

The role of time pressure, behavioral control and human interaction in shaping e-commerce continuance intention across product categories in Indonesia

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Abstract

Purpose – This study investigates how psychological factors, such as time pressure, perceived behavioral control (PBC) and the need for human interaction, influence consumers' continued intention to use e-commerce platforms in Indonesia. By segmenting consumers based on product categories (fashion, beauty and frozen food), this study aims to uncover the behavioral nuances that affect digital loyalty in different market contexts.

Design/methodology/approach – A quantitative cross-sectional survey was conducted using online questionnaires with 149 e-commerce users in the Jabodetabek region. Data were analyzed using partial least squares structural equation modeling (PLS-SEM) and multi-group analysis (MGA) was employed to examine differences across product categories.

Findings – All three psychological variables significantly influenced continuance intention. PBC had the strongest and most consistent positive effect, followed by human interaction and time pressure, although the latter varied significantly across product types. The MGA results revealed no statistically significant moderation by product category, although practical differences were observed in the strength of the effects; for example, fashion consumers were more influenced by urgency, while frozen food buyers valued trust-based interaction.

Research limitations/implications – Findings indicate that PBC ($\beta = 0.277, p < 0.01$), human interaction needs ($\beta = 0.350, p < 0.001$) and time pressure ($\beta = 0.271, p < 0.01$) all significantly influence continuance intention, though category-specific differences emerge urgency dominates in fashion, capability in beauty and trust-based interaction in frozen food.

Originality/value – This study is the first to integrate consumer culture theory (CCT) with time pressure, PBC and human interaction needs in explaining e-commerce continuance intention. MGA reveals distinct psychological drivers across fashion, beauty and frozen food categories in Indonesia's emerging digital economy.

Keywords E-commerce continuance intention, Time pressure, Perceived behavioral control, Human interaction, Consumer behavior

Paper type Research article

1. Introduction

In the last decade, advancements in information and communication technology have significantly transformed how consumers interact with commercial services (Fahlevi *et al.*, 2024a), particularly through online transactions (Chan, Cheung, & Lee, 2017; Chintangunta, Chu, & Cebollada, 2012). One of the most prominent changes has been the increasing popularity of e-commerce, which is defined as the buying, selling, and exchange of products or services via the Internet (Bawack, Wamba, Carillo, & Akter, 2022). In Indonesia, e-commerce



has grown rapidly, supported by rising internet penetration, greater smartphone adoption, and evolving consumer preferences that prioritize convenience (Maskuroh, Fahlevi, Irma, Rita, & Rabiah, 2022; Matroji, Mulyadi, Dandi, & Fahlevi 2023). By 2024, this trend had accelerated further, driven by improved digital infrastructure, widespread use of mobile devices, and familiarity with digital transactions. Factors such as the increasing number of smartphone users, ease of digital payment systems, and expansion of logistics networks across the archipelago have collectively supported this growth (Sutia, Fahlevi, Saparudin, Irma, & Maemunah, 2020). According to APJII (2024), the number of Internet users reached 221.5 million in 2024, equivalent to 79.5% of the population. This number marks a steady increase from previous years.

Most of these users are from Generation Z and Millennials, whose digital fluency has significantly boosted online transaction volumes. The APJII data also show that online transactions rose by 61.09% in 2024, nearly doubling the 49.53% reported by 2023. The total number of Internet users in Indonesia has surpassed 200 million, with a large proportion actively engaged in online shopping. E-commerce transaction value in Indonesia is projected to reach USD 82 billion by 2025 (Yusgiantoro *et al.*, 2019). As digitalization continues to reshape lifestyles, Indonesian consumers increasingly prefer online shopping because of its practicality and efficiency (Fitri & Wulandari, 2020; Prasetya *et al.*, 2022). This behavioral shift was significantly accelerated by the COVID-19 pandemic, during which mobility restrictions drove widespread adoption of digital platforms (Niksirat *et al.*, 2024; Wiratami, Suyoto, Pitaloka, Suleman, & Prasetyo, 2022). Although early e-commerce adoption faced barriers, such as limited access and low trust (Prasetyo *et al.*, 2022), the pandemic marked a pivotal turning point. By 2020, e-commerce awareness had surged, aided by social media exposure and broader digital engagement (Krishnan & Ramesh, 2021; Meiryani *et al.*, 2021).

The major Indonesian platforms Tokopedia, Bukalapak, Lazada, and Shopee now offer diverse product categories, such as fashion, beauty, and frozen foods. These categories were selected because of their distinct consumer decision-making patterns and varying levels of psychological engagement. Fashion represents a high-involvement product category in which subjective preferences and brand identity play major roles and are often influenced by time-sensitive promotions (Aggarwal, Rabby, Fahlevi, Muttaqin, & Bansal, 2024). Beauty products are associated with perceived risk and personal relevance, requiring trust in product information and user experience (Gabriel *et al.*, 2023; Wu *et al.*, 2024). In contrast, frozen foods reflect a more utilitarian purchase behavior in which functional concerns such as delivery reliability and freshness dominate (Asif, Xuhui, Nasiri, & Ayyub, 2018; Fahlevi, Hasan, & Islam, 2023a). The variation in emotional, cognitive, and practical considerations across these categories makes them particularly suitable for examining how psychological factors such as time pressure, perceived behavioral control (PBC), and the need for human interaction differentially influence continuance intention in e-commerce.

Time pressure often triggered by flash sales and countdown promotions tends to accelerate decision-making, sometimes at the expense of thorough evaluation (Sharma *et al.*, 2024). Conversely, a perceived lack of control over the purchasing process can lead to consumer anxiety, especially in less-intuitive platform environments. Meanwhile, the availability of human interactions, such as chat support or direct seller communication, has been shown to enhance trust and user confidence, reinforcing the intention to continue using the platform. These dynamics are especially relevant for consumers who must make quick decisions in fast-paced digital environments. To better understand these behavioral mechanisms in a socio-cultural context, this study adopts Consumer Culture Theory (CCT) as its theoretical foundation (Arnould & Thompson, 2005). CCT provides a lens through which consumer behavior is interpreted not only as a response to functionality or utility but also as a reflection of identity, social interaction, and marketplace ideology. In this framework, time pressure reflects the cultural acceleration of consumption, PBC illustrates consumer agency in navigating digital environments, and the need for human interaction underscores the relational dimension of trust building in impersonal online settings. By applying CCT, this study moves

beyond rational choice perspectives and explores how consumers in Indonesia engage with e-commerce in ways shaped by local cultural norms, community expectations, and the evolving digital landscape.

To validate the conceptual relevance of these factors in the Indonesian context, we conducted a pre-test with 27 e-commerce users in Jabodetabek. This involved a structured survey and in-depth interviews with 11 respondents (40.7%) selected for their varied online shopping behavior. The findings showed that 35% of the respondents identified time pressure as the most influential factor, followed by human interaction (23%), PBC (16%), shipping reliability (16%), and ease of use (13%). Qualitative insights revealed that 72.7% of interviewees viewed the lack of human interaction as a key barrier to continued use, while 63.6% cited time-sensitive offers as a major trigger for repetitive buying behavior. These insights informed the development of a new conceptual framework centered on time pressure, PBC, and human interaction as critical drivers of e-commerce continuance intention. Unlike prior studies, which primarily focused on initial or one-time purchase intentions (Dachyar & Banjarnahor, 2017; Matroji *et al.*, 2023; Wiratami *et al.*, 2022), this study extends the perspective to continuance behavior, emphasizing sustained platform engagement over time.

