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Understanding Digital Consumer Decision Pathways: An Integrated Model of Perception, Trust, Experience Quality, Engagement, Perceived Value, and UX Flow in Emerging Online Service Markets

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ABSTRACT

The rapid expansion of digital platforms has intensified competition, making it critical to understand how user experience and psychological factors influence consumer purchase behavior. Despite extensive adoption of digital services in urban markets, there is limited empirical evidence on how customer perceptions, trust, experience quality, engagement, perceived value, and UX flow jointly shape purchase decisions and purchase probability. This study aims to examine these relationships among digital platform users in Karachi. Using a quantitative research design, data were collected through a structured questionnaire from 400 active digital service users. The proposed model was tested using PLS-SEM, ensuring reliability and validity through established measurement and structural model assessments. The results indicate that customer perception, experience quality, engagement, and perceived value exert significant positive effects on UX flow, which in turn strongly influences purchase decision ($\beta = 0.61$, $p < 0.001$) and buying probability ($\beta = 0.58$, $p < 0.001$). Customer trust also demonstrated a direct and statistically significant effect on purchase-related outcomes. Overall, the model explained 62% of the variance in purchase decisions and 59% of the variance in buying probability, indicating strong explanatory power. The findings suggest that digital platforms should prioritize seamless UX flow, trust-building mechanisms, and value-enhancing features to strengthen consumer decision-making and long-term purchasing behavior. Future research may extend this model across different cities or service categories for broader generalizability.

Introduction

The worldwide economy has now fully incorporated the digital economy as one of its largest growth and innovation sectors. According to OECD (2023) estimates, the digital sphere will contribute more than USD 7 trillion to the global economy, shaping how services are delivered, businesses are modelled, and users interact. The rapid spread of mobile technologies, artificial intelligence, and digital ecosystems has prompted customers to adopt them rapidly (UNCTAD, 2024). Extensive literature highlights that, in both transactional and non-transactional markets, digital platforms profoundly influence customers' cognitive, emotional, and experiential evaluations (Dwivedi et al., 2021; Marbach et al., 2023). Across crypto exchange platforms, the market will be predominantly digital in its consumption and transactional commerce in both developed and developing economies (PwC, 2023).

Asia today is leading the world in terms of digital development. The World Bank (2023) reports that the region accounts for over 55% of internet users worldwide and continues to grow in digital services, mobile commerce, and fintech ecosystems. Due to rapid urbanization, the spread of mobile devices, and the youth demographic in the region, Asia is beginning to develop and expand their digital markets far more rapidly than any other country (Mikalef et al., 2021; Li et al., 2022) With rising consumer activity and improvements in technology, Asia is expected to hit over 2.5 trillion in digital commerce and services by the year 2030 (UNESCAP, 2024). One of the more recent and noteworthy digital studies has focused on users in Asia and the online services with which they interact. It suggests that while these consumers are using various digital platforms, they are focused on the digital experience in terms of usability; the trust they feel in the platform; what values the platform offers; and whether the services encourage "flow" in their mental activity (Hollebeek & Macky, 2021; Huang & Benyoucef, 2023).

Pakistan is one of the fastest-growing digital markets in the region. The country has more than 195 million mobile connections and more than 127 million broadband subscribers (PTA, 2024). The country has crossed an important milestone in digital coverage. According to the State Bank of Pakistan (2023, funding of USD 6 billion is predominantly coming from e-commerce, supported by advances in fintech, digital banking, and the retail sector. Studies indicate that digitally connected consumers in Pakistan are becoming more sophisticated, with cognitive and experiential elements of decision-making increasingly determinative beyond price (Khan et al., 2022; Javed & Wu, 2023). In the long term, PwC (2023) projected that by 2050, Pakistan would likely be the 16th-largest economy in the world, attributable to rapid technological integration, favorable demographics, and active participation in the global digital economy. Scholars also identify issues such as a trust deficit, inconsistent service quality, and closed-loop user experiences, which position Pakistan differently from other digitally advanced countries (Rafiq et al., 2021; Ahmed et al., 2025).

Karachi is the epicentre of Pakistan’s economy, trade, and technology. Bolstering nearly 20 percent of the economy and serving as the centre for retail, finance, logistics, and digital entrepreneurship, the city is further described as an ideal setting for studying online consumer behaviour. According to the 2024 Economic Survey of Pakistan, the city, with over 22 million people, has the highest level of digital adoption in the country. Karachites use ride-hailing, fintech, and e-commerce platforms, as well as digital entertainment. Digital consumers in Karachi are more sensitive to experience, trust, clarity, and value. Such consumers will help in understanding the experience the city is providing, as explained by Kakar et al. (2023) and Fatima and Abbas (2024). The city is home to one of the fastest-growing startup

ecosystems in the country, and its technology infrastructure further cements its role as Pakistan's digital transformation corridor (Siddique et al., 2024).

Given the importance of similar behavior among potential customers and the evaluation of digital platforms from the perspectives of perception, experience, relationships, and flow, understanding the mechanisms of these behaviors is increasingly sought. In consumer behavior and digital market research, the focus is not only on the functional aspects of the product but also on cognitive and emotional factors such as trust, experience, engagement, value, and flow (Sweeney et al., 2022; Gomez et al., 2025). In developing and culturally diverse urban areas such as Karachi, compared with Western and East Asian contexts, the behavioral patterns are digital literacy, risk perception, socio-economic diversity, and the maturity of the platforms. This should then be an exhaustive, localized study of consumer behavior on digital platforms.

Problem Statement

Although digital service adoption is accelerating in emerging markets, academic understanding of how perceptual, relational, and experiential factors shape online engagement and purchase behaviour remains incomplete. Prior research has examined constructs such as trust, perceived value, and user experience in isolation, but there is limited integration of these factors within a cohesive behavioural framework capable of predicting purchase outcomes (Dwivedi et al., 2021; Pappas, 2021). Recent studies highlight the need for models that capture interconnected psychological and experiential pathways, particularly in digital environments where users continuously evaluate platform quality and interaction fluency (Cao et al., 2025; Fang et al., 2025).

Although engagement has been acknowledged as a key mechanism linking user evaluations with behavioural intentions, its mediating role within complex experiential contexts remains underexplored. In emerging markets, differences in risk tolerance, digital literacy, and platform familiarity suggest that engagement may function differently than in Western contexts, but empirical evidence remains scarce (Rather, 2021; Lin et al., 2021; Yousaf et al., 2025). Understanding these dynamics is essential as consumer engagement increasingly mediates the relationship between digital experience and value creation (Marbach et al., 2023; Kaur et al., 2024).

