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Online impulse buying behavior among University Students: An empirical study at east Asia university of technology

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Abstract

The rapid expansion of e-commerce in Vietnam has significantly transformed consumer shopping behavior, particularly among young digital-native consumers. University students, characterized by high internet usage and active engagement in online platforms, represent a key segment in this digital commerce landscape. This study investigates the determinants of online impulse buying behavior among university students, using Dong A University of Technology as a representative case study. Drawing upon the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), and the Stimulus-Organism-Response (S-O-R) framework, a comprehensive conceptual model integrating cognitive, emotional, technological, and social factors was developed. A quantitative research approach was applied through a structured survey of 221 students, with Structural Equation Modeling (SEM) employed to validate the research model and test hypotheses. The results reveal that trust, promotional strategies, website visual appeal, perceived usefulness, subjective norms, and evaluation criteria significantly drive online impulse buying, while perceived risk negatively impacts purchase attitudes. Evaluation criteria, purchase attitude, and subjective norms were identified as key mediators linking external stimuli to impulsive purchase decisions. This study contributes to the growing body of knowledge on online consumer behavior in emerging markets, offering both theoretical insights and practical implications. Recommendations for e-commerce platforms include optimizing website aesthetics, deploying targeted promotions, strengthening consumer trust, and leveraging social influence to enhance spontaneous purchase behavior among university students.

Keywords: Online Impulse Buying; University Students; E-Commerce; Consumer Behavior; Structural Equation Modeling

1. Introduction

The rapid development of digital technologies and the proliferation of e-commerce platforms have fundamentally transformed global consumer behavior, especially in emerging economies such as Vietnam. Supported by widespread smartphone adoption, affordable internet access, and the increasing availability of digital payment systems, online shopping has become a normalized aspect of daily life for many Vietnamese consumers (Vietnam E-Commerce Association [VECOM], 2022). Among these consumers, university students represent a particularly important demographic due to their digital fluency, frequent engagement with online platforms, and openness to innovative purchasing experiences. Despite this, empirical research focusing specifically on university students' consumption behavior in Vietnam remains limited, especially concerning online impulse buying.

Impulse buying behavior has traditionally been examined in the context of physical retail environments. Defined as spontaneous, emotionally driven, and unplanned purchasing, impulse buying is typically triggered by environmental

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cues that stimulate affective responses (Rook, 1987; Beatty and Ferrell, 1998). With the rise of e-commerce, this phenomenon has extended into digital environments, where online platforms employ algorithm-driven recommendations, personalized promotions, and visually engaging interfaces to encourage unplanned purchasing (Chen et al., 2019). Unlike traditional shopping environments, online commerce reduces many of the physical and cognitive barriers to purchase, providing easy access to a vast range of products and enabling impulsive buying through dynamic stimuli and simplified purchasing processes (Flohr and Madl Berger, 2013).

To understand online impulse buying behavior, scholars have drawn upon several established behavioral models. The Technology Acceptance Model (TAM) highlights the role of perceived usefulness and perceived ease of use in technology adoption (Davis, 1989). In the e-commerce context, these constructs shape consumers' attitudes toward online shopping and influence their purchasing behavior. Complementing this perspective, the Theory of Reasoned Action (TRA) posits that consumer behavior is driven by behavioral intentions, which in turn are shaped by individual attitudes and subjective norms (Ajzen and Fishbein, 1980). Moreover, the Stimulus-Organism-Response (S-O-R) framework explains how environmental stimuli, such as promotional offers or website design, evoke internal cognitive or emotional states, leading to behavioral responses such as impulsive purchasing (Mehrabian and Russell, 1974).

However, while the aforementioned models have been extensively applied in developed markets, limited empirical work has examined how these mechanisms operate within Vietnam's emerging digital economy, particularly among university students. Prior research in Vietnam has primarily focused on general online purchase intentions or planned buying behaviors, often examining factors such as perceived risk, trust, or satisfaction with online platforms (Nguyen and Huynh, 2020). These studies have largely overlooked the spontaneous, emotion-driven, and socially influenced nature of impulse buying behavior in online contexts. University students, as digital natives with distinct consumption patterns, represent a critical segment whose behavioral tendencies warrant dedicated investigation.

Given the increasing strategic importance of this consumer group and the lack of focused research, this study seeks to address the following research question: What are the key factors influencing online impulse buying behavior among university students in Vietnam, and how do technological, social, cognitive, and emotional variables interact to shape such behavior?

To answer this question, the study proposes a comprehensive conceptual framework that integrates constructs derived from TAM, TRA, and the S-O-R framework. The model incorporates perceived risk, trust, subjective norms, social influence, promotions, website visual appeal, perceived usefulness, evaluation criteria, and purchase attitude as key variables potentially influencing online impulse buying behavior. The framework hypothesizes that external stimuli, technological perceptions, cognitive evaluations, and social influences converge to shape consumers' attitudes and evaluation processes, which ultimately lead to impulsive purchasing behavior.

This study applies a quantitative research design, using structured surveys to collect primary data from university students at Dong A University of Technology. Structural Equation Modeling (SEM) is employed to validate the proposed conceptual model and test the hypothesized relationships. SEM allows for rigorous assessment of complex causal pathways and provides a robust analytical framework for examining how technological acceptance, cognitive assessments, and social factors interact to influence online impulse buying.