Although previous studies have explored these psychological constructs independently, often within frameworks such as the Theory of Planned Behavior (TPB), few have investigated their combined influence on continuance intention, particularly in culturally embedded e-commerce contexts. For instance, Pereira, Limberger, and Ardigó (2021) identified that the absence of human interaction in chatbot environments can diminish purchase intention but have not explored broader long-term engagement patterns. Likewise, Dachyar and Banjarnahor (2017) and Wiratami *et al.* (2022) concentrated primarily on initial purchase decisions without examining continuance behavior. This study advances research on e-commerce continuance intention in three ways. First, it integrates CCT with key psychological constructs, an approach that has not yet been applied in emerging e-commerce market studies. Second, it examines these constructs simultaneously, rather than individually, enabling a more holistic understanding of user behavior. Third, it applies Multi-group Analysis (MGA) to reveal differences across product categories, fashion, beauty, and frozen food, which have received little comparative attention in continuance intention literature. These contributions provide theoretical enrichment and practical guidance for platform-specific engagement strategies.

2. Theoretical foundation and conceptual framework

2.1 Consumer Culture Theory (CCT)

CCT, first conceptualized by Arnould and Thompson (2005), provides a comprehensive lens for understanding how consumer behavior is influenced by cultural meanings, social practices, and market-driven ideologies. Unlike traditional marketing theories that primarily emphasize rational decision making and individual preferences, CCT views consumers as meaning-makers who engage with the marketplace not merely for utility but also as a form of identity expression, social affiliation, and cultural participation. Over time, this framework has evolved to include four interrelated domains: consumer identity projects, marketplace cultures, the sociohistoric patterning of consumption, and mass-mediated marketplace ideologies. Each domain contributes to a more nuanced understanding of how consumption operates in broader sociocultural systems. In this study, CCT was adopted as the grand theory to investigate continued intention to use e-commerce platforms in Indonesia. The integration of psychological factors such as time pressure, PBC, and the need for human interaction was examined through the cultural lens provided by CCT. These factors, while psychological in nature, are inherently shaped by cultural norms and socio-digital practices, especially in emerging markets, such as Indonesia.

In Figure 1, PBC is conceptually linked to the domain of consumer identity projects (Kim *et al.*, 2013). In an e-commerce environment, these variables capture consumers' sense of

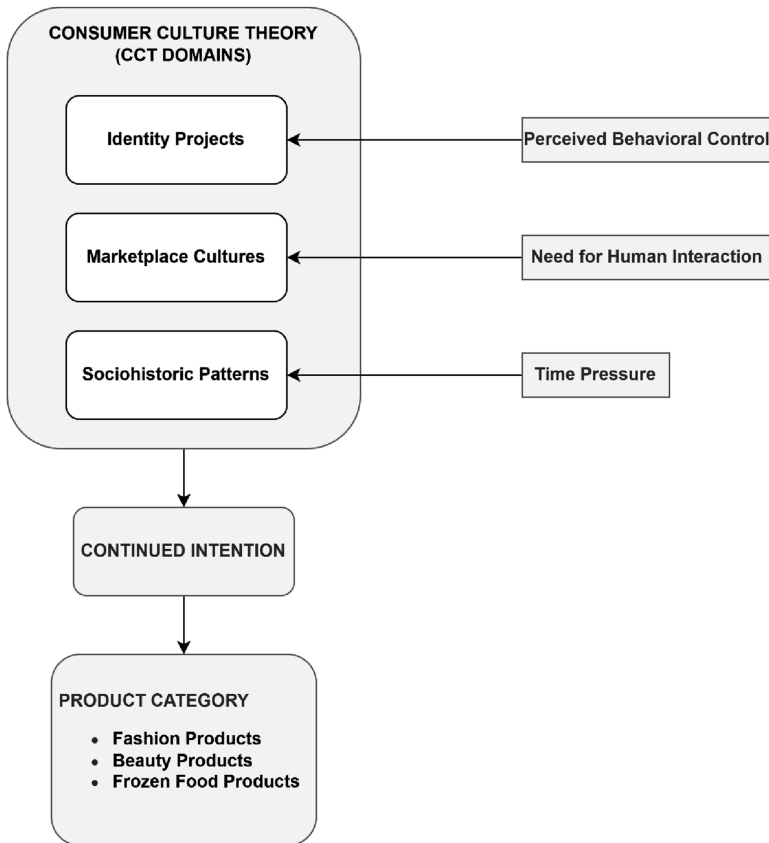


Figure 1. Consumer culture theory (CCT) domains with psychological constructs and MGA

agency and autonomy when navigating digital platforms. Among digitally fluent generations such as Millennials and Gen Z, the ability to confidently engage with technology becomes an extension of their personal identity. Consumers who perceive a high PBC are more likely to feel empowered and self-reliant, reinforcing their self-image as competent digital actors. The need for human interaction corresponds to the marketplace culture domain (Aulia *et al.*, 2021). This dimension emphasizes how consumers develop and sustain community ties through marketplace experiences. In Indonesia's collectivist cultural setting, interpersonal connections, social cues, and interactive touchpoints remain vital, even in digital commerce. Features such as live chat, seller communication, and user reviews not only facilitate transactions but also foster relational trust that sustains platform loyalty. These socialized experiences transform otherwise impersonal digital exchanges into culturally meaningful interactions (Bitner, 1990). Time pressure, a factor commonly induced by flash sales, limited time offers, and urgency cues, aligns with the sociohistoric patterning of consumption. This reflects the cultural acceleration of consumption behaviors in digital environments, where speed and immediacy have become embedded norms. Marketing strategies that emphasize scarcity and real-time decision-making tap into a broader historical shift towards instant gratification and rapid consumption cycles. In this way, time pressure is not merely a functional constraint, but a reflection of deeper cultural transformations in how consumers engage with time, value, and decision-making (Wu & Li, 2023; Zacher, Jimmieson, & Bordia, 2014).

Recent post-pandemic research (Abdul-Halim, Vafaei-Zadeh, Hanifah, Teoh, & Nawaser, 2022; Marhaeni *et al.*, 2024; Wu & Li, 2023) highlights a shift in online consumer habits with sustained e-commerce usage driven by both technological convenience and evolved risk perceptions. While UTAUT2 and the IS Continuance Model remain prominent frameworks, they focus predominantly on functional and expectancy-driven motivations, overlooking the cultural and identity-based factors emphasized by CCT. Studies in Indonesia (Maskuroh *et al.*, 2022) and Southeast Asia (Abdul-Halim *et al.*, 2022; Kass-Hanna, Lyons, & Liu, 2022) reveal that local norms, collectivist orientations, and trust mechanisms play critical roles in sustaining platform engagement. However, few studies have applied a multi-product category lens, leaving gaps in understanding category-specific psychological drivers.

