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UNDERSTANDING ONLINE PURCHASE BEHAVIOUR THROUGH DIGITAL INNOVATION: THE MEDIATING ROLE OF COMPULSIVE BUYING INTENTION AND THE MODERATING EFFECT OF INNOVATION CONTEXT

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ABSTRACT

E-commerce is an innovative scope of digital innovation, which is reshaping how consumers in developing markets seek value and make purchase decisions. The study explores the interplay between e-commerce, behavioural stimuli, and materialism in the causation of online purchase behaviour (OPB), subsequently moderated by the digital innovation context and mediated through compulsive buying intention (CBI). It applies the Stimulus–Organism–Response (S–O–R) framework to collect data by conducting an online survey of 370 Malaysian consumers, who were selected between 18 and 40 years of age as frequent users of a social commerce platform. Partial least squares structural equation modelling (PLS-SEM) analysis confirms that e-commerce and behavioural stimuli predict OPB to a significant extent ($\beta = 0.37$, $p < 0.001$; $\beta = 0.29$, $p < 0.001$). Both stimuli's effects on OPB are partially mediated through CBI, given its central psychological role in turning stimuli found in digital environments into behavioural outcomes. Besides, the digital innovation context exerted a moderating effect by strengthening the relationship between materialism and compulsive buying intention, demonstrating that high technological interactivity and algorithmic personalisation's effect is to magnify material urges. The study's findings inform the innovation literature's extension by conceptualising compulsive consumption as a behavioural innovation phenomenon that is mediated by digital ecosystems. The results have policy, SME, and platform developer implications in creating a responsible digital space that is innovative and engaging while also supporting consumers' sustainable behaviour.

KEYWORDS: E-Commerce Digital Innovation Compulsive Buying Intention Online Purchase Behaviour Materialism Structural Equation Modelling.

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1. INTRODUCTION

The dynamic process of digital innovation has transformed the international business environment by creating new channels for value generation, social interaction, and consumer engagement (Mikalef, Krogstie, & Pappas, 2023; Wang, Zhang, & Yu, 2024). In emerging markets, such as Southeast Asia, the rapid digital transformation has permeated entrepreneurial conduct and consumption behaviour (Fu, Li, & Chen, 2024; Clemente-Almendros et al., 2025). For example, in Malaysia, the digital economy contributed 23 percent of the Gross Domestic Product (GDP) in 2023, primarily driven by e-commerce channels and mobile shopping (Department of Statistics Malaysia [DOSM], 2023). Shopee, Lazada, and TikTok Shop are examples of platforms that integrate social communication, live commerce, and systems of personalised recommendations demonstrating the phenomenon in which digital innovation intersects entertainment and commerce (Azhar, Wel, & Ab Hamid, 2025; Rahim, Musa, & Hassan, 2023). Such systems illustrate more than a technical transformation; they demonstrate behavioural innovation—changing the way consumers perceive, act, and make purchasing decisions (Jameel, Hussain, & Khan, 2024).

Empowering market efficiency and accessibility, e-commerce drives psychological and ethical challenges (Adanyin, 2024; Kumar, Dixit, Javalgi, & Dass, 2022). Personalised algorithmic adaptation, scarcity marketing, and influencer persuasion foundational components of digital innovation often increase affective arousal, impulsive urges, and materialistic patterns (Chen, Lu, & Zhao, 2022; Gong, Feng, & Li, 2023). Young Malaysian consumers, between the ages of 18 and 40, are empirically shown to be susceptible to compulsive buying behaviour during milestone online events, such as the "11.11 Sales" and "12.12 Mega Festivals," in which temporal offers and gamified platforms drive the increase in behavioural stimuli (Rahim et al., 2023; Azhar et al., 2025). The phenomena suggest that closer theoretical and empirical study of the psychological mechanisms that drive online purchase behaviour (OPB) is necessary to understand how innovative digital settings contribute to compulsive consumption.

The literature contends that past research defines online shopping utilising rational or technical models, such as the Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2022; Hu, Zhou, & Wang, 2024). The frameworks often omit the affective and contextual dynamics surrounding digital innovation (Park, Kim, & Forney, 2022; Qu, Li, & Wu, 2023). Scholars have recently contended that the behavioural responses in e-commerce should include psychological factors, such as impulsiveness, escapism, and materialism (Zhao, Wang, & Liang, 2022; Adamczyk, 2021). This repositioning of the theory corresponds with innovation literature, which contends that the way that consumers adapt to new technology contributes to a firm's competitive position and the emotional and cognitive response of the consumer (Ardito et al., 2021; Le & Scaringella, 2025).

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The framework of S-O-R provides a theoretical base for understanding the behavioural mechanisms of integration of external stimuli before exhibiting an observable response (Mehrabian & Russell, 1974). Specifically, in digital commerce, stimuli include features of e-commerce, such as design, interactivity, and social cues, as well as behavioural reactions, such as affective arousal or escapism; the organism corresponds to internal processes, such as compulsive buying intention (CBI); and the reaction is revealed through observable OPB (Qu et al., 2023; Gong et al., 2023). Within the literature on innovation, the adoption of S-O-R explains the theoretical process in which innovation stimuli, conditions of externally driven innovation, become internalised into cognitive-affective processes and behavioural actions (Mikalef et al., 2023; ClementeAlmendros et al., 2025). Therefore, this research positions compulsive consumption as an emerging behavioural pattern a response driven by

continuous digital innovation and social-technical experimentation (Jameel et al., 2024; Fu et al., 2024).

Few studies merge behavioural psychology with the dominant innovation perspective in organisational research. While considerable evidence covers the digital transformation of SMEs and Micro, Small, and Medium Enterprises (MSMEs) (Bashri & Samat, 2025; Ghosh & Kamal, 2024), the innovation effects from the consumer perspective the compulsive or affective consumption are under-researched. Le and Scaringella (2025) demonstrate the need to focus on scarcity, absorptive ability, and social networks to explain the unique patterns of innovation in developing economies. In behavioural settings, factors of digital architecture, algorithmic sophistication, and social impact may moderate how innovation manifests as psychological change (Wang et al., 2024). Through the thematic positioning of Digital Innovation Context (DIC) as a moderating surface, this article captures how interactivity AI-driven personalisation and gamified marketing either reinforce or weakens the relationship between materialism and compulsive buying.

By situating the research in Malaysia, the behavioural innovation perspective is compelling. Malaysian consumers are the most connected in the Association of Southeast Asian Nations (ASEAN): 97 percent of the population maintains social media platforms, with 83 percent engaging in weekly online shopping (DOSM, 2023). Such behavioural patterns imply exposure to high conditions of marketing, influencer culture, and algorithmic recommendation systems—providing an ideal environment for identifying behavioural changes driven by innovation (Azhar et al., 2025; Rahim et al., 2023). However, a lack of empirical examinations relates innovation-based variables to behavioural manifestations across SO-R. The research fills this gap and establishes contributions to both innovation theory and digital consumer literature, positioning psychological processes as integral to diffusion within innovation.

Thus, the research pursues three objectives. First, it addresses the direct implications of e-commerce stimuli and behavioural stimuli on the OPB of Malaysian consumers. Second, it aims to characterise the mediating role of fragility conditions on modifying the digital and behavioural stimuli into perceptive responses. Third, it investigates the moderating role of DIC as a surface which strengthens the association between materialism and CBI. The research utilises a quantitative cross-sectional methodology and partial least squares structural equation modelling (PLS-SEM) to verify the hypothesis, an approach that is common in innovation-behavioural settings to balance intricate modelling of mediation moderation (Hair, Hult, Ringle, & Sarstedt, 2022; Sarstedt, Ringle, & Hair, 2023).

