

UTAUT 2 MODIFICATIONS IN RELATION TO EXTERNAL STIMULI AND CUSTOMER ENGAGEMENT: EVIDENCE OF ONLINE SHOPPING ACTIVITY IN INDONESIA

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ABSTRACT

Introduction/Main Objectives: This study examines external stimuli and customer engagement within a modified Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework. **Background Problems:** During the pandemic, online shopping applications gained rapid popularity, signaling the maturation of e-commerce as a retail channel and causing substantial shifts in consumer purchasing patterns. This study provides empirical evidence that UTAUT2 can explain how technological features influence customer engagement and, in turn, stimulate impulsive buying behavior. **Novelty:** This study extends UTAUT2 by analyzing how external stimuli and customer engagement interact to explain impulsive purchasing in online shopping applications, particularly in the context of a developing economy. **Research Methods:** Data were collected through a web-based survey of 246 active online shoppers. Hypotheses were tested using structural equation modeling (SEM). **Finding/Results:** The results show that external stimuli significantly affect customer engagement, which subsequently drives impulsive purchasing. Customer engagement acts as a mediating mechanism that links technological features with consumer behavior. **Conclusion:** This study advances the theoretical development of UTAUT2 by proposing a customer engagement model that explains impulsive buying in e-commerce. The findings also provide practical insights into online platforms on how to design features that enhance engagement and strategically encourage impulsive purchases.

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INTRODUCTION

E-commerce platforms have become critical actors in the modern economy, serving as essential channels for both businesses and consumers. Their significance lies in their transformative impact on shopping patterns, market accessibility, and consumer participation. The rapid growth of e-commerce has reshaped customer behavior by offering unmatched convenience and global access to products. With global sales projected to surpass \$8 trillion by 2026, understanding the psychological and technological factors influencing consumer decision-making has become a pressing need (Chevalier, 2024). In Indonesia, the past decade has witnessed the expansion of online shopping portals, product variety, and high-speed internet access. These developments have matured e-commerce as a retail channel and driven substantial changes in purchasing patterns. Despite the pandemic, Indonesia's digital economy experienced significant acceleration, as reflected in the rapid growth of e-commerce transactions, which increased by 61.7% year-on-year to reach IDR 291.5 trillion by the third quarter of 2021 (Bank Indonesia, 2021).

Retailers are increasingly adopting mobile applications because they enable seamless digital interactions within e-commerce platforms (Aragoncillo & Orús, 2018; Reinartz et al., 2019). Compared with traditional retail, these platforms offer unmatched convenience and variety. By allowing customers to shop anytime and anywhere, they remove geographical and temporal barriers, thereby enhancing the shopping experience (Yang & Lee, 2022). The wide range of online products caters to diverse preferences and encourages impulsive buying behaviors less common in physical stores (Aragoncillo & Orús, 2018). Moreover, the cost-effectiveness of online shopping—where consumers can quickly compare prices and

secure better deals—underscores its significance, particularly during economic downturns or in developing regions where access to traditional markets may be limited (Mbayo Kabango & Romeo Asa, 2015). As mobile shopping grows, it is crucial for researchers and managers to understand how customers perceive these experiences and how this affects their future behavior. Such insights can help developers design timely promotions and encourage marketers to adopt innovative strategies that respond to shifting consumer behavior.

Nevertheless, academic studies on mobile shopping remain limited and geographically constrained (Groß, 2015; Marriott et al., 2017). Nevertheless, academic studies on mobile shopping remain limited and geographically constrained (Groß, 2015; Marriott et al., 2017). Prior research has examined various psychological and behavioral factors influencing mobile shopping usage, including emotional responses, social influence, and perceived contract violations (Chopdar et al., 2022; Chopdar & Sivakumar, 2018). Existing research primarily examines initial acceptance, usage, and engagement (Huang & Korfiatis, 2015; M. Kim et al., 2017; Natarajan et al., 2017). Among these behaviors, impulsive buying—defined as unplanned, spontaneous purchases driven by emotional and cognitive triggers—has gained attention for its significant implications in online markets (Rook, 1987; Spears, 2006).

Frameworks such as the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) offer valuable insights into how technological features shape consumer behaviour (Venkatesh, Walton, & Thong, 2012). However, their application to impulsive buying in e-commerce remains limited, particularly constructs such as performance expectancy, effort expectancy, hedonic motivation, and price value in relation to customer engagement.

Customer engagement, defined as a consumer's emotional, cognitive, and behavioral commitment to brand interactions, is widely recognized as a key factor influencing impulsive purchasing (Brodie et al., 2011). Although research on impulsive buying is increasing, significant gaps remain. Much prior research has focused on brick-and-mortar retail, overlooking the unique dynamics of online environments where technological features such as personalized recommendations and gamified interfaces strongly influence decision-making (Z. Zhang et al., 2022). Moreover, the relationship between social influence and customer engagement in digital commerce has not been adequately explored. Addressing these gaps requires a comprehensive framework that integrates UTAUT2 constructs with customer engagement to explain impulsive online purchases.

Consumer behavior is shaped by both dispositional and situational cognitive processes that interact differently depending on individual traits and decision contexts (Abdillah, 2009). Positive attitudes and strong beliefs about a product or brand increase purchase likelihood (Abdillah, 2009; Fitri et al., 2022; Siahaan et al., 2022). Social variables, including family, peers, and opinion leaders, also exert strong influence, with purchasing behavior shaped by norms and reference groups (Lynn-Sze et al., 2023; Mayasari et al., 2023; Rizi et al., 2023). Prior studies have identified external stimuli affecting online shopping (Gunasundari J, 2022). More specifically, within the UTAUT2 framework (Venkatesh et al., 2003), constructs such as performance expectancy, effort expectancy, hedonic motivation, and price value can serve as such stimuli. Understanding these drivers helps online marketers design strategies to enhance shopping experiences and stimulate impulse purchases (Danish Habib & Qayyum, 2017).

Customers exposed to stimulating cues are more likely to make unplanned purchases. Online platforms further reinforce this tendency by providing convenience and saving time. The resulting purchases are typically accompanied by strong desire and positive emotions (Ayub & Zafar Maira, 2018; Parboteeah et al., 2009; Zhang & Liu, 2018). Impulse buying has been observed across offline, website, and social media contexts, with more than half of online purchases estimated to be impulsive (Wu et al., 2020; Zheng et al., 2019). This underscores the importance of understanding how technological acceptance influences online impulse buying (Fu et al., 2018). Prior studies classify the following UTAUT2 constructs as key external drivers: performance expectancy (e.g., visual appeal, navigation ability, security display), effort expectancy (ease of use), price value (perceived cost-benefit), and hedonic motivation (product availability, enjoyment). Each of these drivers can indirectly shape impulsive purchasing behavior.