2.2 Time pressure

Time pressure is a psychological condition in which consumers feel constrained by the limited time to make a purchase decision. In the consumer behavior literature, time pressure is often defined as the perceived urgency that reduces cognitive processing and accelerates decision-making (Chen, Yu, Yang, & Wei, 2018; Goethals, Leclercq-Vandelannoitte, & Tütüncü, 2012). Under such constraints, consumers tend to simplify their choices, rely on heuristics, and focus on salient cues, such as discounts, brand familiarity, or social proof (Collins, Cronin, Burt, & George, 2015). In the e-commerce environment, time pressure is most commonly induced by time-sensitive elements such as flash sales, limited-time promotions, countdown timers, and “last item remaining” alerts (Chen *et al.*, 2018). Platforms such as Shopee, Tokopedia, and Lazada frequently use aggressive time-limited marketing strategies. Flash sales (locally known as *flash sale kilat*) and “midnight madness” campaigns have become embedded in daily consumer experiences. These mechanisms are not only promotional tools, but also culturally resonant triggers. Indonesian consumers, particularly in urban centers such as Jabodetabek, have grown accustomed to engaging with deals that demand instant action. The psychological impact of these time-bound decisions creates a sense of urgency that can lead to impulsive behavior but also increases platform engagement and repetition (Amos, Holmes, & Keneson, 2014).

However, the intensity and impact of time pressure differ across product categories. For instance, fashion products are frequently associated with limited stocks and trendy appeal. Consumers in this category are more likely to experience fear of missing out (FOMO) and thus respond strongly to countdown promotions (Lau, Lee, & Phau, 2023). For beauty products, urgency may arise when platforms introduce limited-edition bundles or collaborate with influencers, creating a sense of exclusivity that heightens urgency. In contrast, frozen food products typically involve more functional considerations, such as storage, delivery time, and product freshness, where urgency may be less influential unless tied to bulk-buy discounts or limited stock alerts. This variation suggests that the effect of time pressure on continuance intention may not be uniform across product type. In high-involvement and trend-sensitive categories, such as fashion, time pressure may significantly reinforce the desire to revisit the platform. For frozen food, however, the role of time pressure may be secondary to practical considerations such as trust in logistics and storage reliability. Based on the theoretical grounding in CCT specifically under the domain of sociohistoric patterning of consumption, which recognizes the influence of culturally shaped urgency and temporal expectations, this study positions time pressure as a key construct influencing the continued use of e-commerce platforms. In digitally accelerated societies such as Indonesia, where speed, instant gratification, and reactive behavior have become cultural norms, understanding time pressure is critical for both theoretical development and practical application in marketing strategy. Accordingly, this study proposed the following hypotheses related to time pressure.

- H1. Time pressure positively influences consumers' continued intention to use e-commerce platforms.

- H4. Time pressure positively influences continued intention in the fashion product category.
- H7. Time pressure positively influences continued intention in the beauty product category.
- H10. Time pressure positively influences continued intention in the frozen food product category.

2.3 Perceived behavioral control (PBC)

PBC refers to an individual's belief in their capacity to perform a given behavior, particularly when interacting with systems or environments that require skill, confidence, or autonomy. Originally formalized in the TPB (Ajzen, 1991), PBC has since been widely applied in e-commerce studies to assess how users' self-efficacy and ease of system use influence their engagement, decision making, and intention to continue using a platform. PBC encompasses both internal control factors, such as digital literacy and confidence, and external facilitators, such as interface quality, navigation ease, and platform responsiveness (Kang, Hahn, Fortin, Hyun, & Eom, 2006). PBC plays a central role in the country's heterogeneous digital literacy landscape (Fahlevi, Asetya, Asyrof, & Dandi, 2024b). While urban consumers especially Millennials and Gen Z are typically confident in using mobile-based e-commerce applications, many others still face usability barriers related to app complexity, transaction issues, or limited trust in online systems (Fahlevi, Syafira, Fidyranurhuda, & Nadia, 2023b; Fitri & Wulandari, 2020). E-commerce platforms such as Shopee and Tokopedia have simplified interfaces, integrated mobile payment systems such as GoPay and OVO, and offered customer support features to reduce perceived complexity and boost user control.

The role of PBC varies depending on the product category. For fashion products, consumers must feel confident in navigating multiple product options, filtering by size or color, and understanding return policies. A strong sense of control is crucial for ensuring satisfaction and reducing post-purchase regret. Consumers in the beauty category often seek detailed specifications, usage instructions, and reviews. Perceived control includes the ability to locate trustworthy information and ensure product authenticity. Meanwhile, in the frozen food segment, PBC may relate more to the assurance of successful delivery, handling of logistics, and customizing delivery preferences. The sense of control over when and how perishable items arrive significantly affects users' willingness to continue using a platform for food purchases. This construct is closely aligned with the CCT consumer identity project domain. As consumers increasingly express their identities through their digital competencies and self-sufficiency, PBC becomes more than a functional condition, which reflects agency and mastery in a digitized environment. Particularly for younger tech-savvy consumers, seamlessly navigating e-commerce reinforces self-concepts related to competence, efficiency, and independence. Thus, PBC is not only a driver of continuance intention but also a culturally embedded expression of digital identity.

Recognizing that PBC is both a cognitive and culturally symbolic factor, this study posits that it is a vital variable for sustaining e-commerce engagement. Consumers who feel confident and capable are more likely to integrate platforms into their routines, perceive fewer risks, and maintain their long-term usage patterns. The emphasis on this variable is especially timely in Indonesia, where the rapid pace of digitalization requires platforms to balance growth with inclusivity and usability. Based on this theoretical and contextual basis, the following hypotheses are proposed.

- H2. PBC positively influences consumers' continued intention to use e-commerce platforms.
- H5. PBC control positively influences continued intention in the fashion product category.

H8. PBC positively influences continued intention in the beauty product category.

H11. PBC positively influences continued intention in the frozen food product category.

2.4 Need for human interaction

The need for human interaction refers to consumers' desire for interpersonal communication during the purchasing process, particularly in contexts in which information is uncertain or trust must be established. In digital commerce, this variable encompasses the expectation that users can engage with customer service agents, interact directly with sellers, or receive personalized assistance before and after making a purchase (Al-Hawari, 2014). As defined by Lee and Lyu (2016), human interaction in online shopping environments reduces ambiguity, fosters relational trust, and simulates the social reassurance that characterizes traditional retail experiences. Despite the growing popularity of automated systems, the need for human interactions remains salient (Pereira et al., 2021). Indonesian consumers, particularly those transitioning from offline to online shopping, tend to seek reassurance through interpersonal confirmation. This cultural preference for social contact is embedded in collectivist values, where trust is typically developed through relationships rather than through abstract systems. Platforms such as Shopee and Tokopedia have addressed this expectation by integrating chat features, real-time seller responses, and user reviews that mimic social endorsements. Although the functionality of the transaction may be digital, the underlying experience remains socially contextualized.