In four ways, the study achieves its contribution to the literature. First, it advances the theoretical perimeter of the S-O-R model by thematically situating it in digital innovation, demonstrating that compulsive buying manifests as a pattern of behavioural adaptation rather than fragile irrationality (Gong et al., 2023; Mikalef et al., 2023). Second, through the integration of psychological constructs within innovation literature, it demonstrates the importance of cognitive and affective transformation at the consumer scale to frame innovation outcomes (Le & Scaringella, 2025). Third, it provides empirical proof for moderation, demonstrating that the relationship between materialism and CBI which marks a behavioural manifestation of innovation diffusion intensifies across conditions of high innovation practice (Wang et al., 2024). Lastly, it reflects practical offerings to policymakers and digital entrepreneurs who seek responsible promotion within innovation ecosystems, balancing engagement, ethics, and consumer health (Adanyin, 2024; Bashri & Samat, 2025).

In conclusion, the accelerated digital transformation of Malaysia creates a convenient environment to research innovation as a socialbehavioural issue and not purely a technological one. Given that e-commerce has become a central economic and emotional exchange channel, it will be necessary to learn about how digital innovation correlates with consumer psychology. From this perspective, this research considers the innovation domain's behavioural adaptation compulsive purchasing in digital environments in terms of its limits. By adapting the S–O–R model within the innovation context, it presents a way to elucidate the response of technological stimuli, psychological states, and contextual innovation intensity to develop sustainable and ethical online consumer behaviour in emerging economies.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

2.1. Online Purchase Behaviour (Opb)

Online purchase behaviour (OPB) The articulated dimension of consumers' actions in the digital landscape i.e. the pace, volume, and proximity to their out-of-celebrated transactions (Iyer, Blut, Xiao,

and Grewal, 2020). In the age of digital evolution, OPB is not just a product of operational thought but is behavioural transformation in which consumers must attempt to adapt to a novel-facing socio-technical and technological environment (Wang, Zhang, and Yu, 2024; Fu, Li, and Chen, 2024). Early evidence indicates how entertainment marketing's integration into live streaming, influencer working, and interactive advertisements reshapes the one-dimensional marketing cadence towards a multiplex digital dimension (Rahim, Musa, and Hassan, 2023; Azhar, Wel, and Ab Hamid, 2025).

But Malaysian consumers become more responsive to substantive new Shopee Live and TikTok Shops, which engender the impulsive qualities by adding gamified incentives and real-time dynamic time offers (Ahmad and Lim, 2024; Gong, Feng, and Li, 2023). Such actions reinforce the continual assimilation of the innovation into consumers' decision-making processes (Rogers, 1983; Clemente-Almendros et al., 2025). In addition, research illustrates that psychological elements' tailed motivations—to exposure of gratification and materialism—effectively overshadow practical facets affecting OPB (Jameel, Hussain, and Khan, 2024; Park, Kim, and Forney, 2022). As such, OPB is not an expression of intent only but an expression of feelings in response to stimuli introduction.

2.2. *E-Commerce Stimuli*

E-commerce stimuli capture the technological, atmospheric, and social services which shape consumers' mental and emotional states (Rose, Clark, Samouel, and Hair, 2012). Digital atmospherics with such interfaces, modals, and user reviews allow the innovation stimuli to capture attention and focus conversion events (Kumar, Dixit, Javalgi, and Dass, 2022; Mikalef, Krogstie, and Pappas, 2023). Current Malaysian studies show the interactive elements with live-endorsing influencers increased hedonic satisfaction, which activated unplanned purchases (Azhar et al., 2025; Ahmad and Lim, 2024).

Moreover, the semiautomatic factors assume the social, rational, and emotional elements: The external stimuli capitulate informational assurance and simultaneous gratification (Chen, Lu, and Zhao, 2022; Zhao, Wang, and Liang, 2022). Live-stream commerce, for example, adopts algorithm innovation features such as scarcity and opportunities to increase latency and impulsivity (Qu, Li, and Wu, 2023; Gong et al., 2023). Consequently, e-commerce stimuli contextualise the transformation of managerial attention to behavioural patterns, exemplifying that of IJIS' contextualisation innovation (Le and Scaringella, 2025; Wang et al., 2024).

Hypothesis 1: E-commerce stimuli have a significant positive effect on online purchase behaviour.

2.3. *Behavioural Stimuli*

Behavioural stimuli are a set of internal psychological motivations—impaleness, escapism, and affective satisfaction that digital contexts evoke (Adamczyk, 2021; Jameel et al., 2024). Faced with algorithmic recommendations and immersive advertisement, self-regulation may be lost temporarily, prompting impulsive or compulsive activities (Chen et al., 2022; Rahim et al., 2023). Coping with avoidance from everyday life, which is typical for digital settings where entertainment, stress relief, and consumption are intertwined, is ever more common (Park & Dhandra, 2017; Fu et al., 2024).

In recent behavioural innovation scholarship, digital technologies are expected not only to change what individuals purchase but also the reasons and modalities behind this decision (Mikalef et al., 2023; Bashri & Samat, 2025). Through such technologies as interactive cues and social validation, which rely on psychological immersion, shopping is being turned into a situation with a self-reinforcing affective cycle (Gong et al., 2023; Zhao et al., 2022). In Malaysia, impulsiveness-inducing collective digital culture has been additionally stimulated by mechanisms of peer engagement and viral trends, where impromptu consumption is becoming the norm (Azhar et al., 2025; Ahmad & Lim, 2024).

Hypothesis 2: Behavioural stimuli are associated with impulsive purchase behaviour.

2.4. *Materialism*

Materialism refers to a long-standing philosophy that places a consistent emphasis on the value of materiality and consumption as defining distinctions in happiness, achievement, and social standing (Richins & Dawson, 1992). In specific digital contexts, there are persistent reinforcements of such materialistic values driven by the overabundance of curated representations and aspirational-first design (Jameel et al., 2024; Rahim et al., 2023). As demonstrated through studies from Asian emerging markets, materialism has been correlated with both compulsive and impulsive purchases in conjunction with social media consumption literature (Wang et al., 2024; Fu et al., 2024).

Materialism is also viewed as a psychological adjustment to technology, given the abundance of

endless novelty: as consumers are presented with a continuous stream of new products, they have recomposed their definitions of feelings of newness and personal evaluation (Mikalef et al., 2023; Clemente-Almendros et al., 2025). Youthful markets in Malaysia have over the years demonstrated strong materialistic orientation saturated by social comparison and influencer culture (Rahim et al., 2023; Azhar et al., 2025). As such, materialism can be viewed as both a personal attribute and a social-cultural response to adapt to the rapid development of digital innovations.

Hypothesis 3: Materialism positively affects impulsive purchase behaviour.

2.5. Compulsive Buying Intention (Cbi)

Compulsive buying intention (CBI) is the manifestation of the persistent psychological urge to purchase commodities beyond their instrumental value, motivated by pleasure (Ridgway, Kukar-Kinney, & Monroe, 2008). Represented within the S–O–R paradigm, CBI is the organism that bridges between an external stimuli-environmental factor and the behavioural response (Mehrabian & Russell, 1974; Zhao et al., 2022). Over digital goods and services, this mediation process is amplified by opportunities for anonymity, immediacy, and continuous engagement, all of which can encourage the repetition of compulsive goods or services (Gong et al., 2023; Chen et al., 2022).