This study examines how e-commerce platforms utilize technological features to foster customer engagement, which in turn influences impulsive buying. Data were collected from users who shop through mobile applications using a web-based questionnaire distributed via snowball sampling. The analysis was conducted with AMOS. Theoretically, this study integrates UTAUT2 with flow theory Mirvis P and Csikszentmihalyi M (1991) to explain the immersive and emotional dimensions of online shopping. Practically, it offers insights for app developers and managers to enhance features that strengthen user interaction.

By extending UTAUT2 with flow theory and contextualizing it in the Indonesian e-commerce market, this study: (1) assesses the relationships between the UTAUT2 constructs, customer engagement, and impulsive purchasing; (2)

examines how these constructs influence behavior in e-commerce settings; and (3) provides recommendations for platforms to increase engagement and strategically leverage impulsive buying.

In doing so this study makes several key contributions to both theoretical and practical understanding of consumer behavior in digital commerce. First, it extends UTAUT2 by integrating flow theory to explain how performance expectancy, effort expectancy, hedonic motivation, and price value influence customer engagement and, ultimately, impulsive buying. Previous applications of UTAUT2 have largely focused on adoption, leaving its role in unplanned purchasing underexplored. Second, it provides empirical evidence from Indonesia, a fast-growing yet understudied e-commerce market, thereby broadening the contextual application of UTAUT2 beyond developed economies. Third, by positioning customer engagement as a mediating mechanism, this study deepens theoretical understanding of how technological features not only facilitate adoption but also foster the psychological immersion that stimulates impulsive behavior. Collectively, these contributions enrich the theoretical development of UTAUT2, address key gaps in consumer behavior research, and provide actionable insights for online platforms seeking to strengthen engagement and strategically harness impulsive purchasing.

The research is guided by the following questions: Does performance expectancy positively influence customer engagement in online shopping applications? Does effort expectancy positively influence customer engagement? Does hedonic motivation positively influence customer engagement? Does price value positively influence customer engagement? Does customer engagement positively influence impulsive purchases in online

shopping applications? The study seeks to provide empirical evidence on the effects of these constructs and clarify the role of customer engagement in shaping impulsive buying in the e-commerce context.

LITERATURE REVIEW

1. Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), developed by Venkatesh et al. (2012), extends the original UTAUT framework to the consumer context. This model has attracted significant attention in technology adoption research, particularly in studies focused on consumer behavior. UTAUT2 emphasizes individual-level determinants that shape technology adoption and use, while integrating new constructs and strengthening existing relationships to better capture consumer decision-making.

E-commerce platforms rely heavily on digital technologies to provide seamless user experiences, making UTAUT2 a valuable lens for understanding customer behavior in online environments. Several UTAUT2 constructs are particularly relevant in this context. Performance expectancy refers to the extent to which consumers believe that using a technology will provide benefits in performing certain activities, making it an important predictor of technology acceptance and use (Venkatesh et al., 2012). Effort expectancy refers to the degree of ease associated with consumers' use of technology and is an important determinant of technology acceptance and use (Venkatesh et al., 2012). Hedonic motivation captures the enjoyment derived from aesthetically appealing platforms, which can directly influence both customer engagement and impulsive purchasing (Xu et al., 2020). Price value reflects the importance of

discounts, free trials, and value-oriented pricing strategies in shaping online purchase decisions (Chiu et al., 2014).

Overall, UTAUT2 offers a comprehensive framework for examining technology adoption and use in consumer settings. By incorporating constructs such as hedonic motivation and price value, the model explains the complexities of e-commerce behaviors, particularly in relation to customer engagement and impulsive buying. Applying UTAUT2 in this study not only addresses gaps in the literature but also provides practical insights for improving e-commerce platform design and marketing strategies.

2. Flow Theory

Flow theory has been widely applied in digital and online consumer contexts, including mobile commerce and online shopping, to explain users' immersive, enjoyable, and engaging experiences during technology-mediated interactions (Gao & Bai, 2014; Ozkara et al., 2017). Mirvis P and Csikszentmihalyi M (1991) described flow as a state in which individuals become so deeply absorbed in an activity that they lose awareness of time and external surroundings, while experiencing a sense of pleasure and intrinsic motivation. Individuals in this state report positive emotions and a high degree of behavioral control while carrying out tasks (Wu et al., 2020). Thus, flow represents full engagement, heightened concentration, and enjoyment, accompanied by the effortless execution of activities.

Previous research has examined flow from multiple perspectives, including its antecedents, experiential dimensions, and behavioral outcomes in online consumer environments (Gao & Bai, 2014; Hoffman & Novak, 2009; Ozkara et al., 2017). Studies on social media show that

flow influences perceptions, attitudes, and psychological processes, which in turn shape individual behaviors (Ozkara et al., 2017) such as engagement in purchasing products on social networking sites (Rehman et al., 2020). Building on this evidence, it is reasonable to expect that external stimuli derived from the UTAUT2 framework may foster customer engagement in technology use, ultimately influencing behavioral outcomes such as impulsive buying.

3. Performance Expectancy

Venkatesh et al. (2003) defined performance expectancy as the extent to which an individual believes that using a system will help achieve advantages in a particular job or activity. In the context of online shopping, this construct includes visual appeal (Wells et al., 2011; Zheng et al., 2019), navigation ability (Wells et al., 2011), and security display (Wells et al., 2011). Accordingly, in this study, performance expectancy refers to the extent to which customers perceive that using a shopping platform helps them achieve their product purchasing goals.

4. Effort Expectancy

Effort expectancy refers to the degree of ease associated with using a system or technology. Online shoppers often have limited time, making speed and convenience essential benefits of e-commerce (Sair & Danish, 2018). Venkatesh et al. (2003) reported effort expectancy as the perceived ease of use and the effectiveness of that ease in supporting technology adoption. Consumers thus assess mobile commerce platforms based on how easily they can integrate them into daily routines. In the current study, effort expectancy is defined as the level of convenience customers associate with using retail websites to purchase products.

5. Hedonic Motivation

Hedonic motivation plays a significant role in technology acceptance and use (Chang, 2012; Venkatesh, Walton, & Thong, 2012). In the context of the current study, the enjoyment derived from engaging with online shopping platforms is considered a key driver of purchase behavior.