The significance of human interaction varies across product categories. Consumers often inquire about sizing, availability, and return policies, making seller responsiveness a key part of the pre-purchase decision. For beauty products, the need for human interaction may be lower, especially when users rely more on reviews, tutorials, or influencer endorsements rather than direct inquiry. Conversely, in the frozen food category, human interaction may increase in importance owing to concerns about delivery timing, packaging quality, and perishability. Consumers may feel more secure when they can directly ask sellers about shipment conditions or temperature-control assurances. This variable aligns with the CCT marketplace cultural domain. Marketplace cultures are defined by the shared norms, practices, and social formations that arise within market settings (Arnould & Thompson, 2005). The persistence of interpersonal communication in e-commerce, despite technological automation, suggests that consumers are not merely transactional agents but also participants in socially meaningful exchanges. Interactions with sellers and service agents represent more than functional touchpoints, which are relational experiences contributing to platform loyalty and emotional security. In a society like Indonesia, where relational orientation and community validation strongly influence behavior, human interaction remains the cornerstone of digital consumption.

Framing the need for human interaction within this sociocultural perspective elevates it from a peripheral to a central psychological construct. It represents consumers' embedded expectations for empathy, personalization, and trust-building in an otherwise impersonal digital environment. Recognizing and enabling this need not only enhances user satisfaction, but also contributes to sustained platform engagement, particularly in high-risk or emotionally sensitive transactions. Given this conceptualization, the following hypotheses are proposed.

H3. The need for human interaction positively influences consumers' continued intention to use e-commerce platforms.

H6. The need for human interaction positively influences continued intention in the fashion product category.

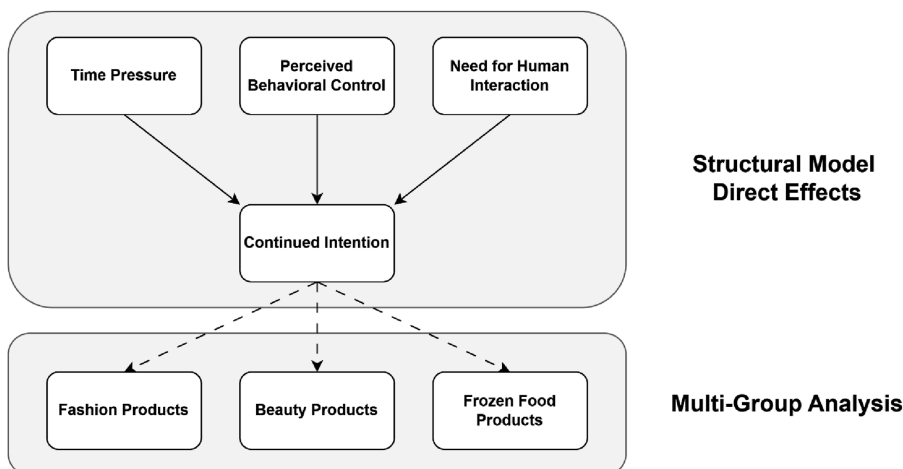
H9. The need for human interaction positively influences continued intention in the beauty product category.

H12. The need for human interaction positively influences continued intention in the frozen food product category.

2.5 Conceptual framework

This study proposes a conceptual framework that investigates the influence of three psychological constructs time pressure, PBC, and the need for human interaction on consumers' continued intention to use e-commerce platforms. These variables were selected based on their prominence in the digital consumer behavior literature and contextual relevance in Indonesia's rapidly evolving online marketplace. The framework positions continued intention as the dependent variable, reflecting users' long-term engagement with e-commerce platforms beyond the initial transactions. Based on their psychological and functional roles in shaping digital purchase behavior, the three predictor variables were theorized to exert direct effects on this outcome. Each construct is expected to contribute differently to how consumers perceive value, control, and trust during their online shopping experiences. In addition to testing the main structural relationships, this study employed an MGA approach to examine whether the strength and significance of these relationships vary across different product categories: fashion, beauty, and frozen food. These categories were selected due to their distinct consumer decision-making processes ranging from symbolic and expressive (fashion) to risk-sensitive (beauty) to functionally utilitarian (frozen food). MGA allows us to explore whether psychological drivers influence continued intention differently, depending on product involvement, emotional attachment, and purchase routines. The resulting framework is illustrated in Figure 2.

This integrated model not only enables hypothesis testing across multiple paths but also strengthens the generalizability of findings by validating differences in psychological influence across consumer contexts. By adopting this structure, this study addresses both individual behavioral factors and situational variation, offering comprehensive insights into digital consumption behavior in Indonesia.



Arrows:
Solid Arrows : Hypothesized direct influences of each psychological factor on continued intention
Dashed Lines : Moderating effects via product category comparison, tested using Multi-Group Analysis (MGA)

Figure 2. Conceptual framework

3. Methodology

This study employs a quantitative approach with a descriptive-associative design (Saunders, Lewis, & Thornhill, 2009), aiming to analyze the causal relationships between three independent variables: time pressure, PBC, and need for human interaction, and one dependent variable, namely continued intention to use e-commerce platforms. The research design was cross-sectional, with data collected at a single point in time to provide a snapshot of behavioral tendencies among users. The unit of analysis in this study was individual consumers residing in the Jabodetabek region. Data were collected using an online questionnaire distributed between September and November 2024. The questionnaire was developed using Google Forms and distributed through multiple digital channels, including WhatsApp personal networks, WhatsApp group links, and Instagram story-link sharing, to reach a diverse and regionally appropriate respondent pool. To maintain the rigor and reliability of the dataset, a series of tight filtering procedures was applied throughout the data collection process. The respondents were required to fulfill the following screening criteria.

- (1) It currently resides in Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek region).
- (2) Must have made at least two e-commerce purchases in the past three months.
- (3) Must be above 17 years old and actively use one of the following platforms: Shopee, Tokopedia, Lazada, or Bukalapak.
- (4) Must have experience purchasing at least one of the following product categories: fashion, beauty, or frozen food.

A screening question was embedded at the beginning of the questionnaire to automatically direct ineligible respondents out of form. To prevent response bias, especially from rushed or careless answers, the researchers monitored the completion time for each questionnaire. Based on pre-testing, the average time to complete the questionnaire was 8 minutes and 47 seconds. Responses submitted in less than 3 minutes were considered invalid and excluded from the dataset, as they likely indicated inadequate engagement or straight-lining behavior. Furthermore, duplicate IP addresses and response timestamps were crosschecked to ensure that each submission came from a unique individual. The questionnaire comprised of four main sections: demographic information, product category preference, Likert-scale statements measuring the four key constructs, and an optional comment box. All closed-ended items used a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The distribution of questions followed a logical grouping to reduce cognitive fatigue and improve the respondents' focus.

Unbalanced distribution across categories was anticipated during data collection and mitigated through targeted reminders, though not forcibly equalized to preserve natural consumer preference patterns. The MGA applied later in this study allows us to examine whether the relationships between variables differ significantly across these product categories (Hair, Hult, Ringle, & Sarstedt, 2021), making sample variation a strength rather than a limitation. Each respondent could only report on one primary category of recent e-commerce purchase, which was selected at the beginning of the survey. In total, 149 valid responses were obtained after filtering.

3.1 Instrument development and measurement items

Table 1 presents a detailed list of item statements for each variable along with their respective codes and literature sources. These measurement items were used as the foundation for the evaluation of the outer model in PLS-SEM analysis.

After finalizing the items, a pre-test was conducted to evaluate the clarity and relevance of the items using a small sample of e-commerce users. Minor adjustments were made for language and flow to enhance respondents' comprehension. These validated instruments formed the basis of the main data collection and subsequent measurement model analyses.