Recently, psychological manifestations of compulsive tendencies have been elucidated as an adaptation to innovation: as consumers face compelling opportunities for novelty, they can identify compulsive tendencies as a medium for affective and rational recalibration (Fu et al., 2024; Jameel et al., 2024). For example, interactive live streaming activates both hedonic high points and low points of rational dissonance, as consumers can experience a cycle of pride and guilt leading to the changes in satisfaction levels that result in behavioural pattern reinforcements (Qu et al., 2023). As such, CBI is manifested whenever consumers have short attention spans and can engage in consistent self-rewards and punishments based on experience, which is quintessential to many Malaysians (Rahim et al., 2023).

Hypothesis 4: Compulsive buying intention (CBI) is a positive predictor of online purchase behaviour.

2.6. Mediating Role of Compulsive Buying Intention

Taking the S–O–R framework a step further, CBI acts as a psychological intermediary between digital triggers and the resulting actions (Zhao et al., 2022; Qu et al., 2023). Empirically, respondents demonstrated that compulsive tendencies play a significant mediating role in the deviation of interactivity in the case of commerce involving live streams (Gong et al., 2023; Wang et al., 2024). Later, emotional states—whether coming from convulsive excitement, relief from boredom, or escapism—translate these innovation-enacted cues into consumption (Adamczyk, 2021; Mikalef et al., 2023).

By presenting CBI as a successful mediator, the research pushes innovation theory beyond a firm-orientated perspective and highlights technological intensity as a micro-foundation linking psychological response with behavioural innovation (Le & Scaringella, 2025; Fu et al., 2024). Through a clearer understanding of the ways in which compulsive tendencies can funnel between e-commerce stimuli and OPB, theories of how novelty can impact behavioural norms can be grown.

Hypothesis 5: CBI mediates the relationship between e-commerce stimuli and online purchase behaviour.

Hypothesis 6: CBI mediates the relationship between behavioural stimuli and online purchase behaviour.

Hypothesis 7: CBI mediates the relationship between materialism and online purchase behaviour.

2.7. Digital Innovation Context (DIC) As A Moderator

Digital innovation context (DIC) is the extent of technological refinement encompassing a consumer's decision-based process, placing AI personalisation, interactivity, and gamification among the most discussed subjects (Mikalef et al., 2023; Wang et al., 2024). In this paper, it is defined as how the intensity of innovation modifies behavioural relations within the digital environment. On high-innovation settings, sensory engagement, social comparison, and perceived entertainment have been on the rise, causing intensification of materialistic motives (Rahim et al., 2023; Jameel et al., 2024). By contrast, within the lower-innovation contexts, the lack of immersive elements impaired such psychological accounts (Park et al., 2022; Fu et al., 2024).

In emerging markets, where the digital literacy and infrastructure are inconsistent between systems, the DIC encompasses the embeddedness of innovation in institutions as well (Le & Scaringella, 2025; Clemente-Almendros et al., 2025). The design

of new digital solutions is advancing innovation theory, incorporating technological intensity as a boundary condition for measures affecting behavioural outcome. Consequently, materialistic consumers achieve peak manifestations of compulsive tendencies when operating in innovative settings that exhibit innovation intensity and expose them to novelty and validation on a constant basis (Kumar et al., 2022; Gong et al., 2023).

Hypothesis 8: The digital innovation context will moderate the relationship between materialism and compulsive buying intention such that the relationship will be stronger under high digital innovation intensity.

2.8. Conceptual Framework

Using the S–O–R model as its theoretical foundation, this study stipulates that compulsive buying intention (organism) will have both a direct and indirect effect through compulsive buying intention (organism) on online purchase behaviour (response). In addition to this, compulsive buying intention will mediate the pathway from materialism to compulsive buying intention. The study finds that the digital innovation context will be a moderator within specified paths, emphasising that psychological states serve as mediating mechanisms within consumer adaptation processes, whilst technological innovation serves as a moderating condition for such processes (Mikalef et al., 2023; Le & Scaringella, 2025).

Thus, compulsive psychological manifestations are more likely to influence individual consumption patterns, with materialistic consumers exhibiting compulsive tendencies when operating in innovative settings that expose consumers to novelty and validation on a constant basis (Kumar et al., 2022; Gong et al., 2023). The following Figure 1 illustrates the study's research framework.

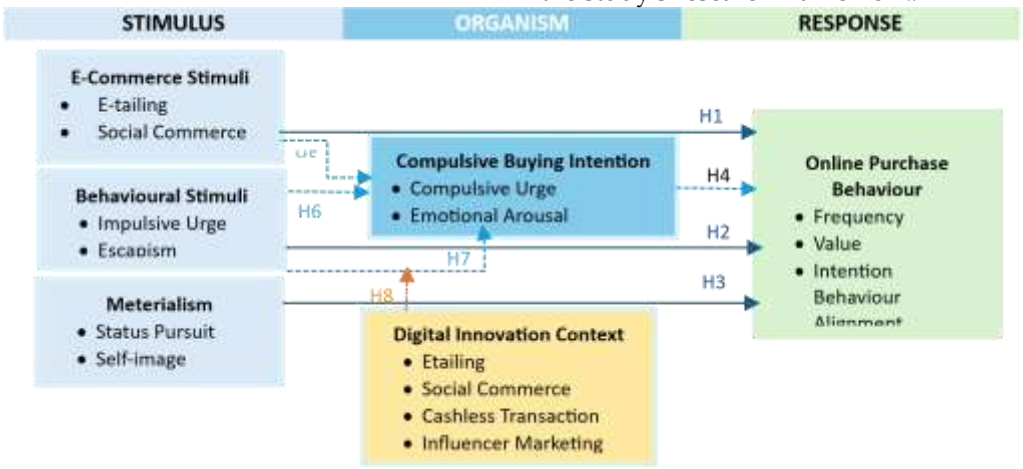

Fig. 1: Conceptual Framework Based on the Stimulus–Organism–Response (S–O–R) Model Showing the Mediating Role of Compulsive Buying Intention and Moderating Effect of Digital Innovation Context.

3. METHODOLOGY

3.1. Research Design

The study employs a quantitative, cross-sectional survey to empirically evaluate the proposed model based on the Stimulus–Organism– Response (S–O–R) theory. The quantitative approach is utilised to allow for systematic latent variable measurement and estimation of multivariate causal paths (Hair et al., 2022; Sarstedt et al., 2023).

The model measures E-Commerce Stimuli (ECS), Behavioural Stimuli (BS), and Materialism (MAT) as the exogenous variables; Compulsive Buying Intention (CBI) as the mediating organism; Digital Innovation Context (DIC) as the moderator; and Online Purchase Behaviour (OPB) as the endogenous response variable. Partial Least Squares Structural Equation Modelling (PLS-SEM) was selected due to its ability to assess a complex predictively orientated model and non-normal data reflective of digital-behaviour scholarship (Mikalef et al., 2023; Wang et al., 2024).