6. Price Value

Price value refers to the degree to which cost and pricing structures influence system or technology use. As a predictor of behavioral intention, perceived usefulness and cost-benefit evaluation are critical factors. Dodds et al. (1991) defined price value as the cognitive trade-off that occurs when the consumer weighs the benefits of a product or service against the monetary cost. Thus, pricing strongly shapes purchase decisions (Deaux & Lewis, 1984). In the current study, price value captures the extent to which perceived value influences consumers' willingness to pay for products.

7. Customer Engagement

Customer engagement refers to consumers' cognitive, emotional, and behavioral investment when interacting with a brand (Hollebeek et al., 2014). The term "engage" can be interpreted as meaning to bind or actively participate (McLean et al., 2018). As applied to the online retail context, engagement can be viewed as a motivational construct consisting of three elements: the object (i.e., the platform), the subject (i.e., the customer), and the valence (i.e., positive affect). Engagement depends on customers' needs, motives, and goals, which guide their participation on a platform (McLean et al., 2018). Importantly, initial adoption of an innovation does not necessarily indicate engagement (S. J. Hong et al., 2006). For

example, respondents may temporarily download an application without becoming engaged users. Mobile applications, however, are powerful tools for fostering high levels of engagement (Bellman et al., 2011). McLean et al. (2018) found that sustained engagement with m-commerce applications enhances customer loyalty. Thus, if platforms consistently develop capabilities that maintain user interest, customers are more likely to remain active and loyal.

8. Impulsive Buying

Impulse buying occurs when consumers experience a sudden and compelling urge to purchase immediately (Dawson & Kim, 2009; Lim et al., 2017). Researchers have identified four types of impulsive buying: pure, reminder, proposition, and planned (Hong et al., 2023). Pure impulse buying involves deviation from habitual purchasing due to an emotional trigger, such as the sudden appeal of a product. Reminder impulse buying arises when consumers recall prior promotions or advertising. Proposition impulse buying occurs when consumers recognize a product, perceive a need, and act immediately. Planned impulse buying happens when consumers intend to make certain purchases but are also influenced by promotions or discounts to buy additional items (Bilal Ahmad et al., 2019; Chan et al., 2017; Zheng et al., 2019). The complexity of these behaviors underscores the importance of studying impulse buying as a distinctive aspect of consumer decision-making, differing significantly from rational or planned purchasing processes.

9. Performance Expectancy, Effort Expectancy, Hedonism Motivation, Price Value and Customer Engagement

Flow theory, proposed by Csikszentmihaly (1990), describes a state of total immersion and enjoyment in an activity. Applied in e-

commerce, flow provides a framework for understanding how constructs from UTAUT2—specifically performance expectancy, effort expectancy, hedonic motivation, and price value—drive customer engagement. Venkatesh et al. (2003) introduced UTAUT2 as a comprehensive model for studying the adoption and diffusion of information technology.

The first external stimulus is performance expectancy, defined by Venkatesh et al. (2003, p 451) as “the degree to which using a technology will provide consumers with benefits when performing certain activities”. In mobile commerce, it refers to users’ belief that apps help them conduct transactions effectively (Sair & Danish, 2018). Performance expectancy encompasses perceived benefits such as visual appeal, navigability, and security displays. Abou-Shouk and Soliman (2021) argue that performance expectancy captures user perceptions of improved performance when using innovations. In this study, performance expectancy is defined as the extent to which customers believe that using an online shopping platform helps them accomplish their shopping activities more effectively (Venkatesh et al., 2012). When customers perceive clear performance advantages, they are more likely to engage more deeply with a platform. Prior research indicates that users’ beliefs about technology can foster cognitive absorption, while immersive flow experiences further shape behavioral outcomes, ultimately strengthening engagement (Agarwal & Karahanna, 2000; Zhou, 2020).

The second external stimulus is effort expectancy, which parallels ease of use and reflects consumers’ perceptions that technology is simple and user-friendly (Jambulingam, 2013). Intuitive navigation and well-designed interfaces allow users to engage without distraction, facilitating flow. Reducing cognitive

load enables sustained focus on enjoyable activities, such as browsing or interacting with platform features. Finneran and Zhang (2005) argued that user-friendly systems minimize frustration and maximize immersion, increasing the likelihood of flow. In the context of mobile commerce, effort expectancy has been reported to correlate positively with flow and customer engagement (Kim et al., 2021). Tan et al. (2013) also found that ease of use significantly predicts mobile learning adoption. As reflected by the growing popularity of online shopping, consumers increasingly prefer e-commerce for its convenience and reduced effort compared with traditional retail. Conversely, poor usability—such as slow loading, cluttered design, or complex payment processes—reduces engagement (Grewal & Roggeveen, 2020; Hansen & Levin, 2010; Linzbach et al., 2019). In other words, high perceived effort negatively impacts behavioral intentions, whereas low effort strengthens engagement (Carter & Yeo, 2016; Roggeveen et al., 2020; Roy et al., 2021). Recent evidence confirms that effort expectancy significantly influences consumer engagement in mobile commerce (Chou et al., 2018).

The third external stimulus is hedonic motivation, or the enjoyment consumers experience when using a product. Flow theory aligns closely with hedonic motivation, as both highlight pleasure and deep involvement. Engaging platforms are more likely to trigger flow and strengthen user commitment. Trevino and Webster (1992) demonstrated that hedonic experiences directly foster flow in technology-mediated contexts. Similarly, hedonic motivation is identified by (Gao & Bai, 2014) as a robust predictor of flow in online shopping, enhancing engagement. In this study, hedonic motivation is defined as the enjoyment that consumers experience when using online shopping applications. Delighted customers

typically show stronger engagement (Gummerus et al., 2012), confidence (Brodie et al., 2013) and advocacy behaviors (Pansari & Kumar, 2017). Accordingly, satisfaction and pleasure are expected to strengthen engagement in the e-commerce context.

The final external stimulus is price value, which reflects the trade-off between the perceived benefits and costs of using a system. Perceived value is a key driver of purchase behavior and competitive advantage. Venkatesh et al. (2012) emphasized that consumers adopt technology when benefits outweigh costs. Subsequent studies confirm that price value positively influences technology adoption, such as smartwatches (Jung et al., 2016; Mani & Chouk, 2017). In the current study, price value refers to the perceived benefits of online shopping compared with traditional retail, including convenience and cost savings. Previous studies have shown engagement rises when users perceive a secure, efficient platform that minimizes effort while maximizing value (Carter & Yeo, 2016; Roggeveen et al., 2020). Recognizing high value generates satisfaction and positive emotions, precursors to flow. Discounts, promotions, and unique offers further enhance perceived value and engagement. Venkatesh, Walton, Thong, et al. (2012) confirmed that price value significantly influences technology adoption, while Chen and Yao (2022) reported that it also increases immersive buying experiences.