Table 1. Measurement items and construct sources

Variable	Code	Item statement
<i>Time pressure</i> (Chen <i>et al.</i> , 2018; Collier, Moore, Horky, & Moore, 2015)	TP1	I always feel rushed when making purchase decisions on e-commerce apps
	TP2	Limited-time discounts often make me feel pressured to purchase quickly
	TP3	I frequently have to make quick decisions due to flash sales or time-sensitive offers
	TP4	Time-sensitive promotions lead me to prioritize fast purchases over thoughtful evaluation
	TP5	I feel compelled to buy immediately to avoid missing out on a deal
	TP6	Countdown timers on discounts increase my urgency to make a purchase
<i>Perceived behavioral control</i> (Kang <i>et al.</i> , 2006)	PBC1	I experience difficulties using e-commerce apps
	PBC2	It is easy for me to use e-commerce apps
	PBC3	Using e-commerce apps simplifies the purchasing process for me
	PBC4	I can quickly learn how to use the services offered by e-commerce apps
	PBC5	I feel fully in control when navigating and using e-commerce apps
	PBC6	I feel confident making purchases on e-commerce apps without external help
	PBC7	I can resolve unexpected issues that arise when using e-commerce apps
	PBC8	E-commerce apps are flexible enough for me to customize my shopping experience
	PBC9	I believe I can successfully complete purchases on e-commerce apps without assistance
	PBC10	I feel empowered to use e-commerce apps for all my shopping needs
	PBC11	The design of e-commerce apps makes them easy for people like me to use
	PBC12	I rarely encounter technical problems that prevent me from using e-commerce apps effectively
<i>Need for human interaction</i> (Dabholkar, Thorpe, & Rentz, 1996; Lee & Lyu, 2016)	HI1	I usually interact with sellers through chat services before making a purchase
	HI2	Interaction with sellers is very important to me
	HI3	Direct communication with sellers increases my trust in the product
	HI4	I feel more confident about my purchase after discussing it with the seller
	HI5	I prefer asking questions to sellers rather than relying solely on product descriptions
	HI6	Being able to connect with sellers via chat or video call influences my decision to use an e-commerce platform
<i>Continued intention</i> (Wu & Chen, 2017; Wu & Li, 2023)	CI1	I intend to continue using e-commerce apps in the future
	CI2	I will recommend this e-commerce app to others
	CI3	I trust the platform more when I can communicate directly with sellers
	CI4	My confidence increases when I can discuss products with sellers before buying
	CI5	I prefer real-time conversations over reading static product information
	CI6	Having access to seller interaction features influences my decision to keep using the platform

3.2 Data analysis and ethical considerations

The data collected in this study were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique, executed through SmartPLS version 4.0 (Ringle, Sarstedt, Mitchell, & Gudergan, 2020; Sarstedt, Ringle, & Hair, 2017). This method was selected because of its suitability for predictive and exploratory modeling involving multiple latent variables and complex relationships among constructs. PLS-SEM allows for a robust estimation of both the outer model (measurement model) and the inner model (structural model), even when the sample size is relatively modest and data distributions may not be normal. This analysis was conducted in several stages. First, the measurement model was evaluated for convergent and discriminant validity and reliability. Convergent validity was assessed via factor loadings and Average Variance Extracted (AVE), while discriminant validity was confirmed using both the Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio. The internal consistency and reliability of each construct were confirmed using Cronbach's Alpha and Composite Reliability (CR) thresholds above 0.70. Second, a structural model was tested to examine the direct effects of time pressure, PBC, and the need for human interaction on continued intention. Key outputs included path coefficients, t-statistics, p-values, and R-squared values, which demonstrate the model's explanatory power.

To examine the variability of the effects across different consumer segments, this study employs an MGA. MGA enables a comparative analysis of path relationships between groups, in this case, respondents categorized by their primary product purchase type (fashion, beauty, and frozen food). This analysis is essential for detecting whether the strength or direction of the relationships between psychological variables and continued intention varies across product categories. Although PLS-SEM is robust for smaller samples, its limited representation in the frozen food category ($n = 19$) may reduce the stability of the MGA results for this segment. Similarly, the high proportion of Shopee users (79.9%) may reflect a platform preference bias, potentially limiting the generalizability of platform-specific insights. The questionnaire was developed from validated prior measures, pre-tested with 27 respondents, and refined for clarity; however, common method bias was addressed through procedural remedies (e.g. varied scale anchors) and statistically tested using full collinearity VIF, which indicated no serious bias.

In addition to statistical rigor, this study adheres to ethical research standards. Ethical approval was obtained from the BINUS Online Learning Ethics Committee, Bina Nusantara University (approval number 025/BION-MNJJ/X/2024). All participants were informed in advance of the purpose, anonymity, and voluntary nature of their participation through a digital informed consent form at the beginning of the online questionnaire. Respondents were assured that their data would be used exclusively for academic purposes, stored securely, and would remain confidential.

4. Results and discussion

4.1 Respondent characteristics

This section outlines the demographic and behavioral characteristics of the 149 respondents who participated in this study. The data were collected through Google Forms and reflected the profile of active e-commerce users in the Jabodetabek area (Jakarta, Bogor, Depok, Tangerang, and Bekasi). Respondents were classified based on gender, age group, occupation, type of product purchased, and e-commerce platform used. Table 2 presents an overview of these characteristics.

The majority of respondents were female (55.7%), with male participants accounting for 44.3% of the total. This gender distribution is consistent with prior e-commerce studies that highlight higher online shopping engagement among female users, particularly in the fashion and beauty sectors. In terms of age, the dominant group comprised individuals aged 21–25 years (47.7%), followed by those aged >25 years (32.2%) and 17–20 years (20.1%). This reflects a youth, digitally literate population that is highly engaged in mobile and online

Table 2. Demographic and E-commerce profile of respondents

Category	Sub-category	<i>n</i>	%
Gender	Male	66	44.3%
	Female	83	55.7%
Age	17–20 years	30	20.1%
	21–25 years	71	47.7%
	>25 years	48	32.2%
Occupation	High school students	21	14.1%
	University students	34	22.8%
	Employees	94	63.1%
Product type	Fashion	79	53.0%
	Beauty products	51	34.2%
	Frozen food	19	12.8%
E-commerce platform	Shopee	119	79.9%
	Lazada	15	10.1%
	Tokopedia	15	10.1%

Source(s): Primary data, 2024

shopping. The occupational profile shows that most respondents were employees (63.1%), suggesting that the sample included economically active individuals who are likely to have purchasing power. Students (both high school and university) comprised 36.9% of the respondents, capturing the influence of digital natives on e-commerce behavior. Regarding product preferences, more than half of the respondents reported purchasing fashion items (53.0%), followed by beauty products (34.2%) and frozen food (12.8%). These proportions align with market data, indicating that fashion and beauty are among the most frequently purchased categories on Indonesian e-commerce platforms, driven by trend responsiveness and personal identity expression. The inclusion of frozen food, although smaller in percentage, offers valuable insights into utilitarian and need-based shopping behavior.