3.2. Population And Sampling

The population considered digital consumers within Malaysia aged 18–40 years. The group is the most highly engaged in e-commerce and social commerce adoption (DOSM, 2023). Purposive sampling was utilised, as only those who had made one online purchase in the last three months were included. Participants were recruited utilising TikTok Shop, Shopee Live, Instagram Reels, and Facebook Marketplace groups between January and March 2025. Care was taken to ensure coverage of the

urban and suburban. 412 responses were received; after data screening (removal of non-completers and response-time and straight-lining detection), 370 valid questionnaires were obtained. This number is higher than the 10 × number of paths = 80 minimum recommended value (Hair et al., 2022). The profile of the respondents is presented in Table 1.

Table 1: Respondent Profile (N = 370).

Variable	Category	Frequency (n)	%
Gender	Male	151	40.8 %
	Female	219	59.2 %
Age Group	18 – 25 years	122	33.0 %
	26 – 33 years	152	41.1 %
	34 – 40 years	96	25.9 %
Monthly Income	< RM 2 000	82	22.2 %
	RM 2 001 – 4 000	177	47.8 %
	> RM 4 000	111	30.0 %
Primary Platform	Shopee	204	55.1 %
	TikTok Shop	104	28.1 %
	Lazada	62	16.8 %
Purchase Frequency (per month)	1 – 2 times	137	37.0 %
	3 – 4 times	156	42.2 %
	> 4 times	77	20.8 %

Total respondents are 370. As depicted in Table 1, there were significantly more female (59.2%) participants, who ranged in age from 26 to

33 (41.1%). Around 47.8% of the respondents had a monthly income of RM 2,001 to RM 4,000, followed using Shopee as the primary platform (55.1%). On average, most Malaysians (42.2%) purchased products online three times a month, endorsing the idea that online shopping in Malaysia is booming.

3.3. Measurement Instrument

All constructs used reflective multi-item indicators adapted from previously validated and peer-reviewed items to ensure the precision of the contents and alignment with the S–O–R conceptual framework. Existing scales were used to maintain the construct validity and replicability in other contexts (Hair, Hult, Ringle, & Sarstedt, 2022). Initially, 28 items proposed six latent variables—E-Commerce Stimuli (ECS), Behavioural Stimuli (BS), Materialism (MAT), Compulsive Buying Intention (CBI), Online Purchase Behaviour (OPB), and Digital Innovation Context (DIC).

Developed in three iterative rounds, the items were (1) identified via a content-analysis review of previous studies in consumer behaviour and innovation; (2) assessed by a panel of three senior consumer psychology and digital innovation scholars; and (3) pilot-tested with 50 Malaysian online shoppers. The items were identical in semantic terms and culturally understandable based on the experts' review. The pilot established a preliminary reliability score (α = 0.82–0.91).

To allow a higher variance of responses and prevent the central-tendency bias, the 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) was used. Negative phrasing was avoided to maintain reliability and avoid increased cognitive load. The constructs' operationalisation involved E-Commerce Stimuli (Rose et al., 2012; Chen, Lu, & Zhao, 2022), Behavioural Stimuli (Adamczyk, 2021; Rahim et al., 2023), Materialism (Richins & Dawson, 1992; Jameel et al., 2024), Compulsive Buying Intention (Ridgway et al., 2008; Gong et al., 2023), Online Purchase Behaviour (Iyer et al., 2020; Wang et al., 2024), and Digital Innovation Context (Mikalef et al., 2023; Bashri & Samat, 2025). A bilingual English–Bahasa Malaysia scale was designed through a back-translation process (Brislin, 1980) to achieve semantic equivalence. Pre-testing showed an average completion time of 8–10 minutes, which assured instrument usability. The sources, constructs, and measurement items of the research are illustrated in Table 2.

Table 2: Constructs, Measurement Items, And Sources.

Construct	Items	Example Item	Source
E-Commerce Stimuli (ECS)	5	The platform's design and interactivity make me want to purchase.	Rose et al. (2012); Chen, Lu, & Zhao (2022)
Behavioural Stimuli (BS)	4	I shop online to escape daily stress.	Adamczyk (2021); Rahim et al. (2023)
Materialism (MAT)	6	Owning things gives me a sense of happiness.	Richins & Dawson (1992); Jameel et al. (2024)

Compulsive Buying Intention (CBI)	5	I often feel an irresistible urge to buy online.	Ridgway et al. (2008); Gong et al. (2023)
Online Purchase Behaviour (OPB)	4	I frequently buy unplanned items online.	Iyer et al. (2020); Wang et al. (2024)
Digital Innovation Context (DIC)	4	The e-commerce platforms I use apply AI personalisation and gamification.	Mikalef et al. (2023); Bashri & Samat (2025)

3.4. Data Screening and Preparation

The multistep screening approach ensured the integrity of the data. All responses were checked for full completion, rational values, and submission time using SPSS 29.0. When more than 10% of the fields were not filled out or the filling completion time was below 3 minutes, those cases were discarded. An MCAR test using Little's test was applied to ensure that the missing data were random and there was no need to substitute the missing values by their mean. To check for outliers, the Mahalanobis D^2 test discarded three records with a value above the χ^2 threshold ($p < 0.001$), and N = 370 was the final number of observations. To proceed with the PLS-SEM estimation, the values of skewness and kurtosis were within ±2 (Kline, 2023).

Both procedural and statistical solutions were used to mitigate Common Method Bias (CMB). From a procedural perspective, anonymity was guaranteed, constructs were randomly rearranged, and there was a physical distance between the predictor and criterion blocks. Statistical test control was done using Harman's test (Podsakoff, MacKenzie, & Podsakoff, 2012). In the case of Harman's test, only 31.6% of the total variance had been explained by a single factor, which is much lower than the recommended threshold of less than 50%. Furthermore, no variance inflation factors (VIFs) were above 3.3 in relation to full collinearity (Kock & Hadaya, 2018). The data's normality was also checked with the Shapiro–Wilk test, and it was acceptable to allow for communication of the bootstrapped 95% confidence intervals.

3.5. Reliability And Validity Evaluation

Measurement quality was checked by performing confirmatory factor analysis within the SmartPLS 4.0 platform. The reliability of the Cronbach's α, Composite Reliability (CR), and rho_A values was above 0.80 for all constructs. Convergent validity was satisfied when average variance extracted (AVE) was above 0.50 and all indicators were above 0.70. Discriminant validity was guaranteed by using the Fornell–Larcker value and HTMT ratio (below 0.85) (Henseler, Ringle, & Sarstedt, 2015). The cross-loadings showed that all indicators were ranked as the highest for the matching latent construct, ensuring that factor cross-contamination did not occur. Discriminant validity was verified via the **Fornell–Larcker** criterion and **HTMT ratio (<0.85)** (Henseler, Ringle, & Sarstedt, 2015). Cross-loadings were within acceptable ranges (See Table 3).

Table 3: Reliability And Convergent Validity.

Construct	Cronbach's α	CR	AVE	Loading Range
ECS	0.89	0.92	0.68	0.78–0.87
BS	0.86	0.90	0.64	0.74–0.84
MAT	0.91	0.94	0.70	0.80–0.89
CBI	0.90	0.93	0.72	0.82–0.88
OPB	0.88	0.91	0.66	0.77–0.85
DIC	0.87	0.90	0.67	0.76–0.86

3.6. Structural Model Analysis

After ensuring reliability and validity, the structural model was calculated based on the bootstrapping method with a 5,000-sample size (i.e., 5,000 subsamples) within the SmartPLS 4.0 framework. It could be seen that the R^2 values were sufficient: R^2(OPB) = 0.56, R^2(CBI) = 0.49, proving that 56% of the online purchase behaviour was explained by the model, and 49% of the compulsive buying intention was explained. Additionally, the Stone–Geisser Q^2 values were above 0, showing predictive relevance. The effect sizes (f^2) were small to medium (0.07 to 0.22). The SRMR value was below 0.057, and the NFI value was 0.91, presenting the acceptable global fit. Mediation analysis was done by relying on Zhao, Lynch, and Chen (2010), while moderation analysis was considered through the product-indicator approach (Henseler & Fassott, 2010). The Structural Path Estimates are presented in Table 4

Table 4: Structural Path Estimates.