This research contributes theoretically by extending existing behavioral models into the context of online impulse buying, specifically among university students in an emerging market. Practically, the findings offer valuable insights for e-commerce businesses targeting young consumers in Vietnam. By understanding the psychological, technological, and social factors driving online impulse purchases, marketers can design more effective strategies to encourage spontaneous buying behavior, optimize user experience, and improve customer engagement.

In conclusion, this study addresses an important gap in the literature by focusing on a digitally engaged yet under-researched consumer segment in Vietnam. By integrating technological, cognitive, emotional, and social dimensions, the study offers a comprehensive understanding of online impulse buying behavior in the Vietnamese e-commerce landscape.

2. Literature review

Online impulse buying, referring to spontaneous and unplanned purchases triggered by external or internal stimuli while browsing e-commerce platforms, has become an increasingly prevalent phenomenon in digital commerce. Unlike traditional retail settings, where environmental cues such as in-store displays and product placements stimulate impulsive decisions (Rook, 1987), online environments introduce distinct triggers, including personalized advertisements, limited-time promotions, and website design aesthetics (Liu et al., 2013). Understanding the mechanisms that drive such behaviors requires the integration of technological, psychological, and social dimensions, especially among digitally native consumers such as university students.

The Technology Acceptance Model (TAM) developed by Davis (1989) posits that perceived usefulness and ease of use are critical in shaping users' attitudes towards technology adoption. Applied to e-commerce, these perceptions influence consumers' acceptance of online platforms and their likelihood to engage in online transactions (Chen et al., 2005). Complementing this, the Theory of Reasoned Action (TRA) emphasizes that behavioral intentions are shaped by both personal attitudes and subjective norms derived from perceived social pressures (Ajzen and Fishbein, 1980). Meanwhile, the Stimulus-Organism-Response (S-O-R) framework explains how external stimuli evoke internal cognitive or emotional responses, leading to specific behaviors such as purchasing (Mehrabian and Russell, 1974). In the online context, factors such as promotional strategies and website aesthetics serve as stimuli, affecting consumers' psychological evaluations and triggering impulse purchases (Cyr et al., 2009).

Building on these theoretical foundations, this study proposes a conceptual framework comprising nine factors influencing online impulse buying behavior: perceived risk, trust, social influence, promotional strategies, website visual appeal, perceived usefulness, subjective norms, evaluation criteria, and purchase attitude.

Perceived risk refers to consumers' anticipation of potential negative outcomes related to online transactions, encompassing financial risk, product performance risk, and privacy concerns (Forsythe et al., 2006). Previous research confirms that perceived risk inhibits online purchase behavior by inducing uncertainty and prompting careful evaluation (Park and Stoel, 2005). Particularly in emerging markets such as Vietnam, where trust in online vendors may not be fully established, perceived risk acts as a significant psychological barrier (Järvenpää et al., 2000). Higher risk perceptions undermine favorable purchase attitudes, reducing the likelihood of impulsive purchases, which rely on low cognitive control and high emotional arousal. Therefore, it is hypothesized that perceived risk negatively influences consumers' attitudes toward online impulse buying.

Trust, defined as the consumer's belief in the reliability and integrity of online vendors, plays an essential role in mitigating perceived uncertainties (Gefen et al., 2003). Trust fosters positive attitudes towards digital transactions by reducing psychological resistance and enhancing emotional security (Nguyen et al., 2021). In the absence of physical interactions, trust becomes a critical determinant in the formation of favorable purchase attitudes online (Chen et al., 2019). Thus, it is hypothesized that trust positively influences purchase attitudes toward online impulse buying.

Social influence, encompassing peer recommendations, online reviews, and influencer endorsements, shapes consumers' behavior through both direct and indirect social pressures (Zhou et al., 2013). Especially in collectivist cultures like Vietnam, where conformity and community orientation are culturally emphasized (Hofstede et al., 2010), social influence exerts a powerful effect on individual decision-making. Subjective norms, reflecting consumers' perceptions of how others expect them to behave, are a core mediator in the impact of social influence (Ajzen, 1991). In online shopping, students may be inclined to engage in impulse buying to align with peer consumption behaviors or trends popularized through social media. Therefore, it is hypothesized that social influence positively affects subjective norms regarding online impulse buying.

Promotional strategies, including flash sales, limited-time discounts, and personalized offers, have been widely recognized as significant stimuli triggering unplanned purchases in digital environments (Park et al., 2012). The immediacy and perceived exclusivity of online promotions stimulate urgency and bypass rational evaluation, fostering heuristic decision-making processes (Jallow et al., 2016). Consumers who encounter attractive promotions may perceive these deals as valuable opportunities, prompting rapid assessment through simplified evaluation criteria. As such, promotional strategies are hypothesized to positively influence consumers' evaluation criteria in online impulse buying.

Website visual appeal is another critical environmental stimulus influencing consumers' emotional engagement. Aesthetically pleasing and well-structured websites enhance user satisfaction, trust formation, and emotional connection, which in turn increase the likelihood of purchase behavior (Cyr et al., 2009). Elements such as color

schemes, layout, typography, and imagery contribute to users' overall evaluation of the platform and shape their impression of product quality and vendor credibility (Protean et al., 2009). Therefore, website visual appeal is hypothesized to positively affect evaluation criteria formation in online impulse buying behavior.