Although the data indicate that Shopee is the platform most dominantly used by respondents (79.9%), this finding primarily reflects usage tendency or recent transactional preference, rather than exclusive platform loyalty. In Indonesia's digital consumer landscape, it is common for users to operate within a multichannel environment by utilizing multiple e-commerce platforms simultaneously, depending on their specific needs, product availability, and promotional campaigns. Many consumers, while favoring Shopee for certain purchases, particularly in categories such as fashion and beauty, still maintain active accounts and engage in purchases on Tokopedia, Lazada, and other platforms. This pattern aligns with recent behavioral studies that show that Indonesian consumers are highly adaptive and pragmatic, often comparing prices, delivery options, seller ratings, and voucher availability across platforms before making a final purchase decision. Thus, the dominance of Shopee in this dataset highlights its top-of-mind presence and user interface familiarity but does not exclude cross-platform usage, which remains a defining characteristic of Indonesia's e-commerce ecosystem.

4.2 Descriptive statistics

This section presents the descriptive statistics of each research variable, Time Pressure, PBC, Need for Human Interaction, and Continued Intention, based on responses from 149 participants in the Jabodetabek area. These statistics help to illustrate the general tendencies, perceptions, and behaviors of e-commerce users in the sample.

4.2.1 Time pressure. In [Table 3](#), time pressure refers to the psychological urgency experienced by consumers when making purchasing decisions under limited-time conditions.

Table 3. Descriptive statistics for time pressure

Variable	Indicator	Mean	Category	Std. dev
Time pressure	TP1	3.987	Quite good	3.987
	TP2	4.362	Quite good	4.362
	TP3	5.785	Good	5.785
	TP4	4.611	Quite good	4.611
	TP5	4.738	Quite good	4.738
	TP6	5.067	Good	5.067

Source(s): Processed primary data, 2024

In the context of e-commerce, this factor can significantly influence consumer behavior by reducing the time spent evaluating alternatives and encouraging impulsive decisions.

Among the time pressure indicators, TP3 (“I frequently have to make quick decisions due to flash sales or time-sensitive offers”) recorded the highest mean value of 5.785, indicating that such promotional mechanisms are particularly effective in triggering urgency-driven decisions among users. Although TP3 had the highest mean, several items such as TP1 and TP2 showed relatively high standard deviations, indicating variability in how respondents experienced urgency cues. This suggests that during flash sales, are effective for many users, a notable subset of users may not perceive them as strong purchase motivators.

4.2.2 Perceived behavioral control (PBC). In [Table 4](#), PBC captures the extent to which consumers feel confident and capable of navigating e-commerce platforms. This perception influences not only the ease of transactions but also the likelihood of continued platform use.

The highest average score was found in PBC10 (“I feel empowered to use e-commerce apps for all my shopping needs”), with a mean of 5.685, suggesting that the respondents generally feel competent and self-sufficient in using e-commerce platforms. Moderate-to-high standard deviations across PBC items indicate diversity in user confidence and digital literacy, possibly reflecting differences in age, prior experience, and familiarity with platform features.

4.2.3 Need for human interaction. In [Table 5](#), the need for human interaction represents consumers’ desire for communication and relational exchanges during the purchasing process. In a digital environment, this often manifests in features such as live chats, direct messaging with sellers, or customer service availability.

Table 4. Descriptive statistics for PBC

Variable	Indicator	Mean	Category	Std. dev
Perceived behavioral control	PBC1	5.054	Good	5.054
	PBC2	4.570	Quite good	4.570
	PBC3	5.134	Good	5.134
	PBC4	5.671	Good	5.671
	PBC5	5.550	Good	5.550
	PBC6	5.671	Good	5.671
	PBC7	5.315	Good	5.315
	PBC8	5.664	Good	5.664
	PBC9	5.624	Good	5.624
	PBC10	5.685	Good	5.685
	PBC11	5.638	Good	5.638
	PBC12	5.537	Good	5.537

Source(s): Processed primary data, 2024

Table 5. Descriptive statistics for need for human interaction

Variable	Indicator	Mean	Category	Std. dev
Human interaction need	HI1	5.987	Very good	5.987
	HI2	5.819	Good	5.819
	HI3	5.953	Very good	5.953
	HI4	4.826	Good	4.826
	HI5	5.000	Good	5.000
	HI6	5.523	Good	5.523

Source(s): Processed primary data, 2024

The item with the highest average was HI1 (“I usually interact with sellers through chat services before making a purchase”) at 5.987, indicating that human interaction remains a strong preference, even in highly digitized shopping contexts.

4.2.4 Continued intention. Continued intention refers to a consumer’s likelihood of persistently using a product or service beyond their initial usage. In e-commerce, this reflects sustained platform engagement, and is a key predictor of long-term customer loyalty.

Based on [Table 6](#), among all the indicators, CI1 (“I intend to continue using e-commerce apps in the future”) had the highest mean value of 6.134, demonstrating a strong positive tendency among users to maintain their engagement with e-commerce platforms.

4.3 Convergent validity and reliability

To evaluate the measurement quality of the model, we assessed convergent validity and construct reliability using outer loading values, Average Variance Extracted (AVE), Cronbach’s Alpha, and Composite Reliability. All constructs in this study met the recommended thresholds: the outer loading values were generally above 0.70, AVE values exceeded 0.50, and reliability coefficients (both Cronbach’s Alpha and Composite Reliability) were above 0.70, indicating good internal consistency and convergence.

[Table 7](#), The loading values for all items across constructs ranged from 0.703 to 0.871, indicating that each item was a sufficiently strong reflection of its underlying latent variable. All constructs exceeded this threshold, with AVE values ranging from 0.603 to 0.640. In this study, all constructs demonstrated strong reliability, with Cronbach’s alpha ranging from 0.868 to 0.941, and Composite Reliability ranging from 0.901 to 0.949. These results confirmed that the constructs were consistently measured across their respective items. The evaluation results indicated that the measurement model had high reliability and good convergent validity, justifying its use for further structural model analysis.

Table 6. Descriptive statistics for continued intention

Variable	Indicator	Mean	Category	Std. dev
Continued intention	CI1	6.134	Very good	6.134
	CI2	5.940	Very good	5.940
	CI3	5.470	Good	5.470
	CI4	5.718	Good	5.718
	CI5	5.638	Good	5.638
	CI6	5.752	Good	5.752

Source(s): Processed primary data, 2024

Table 7. Outer loading range, AVE, and construct reliability

Variable	Outer loading range	AVE	Cronbach's alpha	Composite reliability
Human need for interaction	0.746–0.869	0.640	0.887	0.914
Continued intention	0.703–0.871	0.612	0.873	0.904
PBC	0.709–0.833	0.608	0.941	0.949
Time pressure	0.719–0.833	0.603	0.868	0.901

Source(s): Processed SmartPLS output, 2024

4.4 Discriminant validity

Discriminant validity was established using the Fornell-Larcker criterion, which compares the square root of AVE with the correlations between constructs. All constructs had higher square root AVE values than their interconstruct correlations. Further, the HTMT ratios were all below the conservative threshold of 0.90, confirming strong discriminant validity and construct independence (see Table 8 below).