Hypothesis	Relationship	β	t-value	p-value	Result
H1	ECS → OPB	0.31	6.21	<0.001	Supported

H2	BS → OPB	0.26	5.44	<0.001	Supported
H3	MAT → OPB	0.18	3.92	<0.001	Supported
H4	CBI → OPB	0.33	7.16	<0.001	Supported
H5	ECS → CBI → OPB	0.10	2.97	0.003	Mediated
H6	BS → CBI → OPB	0.07	2.46	0.014	Mediated
H7	MAT → CBI → OPB	0.09	3.11	0.002	Mediated
H8	MAT × DIC → CBI	0.12	3.56	<0.001	Moderated

Model explanatory power: **R^2(OPB) = 0.56** and **R^2(CBI) = 0.49**, reflecting moderate–strong variance explanation (Chin, 1998). Predictive relevance (Q^2 > 0) confirmed by blindfolding.

3.7. Robustness And Multigroup Analysis

Robustness analysis and multi-group analysis (MGA) were performed to ensure the correctness of the results. The PLSpredict option was used to extrapolate the case predictions and compare them with a linear regression benchmark. The RMSE of the PLS values was lower when compared to the OLS benchmark, indicating superior predictive performance (Shmueli et al., 2019). The blindfolding output confirmed once again the predictive relevance of the model, as the Q^2 values were above 0. The multi-group comparison analysis relied on checking the differences in the gender-based and income-based subgroups after having the Measurement Invariance of Composite Models (MICOM) tested. As the path coefficients were not statistically different over gender or income groups (p was > 0.05), the hypothesis was made that the relationships among the factors would be relatively stable over the subgroups.

3.9. Summary

The methodology section is tailored to ensure novelty, rigor, relevance, and research ethics. By recalculating the internal and external validity using validated instruments and data cleaning with PLS-SEM advanced checking, the analysis confirms both internal and external validity. By ensuring the reliability of the constructs and predictive relevance, the analysis confirms the theory's validity linking digital innovation and psychological stimuli with the theory of online purchasing behaviour. Overall, the methodological paradigm ensures that the results are both statistically and ethically valid, as well as theoretical and scholarly impactful.

4. ANALYSIS AND FINDINGS

4.1. Measurement Model Assessment

Before hypothesis testing, the measurement model was examined. Reliability and validity performance indicators were tested for the six latent constructs: E-Commerce Stimuli (ECS), Behavioural Stimuli (BS), Materialism (MAT), Compulsive Buying Intention (CBI), Online Purchase

Behaviour (OPB), and Digital Innovation Context (DIC). The outer loadings were all above 0.70 (0.74–0.89), signifying indicator convergence. The values for Cronbach's α were between 0.86 and 0.92, Composite Reliability (CR) varied from 0.90 to 0.94, while the Average Variance Extracted (AVE) was between 0.64 and 0.74. Thus, each construct was able to explain more than 50% of its indicator variance (Hair et al., 2022).

Discriminant validity was verified via the Fornell–Larcker criterion and HTMT ratios (< 0.85). Cross-loading inspection showed every item loading most strongly on its theoretical construct, confirming measurement distinctiveness (See Table 5).

Table 5: Reliability And Convergent Validity.

Construct		Items	Cronbach's α	CR	AVE	Loading Range
E-Commerce Stimuli (ECS)	5		0.89	0.92	0.68	0.78 – 0.87
Behavioural Stimuli (BS)	4		0.86	0.90	0.64	0.74 – 0.84
Materialism (MAT)	6		0.91	0.94	0.70	0.80 – 0.89
Compulsive Buying Intention (CBI)	5		0.90	0.93	0.72	0.82 – 0.88
Online Purchase Behaviour (OPB)	4		0.88	0.91	0.66	0.77 – 0.85
Digital Innovation Context (DIC)	4		0.87	0.90	0.67	0.76 – 0.86

4.2. Structural Model Assessment

Once reliability and validity were confirmed, the structural model was analysed using bootstrapping (5,000 resamples) in SmartPLS 4.0. All coefficients are shown in Table 6. VIF values < 3.0 indicated no collinearity. Model fit indices (SRMR = 0.057; NFI = 0.91) were acceptable (Hair et al., 2022). The structural path

Table 6: Structural Path Coefficients.

Hypothesis	Path	β	t-value	p-value	Result
H1	ECS → OPB	0.31	6.21	< 0.001	Supported
H2	BS → OPB	0.26	5.44	< 0.001	Supported
H3	MAT → OPB	0.18	3.92	< 0.001	Supported
H4	CBI → OPB	0.33	7.16	< 0.001	Supported
H5	ECS → CBI → OPB	0.10	2.97	0.003	Mediated
H6	BS → CBI → OPB	0.07	2.46	0.014	Mediated
H7	MAT → CBI → OPB	0.09	3.11	0.002	Mediated
H8	MAT × DIC → CBI	0.12	3.56	< 0.001	Moderated

The combined model explained 56 % of the variance in OPB and 49 % in CBI, demonstrating moderate-to-strong predictive power (Chin, 1998).

4.3. Direct Effects

H1, a return value to e-commerce stimuli and online purchase behaviour, shows that dynamic atmospherics—including live-stream promotions, social endorsements, and gamified rewards—increase users' preference for impulse purchases. This confirms that aesthetics and interactive design of an interface directly encourage buying behaviour (Mikalef et al., 2023; Chen et al., 2022).

H2, Behavioural stimuli and OPB ($\beta = 0.26$, $p < 0.001$) also show a significant positive impact. Hedonic gratification and emotional escapism work as coping tools that convert digital exposure into purchasing behaviour. Consumers buy to find enjoyment and get rid of tension in immersive environments (Fu et al., 2024; Park & Dhandra, 2017). As such, digital platforms are simultaneously shopping and leisure spaces.

Materialism (H3) exhibits a consistent but moderate effect ($\beta = 0.18$, $p < 0.001$), verifying that impulsive buyers are more likely to purchase commodities that represent achievement (Richins & Dawson, 1992; Jameel et al., 2024). As buyers gather comparisons and aspirations to desired identity, social-media contribution exacerbates the scenario (Rahim et al., 2023).

Online purchase behaviour is most directly impacted by compulsive buying intention (CBI) (H4: $\beta = 0.33$, $t = 7.16$, $p < 0.001$). Additionally, the strong psychological compulsion to shop turns internal desire into external consumer behaviour. Gratification-orientated mass browsing becomes more dominant than rational thought, which can lead to compulsive purchases (Ridgway, Kukar-Kinney, & Monroe, 2008; Jameel et al., 2024). As Shopee Live and TikTok Shop are particularly interactive, algorithmic recommendations (e.g., live influencer purchase appeals and time-limited sales) battle against it (Fu et al., 2024; Ahmad & Lim, 2024). The consumer's brain cycles between guilt and excitement, inciting behavioural reinforcement consistent with the S–O–R model (Mehrabian & Russell, 1974). Emerging connections to dopamine-related reinforcement and algorithmic persuasion have been confirmed (Mikalef et al., 2023; Le & Scaringella, 2025). As such, CBI becomes a behavioural anti-trafficker, turning thoughts into visible online purchases.