Perceived usefulness, derived from TAM, refers to consumers' belief that using a specific platform enhances shopping efficiency or effectiveness (Davis, 1989). In e-commerce, when consumers perceive online shopping platforms as useful in saving time, simplifying transactions, or facilitating product searches, they are more likely to develop positive evaluations of both the platform and the products offered (Chen et al., 2005). Consequently, perceived usefulness is hypothesized to positively influence consumers' evaluation criteria in online impulse buying.

Purchase attitude, representing consumers' overall favorable or unfavorable evaluation of engaging in online purchasing, directly affects buying behavior according to TRA (Ajzen and Fishbein, 1980). A positive attitude towards online shopping increases consumers' likelihood to make both planned and unplanned purchases (Pavlou and Feinson, 2006). Consumers who perceive online purchasing as convenient, enjoyable, and rewarding tend to develop favorable purchase attitudes, which facilitate spontaneous purchasing decisions. Thus, purchase attitude is hypothesized to positively influence online impulse buying behavior.

Subjective norms, as a social-cognitive construct, reflect individuals' perceptions of social expectations regarding their consumption behaviors (Ajzen, 1991). In online shopping contexts, consumers may conform to perceived social expectations, such as following trends, responding to peer recommendations, or emulating influencer endorsements. This social conformity can promote impulsive purchases, especially among young consumers who value peer validation (Zhou et al., 2013). Hence, subjective norms are hypothesized to positively influence online impulse buying behavior.

Finally, evaluation criteria, referring to consumers' cognitive assessments regarding product value, vendor credibility, and transactional convenience, play a mediating role in transforming external stimuli into purchasing behaviors (Liu et al., 2013). Even in impulse buying scenarios, consumers conduct rapid evaluations, which serve as justifications for their unplanned decisions (Rook and Fisher, 1995). When promotional cues and visual design lead to favorable evaluations of product attractiveness, pricing, or trustworthiness, consumers are more likely to engage in impulse purchases. Therefore, evaluation criteria are hypothesized to positively influence online impulse buying behavior.

Integrating these insights, this study proposes a comprehensive conceptual model wherein external stimuli (promotions, visual appeal), technological perceptions (usefulness), and psychological factors (perceived risk, trust, social influence) shape consumers' attitudes, evaluation criteria, and subjective norms, ultimately driving online impulse buying behavior. This model serves as the foundation for the subsequent empirical investigation using Structural Equation Modeling.

3. Hypothesis and Research Model

Based on the literature review, this study proposes an integrated conceptual framework exploring the factors influencing online impulse buying behavior among university students in Vietnam. The model is grounded in the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), and relevant online consumer behavior theories. Nine independent variables are hypothesized to affect online impulse buying behavior, either directly or through mediating constructs such as purchase attitude and evaluation criteria.

3.1. Perceived Risk and Purchase Attitude

Perceived risk is conceptualized as consumers' cognitive assessment of potential negative outcomes associated with online purchasing, including concerns about product authenticity, financial loss, and personal data security (Forsythe et al., 2006). Prior studies emphasize that in digital commerce environments, perceived risk acts as a significant inhibitor of consumer purchase intentions (Luo, 2005; Chen et al., 2019). Given the spontaneous and emotionally driven nature of impulse buying, it is plausible that heightened perceived risk dampens consumers' favorable attitudes towards unplanned online purchases. Especially in developing markets like Vietnam, where consumer trust in online transactions is still evolving, perceived risk may exert substantial psychological restraint, leading to avoidance behaviors.

H1: Perceived risk negatively influences consumers' purchase attitudes towards online impulse buying.

3.2. Trust and Online Impulse Buying Behavior

Trust is recognized as a critical facilitator in mitigating perceived uncertainties within online transactions (Gefen et al., 2003). Trust reflects consumers' belief in the reliability, competence, and honesty of online vendors (Khalifa and Shen, 2005). High levels of trust not only reduce cognitive deliberation but also create a psychological safety net that enables consumers to act upon emotional impulses. In contexts where purchasing decisions are spontaneous, as in online impulse buying, trust can accelerate the shift from intention to action by minimizing hesitation. The established association between trust and impulse buying behavior (Verhagen and van Dolen, 2011) justifies the hypothesis that trust directly enhances the likelihood of spontaneous purchase behavior.

H2: Trust positively influences online impulse buying behavior.

3.3. Subjective Norms and Online Impulse Buying

Subjective norms, a central construct in TRA, represent the perceived social pressure from peers, family, and online communities regarding whether an individual should engage in a particular behavior (Ajzen and Fishbein, 1980). In collectivist cultures like Vietnam, where conformity and social approval are valued (Hofstede et al., 2010), subjective norms exert a particularly strong influence. The rise of social commerce platforms, where peer feedback and recommendations are easily accessible, amplifies the role of subjective norms. Prior research confirms that university students' consumption behaviors, including impulsive purchases, are shaped by the perceived expectations of their immediate social circles (Zhou et al., 2013).

H3: Subjective norms positively influence online impulse buying behavior.

3.4. Social Influence and Online Impulse Buying

While subjective norms refer to perceived direct pressure, broader social influence includes indirect social cues, such as influencer endorsements, online community reviews, and trends within digital networks. The pervasive role of social media platforms enhances passive and active exposure to such cues, fostering observational learning and mimetic behavior. Electronic word-of-mouth (EWOM) mechanisms, such as product reviews and user-generated content, further contribute to trust formation and influence consumers' impulsive purchase decisions (Chevalier and Mayzlin, 2006). Particularly among university students, who are highly connected via social networks, social influence may create situational triggers that encourage online impulse buying.