Integrating flow theory with UTAUT2 constructs offers a comprehensive framework for understanding and enhancing customer engagement. By cultivating flow conditions, e-commerce platforms can deliver pleasurable and immersive experiences, driving sustained engagement and loyalty. In line with flow theory, customers experience flow when they are fully absorbed, motivated, and satisfied, often

losing track of time (Santini et al., 2020). Furthermore, prior literature consistently shows that consumers adopt new technologies when they believe these technologies are beneficial (Alalwan et al., 2017). Accordingly, this study applies flow theory to examine how technological stimuli foster customer engagement, leading to the following hypotheses:

- H1: Performance expectancy has a positive effect on customer engagement.
- H2: Effort Expectancy has a positive effect on customer engagement.
- H3: Hedonism motivation has a positive effect on customer engagement.
- H4: Price value has a positive effect on customer engagement.

10. Customer Engagement and impulsive buying

Incorporating flow theory provides deeper insight into the role of customer engagement in impulsive buying. Flow theory posits that when individuals are fully absorbed in an activity, they experience heightened enjoyment and concentration, which can shape behaviors and decisions. Customer engagement reflects the customer's attachment and active participation in non-transactional activities related to a brand or product (Santini et al., 2020). The construct of customer engagement has been widely applied in the digital era, especially in social networks. These networks empower customers to interact freely and participate in brand-related activities, making engagement an increasingly common phenomenon in online shopping applications.

Highly engaged customers directly contribute to firms through word-of-mouth promotion and value creation, while indirectly benefiting firms by enhancing loyalty and impulsive buying behavior (Thakur, 2016). As such, companies in the online marketplace actively strive to improve

engagement. In the literature, customer engagement is defined as the investment of customer attitudes and behaviors in non-transactional interactions with focal objects such as convenience, safety, comfort, visual appeal, or product availability. Engaged customers also interact virtually with other customers and platform staff to obtain information that supports purchase decisions (Ganesh et al., 2010).

Customer engagement on e-commerce platforms plays a crucial role in achieving customer shopping goals. Findings show external stimuli such as perceived convenience, security, comfort, visual appeal and product availability trigger engagement and subsequently influence online impulsive buying (Mollen & Wilson, 2010). Highly engaged customers are more likely to reach flow states during interactions with e-commerce platforms. Attention-grabbing features sustain engagement, heighten immersion, and create psychological conditions conducive to impulsive purchases. Digital participation thus cultivates flow experiences by encouraging focused attention and reducing distractions (Hoffman & Novak, 2009). Engaged users are more prone to emotional connections and immersion, factors that strongly predict impulsive buying behavior (Zhao et al., 2022).

The premise of the current study is that external stimuli are the main drivers of customer engagement in online shopping applications.

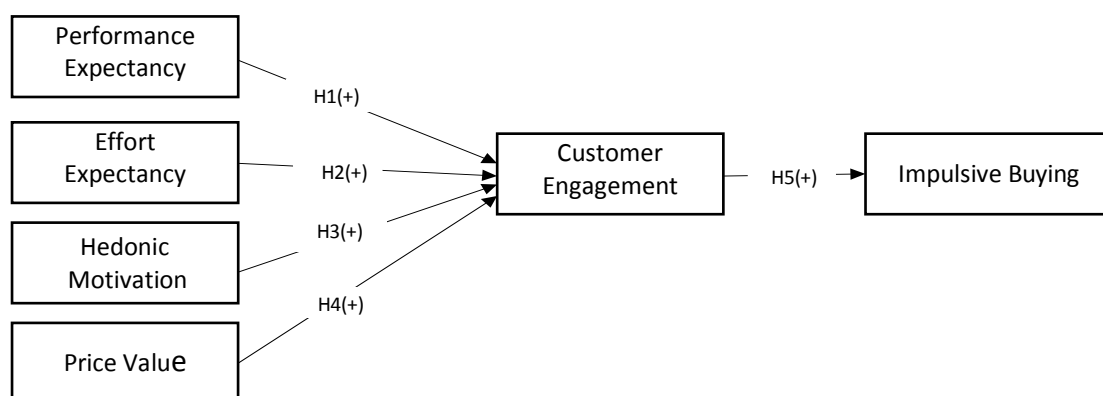
Further, engagement manifests through customer experience (Calder et al., 2009), brand interaction (Hollebeek et al., 2014), and online consumption or recommendations (Hopp & Gallicano, 2016), all of which generate value for firms (Pansari & Kumar, 2017). Prior research has demonstrated that when customers interact meaningfully with organizations, brands, or products, they form emotional bonds and build trust (Boateng, 2019; J. Islam & Rahman, 2017). In the context of online shopping, such engagement includes trust in a platform’s ability to safeguard personal information, such as payment details and digital data (Boateng, 2019; J. U. Islam et al., 2018).

Accordingly, this study posits that highly engaged customers are those who believe in a website’s ability to fulfil its promises, which in turn strengthens their trust and engagement with both the company and its products. Furthermore, customer engagement can be reinforced by fostering positive experiences and cultivating meaningful involvement (Taheri et al., 2024). Based on these insights, the following hypothesis is proposed:

H5: Customer engagement has a positive effect on impulsive buying.

The following research model is based on the online shopping context and theoretical foundations from the existing literature:

Figure 1. Theoretical Model



METHOD, DATA, AND ANALYSIS

1. Sample and Data Collection

The study employed a survey method. Specifically, an online questionnaire was distributed to Indonesian consumers who had previously used an e-commerce application for purchases. Respondents were first contacted for permission to collect data. Upon agreement, the survey was administered, and the data collection lasted for two weeks. The questionnaire was distributed via direct private messages to online shopping users, with informed consent obtained from each participant. Additional respondents were recruited through social media channels.

A total of 246 participants agreed to take part in the study. Sampling followed a purposive approach, where participants were selected based on predetermined criteria (Neuman, 2014). The inclusion criteria required respondents to be at least 17 years old and active users of online shopping platforms. According to Hair et al. (2014), a minimum of 100 observations is sufficient for research models with six or fewer latent constructs and more than three indicators per construct. This study included six variables (independent and dependent), each represented by three to four indicators, thereby meeting the recommended sample size requirements.