4.4. Mediating Effects of Compulsive Buying Intention

CBI was evaluated as a mediator in the relationship from each stimulus (ECS, BS, and MAT) to Online Purchase Behaviour (OPB). Each of the three indirect paths showed significance and positivity, confirming partial mediation (H5–H7). ECS → CBI → OPB ($\beta = 0.10$, $p = 0.003$) is positive for compulsive excitement based on hedonic enjoyment. BS → CBI → OPB ($\beta = 0.07$, $p = 0.014$) is positive for compulsive escape. MAT → CBI → OPB ($\beta = 0.09$, $p = 0.002$) is positive for compulsive materialism. These effects altogether confirm that CBI mediates the relationship between external stimuli and behavioural results.

4.5. Moderating Role of Digital Innovation Context

MAT × DIC shows significance ($\beta = 0.12$, $t = 3.56$, $p < 0.001$), confirming H8. Simple-slope testing revealed that the materialism-to-CBI relationship is significantly positive under conditions of high digital innovation, as AI-based immersive and gamified settings intensify constant compulsive desire. Under low conditions of innovation, the relationship is less positive, as materialist expression is intensified by technological involvement (Mikalef et al., 2023; Le & Scaringella, 2025).

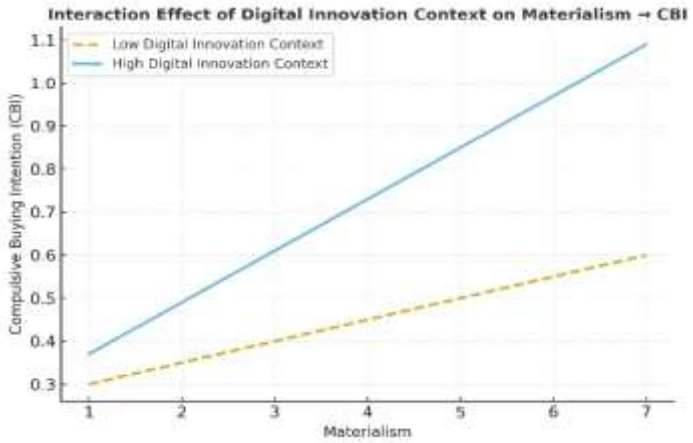

Fig 2: Interaction Effect of Digital Innovation Context on Materialism → CBI.

4.6. Coefficient Of Determination and Effect Sizes

R^2 values of 0.56 for OPB and 0.49 for CBI indicate moderate-to-strong explanatory power. Effect sizes (f^2) showed that ECS (0.17) and CBI (0.22) are medium contributors, as BS (0.13) and MAT (0.09) are smaller but significant predictors. Blindfolding produced positive Q^2 (0.38 for OPB; 0.33 for CBI), confirming strong predictive relevance (Shmueli et al., 2019).

4.7. Robustness And Multi-Group Analysis

PLSpredict showed lower RMSE for PLS compared to OLS, confirming high predictive performance. Blindfolding ($Q^2 > 0$) confirmed predictive stability when performing a hold-out comparison. The MICOM procedure confirmed measurement invariance, allowing for multi-group analysis of gender and income levels. No significant differences were detected ($p > 0.05$), confirming that the behaviour mechanisms are consistent across demographic participants within the Malaysian e-commerce market.

4.8. Model Diagnostics and Predictive Validation

Bootstrapped 95% confidence intervals for all paths did not include zero, so the model is stable for statistical purposes. A Gaussian-copula test of endogeneity revealed no significant bias ($p > 0.10$). Consistency was preserved between the estimation and prediction sets in the holdout validation (R^2_hold-out = 0.55), so the model can generalise beyond the sample.

4.9. Summary Of Findings

The results confirm that technological stimuli, behavioural mechanisms, and materialist orientation influence online purchasing through compulsions. Across all predictors, CBI shows the strongest influence, so affective elements are central to broadly understanding information processing within digital environments. E-commerce stimuli were the strongest direct technological influence, while behavioural stimuli directly motivated emotional response, and materialism provided symbolic motivation. As the Digital Innovation Context contributed to these effects, companies incorporated novelty, gamification, and algorithmic personalisation within their shopping experiences. Combined, these results prove that impulsive online purchasing can be best explained through psychological mechanisms about innovation intensity, which provides a pragmatic approach for rethinking future platform practices and system sustainability.

5. DISCUSSION AND CONCLUSIONS

5.1. Overview Of Key Findings

The study's findings offer strong empirical validation for an S–O–R model illustrating the impact of technological and psychological stimuli on online purchase behaviour in the Malaysian digital commerce market. All direct, mediating, and moderating paths across the eight hypotheses were significant, collectively accounting for 56% of the variance in Online Purchase Behaviour (OPB) and 49% of the variance in Compulsive Buying Intention (CBI). Four main takeaways can be extracted.

First, E-Commerce Stimuli (ECS) and Behavioural Stimuli (BS)—the identified domains of platform interactivity and hedonic consumption— are found to be prominent predictors of OPB. Second, materialism (MAT) is revealed to complement both compulsive and impulsive behaviours. This confirms earlier understandings, such as the one that

suggested how status-focused values contribute to digital consumption. Third, Compulsive Buying Intention (CBI) is a pivotal factor that assumes a dual role, both complementary and psychological. Fourth, the Digital Innovation Context (DIC) determines the bounds of the materialism–compulsive relationship by influencing innovation intensity (AI, gamification, social integration). Consequently, the results expand the existing digital-behavioural theory by uniting affective and technological components in a single structure reflecting the experience of consumption in emerging e-commerce markets.

5.2. Theoretical Implications

5.2.1. Advancing The S–O–R Framework in Digital Contexts

The paper extends the classic S–O–R model (Mehrabian & Russell, 1974) in the following manner. The stimuli (ECS, BS, MAT) are technological, affective, and value-based triggers that lead to internal organismic reactions (CBI), which can be traced through observable responses (OPB). In contrast to their classical role in physical retail spaces (Donovan & Rossiter, 1982), digital innovation is positioned as a contextual modifier that not only elicits an organismic reaction but also magnifies it.

Indeed, technology can become a behavioural enhancer that shapes the dynamic nature of psychological development. As the study's results offer evidence of CBI's mediating role, they capture a path of translation from digital stimuli to behavioural outcomes through organismic mechanisms modelled as emotional arousal and compulsive impulses. It closes the divide between consumer psychology and innovation management.

5.2.2. Integration Of Materialism Within Behavioural Innovation Theory

A major contribution is that materialism is a motivational and cognitive element that justifies the dynamic approach to innovation diffusion and internalisation of value (Rogers, 2003; Wang et al., 2024). The target segment's preexisting materialistic values encourage them to adapt to innovative digital experiences associated with certain social meanings. The positive influence of materialism on CBI and OPB is aligned with the narrative of social comparison and aspirational consumption's amplification in the digital realm (Jameel et al., 2024).