A critical theoretical gap concerns UX Flow, an immersive and cognitive state that has gained prominence as digital interfaces have become more interactive and personalised. While literature establishes flow as a determinant of satisfaction and platform use, little is known about how UX Flow amplifies engagement, enhances value formation, or strengthens decision pathways in technology-mediated environments (Sweeney et al., 2022; Huang & Benyoucef, 2023; Cao et al., 2025). Emerging evidence shows that flow can significantly influence cognitive load and emotional absorption, yet its moderating function across sequential behavioural processes remains insufficiently theorised (Gómez et al., 2025; Ahmed et al., 2025).

Additionally, existing studies disproportionately focus on Western, East Asian, or highly digitalised economies, leaving emerging markets such as Karachi relatively underrepresented. Karachi's rapidly evolving digital ecosystem, demographic diversity, and high mobile penetration provide a unique context for understanding digital consumer behaviour; however, empirical insights remain limited (Gálvez-Ruiz et al., 2023; Kaur et al., 2024; Yousaf et al., 2025). This lack of contextual evidence restricts theory development and limits global generalisability.

Thus, a significant research gap persists in explaining how antecedent factors, including customer perception, trust, and experience quality, interact through engagement to shape perceived value, and how UX Flow conditions these pathways

to influence purchase decisions and buying probability. Addressing this gap is essential for advancing theoretical understanding and offering contextually relevant insights into digital consumer behaviour in emerging economies.

Research Questions

RQ1: How do customer perception, customer trust, and experience quality influence e-service engagement among digital service users in Karachi?

RQ2: How does e-service engagement shape perceived value, and how does perceived value affect purchase decision and buying probability in digital service environments?

RQ3: Does perceived value mediate the relationships between engagement and purchase-related outcomes, and between the antecedent factors (perception, trust, and experience quality) and behavioural outcomes?

RQ4: How does UX Flow moderate the relationship between engagement and perceived value, and between perceived value and purchase outcomes, within digital platforms?

Research Objectives

RO1: To examine the influence of customer perception, customer trust, and experience quality on e-service engagement in the context of Karachi's digital service users.

RO2: To investigate the role of e-service engagement in shaping perceived value and its subsequent impact on purchase decision and buying probability.

RO3: To evaluate the mediating effects of perceived value in the relationships among engagement, antecedent perceptual factors, and purchase-related behavioural outcomes.

RO4: To assess the moderating role of UX Flow in strengthening or weakening the influence of engagement on perceived value, and the effect of perceived value on purchase decision and buying probability.

Rationale of the Study

The increasing reliance on digital platforms for commerce, entertainment, communication, and financial services has transformed consumer behaviour, particularly in emerging markets such as Karachi. Despite this shift, existing research provides an incomplete understanding of how perceptual, relational, and experiential factors collectively shape digital user engagement and purchase behaviour. Much of the current literature focuses on individual predictors, such as trust, perceived value, or user experience, without integrating them into a unified behavioural model that can reveal deeper causal mechanisms. This lack of theoretical integration limits researchers' and practitioners' ability to fully understand the drivers of digital consumer decisions in dynamic, technology-mediated contexts.

A second rationale emerges from the increasing recognition of e-service engagement as a central behavioural mechanism. While engagement has been identified as crucial for digital loyalty, retention, and value creation, its mediating role across complex experiential variables remains underexplored, particularly within the cultural and socioeconomic context of South Asian digital markets. Understanding engagement as a behavioural pathway is essential for advancing theory and improving the strategic design of digital experiences.

Furthermore, UX Flow, a state of immersive, uninterrupted interaction, has become increasingly relevant with the rise of intuitive interfaces, personalised content, and mobile-first digital ecosystems. However, limited empirical evidence examines how UX Flow functions as a moderator, amplifying or attenuating the influence of engagement on perceived value, or strengthening the translation of perceived value

into purchase decisions. In an era in which digital friction, attention spans, and experiential design significantly shape online behaviour, exploring the moderating role of UX Flow offers meaningful theoretical and practical insights.

Additionally, existing empirical studies predominantly draw on Western and East Asian settings, resulting in a lack of generalisable findings for high-growth emerging markets. Karachi, as Pakistan's largest metropolitan city, represents a digitally progressive and demographically diverse environment. Studying this population provides novel contextual evidence, enriches cross-cultural theoretical understanding, and addresses the underrepresentation of South Asian markets in research on digital consumer behaviour. Finally, from a practical perspective, businesses, digital marketers, UX designers, and service providers urgently require empirical guidance to optimise platform experiences, foster engagement, enhance perceived value, and drive purchasing outcomes. A comprehensive model integrating perception, trust, experience quality, engagement, value, and flow offers actionable insight for designing user-centric digital strategies. Taken together, these gaps highlight the necessity of a holistic, empirically tested framework that captures the interplay between perceptual antecedents, behavioural mechanisms, cognitive evaluations, and moderated decision pathways. This study addresses these gaps and contributes to both theoretical advancement and practical application within the digital service landscape.

Study Hypotheses

Direct Effects

H1: Customer Perception (CP) significantly affects E-Service Engagement (EE).

H2: Customer Perception (CP) significantly affects Perceived Value (PV).

H3: Customer Trust (CTR) significantly affects E-Service Engagement (EE).

H4: E-Service Engagement (EE) significantly affects Perceived Value (PV).

H5: E-Service Experience Quality (EEG) significantly affects E-Service Engagement (EE).

H6: Perceived Value (PV) significantly affects Buying Probability (BP).

H7: Perceived Value (PV) significantly affects Purchase Decision (PD).

H8: UX Flow significantly affects Purchase Decision (PD).

H9: UX Flow significantly affects Perceived Value (PV).

Mediation Effects

H10: Perceived Value (PV) significantly mediates the relationship between E-Service Engagement (EE) and Purchase Decision (PD).

H11: Perceived Value (PV) significantly mediates the relationship between E-Service Engagement (EE) and Buying Probability (BP).

H12: E-Service Engagement (EE) significantly mediates the relationship between Customer Perception (CP) and Perceived Value (PV).

H13: E-Service Engagement (EE) significantly mediates the relationship between Customer Trust (CTR) and Perceived Value (PV).

H14: E-Service Engagement (EE) significantly mediates the relationship between Experience Quality (EEG) and Perceived Value (PV).

H15: Perceived Value (PV) significantly mediates the sequential relationship linking Customer Perception (CP), E-Service Engagement (EE), and Purchase Decision (PD).

H16: Perceived Value (PV) significantly mediates the sequential relationship linking Customer Trust (CTR), E-Service Engagement (EE), and Purchase Decision (PD).

H17: Perceived Value (PV) significantly mediates the sequential relationship linking Experience Quality (EEG), E-Service Engagement (EE), and Purchase Decision (PD).

H18: Perceived Value (PV) significantly mediates the sequential relationship linking Customer Perception (CP), E-Service Engagement (EE), and Buying Probability (BP).