H4: Social influence positively affects online impulse buying behavior.

3.5. Promotions and Online Impulse Buying

Promotions, including flash sales, time-limited discounts, and personalized offers, are identified as direct environmental stimuli influencing consumer behavior. According to the Stimulus-Organism-Response (S-O-R) model, promotions serve as external stimuli that evoke emotional arousal and facilitate behavioral responses (Mehrabian and Russell, 1974). Research shows that promotions stimulate urgency and scarcity perceptions, thus lowering consumers' purchase inhibitions and fostering immediate action (Park et al., 2012). In online commerce environments, personalized promotions further strengthen the effect by increasing perceived relevance.

H5: Promotions positively influence online impulse buying behavior.

3.6. Website Visual Appeal and Online Impulse Buying

Website aesthetics, comprising design quality, visual elements, and interface usability, significantly shape consumers' emotional and cognitive responses during online shopping (Cyr et al., 2009). According to experiential marketing theories, visual appeal enhances consumers' sensory engagement, satisfaction, and emotional gratification. Visually engaging websites generate a pleasurable browsing experience that can lead to reduced cognitive control, thereby facilitating impulsive purchases (Liu et al., 2013). In the context of university students, who exhibit higher aesthetic sensitivity and preference for intuitive digital platforms, website visual appeal may serve as a salient trigger of online impulse buying.

H6: Website visual appeal positively influences online impulse buying behavior.

3.7. Perceived Usefulness and Online Impulse Buying

The Technology Acceptance Model (Davis, 1989) posits that perceived usefulness significantly impacts consumers' attitudes toward adopting new technologies. In online shopping contexts, perceived usefulness extends to perceptions regarding the efficiency, convenience, and functional benefits of shopping platforms. While impulse buying is predominantly affect-driven, the perceived functional value of a platform can enhance the overall shopping experience, indirectly contributing to spontaneous purchasing behavior (Verhagen and van Dolen, 2011). Consumers are more likely to make impulsive purchases when they perceive the platform as efficient and facilitating easy completion of transactions.

H7: Perceived usefulness positively influences online impulse buying behavior.

3.8. Evaluation Criteria and Online Impulse Buying

Despite the spontaneous nature of impulse buying, consumers engage in rapid evaluation processes, often unconsciously assessing product utility, vendor credibility, and transaction reliability before completing a purchase (Liu et al., 2013). Evaluation criteria serve as cognitive filters that, although compressed in time, influence whether external stimuli translate into actual buying actions. Consumers who perceive positive evaluation outcomes may transition from impulse desire to actual purchase more readily.

H8: Evaluation criteria positively influence online impulse buying behavior.

3.9. Purchase Attitude and Online Impulse Buying

Purchase attitude, derived from TRA, encapsulates consumers' overall evaluations and affective responses towards buying behavior in online contexts (Ajzen and Fishbein, 1980). Positive purchase attitudes, influenced by prior satisfactory experiences, platform trust, and social recommendations, increase the likelihood of both planned and unplanned purchases (Chen et al., 2019). In online shopping environments, purchase attitude acts as a proximal determinant, directly influencing impulse buying behaviors by reinforcing approach motivations.

H9: Purchase attitude positively influences online impulse buying behavior.

3.9.1. The research mode is depicted in the Figure below

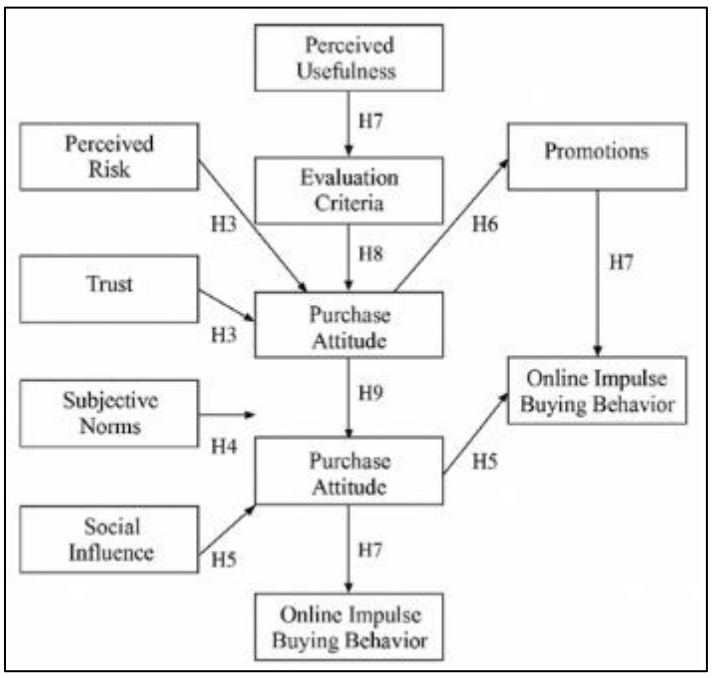

Figure 1 proposed Research Model

4. Research Methodology

This study adopts a quantitative research methodology, aligned with the objective of testing the proposed conceptual framework regarding online impulse buying behavior among university students in Vietnam. A positivist research philosophy underpins the methodology, focusing on hypothesis testing using objective measurement and statistical analysis (Creswell and Creswell, 2017). The rationale for using a quantitative approach rest in its suitability for analyzing causal relationships among latent variables within structural equation models, and its ability to yield generalizable findings across large populations (Hair et al., 2014).

