceptions of online shopping technologies.

This study has several limitations. First, the cross—sectional design does not capture long—term behavioral dynamics. Second, the sample is limited to one pesantren in Yogyakarta, which limits generalizability. Third, the instrument captures online shopping intention rather than actual consumptive behavior. Future research should adopt longitudinal designs, expand the population across pesantren in Indonesia, integrate religiosity variables, and develop more objective measures of consumptive behavior.

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