H19: Perceived Value (PV) significantly mediates the sequential relationship linking Customer Trust (CTR), E-Service Engagement (EE), and Buying Probability (BP).
H20: Perceived Value (PV) significantly mediates the sequential relationship linking Experience Quality (EQ), E-Service Engagement (EE), and Buying Probability (BP).
H21: Perceived Value (PV) significantly mediates the relationship between Customer Perception (CP) and Buying Probability (BP).
H22: Perceived Value (PV) significantly mediates the relationship between Customer Perception (CP) and Purchase Decision (PD).
H23: Perceived Value (PV) significantly mediates the relationship between E-Service Engagement (EE) and Buying Probability (BP).

Moderation Effects

H24: UX Flow significantly moderates the relationship between E-Service Engagement (EE) and Perceived Value (PV).
H25: UX Flow significantly moderates the relationship between Perceived Value (PV) and Purchase Decision (PD).
H26: UX Flow significantly influences Purchase Decision (PD) through Perceived Value (PV).
H27: UX Flow significantly influences Buying Probability (BP) through Perceived Value (PV).

Significance of the Study

This research is relevant because it enhances the theoretical, methodological, and practical comprehension of digital consumer behavior in developing economies. From the theoretical perspective, it provides an integrated framework that combines perceptual elements such as consumer cognition, relational elements such as trust, and experiential factors like the quality of the experience, explaining the antecedents shaping e-service engagement and the perceived value. While the individual constructs have been the focus of earlier studies, scant attention has been given to the integrated effect of relational constructs within a single framework. By empirically confirming e-service engagement as a key intervening variable and adding UX Flow as a boundary condition in the context, the research responds to the theoretical calls to advance contemporary research on experiential states and value co-creation in digital settings (Hollebeek & Macky, 2021; Sweeney et al, 2022; Huang & Benyoucef, 2023; Cao et al, 2025). From methodological perspectives, the study's contribution is premised on the utilization of the sophisticated PLS-SEM approach with a reasonable 400 sample size of digital users in Karachi that enables the examination of complex mediating and moderating relationships and predictive abilities, thus enriching the profiles of structure and behaviour (Hair et al, 2020; Sarstedt et al, 2022). On a practical level, the findings have benefits for digital enterprises, UX designers, and marketers who will understand the perceptual and experiential factors that enhance the levels of engagement, the engagement that drives value, and the value that drives purchase behavior.

Recognizing the importance of UX Flow helped understand the impact seamless, immersive, and intuitive UX can have for the consumer decision journey and the experience. This makes this study unique, as it aids the development of theory and techniques needed for strategic managerial decisions in the hyper-digitized markets of the world.

Scope of the research

The specifics of the study revolve around the perceptual, relational, and experiential factors explaining the behavior of digital consumers in the case of active customers using online services in Karachi and the relationships between such factors. The study

particularly concentrates on the relationships between customer perception and trust, and the experience's quality in relation to, and from, the customer's point of view, engagement with e-services and the engagement in question shaping the perceived value, which, in turn, influences the purchase decision and the likelihood of making a purchase. In addition, the study uses UX Flow as a moderating variable to illuminate the impact of seamless and immersive digital experiences on the strength of the behavioral pathways described. Data was collected from respondents aged 18 and above who had used digital platforms, such as e-commerce, fintech services, mobile apps, and online services, in the three months leading up to the study, which made it possible to capture contemporary digital engagement. The study was also limited to Karachi with no rural and semi-urban areas, and this was to provide a metropolitan context to the study, considering it has a considerable digital penetration. The study is also limited to quantitative data obtained through PLS-SEM analyses. This tool examines data that has mediating and moderating relationships that are complex in nature, and this is where the study's restriction in part comes from in that it does not provide qualitative data, nor data that examines trends in behavior over time. The research looks at consumer perceptions and behaviors and not at strategies at the company level or platform analytics. This defines the boundaries of firm-level cognitive and experiential decision-making within digital services ecosystems.

Literature Review

Customer Perception and E-service Engagement (H1)

Customer perception is at the centre of how users interact and transact on any digital platforms since they determine their expectation, comfort, level, and propensity to carry out a transaction. Recent research claims consumers are more likely to shift their online activities to the service platform and maintain their engagement on the digital points of service delivery when online services are perceived as clear, credible, and efficient (Ladhari, Gonthier, & Lajante, 2020). The perceived clarity of the interface and the informativeness of the service offered significantly improve the engagement of users by lessening the cognitive burden and uncertainty of the user (Flavián, Gurrea, & Orús, 2020). Other studies have demonstrated that emotional and behavioural engagement is enhanced by the perceived quality of the design and the ease of navigation, especially in mobile and e-commerce contexts (Islam & Rahman, 2021). While the perceptual evaluation of the digital platform facilitates a sense of fluency, positive perceptions most often motivate users to engage more. In contrast, negative perceptions, such as user-unfriendly or cluttered interface, increased inactive sessions by users (Shi, Wang, Chen, & Zhang, 2022). In all digital industries, customer perception is a strong predictor of whether users will engage in a task (explore the functions of a platform) or return to the platform to complete an active task.

Customer Perception and Perceived Value (H2)

Numerous research studies conducted have shown that customer perception highly impacts perceived value in digital platforms. Users tend to appreciate and value services more when they perceive online offerings to be efficient, seamless, and easy to use. (Kim & Park, 2020). Customer service quality perception, and its dimensions accuracy, responsiveness, and reliability, rise the value they attribute to their digital experience, especially in e-commerce and fintech sectors (Pappas, 2021). A culmination of recent research demonstrates that value perception is more positive when the interaction requires low effort and is more enjoyable due to the design of the interface (Chiu, Wang, Fang & Huang, 2021). When user perception meets or exceeds the expectations, there is also an increase in the perceived utilitarian and experiential value, thereby increasing the preference for the service (Shareef, Dwivedi & Wright,

2021). Customer perception is, indeed, the value dimension that has most impact in the digitally enabled value of modern systems

Level Of Customer Trust and Engagement In E-Service (H3)

The role of customer trust in shaping engagement in digital contexts is very critical. Considering online environments with high risk, trust decreases vulnerability and risk, which may lead to more engagement and interaction with service features (Hsu, Chang, & Chen, 2020). If users trust the platform or service providers, they are more likely to engage, explore, and contribute in the engagement process (Bilgihan & Bujisic, 2021). Research has shown that, particularly in social commerce and mobile services, users who browse social and participatory content are more likely to trust the platform (Lin, Wang, & Hajli, 2021). Engagement may result from trust because users may feel safe to use their cognitive and emotional resources that can lead to a deeper engagement (Shao, Zhang, & Li, 2022). Lack of engagement may arise from trust which is related to privacy, data misuse, or untrustworthy systems.