As Table 8 shows, each construct's diagonal value (representing $\sqrt{\text{AVE}}$) is higher than its off-diagonal correlations. For example, the $\sqrt{\text{AVE}}$ for Human Need for Interaction is 0.800, which is higher than its correlation with Continued Intention (0.589), PBC (0.547), and Time Pressure (0.323). This pattern confirms that all constructs in the model meet the Fornell-Larcker requirement. The heterotrait–monotrait (HTMT) ratio provides a more stringent assessment of discriminant validity. According to (Henseler, Ringle, & Sarstedt, 2015), HTMT values below 0.85 (strict criterion) or 0.90 (more lenient criterion) indicate that discriminant validity is established. All HTMT values in this study fall below the 0.85 threshold, with the highest value being 0.644 (between Human Need and Continued Intention). This further confirms the absence of multicollinearity and empirical distinctiveness of each latent construct.

4.5 Inner model analysis

At this stage, the focus of the analysis shifted from measurement validation to the evaluation of the predictive capabilities of the structural model. In the context of Partial Least Squares Structural Equation Modeling (PLS-SEM), the structural model is assessed using several key indicators, including the coefficient of determination (R^2), effect size (F^2), path coefficients,

Table 8. Fornell-Larcker criterion and HTMT ratios

Construct comparison	Fornell-Larcker ($\sqrt{\text{AVE}}$)	HTMT ratio
Human need vs Itself	0.800	–
Continued intention vs Itself	0.782	–
PBC vs Itself	0.780	–
Time pressure vs Itself	0.777	–
Human need vs Continued intention	0.589	0.644
Human need vs PBC	0.547	0.588
Human need vs Time pressure	0.323	0.362
Continued intention vs PBC	0.599	0.624
Continued intention vs Time pressure	0.518	0.574
PBC vs Time pressure	0.484	0.532

Source(s): Processed SmartPLS output, 2024

and predictive relevance (Q^2) through PLS Predict. Path coefficients are used to evaluate the strength and direction of the relationships between the exogenous (independent) latent variables, namely, time pressure, PBC, the need for human interaction, and the endogenous (dependent) latent variable, continued intention. These coefficients range from -1 to 1 . A positive value between 0 and 1 suggests a positive relationship, whereas values between -1 and 0 indicate a negative influence (Lind, Marchal, & Wathen, 2018). The coefficient of determination (R^2) serves as a key metric for evaluating how well the independent variables explain the variance of the dependent variable. In this study, the R^2 value for continued intention was 0.512 , meaning that 51.2% of the variance in consumers' continued intention to use e-commerce platforms could be explained by the combined influence of time pressure, PBC, and human interaction needs. This value reflects a moderate level of explanatory power of the model. To complement the R^2 value, the effect size (F^2) was calculated to assess the individual contribution of each predictor variable to R^2 of the dependent construct. An F^2 value between 0.02 and 0.15 is considered small, between 0.15 and 0.35 is moderate, and above 0.35 is large (Saunders *et al.*, 2009). The results showed that the need for human interaction contributed the most to continued intention ($F^2 = 0.174$), indicating a moderate effect. Time pressure ($F^2 = 0.114$) and PBC ($F^2 = 0.094$) exerted small but meaningful effects. This demonstrates that all three constructs play important roles with varying degrees of influence.

In addition to the explanatory power, predictive relevance is essential. The PLS Predict test assesses how well the model can predict new data by comparing prediction errors, such as the Root Mean Square Error (RMSE) and Mean Absolute Error (MAE) between the PLS-SEM model and a linear regression (LM) benchmark. A lower RMSE and MAE in PLS-SEM indicate superior predictive performance.

In Table 9, the comparison of PLS-SEM and linear regression models reveals that for most indicators, the PLS-SEM model has lower prediction error values, confirming its medium-to-strong predictive relevance. This further supports the robustness of the model in forecasting consumers' continuance intention to use e-commerce platforms.

4.6 Hypothesis testing and multi-group analysis

This section evaluates the structural model through hypothesis testing and the MGA. Hypothesis testing assesses the direct effects of the three independent variables—time pressure, PBC, and human interaction—on continuance intention, while MGA explores whether these effects differ across product categories (fashion, beauty, and frozen food).

Based on Table 10, the hypothesis testing using SmartPLS 4.0, with a bootstrapping procedure, the structural model reveals that all three independent variables—human need for interaction, PBC, and time pressure—have a significant positive influence on continuance intention in the context of e-commerce use in Jabodetabek. Among the three, human interaction needs demonstrated the strongest effect on continuance intention, with a path

Table 9. PLS predict test output

Item	Q^2 predict	PLS- SEM RMSE	PLS- SEM MAE	LM RMSE	LM MAE	IA RMSE	IA MAE
KN1	0.473	0.779	0.570	0.814	0.584	1.072	0.782
KN2	0.184	1.366	0.882	1.456	1.012	1.512	1.078
KN3	0.145	1.400	1.004	1.501	1.137	1.514	1.194
KN4	0.350	1.012	0.755	1.105	0.833	1.255	0.983
KN5	0.298	1.063	0.839	1.140	0.882	1.269	1.035
KN6	0.150	1.295	0.825	1.424	0.962	1.405	1.001

Source(s): Data processed by SmartPLS, 2024

Table 10. Path analysis

Relationship	All data – β	All data – p	Fashion – β	Fashion – p	Frozen food – β	Frozen food – p	Beauty – β	Beauty – p	MGA <i>p</i> (FvFF)	MGA <i>p</i> (FvB)	MGA <i>p</i> (FFvB)
Human need → Continued intention	0.350	0.000	0.296	0.000	0.719	0.003	0.198	0.254	0.157	0.655	0.112
PBC → Continued intention	0.277	0.002	0.243	0.029	0.261	0.447	0.544	0.003	0.900	0.149	0.416
Time pressure → Continued intention	0.271	0.003	0.369	0.001	0.120	0.585	0.180	0.152	0.230	0.255	0.831

Source(s): Data processed by SmartPLS, 2024

coefficient of 0.350 and p-value of 0.000, indicating a highly significant relationship. This finding supports the hypothesis that consumers who experience more meaningful human interactions, such as communicating with sellers or using live chat features, are more likely to continue using e-commerce platforms. The emotional trust and social reassurance gained from such interactions play a vital role in fostering loyalty. The second strongest effect was attributed to PBC, with a path coefficient of 0.277 and p-value of 0.002. This result confirms the hypothesis that when users feel confident and competent in using a platform, such as being able to navigate interfaces independently or solve problems without external assistance, they are more inclined to continue shopping on the same platform. This perception of self-efficacy enhances user satisfaction and reinforces behavioral consistency in digital purchases. The third construct, time pressure, also showed a significant and positive effect on continuance intention, with a path coefficient of 0.271 and a p-value of 0.003. This indicates that the urgency created by flash sales, countdown timers, and limited-time offers can drive consumers to act quickly, reinforcing habitual shopping behavior. Although the effect is slightly weaker than that of the other two variables, the psychological influence of time pressure remains important in sustaining e-commerce use.