2. Data analysis procedure

All constructs in the study used measurements from previous research, which needed to be translated into Indonesian following the retranslation procedure. Each instrument was translated using a rigorous process, including back-translation (Brislin, 1970), and then reviewed by a panel of bilingual and academic

experts familiar with this area of research. This process ensured that the translated version retained the meaning of the original items but also had cultural relevance in the Indonesian context. The questionnaire items established in previous research by Venkatesh et al. (2003), Hollebeek et al. (2014), and Ortiz Alvarado et al. (2020) were modified as shown in Table 1. All variables were measured using a 5-point Likert scale ranging from 1 to 5. Respondents were instructed to rate items as follows: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree.

AMOS 26 (Analysis of Moment Structures) was used for data analysis (Thakkar, 2020). As noted earlier, the research model was tested in the Indonesian context, with factor analysis carried out to confirm the structure and relationships among variables were consistent with the underlying theory. As described previously, data were collected through an online questionnaire (Ebert et al., 2018). Following data collection, validity and reliability tests were performed. Structural Equation Modeling (SEM) was then employed to examine the causal relationships among the variables and to test the study's hypotheses. After establishing standard reliability and validity, the model's overall appropriateness was evaluated by comparing the goodness-of-fit indices to conventional thresholds. The model fit was assessed using several indices, including the chi-square statistic, RMSEA (Root Mean Square Error of Approximation), CMIN/DF (Minimum Discrepancy Function), TLI (Tucker–Lewis Index), and CFI (Comparative Fit Index). These measures provided evidence supporting the adequacy of the proposed model.

Table 1. Operational Definition

Variables	Operational Definitions	Measures
Performance expectancy	The extent to which an individual assumes that using the system will help them attain a competitive advantage in a particular job or activity.	Venkatesh et al. (2003)
Effort expectancy	The level of convenience associated with using a specific system, as well as how a person feels about using technology in an effortless manner and how much ease-of-use power there is in using technology	Venkatesh et al. (2003)
Hedonism motivation	It is the delight or enjoyment derived from the use of technology and has been shown to play a significant role in determining system/technology acceptance and utilization.	Venkatesh et al. (2003)
Price value	Refers to the degree to which the cost and pricing structure has a significant impact on the system/technology's utilization.	Venkatesh et al. (2003)
Customer engagement	Cognitive, emotional, and behavioral consumer engagement throughout a brand interaction.	Hollebeek et al. (2014)
Impulsive buying	Customers engage in impulsive purchasing when they experience sudden and persistent pressure to buy something immediately.	Dawson and Kim (2009); Ortiz Alvarado et al. (2020)

RESULTS AND DISCUSSION

1. Data description

The study examined external stimuli and consumer engagement using a questionnaire distributed through an online survey. Because the analysis relied on Structural Equation Modeling (SEM), sample size was carefully considered. According to Hair et al. (2014), the required sample size depends on the complexity and characteristics of the measurement model. A minimum of 100 observations is recommended for models with six or fewer latent constructs and more than three indicators per construct.

This study included six variables (independent and dependent), each represented by three to four indicators. Based on these requirements, the final sample consisting of 244 respondents, exceeding the minimum threshold. Initially, 246 responses were collected. However, two outliers

were subsequently removed because the participants were under 17 years of age and did not meet the inclusion criteria.

Table 2 presents the descriptive statistics of the sample. Women constituted 78.9% ($n = 192$) of respondents, with men accounting for 21.1% ($n = 52$). The age distribution shows the majority of participants (63.4%, $n = 156$) were aged between 18 and 25 years. Table 2 provides a detailed classification of respondents' demographic profiles.

2. Measurement Model Analysis

All the constructs measured in the current study have been utilized in previous research. As described above, constructs were translated into Indonesian using the retranslation technique. Each variable was measured using a five-point Likert scale, with respondents rating questionnaire items as follows: 1 = strongly disagree, 2 =

Table 2. Profile of Respondents

Respondent profile		Frequency	Presentation
Gender	Male	52	21.1 %
	Female	192	78.9%
Marital status	Not married yet	218	89.4%
	Married	26	10.6%
Age	18-25	156	63.4%
	26-35	52	21.1%
	36-45	34	13.8%
	>45	2	8%
Profession	Student	184	75.6%
	Private sector employee	37	15%
	Government employee	16	6.5%
	Entrepreneur/businessman	4	1.6%
	Unemployed	3	1.2%

Source: Data processed (2023)

disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Utilizing three question items each from Venkatesh et al. (2003), we respectively gauged performance expectations, effort expectations, and hedonic motivation. Price value was measured using four question items from Venkatesh, Walton, Thong, et al. (2012). Customer engagement was then measured using four question items from Ahn and Back (2018) and Harrigan et al. (2017), and finally, impulsive buying was measured using four question items adapted from Zhou & Wong (2004).

The researchers first evaluated the goodness of fit (GOF) of the measurement model before putting the hypotheses to the test. The study's GOF measurement model satisfied the necessary requirements, with CMIN/DF = 1.779, RMSEA = 0.056, CFI = 0.962, and SRMR = 0.049. As a result, the GOF measuring model used in this work was confirmed to be appropriate. Additionally, the convergent and discriminant validity of the constructs were evaluated.

Table 4 summarizes the findings of the convergent validity test. According to Hair et al.

2014) guidelines for convergent validity testing, a questionnaire item is considered to be good if its factor loading (λ) value is more than 0.5. The results of our analysis showed a factor loading value (λ) above 0.5 for each of the 21 questionnaire items.

Given that all data were obtained from a single source, common method bias (CMB) was a possibility in our study (Podsakoff et al., 2003). Consequently, a sequence of confirmatory factor analyses (CFAs) was carried out to evaluate the potential impacts of CMB. The Harman single-factor test was also utilized. The test yielded a χ^2 value of 1360.734, a CMIN/DF ratio of 7.2, an RMSEA value of 0.159, a CFI value of 0.669, and a TLI value of 0.632. While the single-factor test yielded an unsatisfactory model fit, the CMB in this study is not statistically significant according to Podsakoff et al. (2003). In summary, the comparison between Harman's model and the single-factor test from the measurement model did not indicate the presence of common method bias.