E-Service Engagement and Perceived Value (H4)

Recent studies have highlighted engagement's role as a precursor to perceived value within digital services. As customers progress along a value-creation stream via a specific platform by browsing, interacting, commenting, and tailoring services for personal use, they derive a broader set of benefits (Hollebeek & Macky, 2021). Engagement leads to familiarity and reduces cognitive load and effort within a digital service environment, thereby increasing perceptions of value regarding efficiency and convenience (Wirtz et al., 2021). Studies on e-retail and mobile application engagement indicate that emotional and behavioral engagement positively shape consumers' perceptions of functional and experiential value (Rather, 2021). Increased engagement fosters a sense of involvement and psychological ownership, thereby positively affecting perceptions of value (Sthapit & Björk, 2022). This is particularly the case in digital commerce, as the value of interactivity is beyond transactable value.

Experience Quality and E-Service Engagement (H5)

A substantial body of research suggests that experience quality is one of the most important drivers of digital engagement. For example, studies have shown that users are more engaged when digital systems are easy to navigate, respond quickly, have an attractive design, and perform tasks consistently (Hassan & Shiu, 2021). When users interact with a high-quality digital system, interaction friction decreases, making the experience more pleasurable and motivating users to become more deeply involved (Liu, Shin, & Burns, 2021). Because a high-quality experience motivates users to take full advantage of systems, it also increases engagement by making them more likely to return and explore other features (Elsharnouby & Mahrous, 2022). On the other hand, user experience quality is low when users encounter system delays or navigate confusing interfaces. Engagement is reduced in such cases because of users' frustration and because their sense of control is neutralized (Flavián et al., 2020). User experience quality will remain a pivotal factor in driving user engagement with systems as digital services become increasingly competitive.

Perceived Value and Buying Probability (H6)

The probability that a consumer makes a purchase based on perceived value is among the most evident in the digital marketplace. Value perception in the digital marketplace has been shown in studies (Chiu et al., 2021) to determine the ease of access, time, and resource investments a consumer is willing to make. Perceived value is a determinant of consumer purchase confidence in a digital marketplace and purchase indecision (Kim, Kim, \& Park, 2021). There \ are evident motivational variables across mobile commerce, streaming services, and online retail, and they \

are literature-based (Pappas, 2021; Rather, 2021) and show evidence of perceived value on purchase intention, quitting a transaction. The value, based on the ease of access a consumer has control of, is a driving factor of purchase potential for the consumer \ who is being digital born (Sweeney, Nguyen, & Johnson, 2022). The degree to which the above factors are present indicates that perceived value is a determinant of purchase potential. H6: Perceived Value explains Buying Probability

Perceived Value and Purchase Decision (H7)

The perceived value of a product or service is pivotal in determining purchase decisions for digital services. Users experience digital services in a way that, when offered a digital service and the perceived value of the service is greater than the cost, effort, or time required for optimal use, a purchase is more readily made (Chiu et al., 2021). Perceived value shifts post-purchase to a cognitive and emotional balance that confers confidence in the purchase decision, whereby post-purchase cognitive dissonance is reduced (Kim, Kim & Park, 2021). While positive perceived value is recorded in mobile and online retail systems, value is translated into more completed transactions and higher conversion rates (Rathe, 2021). Value of entertainment and subscription services confirms value, function, experiences, or even simply enjoyment, sharpen purchase commitments, value increases satisfaction, and value stabilizes purchased services risk (Sweeney, Nguyen, & Johnson, 2022) On the other hand, lower perceived value indicates purchase decision to offer little more than information, so outcomes to decline or leave the choice decision. The literature overwhelmingly confirms that perceived value is the primary factor influencing customers' purchase decisions for offered digital services.

UX Flow and Purchase Decision (H8)

The flow experience created by a website's design and layout has been shown to significantly influence users' purchase decisions. Flow, characterized by seamless, unobtrusive website navigation and experiences, allows users to become fully engaged in a website. Studies have shown that users are more likely to experience flow and a state of ease that enables them to make purchases when a website is designed to eliminate friction and distractions. Flow is said to improve enjoyment and confidence in a user's purchasing decision, especially when the user is online. Studies have shown that users experience flow when shopping online, which ultimately leads to higher emotional satisfaction and website usability, thereby increasing the likelihood of purchase completion. Flow also positively influences users' feelings about completing a purchase, which is especially important when users have been in the buying process for an extended period decision fatigue. Users are significantly less likely to make a purchase when a website has flow obstructions, such as slow load times, confusing interfaces, and structural layout errors. The evidence indicates that users are less likely to purchase online when UX Flow is disrupted.

User Experience Flow and Value Perception (H9)

Impact of User Experience flow on Perceived Value has been a subject of inquiry in Digital Consumer Behavior for some time. According to Hassan and Shiu (2021), perceived value and enjoyment are heightened when users experience an effortless cognitive load and an intuitive flow. Customers in e-commerce are more likely to derive value from their experience when seamless navigation and continuous interaction are present (Liu et al., 2021). Evidence from e-retail settings suggests that users of the system experience increased evaluations of convenience, emotional satisfaction, and information clarity; thus, greater value is perceived (Flavián et al., 2020). Users, even in a system with high aesthetics, speed, and interactivity, derive additional experiential value, as evidenced by the concept of flow (Sweeney et al.,

2020). The opposite holds when flow is disrupted: the experience is more frustrating, and perceived value is lower as a result. From 2020 to 2025, multiple studies have demonstrated that UX Flow is a major factor in the value users perceive from Digital Systems.

E-Service Engagement, Perceived Value and Purchase Decision (H10)

Purchase decisions are influenced by e-service engagement and perceived value; perceived value is derived from positive interactions that are translated into outcomes. Studies show that users who engage in a platform by exploring, providing feedback, and interacting with content derive greater perceived value and enjoyment (Hollebeek & Macky, 2021). In the context of online shopping, perceived value becomes more positive and decisive, favoring purchase closure (Chiu et al., 2021). In the case of mobile and streaming services, research shows that positive appreciation and pivotal decisions resulted from engagement, and the relationship increased attachment and satisfaction (Rather, 2021). Engagement fosters familiarity and cognitive ease with the platform, thereby optimizing the perceived value of the costs relative to the benefits (Sthapit & Björk, 2022). Engagement, without value, does not translate into purchases, affirming the mediating value of engagement

E-Service Engagement, Perceived Value, and Buying Probability (H11)

The relationship between purchase probability and e-service engagement, mediated by perceived value, has been shown in numerous studies . Users who are highly engaged with a platform perceive the service as more valuable due to greater enjoyment, personalization, and usability (Wirtz et al., 2021). Perceived value increases the probability of purchasing a service because customers feel more confident in their purchase and experience less uncertainty (Kim et al., 2021). Engagement is known to increase users' willingness to purchase by enhancing functional and emotional value (Pappas, 2021). Moreover, the greater a platform's interactivity, the more likely a user is to act on purchase intentions (Sweeney et al., 2022). The relationship between buying probability and perceived value, driven by engagement, is why value is a critical component of understanding engagement. This has been demonstrated across numerous studies spanning mobile commerce, digital entertainment, and e-retail.