A cross-sectional survey design was applied, enabling the collection of primary data within a specific timeframe using structured questionnaires. The survey method is widely recognized in consumer behavior research for its efficiency in gathering standardized data and facilitating comparative analysis (Malhotra, 2010). The structured nature of the instrument ensures consistency, minimizing interviewer bias and improving reliability.

The population for this study consisted of undergraduate students at Dong A University of Technology in Vietnam. This group was selected based on their characteristics as digital natives, exhibiting high levels of internet and smartphone usage, frequent engagement in online shopping activities, and responsiveness to digital marketing stimuli. Prior studies have confirmed that university students represent an emerging consumer segment with significant e-commerce engagement (Nguyen et al., 2020). Given the absence of a complete sampling frame, a non-probability purposive sampling technique was adopted. Participants were selected according to two inclusion criteria: (i) being currently enrolled university students and (ii) having purchased at least one product online within the previous six months. This sampling approach is considered appropriate for studies where the focus lies in examining specific behavioral traits within a defined population (Saunders et al., 2019).

The required sample size was determined following recommendations by Hair et al. (2014), which suggest that sample size should be at least ten times the number of observed variables in the proposed measurement model. Given that the conceptual framework included approximately 40 observed variables, a minimum sample size of 400 respondents was deemed necessary for structural equation modeling (SEM). To account for non-response and incomplete data, a total of 500 questionnaires were distributed, resulting in 421 valid responses retained for analysis. This sample size exceeded the minimum requirement, ensuring robustness and reliability of the analysis.

The questionnaire was developed based on established measurement scales adapted from previous studies. Three main sections comprised the instrument. The first section collected demographic data and shopping behavior information, including respondents' gender, age, frequency of online purchases, and preferred online shopping platforms. The second section contained multiple-item scales measuring the study's latent constructs, including perceived risk, trust, subjective norms, social influence, promotional effectiveness, website visual appeal, perceived usefulness, evaluation criteria, purchase attitude, and online impulse buying behavior. Items were adapted from Forsythe et al. (2006), Gefen et al. (2003), Ajzen and Fishbein (1980), Zhou et al. (2013), Park et al. (2012), Cyr et al. (2009), Davis (1989), and Verhagen and van Dolen (2011). The third section included screening questions designed to confirm respondents' eligibility for participation based on recent online shopping activity.

A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was applied for all construct items. This scale is commonly used in marketing and behavioral research due to its ease of use and ability to capture attitudinal variance among respondents (Malhotra, 2010). The questionnaire was originally developed in English and translated into Vietnamese using Brislin's (1970) back-translation procedure to ensure semantic equivalence and cultural appropriateness. A pilot test was conducted with 50 university students to assess the clarity, relevance, and reliability of the items. Based on pilot feedback, minor revisions were made to improve item comprehensibility.

Data were collected over a six-week period from March to April 2024 using both online (Google Forms) and offline (printed questionnaires) distribution channels. Respondents were briefed about the purpose of the study and assured of the confidentiality and anonymity of their responses. Participation was voluntary and informed consent was obtained prior to questionnaire completion. Upon completion of data collection, preliminary data screening was conducted using SPSS version 26. Responses with substantial missing data were eliminated. Multivariate outliers were identified using Mahala Nobis distance and removed to enhance data normality and analysis robustness (Hair et al., 2014). The cleaned dataset was subsequently subjected to rigorous statistical analysis.

Measurement reliability was assessed through internal consistency metrics. Cronbach's alpha coefficients for each construct were calculated, with thresholds of 0.70 considered acceptable (Nunnally and Bernstein, 1994). Additionally, Composite Reliability (CR) was calculated for each latent variable, with values above 0.70 indicating satisfactory

construct reliability (Hair et al., 2014). Convergent validity was evaluated using Average Variance Extracted (AVE), where AVE values exceeding 0.50 demonstrated adequate variance explanation by each construct. Discriminant validity was examined using the Fornell-Larcker criterion, confirming that the constructs were empirically distinct.

Exploratory Factor Analysis (EFA) was employed to explore the dimensionality of constructs. Principal Component Analysis with Varimax rotation was used to extract factor structures and validate the construct measurement scales. Factor loadings above 0.50 were considered significant for retention.

Confirmatory Factor Analysis (CFA) was conducted using AMOS version 24 to assess the measurement model's fit and validate construct measurement properties. Model fit was evaluated using several indices, including Chi-square/degrees of freedom (acceptable if ≤ 3), Comparative Fit Index (CFI ≥ 0.90), Tucker Lewis Index (TLI ≥ 0.90), Root Mean Square Error of Approximation (RMSEA ≤ 0.08), and Standardized Root Mean Square Residual (SRMR ≤ 0.08) (Byrne, 2016). These indices collectively ensured a rigorous assessment of the model's goodness of fit.

Structural Equation Modeling (SEM) was employed to evaluate the proposed hypotheses and the causal relationships between the constructs. SEM is recognized as a robust multivariate analysis method that allows simultaneous estimation of multiple dependent relationships while controlling for measurement errors (Hair et al., 2014). This method was particularly appropriate for the current study, given the complexity of the research model and the latent nature of the primary constructs. Both direct and indirect effects were analyzed to assess not only the main relationships but also the mediating roles of constructs such as evaluation criteria and purchase attitude.