Table 3. Mahalanobis distance

Observation number	Mahalanobis d-squared	p1	p2
193	58.26	0.050	0.000
144	58.20	0.050	0.000
211	58.02	0.050	0.000
147	57.48	0.060	0.000
210	57.30	0.060	0.000
165	56.99	0.060	0.000
177	56.70	0.060	0.000
187	56.51	0.070	0.000
7	56.47	0.070	0.000
181	55.99	0.070	0.000
157	55.89	0.070	0.000
10	55.18	0.080	0.000
65	54.57	0.090	0.000
50	54.48	0.090	0.000
67	54.30	0.100	0.000
209	53.92	0.100	0.000
206	53.65	0.110	0.000
38	53.26	0.110	0.000
25	52.73	0.120	0.000
76	51.41	0.150	0.000
167	51.33	0.150	0.000
34	50.89	0.160	0.000
41	50.85	0.160	0.000
197	50.73	0.170	0.000
48	50.42	0.170	0.000
37	50.31	0.180	0.000
56	49.66	0.190	0.000
63	49.58	0.200	0.000
90	47.56	0.260	0.000
36	46.71	0.280	0.000
146	46.51	0.290	0.000
15	46.19	0.300	0.000
176	46.17	0.300	0.000
51	46.06	0.310	0.000
13	45.73	0.320	0.000
58	45.39	0.330	0.000
199	45.37	0.330	0.000
87	45.23	0.340	0.000
40	45.14	0.340	0.000
162	45.11	0.340	0.000

Table 4. Normality test

Indicators	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
PE_1	-0.434	0.155	-0.547	0.309
PE_2	-0.516	0.155	-0.541	0.309
PE_3	-0.623	0.155	-0.244	0.309
EE_1	-0.852	0.155	0.540	0.309
EE_2	-0.477	0.155	-0.006	0.309
EE_3	-0.960	0.155	1.322	0.309
HM_1	-0.559	0.155	-0.236	0.309
HM_2	-0.590	0.155	0.131	0.309
HM_3	-0.576	0.155	0.022	0.309
PV_1	-0.555	0.155	0.459	0.309
PV_2	-0.442	0.155	0.102	0.309
PV_3	-0.498	0.155	-0.155	0.309
PV_4	-0.172	0.155	-0.245	0.309
CE_1	-0.261	0.155	-0.671	0.309
CE_2	-0.723	0.155	0.434	0.309
CE_3	-0.262	0.155	-0.643	0.309
CE_4	-0.653	0.155	-0.036	0.309
IB_1	-0.089	0.155	-0.856	0.309
IB_2	0.161	0.155	-0.595	0.309
IB_3	-0.057	0.155	-0.756	0.309
IB_4	0.199	0.155	-0.608	0.309

Before testing the measurement model and the structural model, data preparation and cleaning were conducted according to best practices and considering transparency issues. In order to address the presence of nonnormality, outliers, and missing data in the dataset, robust maximum likelihood (ML) estimate was utilized (Kline, 2015). Recommendations from Aguinis et al. (2021) and McDonald and Ho (2002) regarding data preparation address the handling of outliers, normality, and missing data. This

research used Mahalanobis distance for outlier detection, classification and quality control. Mahalanobis distance measures the number of standard deviations a point is from the mean of the distribution, taking into account the covariance between variables. A larger Mahalanobis distance value and a significant p 1 close to 0 indicate that a point is further away from the center of the distribution. Outliers were thus identified and removed based on these scores.

Table 5. Construct Validity Test Results

Construct	Indicators	Factor Loading	AVE	Composite Reliability
Performance Expectancy (PE)	PE1	0.934	0.721	0.883
	PE2	0.641		
	PE3	0.939		
Effort Expectancy (EE)	EE1	0.712	0.599	0.817
	EE2	0.762		
	EE3	0.843		
Hedonic Motivation (HM)	HM1	0.909	0.842	0.941
	HM2	0.935		
	HM3	0.907		
Price Value (PV)	PV1	0.760	0.528	0.814
	PV2	0.826		
	PV3	0.756		
	PV4	0.532		
Customer Engagement (CE)	CE1	0.816	0.702	0.904
	CE2	0.794		
	CE3	0.874		
	CE4	0.865		
Impulsive Buying (IB)	IB1	0.776	0.612	0.863
	IB2	0.749		
	IB3	0.877		
	IB4	0.719		

Source: Data processed by AMOS 26 Graphics (2023)

Furthermore, as an important step in structural equation modeling (SEM) (Aguinis et al., 2021; McDonald & Ho, 2002), normality is usually assessed for variables included in SEM to ensure parametric statistical assumptions are met. In general, skewness values between -1 and +1 indicate a more or less symmetrical distribution, and kurtosis values around 0 indicate a normal distribution (Kline, 2015). When the AVE values of constructs are more than 0.5, they are also considered to be good. The results of the analysis indicated an AVE value for each construct in the model larger than 0.5. According to general recommendations by Hair et al. (2014), Cronbach alpha and composite reliability scores between 0.6 and 0.7 are acceptable for the discriminant validity test. In particular, the results of the reliability test indicated an excellent and good rating. The

results of the convergent validity test for this study are thus acceptable. Table 6 also shows the results of the discriminant validity test. According to the test results, the AVE root value of each construct is higher than its corresponding correlation value and therefore adequate.

3. Structural Model Analysis

The next stage was carrying out a structural model analysis, which entailed calculating the structural model's GOF value. The results for the GOF structural model indices were CMIN/DF = 1.860, RMSEA = 0.059, CFI = 0.961, and SRMR = 0.051. To aid interpretation, the implications of these indices can be summarized as follows. The root mean square error of approximation (RMSEA) was below the recommended threshold of 0.08, indicating that the model provides a satisfactory approximation

of fit. The comparative fit index (CFI) exceeded 0.90, suggesting that the hypothesized model explains the data well relative to a baseline model. Likewise, the standardized root mean square residual (SRMR) was below 0.08, reflecting an acceptable level of residual difference between the observed and predicted correlations. Taken together, these results confirm that the proposed model achieves an adequate to strong overall fit, thereby supporting the validity of the hypothesized relationships among the UTAUT2 constructs, customer engagement, and impulsive buying. Figure 2 displays the results of the hypothesis test, and Table 7 below shows the results of the hypotheses.

Table 7 and Figure 2 show that all hypotheses in the research model are supported. This study thus extends the UTAUT 2 model by offering new insights into how performance expectancy, effort expectancy, hedonic motivation, price value, and customer engagement drive impulsive purchase behaviors in digital commerce environments. As depicted in Figure 2, the findings of this study demonstrate the crucial significance of flow theory in understanding

how the UTAUT 2 constructs—performance expectancy, effort expectancy, hedonic motivation, and price value—influence customer engagement and subsequently drive impulsive buying on e-commerce platforms.