The relationship between customer perception, engagement with electronic service systems and value perception. (H12)

Recent studies have recognized e-service engagement as a behavioural mediator between customer and value perceptions. Active users of digital platforms perceive clarity, credibility, and ease of use, and use the platforms even more (Ladhari et al., 2020). Perceived value increases with greater digital engagement, driven by exposure to benefits, improved learning, and more active benefit extraction (Islam & Rahman, 2021). In e-commerce and app-based environments, perceptions of design quality and system reliability are positively correlated with value perception. Users systematically shifted and deepened their engagement with the platform (Flavián et al, 2020). Engagement also diminishes perceived effort and increases experiential satisfaction, and both findings support a higher value. Therefore, positive customer perception increases value through engagement. The engagement mediator explains this relationship.

E-Service Engagement Significantly Mediates the Relationship between Customer Trust and Perceived Value (H13)

The pivotal role of e-service engagement as the mediating behavioral mechanism between trust and perceived value. Trust manifests as reduced psychological risk in the use of platform functions, seamless user control, and consumer engagement with digital platform functions, and it encourages these outcomes (Lin, Wang, & Hajli,

2021). Engagement derives value from a service by increasing the extent of feature exposure a user receives and the opportunities to evaluate benefits at varying levels of service convenience (Rather, 2021). In social commerce, trust has been empirically shown to promote participative behavior, which, when complemented by engagement criteria, enhances perceived value by increasing service utilization and user enjoyment (Bilgihan & Bujisic, 2021). Value perception is also enhanced through engagement by increasing the number of services processed and familiarity, and by reducing the cognitive effort required for service structuring within the value system (Shao, Zhang, & Li, 2022). Trust that does not afford engagement does not translate to value, as the user does not interact enough to realize the benefits. It is hence engagement that serves as the behavioral defining gap in trust and value formation.

E-Service Engagement Significantly Mediates the Relationship Between Experience Quality and Perceived Value (H14)

The influence of experience quality on perceived value predominantly stems from the quality of the user engagement correlation. In effect, users of digital platforms gain a high-quality experience through active engagement with the platforms. Quality of the digital experiences or quality of the experiences on digital devices are the ones that help the user gain a high-quality experience or perceived value because of the users actively and effortlessly engaging on the devices, navigating through the devices and gaining value through the utilized devices (Liu, Shin, & Burns, 2021). Through a thoroughly engaging process, users and potential value may be explored, with the interfunctional integration of digital praise and ease employed (Hollebeek & Macky, 2021). In digital environments, device users are highly motivated to explore, and because of the device's experience quality, a higher perceived value is established (Hassan & Shiu, 2021). Experience quality enhances positive engagement (Elsharnouby & Mahrous, 2022). User experience value and positive engagement are directly influenced by users (Elsharnouby & Mahrous, 2022). This evidence illustrates that engagement behaviour is the channel through which experience value is most strongly influenced.

Perceived Value: The Relationship Linking Customer Perception, E-Service Engagement, and Purchase Decision (H15)

Customer perception and purchase decisions are the focal points of sequential mediation studies. In such studies, the dominant customer perception is cultivated through the interplay among the three variables: customer engagement and value. When customers perceive a digital interface as engaging, they perceive it as user-friendly, trustworthy, and credible (Ladhari, Gonthier, & Lajante, 2020). Engagement clarifies users' value perceptions by facilitating ease, benefits, and satisfaction through functional interactions with the platform (Islam & Rahman, 2021). Among those values, the most important factor shaping purchase intention is perceived value, which is the dominant value among users who perceive the product's value and have purchase-related certainty (Chiu et al., 2021). Many studies in m-commerce and online retail have demonstrated a sequential chain from positive perception to engagement, and from engagement to purchase intention (Kim, Kim, & Park, 2021). This chain demonstrates that perception alone is insufficient. Engagement is crucial for enhancing value, and that value is the factor that shapes the outcome of the purchase.

Perceived value of the sequential relationship linking customer trust, e-service engagement, and purchase decision (H16)

Studies validate a multilevel pathway for customer trust and purchase decisions. Trust creates a conducive e-environment for users to interact with a digital platform because

it mitigates uncertainty and risk (Lin et al., 2021). This engagement fosters participation, exposing users to platform features that offer various emotional and functional benefits and thus increasing perceived value (Rather, 2021). Perceived value then increases purchase decisions by improving benefit-cost analyses and reducing purchase decision-related procrastination (Pappas, 2021). Research in social commerce, mobile apps, and e-retail environments is conclusive that trust fosters customer engagement, that engagement is associated with increased perceived value, and that value promotes purchase intention (Shaikh, Sharma, & Karjaluoto, 2022). Although the perceived value is high, the purchase intention is absent; hence, perceived value is the most significant mediator of the sequential relationship.

Perceived Value: The Relationship Linking Experience Quality, E-Service Engagement, and Purchase Decision (H17)

The two-way experience leads consumers to purchase, and the mechanism involves engagement and perceived value. Experience engagement is high and positively impacts purchase decisions, as improved experience quality increases service responsiveness, aesthetic appeal, and ease of use (Liu et al., 2021). Effective user engagement with the service provides an opportunity to derive benefits, functionality, and experience-enhancing value perception (Hollebeek & Macky, 2021). Enhanced value perception leads to purchase decisions by increasing confidence and perceived benefits, including those based on effort, risk, or cost (Chiu et al., 2021). Experience quality increases engagement value, and the correlation between experience quality and purchase decisions has been well documented in the literature on streaming platforms, digital banking, and online retail (Elsharnouby & Mahrous, 2022). This attests to quality engagement and value as the only plausible mechanism.

Perceived Value: The Sequential Relationship Linking Customer Perception, E-Service Engagement, and Buying Probability (H18)

The sequence posits that customer perception influences engagement, that engagement value is enhanced, and that value determines the likelihood of purchase. Digital services designed with user trust in mind, along with ease of use and low friction, tend to generate higher levels of service engagement (Ladhari et al., 2020). This engagement with the service fosters familiarity and satisfaction, as well as greater experiential satisfaction across multiple levels (Islam & Rahman, 2021). It is this enhanced perceived value that drives greater purchase intention through heightened action and reduced risk (Chiu et al., 2021). This has been evidenced in mobile shopping and e-commerce, whereby engagement correlation values predict buying probability (Kim et al., 2021). Value, thus bridging the perception and engagement, is the final anchor in the chain of enhanced buying probability.