To ensure adherence to ethical standards, the study complied with research ethics guidelines as stipulated by Saunders et al. (2019). Participants were informed of the academic nature of the study, and anonymity and confidentiality were guaranteed. Respondents were notified of their right to withdraw from the study at any point without penalty. Importantly, no personally identifiable or sensitive data were collected.

Common method bias (CMB) was mitigated through both procedural and statistical controls. Procedurally, respondents were assured of response confidentiality, and the questionnaire was carefully designed to minimize item ambiguity and reduce evaluation apprehension. Harman's single-factor test was applied as a post-hoc statistical remedy to assess CMB. The results indicated that no single factor accounted for the majority of variance, suggesting that common method variance did not pose a significant threat to the validity of the results (Podsakoff et al., 2003).

In summary, the research methodology applied in this study provides a robust framework for empirically examining the factors influencing online impulse buying behavior among Vietnamese university students. The combination of rigorous measurement scale development, validated through both EFA and CFA, and comprehensive hypothesis testing using SEM ensures the reliability and validity of the study's findings. The following section presents the empirical results generated through this methodology.

5. Research results

5.1. Descriptive Statistics of the Sample

In total, 250 questionnaires were distributed to students at Dong A University of Technology, of which 243 responses were collected. After cleaning the data, including the removal of incomplete or inconsistent responses, the final sample consisted of 221 valid questionnaires. Among the respondents, female students accounted for 53.8%, while male students comprised 46.2%. Regarding age distribution, the majority of respondents (58.8%) were aged between 20 and 21 years, followed by those aged 18–19 years (38%) and a minimal proportion older than 22 years (3.2%). In terms of academic specialization, 48.4% of respondents were majoring in Marketing, 35.3% in Business Administration, and 16.3% in other disciplines. This demographic distribution highlights the digital fluency and technological adaptability characteristic of young consumers in Vietnam (VECOM, 2022).

5.2. Reliability Assessment Using Cronbach's Alpha

Cronbach's Alpha coefficients were employed to assess the internal consistency reliability of the measurement scales. The results indicated that all constructs demonstrated satisfactory reliability, with Cronbach's Alpha values exceeding the threshold of 0.7, as recommended by Nunnally (1978). Specifically, constructs such as Perceived Risk ($\alpha = 0.822$), Trust ($\alpha = 0.853$), Promotional Strategies ($\alpha = 0.810$), Website Visual Appeal ($\alpha = 0.905$), and Perceived Usefulness ($\alpha = 0.903$) exhibited high reliability. These results are consistent with prior studies emphasizing the criticality of ensuring scale reliability in digital commerce research (Gefen et al., 2003; Cyr et al., 2009).

5.3. Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) was conducted using Principal Component Analysis with Varimax rotation to validate the dimensional structure of the constructs. The Kaiser-Meyer-Olkin (KMO) measure was 0.822, exceeding the minimum threshold of 0.5, indicating sample adequacy for factor analysis. Bartlett's Test of Sphericity yielded a significant result ($p < 0.001$), affirming the presence of correlations among items suitable for factor extraction (Hair et al., 2010). The total variance explained was 70.079%, surpassing the recommended 50% benchmark, suggesting that the extracted factors accounted for substantial variance in consumer responses (Tabachnick and Fidell, 2013).

Ten distinct factors corresponding to the conceptual model's constructs were extracted, with factor loadings exceeding 0.5 across all items. This confirms the robustness of the constructs' factorial structure, aligning with findings from previous e-commerce behavioral studies (Verhagen and van Dolen, 2011).

5.4. Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) was performed using AMOS software to assess convergent validity, discriminant validity, and overall model fit. The model fit indices indicated an acceptable fit: CMIN/df = 1.528 (acceptable threshold < 3), Comparative Fit Index (CFI) = 0.950, Tucker-Lewis Index (TLI) = 0.943, Root Mean Square Error of Approximation (RMSEA) = 0.049, and Goodness-of-Fit Index (GFI) = 0.841. These indices meet established standards for structural equation modeling (Hu and Bentler, 1999).

Convergent validity was confirmed as standardized factor loadings exceeded 0.5 and were statistically significant ($p < 0.001$). Additionally, Average Variance Extracted (AVE) values exceeded 0.5, and Composite Reliability (CR) values were greater than 0.7 for all constructs, satisfying the criteria outlined by Fornell and Larcker (1981).

Discriminant validity was verified as Maximum Shared Variance (MSV) values were lower than the AVE for each construct, and the square root of AVE for each construct exceeded the inter-construct correlations, ensuring distinctiveness among constructs (Fornell and Larcker, 1981).