Flow theory gives a psychological perspective on the profound immersion and engagement that happens during interactions with technology, thereby providing a nuanced explanation of consumer behavior. Introduced by Csikszentmihalyi (1990), flow theory describes a state of optimal experience characterized by deep engagement, enjoyment, and immersion in an activity. In the context of e-commerce, flow occurs when users are fully absorbed in browsing or interacting with a platform, often leading to impulsive buying behaviors. Incorporating flow theory into the UTAUT 2 framework thus adds a psychological layer, emphasizing how seamless interaction with technology (i.e., e-commerce platforms) fosters engagement and impulsivity. In doing so, we address a gap in the literature where impulsive buying behavior has been underexplored within the UTAUT 2 framework.

Table 6. Discriminant Validity Test Results

	PE	EE	HM	PV	CE	IB
PE	0.849					
EE	0.587***	0.774				
HM	0.617***	0.733***	0.917			
PV	0.591***	0.656***	0.655***	0.727		
CE	0.588***	0.674***	0.788***	0.661***	0.838	
IB	0.214***	0.375***	0.403***	0.367***	0.470***	0.783

Source: Data processed by AMOS 26 Graphics (2023)

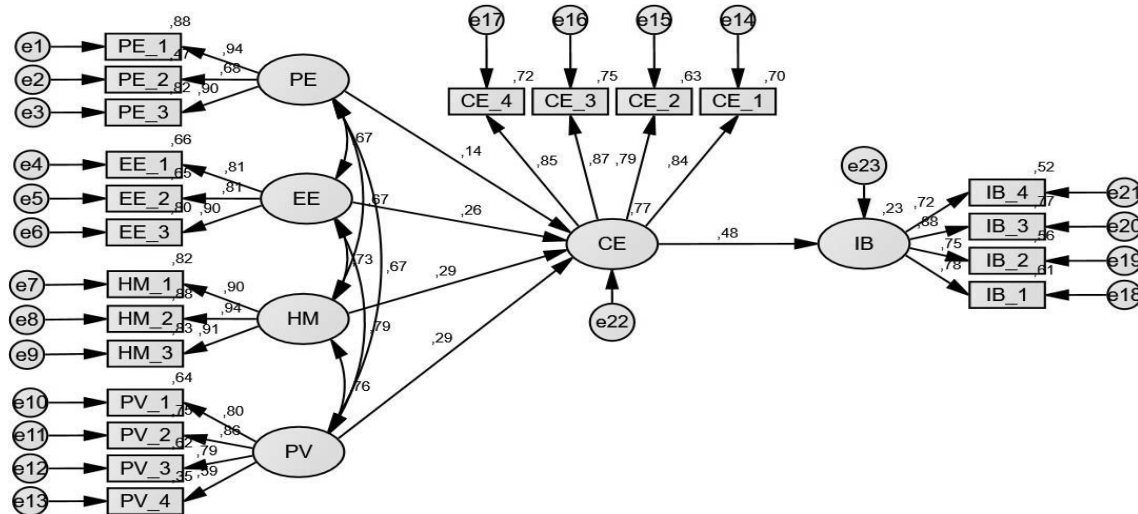
Note: *** The correlation between constructs is less than the AVE root value.

Table 7. Results of the Hypotheses

Hypotheses	Causality	Model Coeff	CR	Significance
H1	PE → CE	0.142**	2.285	Supported
H2	EE → CE	0.264**	3.115	Supported
H3	HM → CE	0.285***	3.828	Supported
H4	PV → CE	0.290**	3.151	Supported
H5	CE → IB	0.476***	6.686	Supported

Note: Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Figure 2. Path Analysis



Source: Data processed by AMOS 26 Graphics (2023)

First, H1 suggests that performance expectations have a positive effect on customer engagement. Previous studies have shown that performance expectancy significantly influences customer engagement by enhancing the perceived usefulness of the technology. The findings of the current study align with previously reported findings showing the importance of performance expectancy in driving engagement and impulse purchases. Hence, if a consumer believes that utilizing an e-commerce platform will improve their performance or provide them with advantages, they will be more inclined to actively participate in the platform. Users of online shopping applications believe the system they use facilitates their online shopping, and that online shopping is more efficient than direct shopping Tan et al. (2013), Wells et al. (2011); and Zheng et al. (2019). The ability of performance expectancy to foster flow lies in its alignment with users' intrinsic motivation to complete tasks effectively. Flow intensifies when task-relevant outcomes align with expectations, driving greater emotional and behavioral engagement. When users perceive that an e-commerce platform is meeting their goals

efficiently, they are more likely to enter a state of flow. Prior research from Venkatesh, Walton, Thong, et al. (2012), showed that performance expectancy is a critical determinant of technology acceptance, particularly when users perceive tools as goal oriented. Similarly, high perceived usefulness correlates with flow, enhancing emotional engagement during online shopping experiences (Zhou et al., 2013). As a result, a user searching for a product finds it quickly using advanced search tools, feels satisfied and immersed, and is more likely to make an impulsive purchase due to the seamless experience. Platforms with advanced search features or AI-driven recommendations (e.g., Amazon's personalized suggestions) facilitate task efficiency, enabling users to focus deeply on their shopping activities.

Second, H2 suggests that effort expectancy has a positive effect on customer engagement. This finding indicates that when consumers perceive an online shopping platform as easy to use, they are more likely to interact with it more deeply. This interpretation is consistent with UTAUT2, which conceptualizes effort expectancy as the perceived ease associated with technology use, and with smart retailing research

that incorporates effort expectancy within models of customer engagement behaviour (Roy et al., 2021; Venkatesh et al., 2012). Accordingly, ease of use may enhance customer engagement by reducing cognitive effort during online transactions, which can subsequently create conditions that support impulsive buying. In the current study, users report satisfaction with an online shopping application system/technology because of the convenience the system provides. The role of effort expectancy in relation to flow lies in its capacity to create a frictionless environment. By reducing cognitive distractions, it ensures that users stay immersed, focusing solely on the shopping experience rather than technical issues. Effort expectancy thus supports customer engagement by ensuring ease of use, which is vital for maintaining uninterrupted focus – a prerequisite for flow. The findings of this study are consistent with prior research that incorporates effort expectancy within technology acceptance models to explain customer engagement behaviour in smart retailing and e-commerce contexts (Roy et al., 2021; Taheri et al., 2024). Consequently, ease of use significantly affects flow states by minimizing cognitive load and facilitating effortless navigation. In e-commerce, intuitive design amplifies users' ability to remain immersed in their activities. For example, platforms like Shopee or Lazada implement "quick buy" options and streamlined interfaces to ensure smooth navigation, in turn enhancing user engagement.