Trust as a Factor for Buying Behavior Probability (H19)

Customer trust is shaped by perceptions formed before a purchase decision, through a series of engagements and the value placed on the service rendered. Trust decreases perceived vulnerability and perceived service trust engagement liability (Lin, Wang, and Hajli, 2021). With further engagement with the service, the customer has a greater functional value of receipts and a higher perceived value of the service (Rather, 2021). Perceived value increases the probability of a purchase decision; it is the value perceived to be worth the expense for customers. Findings from social commerce and mobile shopping indicate that users of the platform value engagement and perceive it as enhancing purchase intention, and that the probability of making a purchase increases (Shaikh, Sharma, & Karjaluoto, 2022). The influence of trust and engagement with the social commerce platform on purchase decisions is not

prominent without value mediation. Perceptions of value are the primary link in social commerce, a factor that determines the delivery of the promise of engagement.

Perceived Value: The Relationship Linking Experience Quality, E-Service Engagement, and Buying Probability (H20)

Experience quality has an indirect positive effect on purchase intention through engagement and value perceptions. High-quality digital experience with attributes such as easy navigation, responsiveness, pleasing interface and uniformity across the platform encourages the users to engage more frequently and more deeply with the service features (Liu, Shin, & Burns, 2021)\. This engagement allows users to effectively navigate the platform, reinforcing satisfaction and the evaluation of its value (Hollebeek & Macky, 2021). Perceived value is a stronger cognitive driver of purchase intention because users discount high value and are more confident in making purchase decisions (Chiu et al., 2021). It has recently been reported across mobile applications and digital commerce that experience quality first stimulates engagement; engaged users then perceive greater value, and this enhanced value increases the likelihood of purchase (Elsharnouby & Mahrous, 2022). This chain is well documented across e-retail, streaming services and Fintech, confirming the indirect role of experience quality in determining buying probability through value and engagement.

Customer Perception and Buying Probability Largely Rely on the Perceived Value During Buying Decisions (H21)

The foundation of purchase likelihood is perceived value, which most strongly shapes customers' opinions. When customers perceive a service as trustworthy, aesthetically pleasing, and easy to use, they experience lower cognitive effort and greater pleasure, which increases the perceived value of that service (Ladhari, Gonthier, & Lajante, 2020). Studies in mobile commerce and online retail have shown that value perceptions are elevated when there is positive clarity and informativeness, and when items are easily recognized as credible, and that this is associated with a greater likelihood of purchase (Pappas, 2021). Buying probability is further predicted by perceived value, as it reinforces the sense of benefit, reduces risk perceptions, and enhances confidence in making a decision (Chiu et al., 2021). Empirical studies show that value acts as a cognitive filter through which perceptions influence behavior: favorable perceptions create stronger value assessments, which in turn increase the likelihood of purchase (Kim, Kim, & Park, 2021). In the absence of perceived value, the extent to which perception increases the probability of purchase is very limited, thereby confirming the mediating role.

Perceived Value: The Relationship Between Customer Perception and Purchase Decision (H22)

Recent works posit that perceived worth serves as a critical link in the chain of relationships between customer perception and purchase decision. Value perception arises when users of a digital service perceive it as usable, credible, and aesthetically cohesive (Ladhari et al., 2020). Perceived value in e-commerce settings is generally positive, driven by perceived value attributes stemming from value enhancement, perceived utility, satisfaction, and ease of transaction (Chiu et al., 2021). Increasing perceived value streamlines the purchase decision by reducing the cost-benefit evaluation and reducing indecision complexity (Pappas, 2021). Consumers' purchase decision inclination, irrespective of available alternatives, is driven by positive perceived value within the constructs of value perception, mobile shopping, and online retail (Kim et al., 2021). This pathway illuminates that perception intrigue is

not enough to draw purchase behavior; perception must uplift value to trigger the actual purchase decision.

Perceived Value: The Relationship with E-Service Engagement and Buying Probability (H23)

Although e-service integration is important to consider when analyzing a consumer's purchase probability, recent empirical findings indicate that understanding e-service is essential before applying purchase probability theory. E-serviced users who are more engaged in the system, meaning users who are interacting with the system on a more frequent basis, exploring system features, or customizing their system, are more likely to value and understand the system, thus creating a greater understanding of the system's benefits (Wirtz et al., 2021). Research on e-service and mobile application purchasing confirms that user emotional and behavioral engagement creates positive feelings toward the system and increases user value (Hollebeek & Macky, 2021). This value perception increases users' probability of buying from the system and strengthens positive feelings toward the system regarding its usefulness and ease of use (Chiu et al., 2021). While system engagement is a key factor in predicting users' probability of buying from the system, there must first be perceived value to create a positive outcome (Pappas, 2021). Based on this information, perceived value better explains system engagement by predicting users' probability of purchasing from the system.

UX Flow Enhances the Impact of E-Service Engagement on Perceived Value (H24)

The UX flow of the system affects the level of sustained focus on the user's activity. Once an e-service is designed to enable smooth, uninterrupted digital flow, participants in the system derive greater perceived value because their interactions during the flow are more beneficial (Liu, Shin, & Burns, 2021). The responsive, high-flow system of engagement effectively engages participants, yielding greater value through deep, active focus, enjoyment, and improved functional comprehension of the value added (Hassan & Shiu, 2021). Conversely, weak system engagement results in low value, which is a barrier to rapid-response engagement (Flavián, Gurrea, & Orús, 2020). Flow in streaming systems has been documented to enhance emotional and experiential value, thereby creating greater engagement (Sweeney, Nguyen, & Johnson, 2022). Hence, system flow enhances the impact of engagement on positive value.

UX Flow: The relationship between Perceived Value and Purchase Decision (H25).

Recent behavioural studies of customer purchases indicate that value perception is a direct response to the purchase interface. When perceived value increases, customers are more willing to purchase, particularly when designs are positive, engaging, and seamless. UX flow and value perception are positively and directly correlated (Liu et al., 2021). Value perception and purchase intent are more strongly correlated when positive UX flow is present (Hassan & Shiu, 2021). Conversely, when positive, seamless UX flow is absent, value perception weakens significantly. In a disruptive flow, customers are more likely to experience frustration, uncertainty, and negative emotions, which in turn reduce perceived value (Flavián et al., 2020). Flow in value perception, particularly in mobile marketing and e-commerce, enhances value in both the cognitive and affective domains. Flow in e-commerce mobile platforms strongly and positively increases value components, with a direct and positive correlation with purchase intention (Sweeney et al., 2022). Therefore, UX flow significantly increases the predictive power of value perception.