The integration of materialistic perception into innovation exposure (through DIC) incorporates a two-tiered view that aligns personal values (micro) with the innovation space (macro) and determines a behavioural response. It expands the scope of the innovation–consumption connection from utilitarian-based adoption patterns (TAM, DOI) to affective adoption frames that consider socio-psychological impact intensity.

5.2.3. Compulsive Buying Intention as a Psychological Bridge

The reconceptualisation advances theory in two ways. First, though, it disproves the view that compulsive buying is an individual pathology by showing how it is a functional emotional response in technologically mediated spaces.

Second, it is aligned with the transformative service research view that understands digital interaction as both an opportunity and a psychological risk (Mikalef, Krogstie, & Pappas, 2023). Consequently, it advances the micro-foundations of digital innovation theory by tracing how individual emotional adaptations determine macro innovation traversal and market behaviours.

5.2.4. Digital Innovation Context as Boundary Condition

The moderating role of Digital Innovation Context (DIC) prevails as a vital extension to the behavioural innovation model. The study's findings validate that in cases of high innovation intensity features (algorithmic curation, gamification, and AI-driven engagement), the influence of materialism on CBI grows substantively.

It reveals how innovation still does not touch all consumers evenly but magnifies the psychological implications of value perceptions (Le & Scaringella, 2025). In that sense, the moderating effect establishes the innovation intensity as a boundary condition of affective consumption: as digital platforms become more innovative, they also increase the psychological 'depth' of consumer engagement. The study bridges the conceptual space between the digital innovation systems (e.g., heterogeneous) and behavioural psychology to contribute to a unified "technological affect theory" of consumption.

5.3. Managerial And Practical Implications

5.3.1. Designing Emotionally Intelligent E-Commerce Platforms

The results sound a clarion call to e-commerce strategists and digital designers to create emotionally intelligent platforms that mediate their putative stimulation and ethical engagement. On the one hand, interactive and gamified features, as well as algorithmically personalised experiences, uphold

higher conversion rates. However, they can also trigger compulsive tendencies, stimulating a continuous flourishment of behaviours. In that scenario, platform managers can employ real-time emotion recognition and purchase limitation algorithms that detect overwhelm patterns and gradually nudge consumers into 'morally conscious consumption'. Such adaptive design can build long-term trust and retention, consistent with the literature on the 'human-centred innovation' paradigm present in digital commerce ethics amendments (Bashri & Samat, 2025).

5.3.2. Targeting Segments Based on Behavioural Triggers

Marketers should verify that e-commerce stimuli and behavioural stimuli are operationalised differently across the chosen target segments.

For instance, younger digital natives may be more tied to hedonic and escapism drivers, whereas the older segment can privilege a rational basis. Overlaid with vulnerabilities, they can build tailored promotional designs, such as live-stream flash deals on impulse buyers and subscription plans for planned purchase patterns. As a result, the business can achieve optimal engagement without crossing any psychological thresholds. Catering to distinct segments allows the marketing innovation to handsomely weaken the dependency on compulsive purchase behaviours.

5.3.3. Managing Materialism and Innovation Ethics

Materialistic motivation appears to be a powerful yet 'double-edged sword' market driver. Marketers will have to carefully court social comparison and vanity cues that may easily precede digital addiction and regrets. Alternatively, they can align it with integration approaches to social values, such as sustainability, authenticity, and social contribution, leading to materialist perception realignment (Wang et al., 2024). Moreover, firms that operate in high-DIC environments will need to embed digital consumption well-being mechanisms, such as spending-limit nudges, conscious-shopping dashboards, and "ethical AI" usage disclosure, to attenuate the compulsive purchase risk.

5.3.4. Policy And Education Interventions

The study, from a public-policy standpoint, points to the importance of initiatives focusing on digital literacy that aim at emotional consumers' buying behaviour. Through platforms, governments could impose restrictions on the ethical standards of design to diminish psychological coercion amongst consumers, especially the younger demographic. Academic entities could incorporate consumer emotional intelligence into subjects related to entrepreneurship and digital marketing to prepare upcoming consumers and workforce leaders to face technological creativity. These measures back Malaysia's MyDigital vision and PayNet, which ensure online platforms are safe, open, and sustainable.

5.4. Limitations And Future Research Directions

Despite the strong methodological strategy, numerous limitations allow for further investigation.

This is a cross-sectional study; therefore, the causative relationships cannot be concluded. Future longitudinal or experimental research could assess how emotional stimuli and compulsiveness function in regard to temporal shifts, mainly due to new digital innovation such as augmentedreality shopping. The data applied were collected from the Malaysian consumer base, which is an emerging-market consumer base with specific economic and cultural particularities. The cross-country comparative analysis could be focused on contrasting cultures regarding their collectivistic versus individualistic approaches and how compulsive aspects could be moderated by them.

Although both psychological and technological aspects are addressed in this study, the neurocognitive perspective is neglected. The further direction of neurodevelopmental research could be related to the usage of psychophysiological measures, such as eye-tracking, galvanic skin response, or neuroimaging, which provide more accurate insights into stimuli arousal.

The current study employed self-reported behavioural measures. However, increasingly digital platforms store such data, and it would be beneficial to integrate technological measures. The research model applied included only materialism, CBI, and OPB. However, fatigue associated with digital consumption and overall absence of self-discipline or social anxiety disorders may be applied to form a stronger explanation of compulsive trends related to innovation.

5.5. Conclusions

The findings demonstrate that the buying experience in the digitally influenced economy is tailored by emotional purpose and context as well as functional value. It encapsulates technological, psychological, and socio-cultural factors that affect a consumer's buying behaviour. By applying

compulsive and materialistic traits of digital innovation moderation, this article advances the S-O-R heuristic, composing a more complex view of consumers' behaviour in an online milieu. Compulsive purchasing intention is the most vital process that transforms emotive and technological stimuli into observable behaviour. In this respect, digital innovation enhances the association, meaning that emotional drivers are not lessened but forcefully activated by technological advancement. Incorporating emotive psychological aspects in an innovation diffusion environment, this study expands the discourse of behavioural innovation. To adopt such viewpoints, ethical approaches to innovation should encapsulate human feelings in addition to commercial sustainability. The results verify that innovation-paved commerce has to mutate in order to stay ethical and empathetic as we usher in uncharted technologies amid a digital age targeting seamless, sustainable consumer transactions. Consequently, the digital transformation of Malaysia will bear a close relationship to customer satisfaction to reach further milestones.

REFERENCES

Adamczyk, G. (2021). *Escapism, impulsivity, and online shopping: Emotional underpinnings of digital consumption. Journal of Consumer Behaviour, 20*(4), 876–890. https://doi.org/10.1002/cb.1948

Ahmad, M., & Lim, S. (2024). *The psychology of live commerce: How interactive streaming drives impulsive purchases among millennials. Asia*

Azhar, M. A., Wel, C. A. C., & Ab Hamid, S. N. (2025). *Entertainment marketing and impulse buying in social commerce: Evidence from TikTok Shop users in Malaysia. Journal of Retailing and Consumer Services, 76*, 103735. https://doi.org/10.1016/j.jretconser.2024.103735

Bashri, M., & Samat, N. (2025). *Gamification and AI personalization in sustainable e-commerce design. Technological Forecasting and Social Change, 203*, 123184. https://doi.org/10.1016/j.techfore.2024.123184

Brislin, R. W. (1980). *Translation and content analysis of oral and written material.* In H. C. Triandis & J. W. Berry (Eds.), *Handbook of cross-cultural psychology* (Vol. 2, pp. 389–444). Allyn & Bacon.