5.5. Structural Equation Modeling (SEM) Analysis

The structural model was assessed using SEM to test hypothesized relationships among variables. The model fit indicators supported the model's adequacy: CMIN/df = 1.747, CFI = 0.925, TLI = 0.919, RMSEA = 0.058, GFI = 0.812, and PCLOSE = 0.015, aligning with the standards proposed by Byrne (2010) and Hair et al. (2010). The SEM results revealed significant relationships among the constructs:

- Perceived Risk negatively influenced Purchase Attitude ($\beta = -0.202$, $p = 0.015$), corroborating prior research highlighting the deterrent role of perceived risks in online shopping (Park and Stoel, 2005; Chang and Chen, 2008).
- Trust had a significant positive effect on Purchase Attitude ($\beta = 0.352$, $p < 0.001$), consistent with earlier findings emphasizing trust's role in reducing consumers' uncertainties in digital transactions (Gefen et al., 2003).
- Social Influence positively affected Subjective Norms ($\beta = 0.180$, $p = 0.007$), supporting the notion that peer opinions and social interactions shape online purchase intentions (Ajzen, 1991).
- Promotional Strategies, Visual Appeal, and Perceived Usefulness were positively associated with Evaluation Criteria, highlighting their combined role in shaping consumers' pre-purchase assessments and triggering impulse buying (Liu et al., 2013).
- Evaluation Criteria, Purchase Attitude, and Subjective Norms directly and positively influenced Online Impulse Buying Behavior, with Evaluation Criteria exerting the strongest effect ($\beta = 0.351$), followed by Purchase Attitude ($\beta = 0.292$) and Subjective Norms ($\beta = 0.193$).
- The results validate all nine hypothesized relationships proposed in the conceptual model, elucidating the interplay of cognitive, emotional, social, and technological factors in shaping online impulse buying behaviors.

5.6. Effect Size and Variance Explained

The final model accounted for 45.1% of the variance in Online Impulse Buying Behavior, indicating a substantial explanatory power for the constructs included. The relative contributions of the constructs to predicting impulse buying behavior highlight the critical role of perceived trustworthiness, promotional stimuli, and website design aesthetics, reflecting findings from global digital consumer studies (Park et al., 2012; Cyr et al., 2009).

5.7. Summary of Findings

This study's empirical analysis confirmed the relevance and robustness of the proposed theoretical model. The significant negative impact of Perceived Risk and the positive effects of Trust, Promotional Strategies, and Visual Appeal align with the Technology Acceptance Model (Davis, 1989) and the Theory of Reasoned Action (Ajzen and Fishbein, 1980), as they demonstrate how technological acceptance constructs interact with emotional and social influences.

Moreover, the prominence of social influence and subjective norms underscores the communal and networked nature of digital consumers, especially among university students in Vietnam. These findings reinforce prior conclusions by Zhou et al. (2013) regarding the persuasive role of social circles and online communities.

In conclusion, the model not only confirms previous research but also extends understanding by integrating evaluation criteria as a mediating construct, highlighting the role of cognitive assessment in facilitating impulse purchases online. This enriches existing digital marketing literature and provides actionable insights for practitioners seeking to optimize digital engagement strategies and conversion rates.

6. Discussion

This study aimed to investigate the key determinants of online impulse buying behavior among university students in Vietnam by developing and empirically testing an integrated research model. The analysis of the structural equation model revealed that all proposed hypotheses were supported, underscoring the significant influence of various technological, cognitive, emotional, and social factors in shaping consumers' online impulse buying tendencies.

6.1. Interpretation of Key Findings

Among all identified factors, Evaluation Criteria emerged as the most influential determinant of online impulse buying behavior. This finding suggests that, despite the spontaneous nature of impulse buying, university students still engage in rapid yet meaningful evaluations regarding product quality, vendor reliability, and convenience prior to making impulsive purchase decisions. This supports Liu et al. (2013), who found that consumers often engage in "fast cognitive filtering" before finalizing purchases in digital environments. For e-commerce businesses targeting student segments, this emphasizes the need to simplify website navigation, provide transparent product information, highlight value propositions, and leverage attractive promotions to positively shape students' evaluations and encourage unplanned purchases.

Purchase Attitude was identified as the second strongest predictor of online impulse buying. Consistent with the Theory of Reasoned Action (Ajzen and Fishbein, 1980), this result affirms that consumers' overall favorable attitudes toward online shopping substantially enhance their likelihood of engaging in impulsive purchasing. The analysis further revealed that Trust exerts a significant positive influence on Purchase Attitude. This reinforces prior studies (Gefen et al., 2003; Zhou et al., 2013) asserting that trust reduces perceived uncertainty, thereby fostering positive shopping attitudes. In online settings, trust derives from transparent business practices, secure payment methods, clear return policies, and reliable customer service. Hence, businesses seeking to promote impulse buying should prioritize building and maintaining consumer trust.

Conversely, Perceived Risk was found to negatively impact Purchase Attitude, aligning with existing literature (Forsythe et al., 2006; Park and Stoel, 2005). When consumers perceive high risks related to product authenticity, payment security, or personal data privacy, they are likely to develop negative attitudes toward online purchases, suppressing impulse behaviors. This finding is particularly pertinent for university students in Vietnam, who typically have limited purchasing power and prior experience with online transactions, rendering them more risk-averse. Businesses should therefore focus on minimizing perceived risks by offering clear guarantees, secure transactions, and detailed product information.

Subjective Norms also demonstrated a significant positive impact on online impulse buying behavior. This highlights the power of social influence in a collectivist society such as Vietnam (Hofstede et al., 2010), where peer opinions, family recommendations, and broader online community discussions significantly affect individual purchasing decisions. Students are especially susceptible to peer influence and seek social approval through mimicking consumption behaviors endorsed by their networks. This result corroborates prior studies (Zhou et al., 2013) and underscores the strategic importance of social proof, online reviews, and influencer marketing in stimulating impulse buying behaviors among young consumers.