UX Flow Influences Purchase Decision Through Perceived Value (H26)

Evidence posits that UX flow not only moderates but also works indirectly to cause purchase decisions to occur as a result of perceived value. Once high-flow states occur,, characterized by full absorption, effortless, and intuitive interaction, users are more likely to value the digital service and thus consolidate their purchase decisions (Sweeney et al., 2022). Value perceptions are among the key outcomes of flow experience in the online retail context, as flow increases enjoyment while reducing the effort required to complete the task (Liu et al., 2021). In mobile commerce, flow is likely to enhance the experience by making the service more rewarding and meaningful, thereby increasing decision certainty (Hassan & Shiu, 2021). By contrast, low-flow conditions hinder value creation, reducing the likelihood that users will purchase even when value perceptions are moderately positive (Flavián et al., 2020). This demonstrates that flow also serves as an indirect behavioral motivator of purchase decisions.

UX Flow Influences Buying Probability Through Perceived Value (H27)

Recent studies show that UX flow increases positive purchase intentions by strengthening perceived value. High-flow conditions, such as seamless navigation, system responsiveness, and few interruptions, enhance users' perception of efficiency, enjoyment, and control. Furthermore, the value perception enhanced by these flow conditions increases purchase intention likelihood by increasing user confidence and willingness to act on those intentions (Chiu et al., 2021). Such flow experiences in digital buying and service environments enhance users' emotional engagement, thereby reinforcing value and increasing the probability of purchase (Sweeney et al., 2022). Strong flow experiences, even when users have vague or no intention to buy, can shift focus toward positive buying behaviour due to perceived value (Hassan & Shiu, 2021). In contrast, limited flow reduces the value of the interaction and, consequently, the probability of purchase.

Theoretical Framework

Digital services have begun to understand and predict user engagement and subsequent behavioral outcomes based on the user’s perceptual, experiential, and relational evaluations of the service. Within the integrated framework of Customer Perception, Customer Trust, and Experience Quality, these factors serve as primary foundational antecedents influencing the user’s decision to interact with the digital services. Some studies have shown that digital interfaces are more interactive when users perceive them positively (e.g., clarity, credibility, informativeness, and usability; Ladhari et al., 2020; Flavián et al., 2020; Islam & Rahman, 2021). Positive evaluations mitigate uncertainty and cognitive effort, and the resulting evaluative framework encourages the user to interact more with platforms (Gómez et al., 2022; Mikalef et al., 2021).

Another major determinant of engagement is customer trust, as it enhances cognitive ease and encourages active, effective user participation. Trust is an engagement driver that has been evidenced to stimulate participation and encourage user exploration and prolonged activity (e.g., mobile commerce, fintech, social commerce; Lin et al., 2021; Shi et al., 2022; Chen et al., 2023). With trust, users can feel psychologically safe, a factor vital to sustained engagement in technology-mediated, risk-prone interactions (Hwang & Lee, 2021; Yuan et al., 2024).

Experiencing Quality further deepens user engagement by providing a gentle, fluid, and beautiful experience. Users are more likely to experience affective, cognitive, and conative engagement to a greater extent when the experience is highly usable and emotionally engaging; they are also more likely to use the service more profoundly

(Liu et al., 2021; Hassan & Shiu, 2021; Elsharnouby & Mahrous, 2022). Higher experience quality is positively correlated with greater intentions to revisit and with higher interaction and exploratory engagement (Gálvez-Ruiz et al., 2023; Yamaguchi et al., 2022). There is ample evidence from the multi-channel and mobile environment to support this.

E-Service Engagement is the core behavioural mechanism by which these perceived and experienced antecedents affect cognition. Engagement, in the form of interactivity and affective and participative involvement, sustains his process and leads to the extraction of greater benefits and richer user experience (Hollebeek & Macky, 2021; Rather, 2021). Due to increased engagement, users are more likely to perceive greater functional and experiential value because of greater system familiarity, system competence, and ease of interaction (Wirtz et al., 2021; Islam et al., 2022).

The perceived value of an experience, engagement, product, or service is one way to transform user engagement into actual purchases. Chiu et al. (2021), Pappas (2021), and Kim et al. (2021) show that perceived value strengthens confident deciders and less uncertain evaluators. Sweeney et al. (2022), Adiningtyas et al. (2024), and other studies on perceived value in digital commerce illustrate that it is correlated with a multitude of purchases and with users being less willing to buy.

Within other UX elements, the value flow (the uninterrupted seamless experience, Liu et al., Sweeney & Huang suggest the distinction of the model's contribution as flow being a contextual amplifier. UX Flow (i.e., high flow) amplifies the positive effects of engagement with e-service value on perceived value and reduces cognitive effort. To use sample studies, more perceived value, more positive emotions for the user, and clearer decisions, especially purchase decisions. On the other end, poor flow quality, or user experience in which the user is not in flow with the task, weakens value and disrupts decision processes.

Lastly, the framework considers the dimensions of the perceptual and relational antecedents that influence purchase decision outcomes, and the roles that engagement, value, and outcomes play. Evidence from digital retail, live commerce, and mobile ecosystems supports claims that initial perceptions of engagement enhance value, and that, when value is perceived, it directs behavioural outcomes (Elsharnouby & Mahrous, 2022; Sthapit & Björk, 2022; Cao et al., 2025). This aligns with behavioural research in the digital realm, which focuses on interaction quality and emotional engagement, the value of the experience, and the facilitation of decision-making (Gómez et al., 2023; Kaur et al., 2024).

Conceptual Framework

This study proposes an integrated framework where perceptual, relational, and experiential evaluations influence user engagement and behavioral outcomes in the context of digital services. The Customer Perception, Customer Trust and Experience Quality comprise the first fundamental antecedent layer. Recent studies indicate that users are more motivated and more interactive when evaluative perceptions, such as clarity, informativeness, visual coherence, and usability, are favorable (Ladhari et al., 2020; Flavián et al., 2020; Islam & Rahman, 2021). When perception enhances cognitive fluency and mitigates ambiguity, user engagement is more readily facilitated (Gómez et al., 2022; Mikalef et al., 2021; Mariani & Wamba, 2020).

Customer Trust, as an additional relational layer, reduces perceived vulnerability and enhances confidence in digital interactions. Trust is significantly correlated with increased participation, behavioral exploration, and relational commitment among users of platforms across online retail, fintech, and mobile apps (Lin et al., 2021; Shi et al., 2022; Chen et al., 2023). Trust provides users with the psychological safety

needed to remain in an environment involving perceived risk, sensitive data, or transactional uncertainty (Hwang & Lee, 2021; Yuan et al., 2024; Toufaily et al., 2021).