Moreover, H3 suggests that hedonic motivation has a positive effect on customer engagement. The current study reveals that hedonic motivation emerges as the most potent predictor of flow and customer engagement. These findings corroborate prior research highlighting the significance of hedonic motivation in fostering consumer engagement

(Chang, 2012; Kašparová, 2024; Novak et al., 2000; Roy et al., 2021; Venkatesh, Walton, Thong, et al., 2012). Hedonic motivation aligns with flow theory's emphasis on intrinsic motivation. The emotional satisfaction derived from the experience keeps users engaged beyond functional needs, enhancing both cognitive focus and behavioral loyalty. Users who find shopping experiences fun and emotionally rewarding are more likely to enter a state of flow. Enjoyment fosters deep immersion, where users lose track of time and focus entirely on the browsing experience. This state heightens emotional engagement and diminishes self-control. In turn, incorporating gamified and pleasurable elements (*Hedonic Motivation*) can maintain consumers in a flow state, thereby augmenting customer engagement.

Fourth, H4 states that price value has a positive effect on customer engagement. The results of the current study show price value directly impacts flow by shaping user perceptions of affordability and satisfaction. This aligns with research conducted by (Redondo & Charron, 2023) showing that the use of mobile shopping offers specific price-related benefits. Users are able to check price comparison sites via their mobile devices to determine price value. When users feel they are receiving high value for money, they are more likely to enter a flow state, where attention is directed toward maximizing perceived benefits, often resulting in impulsive purchases. Furthermore, the current study's findings suggest that price value contributes to customer engagement in online shopping. This interpretation is consistent with UTAUT2, which conceptualizes price value as consumers' cognitive trade-off between the perceived benefits of using a technology and its monetary cost (Venkatesh et al., 2012). Recent smart retailing and e-commerce research also supports the use of

UTAUT-based dimensions in explaining customer engagement behaviour in digital retail environments (Roy et al., 2021; Taheri et al., 2024).

Finally, H5 proposes that customer engagement has a positive effect on impulsive buying. The results of the analysis show that customers who are fully involved and have a sense of trust in a system will continue to shop even under stressful conditions. As previously reported by (Hong et al., 2023), impulsive buying is triggered by the customer's emotional state. So, when emotion is triggered by the best price, customers will buy an item though they don't need it or had no intention of buying it. Highly engaged customers are more likely to experience flow states while interacting with e-commerce platforms. The current findings confirm prior studies showing that customer engagement plays a significant role in determining impulsive purchasing behavior. Features that captivate attention and encourage continuous interaction enhance immersion, creating the psychological conditions conducive to impulsive buying (Hoffman & Novak, 2009; Zhao et al., 2022). Engagement in digital environments fosters flow states by enabling focused attention and reducing interruptions (Hoffman & Novak, 2009). Engaged users on e-commerce platforms are more likely to exhibit emotional attachment and immersive behaviors, which are directly linked to impulsive purchase tendencies (Zhao et al., 2022). The integration of flow theory enriches understanding of how the UTAUT 2 constructs – performance expectancy, effort expectancy, hedonic motivation, and price value – drive customer engagement and impulsive buying. The empirical evidence from the current study strongly supports the importance of emotional and psychological immersion in shaping consumer behavior. By leveraging these insights, e-commerce platforms

can optimize user experiences, foster deep engagement, and capitalize on impulsive purchasing tendencies.

CONCLUSION AND SUGGESTIONS

Flow theory, proposed by Csikszentmihaly (1990), describes the state of deep absorption and enjoyment that individuals experience when fully engaged in an activity. In e-commerce, flow connects technological affordances, as conceptualized in UTAUT2, to customer engagement and impulsive purchasing behaviors. This study has advanced the theoretical development of UTAUT2 by proposing a customer model in which engagement stimulates impulsive purchases. Flow theory serves as the primary framework for explaining this relationship. Specifically, the UTAUT2 constructs—performance expectancy, effort expectancy, hedonic motivation, and price value—are shown to enhance engagement, which in turn drives impulsive buying. The empirical findings of the study confirm that applying UTAUT2 in the online shopping context increases engagement and encourages impulsive purchases by consumers.

The findings also highlight the practical importance of customer engagement in e-commerce. Online shopping enables consumers to access a wide range of products, compare prices, and enjoy promotional benefits (Redondo & Charron, 2023). Advances in digital technology allow firms to enhance user experiences through visualization, personalization, and interactivity (Davidaviciene et al., 2021; Grewal & Roggeveen, 2020; Rezaei et al., 2016). By fostering engagement, firms can thus encourage loyalty and promote impulsive purchases.

This study offers several managerial implications. First, performance expectancy significantly contributes to engagement. Platforms that help users achieve their goals—

such as finding products quickly or accessing personalized recommendations—facilitate flow, reduce cognitive resistance, and increase the likelihood of impulsive buying. Businesses should therefore minimize downtime, enhance transaction reliability, and implement AI-driven search and recommendation systems. Second, effort expectancy plays a critical role. Simplifying navigation and checkout reduces user effort, promotes satisfaction, and supports impulsive purchases. Strategies should therefore include intuitive interfaces, one-click payment systems, voice or visual search, and chatbots for real-time support. Third, hedonic motivation enhances emotional engagement. Aesthetically pleasing designs, interactive product showcases, gamified elements, and live-stream shopping events can increase enjoyment and strengthen impulsive buying behavior. Fourth, price value fosters engagement by reinforcing perceptions of fairness and savings. Dynamic pricing, personalized discounts, bundled offers, and time-limited promotions can enhance perceived value and drive engagement. Finally, customer engagement itself directly influences impulsive buying. Platforms can nurture engagement by implementing loyalty programs, targeted push notifications, and community features such as user-generated content or forums. These initiatives build stronger connections and encourage repeat purchasing.

Alongside its contributions, this study has some limitations. First, data were collected through a self-administered survey, potentially introducing response bias. Future research could complement survey data with behavioral measures, such as clickstream analysis or purchase history, for greater accuracy. Second, the cross-sectional design limits causal inference. Longitudinal studies are needed to better establish temporal relationships. Third, reliance on self-reported data may lead to social

desirability bias. Researchers can address this by incorporating method-bias latent variables into SEM or applying additional controls. Fourth, the use of purposive sampling from a single application limits generalizability. Future studies should therefore expand to larger and more diverse populations. Finally, while flow theory provided a valuable lens, this study did not capture all dimensions of flow. Future work should incorporate specific metrics such as enjoyment, focused attention, and perceived control to better capture flow experiences.

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