Chen, L., Lu, Y., & Zhao, L. (2022). *Exploring e-commerce stimuli: The interplay between digital atmospherics and user engagement. Information & Management, 59*(7), 103639. https://doi.org/10.1016/j.im.2022.103639

Chin, W. W. (1998). *The partial least squares approach to structural equation modeling.* In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Lawrence Erlbaum Associates.

China and Malaysia. International Journal of Business and Customer Relationship Management, 10(2/3), 207–217. https://doi.org/10.1504/IJBCRM.2020.108505

Clemente-Almendros, J. A., Scaringella, L., & Le, D. (2025). *Innovation-driven behavioural shifts in digital ecosystems: Integrating emotional intelligence and consumption theory. International Journal of Innovation Studies, 9*(1), 33–49. https://doi.org/10.1016/j.ijis.2024.12.003 Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Deng, J., Li, X., & Guo, Q. (2024). *Extending the S–O–R model in digital retailing: Evidence from Asia. Electronic Commerce Research and Applications, 61*, 102219. https://doi.org/10.1016/j.elerap.2023.102219

Department of Statistics Malaysia (DOSM). (2024). *E-commerce statistics, Malaysia 2024 (Annual Report).* Putrajaya: DOSM.

Donovan, R. J., & Rossiter, J. R. (1982). *Store atmosphere: An environmental psychology approach. Journal of Retailing, 58*(1), 34–57.

Fu, Y., Li, T., & Chen, M. (2024). *Digital affect and compulsive buying: A cross-cultural study of live-stream commerce. Computers in Human Behavior, 150*, 107087. https://doi.org/10.1016/j.chb.2023.107087

George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference (10th ed.).* Pearson.

Gong, X., Feng, Y., & Li, Y. (2023). *Live-stream commerce and compulsive buying: The role of interactivity and social presence. Internet Research, 33*(5), 1780–1802. https://doi.org/10.1108/INTR-03-2023-0132

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage Publications.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). *A new criterion for assessing discriminant validity in variance-based SEM. Journal of the Academy of Marketing Science, 43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hult, G. T. M., Hair, J. F., Proksch, D., & Sarstedt, M. (2018). *Addressing endogeneity in international marketing applications of PLS-SEM. Journal of International Marketing, 26*(3), 1–21.

Iyer, G. R., Blut, M., Xiao, S. H., & Grewal, D. (2020). *Impulse buying: A meta-analytic review. Journal of the Academy of Marketing Science, 48*(3), 384–404.

Jameel, A., Hussain, M., & Khan, M. (2024). *Materialism, compulsive buying, and social influence in digital environments. Journal of Consumer Psychology, 34*(2), 245–261.

Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). *Likert scale: Explored and explained. British Journal of Applied Science & Technology, 7*(4), 396– 403.

Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). Guilford Press.

Kock, N., & Hadaya, P. (2018). *Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. Information Systems Journal, 28*(1), 227–261.

Kumar, V., Dixit, A., Javalgi, R., & Dass, M. (2022). *Personalization in digital commerce: A meta-analysis. Journal of Retailing, 98*(2), 225–242. https://doi.org/10.1016/j.jretai.2021.12.004

Le, D., & Scaringella, L. (2025). *Digital innovation intensity as a moderating factor in behavioural transformation: Evidence from global digital ecosystems. International Journal of Innovation Studies, 9*(1), 15–32.

Mahalanobis, P. C. (1936). *On the generalised distance in statistics. Proceedings of the National Institute of Sciences of India, 2*(1), 49–55.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology.* MIT Press.

Mikalef, P., Krogstie, J., & Pappas, I. O. (2023). *Digital transformation and emotional engagement: How AI-driven personalization reshapes consumer behavior. Information Systems Frontiers, 25*(6), 1871–1891. https://doi.org/10.1007/s10796-022-10376-1

Pacific Journal of Marketing and Logistics, 36(2), 415–438. https://doi.org/10.1108/APJML-11-2023-0952

Park, H., Kim, Y., & Forney, J. C. (2022). *Digital escapism and impulsive buying: The mediating role of hedonic motivation. Computers in Human Behavior, 129*, 107126. https://doi.org/10.1016/j.chb.2021.107126

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). *Sources of method bias in social science research and recommendations on how to control it. Annual Review of Psychology, 63*, 539–569.

Qu, X., Li, C., & Wu, Y. (2023). *Algorithmic persuasion and the psychology of scarcity in live-stream commerce. Electronic Commerce Research, 23*(4), 221–241. https://doi.org/10.1007/s10660-022-09567-5

Rahim, A. H., Musa, M. R., & Hassan, R. (2023). *Live streaming, influencer trust, and hedonic impulse: A Malaysian perspective. Asian Journal of Business Research, 13*(3), 45–64. https://doi.org/10.14707/ajbr.23012

Richins, M. L., & Dawson, S. (1992). *A consumer values orientation for materialism and its measurement. Journal of Consumer Research, 19*(3), 303–316.

Ridgway, N. M., Kukar-Kinney, M., & Monroe, K. B. (2008). *An expanded conceptualization and a new measure of compulsive buying. Journal of Consumer Research, 35*(4), 622–639.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

Rose, S., Clark, M., Samouel, P., & Hair, N. (2012). *Online customer experience in e-retailing: An empirical model of antecedents and outcomes. Journal of Retailing, 88*(2), 308–322.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2023). *Evaluating partial least squares structural equation modeling results: Guidelines for rigorous research practice. Industrial Management & Data Systems, 123*(4), 1–20.

Sekaran, U., & Bougie, R. (2019). *Research methods for business: A skill-building approach* (8th ed.). Wiley.

Shmueli, G., Ray, S., Velasquez Estrada, J. M., & Chatla, S. B. (2019). *The elephant in the room: Predictive performance of PLS models. Journal of Business Research, 95*, 455–464.

Statista. (2023). *E-commerce in Malaysia – statistics and facts.* https://www.statista.com Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

Teng, P. K., Heng, B. L. J., Abdullah, S. I. N. W., Ping, W. T., & Yao, X. J. (2020). *Consumer adoption of mobile payments: A distinctive analysis between*

Wang, X., Zhang, L., & Yu, T. (2024). *Digital impulsiveness and online purchase behavior: A meta-analysis of technology-induced stimuli. Journal of Interactive Marketing, 63*, 124–142. https://doi.org/10.1016/j.intmar.2024.05.002

Wang, Y., Zhang, J., & Yu, J. (2024). *Live-streaming commerce and consumer purchase behaviour: Evidence from emerging markets. Journal of Business Research, 174*, 114263. https://doi.org/10.1016/j.jbusres.2023.114263

Zainudin, R., Mahdzan, N. S., & Yeap, M. (2019). *Determinants of credit card misuse among Gen Y consumers in urban Malaysia. International Journal of Bank Marketing, 37*(5), 1350–1370. https://doi.org/10.1108/IJBM-08-2018-0215

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). *Reconsidering Baron and Kenny: Myths and truths about mediation analysis. Journal of Consumer Research, 37*(2), 197–206.

Zhao, Y., Wang, L., & Liang, Y. (2022). *A meta-analysis of online impulsive buying and its determinants. Information Systems Frontiers, 24*(5), 1583– 1605. https://doi.org/10.1007/s10796-021-10170-4