When examining the results by product category using MGA, the pattern of influence became more nuanced. In the fashion category, all three variables significantly influenced the continuance intention. Time pressure was the strongest predictor in this group, with a coefficient of 0.369 and p-value of 0.001, followed by human interaction ($\beta = 0.296$, $p = 0.000$) and PBC ($\beta = 0.243$, $p = 0.029$). This suggests that consumers in the fashion segment are especially responsive to promotional urgency and trust-building interactions with sellers while also valuing ease of use. In the frozen food category, human interaction again stood out as the most influential factor, with a large coefficient of 0.719 and a p-value of 0.003. This reflects the need for personal assurance when purchasing perishable goods. However, PBC ($\beta = 0.261$, $p = 0.447$) and time pressure ($\beta = 0.120$, $p = 0.585$) were not statistically significant, indicating that ease of use and urgency are less decisive in this category, perhaps because consumers prioritize reliability and freshness over speed or interface functionality. In contrast, in the beauty product category, only PBC showed a significant impact on continuance intention, with a coefficient of 0.544 and p-value of 0.003. This implies that users in the beauty segment must feel capable and confident when interacting with the platform because product selection may involve careful browsing and detailed product comparisons. Neither human interaction ($\beta = 0.198$, $p = 0.254$) nor time pressure ($\beta = 0.180$, $p = 0.152$) significantly affected continued usage in this group, potentially because of consumers' focus on product specifications and quality over urgency or communication.

The non-significance of time pressure and human interaction in the beauty category could reflect consumers' reliance on product specifications, ingredient details, and third-party reviews for urgency or direct communication. This contrasts with fashion, where immediacy and relational reassurance are more influential, and frozen food, where perishability heightens the need for direct contact with the seller. The R^2 value of 0.512 indicates that while the model captures a substantial proportion of continuance intention variance, additional constructs, such as trust in platform security or perceived value, could further enhance predictive accuracy. Hypotheses H1, H2, and H3 are fully accepted across the general dataset. However, when analyzed across specific product categories, the acceptance of the hypotheses becomes conditional. The influence of time pressure (H4–H6) is only significant for fashion products, while PBC (H7–H9) shows the strongest effect on beauty and fashion. Meanwhile, the need for human interaction (H10–H12) is critical in frozen food and fashion categories but not in beauty. These variations confirm that consumer continuance intention in e-commerce is strongly context-dependent, with human interaction being the dominant predictor in emotionally or functionally sensitive product segments, whereas control and urgency play differentiated roles across consumer groups.

4.7 Discussion

This study offers a culturally grounded perspective on e-commerce continuance intention by integrating CCT with time pressure, PBC, and human interaction. Unlike previous research, which primarily focused on initial purchase behavior, our findings broaden the discussion to include sustained engagement, illustrating how psychological factors interact differently across product categories in Indonesia's evolving digital marketplace. The findings indicate that all three psychological factors significantly shape user behavior, with each playing a distinct role depending on the consumer context and product category. Time pressure has become increasingly prevalent in the Indonesian e-commerce landscape because of aggressive promotional tactics, such as flash sales, countdown timers, and limited-time discounts, especially on platforms such as Shopee and Tokopedia. These marketing strategies are highly effective in creating a sense of urgency and compelling consumers to make rapid purchase decisions. While this can increase short-term conversion rates, it also leads to impulsive buying behavior and, for some users, post-purchase anxiety or regret. This dual effect reflects the tension between efficiency and emotional strain, especially among younger consumers, who are most responsive to such promotions. As noted in previous research (Wu & Li, 2023), time pressure can be a double-edged sword, acting as both a behavioral driver and a source of cognitive overload.

The PBC is another key determinant of sustained platform engagement. This refers to consumers' perceived ease and competence in navigating the e-commerce platform, resolving issues, and completing transactions without external assistance. In Indonesia, where digital literacy varies across age and education levels, platforms that offer intuitive interfaces, responsive designs, and seamless checkout processes tend to build higher user confidence. This aligns with the findings of Al-Hawari (2014) and Fahlevi *et al.* (2023a,b), who found that sense of control directly correlates with user satisfaction and loyalty. Importantly, this study confirms that when users feel empowered, particularly when they can personalize settings or resolve problems independently, they are more likely to develop habitual usage patterns. The need for human interaction also emerges as a critical factor, particularly in collectivist cultures like Indonesia, where interpersonal communication and trust-building are essential. Despite the digital nature of e-commerce, Indonesian consumers still value human contact through live chats, seller Q&A, and customer support. This is especially relevant for product categories involving high involvement or uncertainty (e.g. fashion or perishables), where direct engagement reduces perceived risk.

Our findings echo those of Lee and Lyu (2016) and Pereira *et al.* (2021), who emphasized that the absence of human interaction can hinder the continuity of digital usage, particularly when consumers seek reassurance or detailed information. In practice, many Indonesian buyers use the chat feature not only for inquiries, but also for gauging seller credibility, assessing response speed, and confirming product availability factors that are not always visible in product listings. From a practical standpoint, these findings suggest that e-commerce platforms in Indonesia must go beyond technical functionality to integrate psychologically attuned service features. While optimizing speed and usability remains important, platforms should also address emotional and social needs by enabling richer buyer-seller communication and more transparent real-time support. Failure to do so may result in users switching to competitors or reverting to offline channels, particularly in regions where digital trust is still maturing.

5. Conclusions

The findings confirm that all three psychological constructs significantly affect continuance behavior, although their intensities vary across product categories. Time pressure, often induced by flash promotions and countdowns, has been shown to drive impulsive yet repeated purchasing behavior, especially in the fashion category. PBC emerged as a consistent predictor across all categories, suggesting that consumers' sense of competence and autonomy play a

vital role in their decision to continue using a platform. Meanwhile, the need for human interaction is particularly relevant in fashion and frozen food purchases, where trust and real-time communication with sellers remain critical. This research extends CCT to the digital commerce domain, demonstrating its applicability in explaining continuance intention. It also contributes by integrating three psychological factors into one framework and applying category-specific MGA, offering empirical evidence that psychological drivers are context-dependent in emerging e-commerce markets. For large platforms, implementing AI-driven personalized urgency cues in the fashion segment and integrating virtual try-on tools into beauty could strengthen category-specific engagement. Small sellers can leverage live streaming and responsive chats to build relational trust, especially in frozen food transactions. Policymakers can support platform sustainability by establishing standardized seller verification, promoting consumer protection education, and incentivizing platforms to maintain balanced urgency-based marketing practices.

5.1 Implications for business practice

While time pressure increases conversion, overuse may lead to consumer fatigue or mistrust. Flash sales and countdowns should be strategically timed and communicated transparently, to avoid undermining user satisfaction. Incorporating timers in categories such as fashion can be effective but should be avoided in utilitarian categories such as frozen foods, where rushed decisions are less acceptable. Platforms should invest in intuitive interface design, personalized features, and troubleshooting tools to enhance PBC. For example, step-by-step checkouts, real-time help widgets, and easy return policies can increase consumer confidence, particularly in less digitally literate segments. Despite automation trends, this study highlights the importance of human connections in building trust. E-commerce providers should maintain or enhance seller–chat systems, live-agent support, and personalized customer care. In categories such as beauty and frozen food, real-time clarification can reduce purchase hesitation and increase retention.

Behavioral responses varied by category. Fashion buyers are more responsive to urgency and emotional triggers; beauty consumers rely on control and reassurance; and frozen food buyers demand reliability and human trust. Tailoring user journeys and promotion styles based on category-specific preferences can result in higher conversion and retention rates. As Indonesian consumers often use multiple platforms simultaneously (e.g. Shopee and Tokopedia), fostering loyalty requires more than just app utility. E-commerce businesses must build brand consistency, data security, and reliable customer service to compete in a market with low switching costs.

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