Furthermore, Promotions, Perceived Usefulness, and Website Visual Appeal were found to positively influence Evaluation Criteria, thereby exerting indirect effects on online impulse buying behavior. These findings suggest that external stimuli such as time-limited discounts, personalized offers, engaging web design, and perceived convenience of use are critical in shaping consumers' rapid evaluation processes. The results confirm the applicability of the Stimulus-Organism-Response (S-O-R) framework in explaining how external environmental cues trigger emotional arousal and lead to unplanned purchases (Mehrabian and Russell, 1974). E-commerce platforms should therefore optimize both their functional (perceived usefulness) and hedonic (visual appeal) aspects to drive positive consumer evaluations and impulse buying actions.

6.2. Comparison with Prior Research

This study's findings align with existing literature while offering novel contributions specific to the Vietnamese context. Factors such as Trust, Perceived Risk, Promotions, Website Aesthetics, and Social Influence have been widely studied in global contexts (Park et al., 2012; Cyr et al., 2009; Liu et al., 2013), but their relative importance varies across cultures and demographic groups. The prominence of Evaluation Criteria in this study contrasts with some international studies, which highlight emotional arousal or hedonic motivations as the primary drivers of online impulse buying. This difference likely reflects the rational and price-sensitive consumption patterns characteristic of Vietnamese university students.

The study also extends the Technology Acceptance Model (Davis, 1989) and the Theory of Reasoned Action (Ajzen and Fishbein, 1980) by integrating external environmental factors (such as promotions and website aesthetics) and social variables (subjective norms and social influence) into a unified impulse buying framework. This expanded model acknowledges the multifaceted nature of online impulse buying, bridging cognitive assessments, technological acceptance, and social influences.

6.3. Practical implications

From a managerial perspective, this study offers actionable insights for e-commerce businesses targeting young consumers in Vietnam. Building and maintaining trust must be prioritized through transparent information, secure payment gateways, and responsive customer support. Simultaneously, reducing consumers' perceived risks via clear return policies, privacy protections, and money-back guarantees will help foster positive shopping attitudes and encourage impulse purchases.

Furthermore, e-commerce platforms should employ promotional tactics such as flash sales and personalized discounts to stimulate impulse buying. Equally important is the development of visually appealing, easy-to-navigate websites that convey professionalism and foster positive emotional engagement. Marketing strategies should harness social influence by leveraging influencer partnerships, encouraging customer reviews, and creating shareable content to generate social proof. Lastly, optimizing product presentation and ensuring clear communication of product benefits can positively shape consumers' evaluation criteria, ultimately facilitating spontaneous purchasing decisions.

6.4. Limitations and Recommendations for Future Research

Despite its contributions, this study is subject to several limitations. The sample was restricted to university students from a single institution, limiting the generalizability of the findings. Additionally, the use of purposive sampling may introduce sampling bias, as respondents were self-selected based on their online shopping experience. The study's cross-sectional design captures behavior at a single point in time and does not account for potential temporal changes in consumer behavior. Moreover, while the proposed model explained approximately 45.1% of the variance in online impulse buying behavior, this indicates that other relevant variables remain unaccounted for.

Future research could address these limitations by expanding the sample to include students from multiple universities and non-student populations for comparative analysis. Incorporating additional variables such as personality traits, emotional states, brand loyalty, and cultural dimensions may enhance the explanatory power of the model. Longitudinal studies could offer valuable insights into how online impulse buying behavior evolves over time, especially as consumers gain more experience and as digital technologies advance. Furthermore, employing qualitative methods such as in-depth interviews or focus groups could uncover latent variables and nuanced motivations underlying impulsive online purchases.

This study confirms that online impulse buying behavior among Vietnamese university students results from the complex interplay of cognitive, emotional, technological, and social factors. Evaluation Criteria, Purchase Attitude, and Subjective Norms were identified as the most influential factors shaping consumers' spontaneous purchasing decisions.

By integrating trust-building measures, aesthetic design, effective promotions, and leveraging social influence, e-commerce platforms can stimulate impulse buying and enhance conversion rates. The findings contribute to advancing the theoretical understanding of online consumer behavior in emerging markets and offer practical guidance for digital marketers targeting youth consumers in Vietnam.

7. Conclusion

This study examined the determinants of online impulse buying behavior among Vietnamese university students by integrating the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), and the Stimulus-Organism-Response (S-O-R) framework. The empirical results from Structural Equation Modeling confirm that evaluation criteria, purchase attitude, and subjective norms are the most influential drivers of impulsive online purchases. Key enablers such as trust, promotional strategies, website visual appeal, and perceived usefulness positively shape cognitive and emotional readiness for impulse buying, while perceived risk negatively affects consumer attitudes. The study contributes to both theoretical understanding and managerial practice by offering a comprehensive view of how digital, psychological, and social elements jointly impact spontaneous buying decisions among digitally active youth. These insights help e-commerce platforms tailor strategies that foster trust, optimize user experiences, and leverage social influence to stimulate impulse purchasing. By deepening knowledge of youth consumer behavior in emerging markets, this research supports more effective digital marketing strategies and empowers businesses to align with evolving consumer expectations; future studies may extend this framework across broader demographics and longitudinal timelines to further benefit the development of responsible and consumer-centric e-commerce ecosystems..

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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