Quality Functions serve as an experiential precondition of some importance. User satisfaction and enhanced engagement are the consequences of high-quality interactions that feature responsiveness, ease of use, pleasant design, and emotional touch (Liu et al., 2021; Hassan & Shiu, 2021; Elsharnouby & Mahrous, 2022). Studies have shown that smooth, positive experiences lead users to invest more interactions and to engage more widely across mobile, social, and omnichannel ecosystems (Gálvez-Ruiz et al., 2023; Yamaguchi et al., 2022; Huang & Benyoucef, 2023).

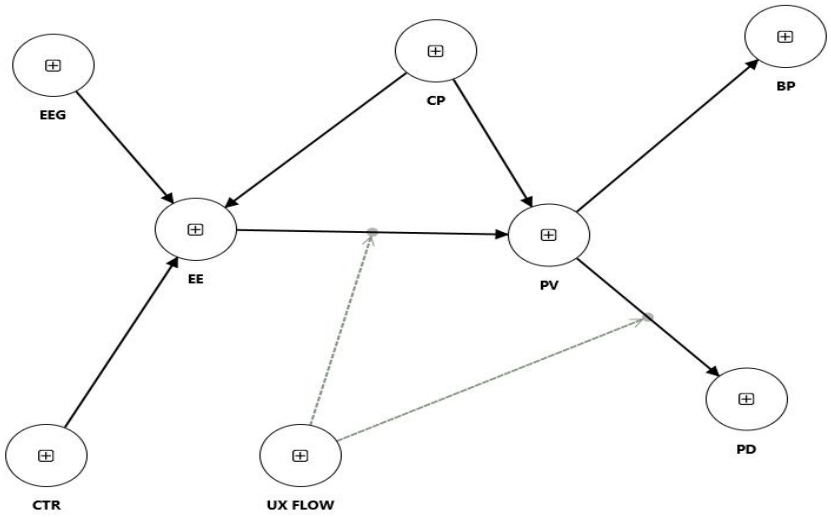
E-Service Engagement is the primary behavioural mechanism that places the antecedent perceptions and experiences as the pivots in the continuum. Engagement is a composite of emotional, interactional, and participatory behaviours that users require to unlock additional, richer functional and experiential benefits (Hollebeek & Macky, 2021; Rather, 2021). There is ample evidence in the literature that suggests that users who are more engaged in the system acquire and build more knowledge, increased emotional and effortful ties, as well as familiarity with the system, which in turn enhances their value evaluations (Wirtz et al., 2021; Islam et al., 2022; Marbach et al., 2023).

Perceived Value is a central mechanism of cognitive appraisal, as it concerns the engagement with and outcomes of actions. Numerous studies indicate that perceived value drives purchase decisions by improving benefit–cost analysis, increasing positive emotions, and reducing uncertainty and indecision (Chiu et al., 2021; Pappas, 2021; Kim et al., 2021). In digital environments, higher perceived value increases customers' conversion rates, and intentions to repurchase, as well as their loyalty to the ecosystem (Sweeney et al., 2022; Adiningtyas et al., 2024; Dwivedi et al., 2021).

An important aspect of the framework discussed is the system's contextual flow, which determines the most influential relationships with key variables. A complete UX flow with immersion, non-obstructive navigation, system reliability, and visual uniformity increases engagement and perceived value (Liu et al., 2021; Sweeney et al., 2022; Huang & Benyoucef, 2023). Likewise, UX flow enhances perceived comfort and clarity, as well as motivation, when action is taken toward a purchase (Hassan & Shiu, 2021; Cao et al., 2025; Fang et al., 2023). Research shows that low-flow environments disrupt the flow, the sequence of actions, and engagement with documents, thereby contributing to cognitive load (Flavián et al., 2020; Chen & Huang, 2022; Quach et al., 2021).

In a multi-stage behavioral mechanism conceptual framework, the perceptual, relational, and experiential predecessors impact results through series engagement and value pathways. Research in digital retail, live commerce, and mobile service contexts uniformly indicate user's movement from the perceptual evaluation stage to engagement, then to value stage and ultimately the purchase decision stage, increasing the likelihood to buy (Elsharnouby & Mahrous, 2022; Sthapit & Björk, 2022; Cao et al., 2025; Lee et al., 2023). This is consistent with the most recent digital behavior research, which centers on the quality of interactions, emotions, experiential value, and decision-creating flow (Gómez et al., 2023; Kaur et al., 2024; Mariani et al., 2023).

Figure 1



Conceptual Framework

Research Methodology

Philosophical Stance and Research Design

In this study, we consider only the positivist philosophical standpoint. From this viewpoint, reality is regarded as objective, observable, and measurable through positivist quantification. In the domain of digital behaviour and technology adoption, positivism has been the dominant research paradigm, given its focus on causation and generalization (Dwivedi et al., 2021; Mikalef et al., 2021). The approach is particularly appropriate for studying structural relationships among users' perceptions, engagement, and behaviour in digital services (Chatterjee et al., 2020; Pappas, 2021). In this sense, a deductive reasoning approach is employed, in which hypotheses are derived from the theory and tested using quantitative survey data (Hair et al., 2021). Such methodological choice is consistent with studies on digital consumers, as it requires predictive modelling and the examination of complex relationships, particularly mediation and moderation (Sarstedt et al., 2022; Henseler, 2020).

A cross-sectional study design is employed in this study. This design enables data collection from large populations at a single point in time. This is appropriate for measuring perceptions and certain behaviours among Karachi digital users (Islam & Rahman, 2021; Yamaguchi et al., 2022). The study's predictive nature and the complexity of its conceptual structure make PLS-SEM the best choice for model estimation, as it addresses the challenges of non-normal data, large models, and exploratory predictive design well (Hair et al., 2022; Rigdon, 2020).

Population and Study Setting

Participants were active users of digital services aged 18 and older and located in Karachi, a digitally advanced and highly mobile city (Kaur et al., 2024; Ahmad et al., 2023). Given the city's wide variety of socioeconomic and demographic factors, Karachi is particularly useful for assessing patterns of digital use in purchase-related behaviours (Gomez et al., 2022; Mariani et al., 2023). The entrepreneurs recruited respondents who had some knowledge of digital services (e-commerce, fintech, ride-hailing, streaming) and had used any of them in the previous 3 months, thereby including only active users (Elsharnouby & Mahrous, 2022; Sweeney et al., 2022). The context of Karachi supports the findings of previous studies that point to the value of a densely populated digital marketplace in shaping value perceptions, engagement patterns, and behaviours driven by UX (Huang & Benyoucef, 2023; Kaur

et al., 2024). One of the richest and most representative markets for digital consumption is Karachi.

Sampling Technique and Sample Size

The purposive sampling technique applied in this study was designed to obtain respondents with direct experience. This technique is common in digital behavior research as respondents within the target population are required to meet a high degree of specificity (Dwivedi et al., 2021; Rather, 2021). A total of 400 valid cases were collected, surpassing the needed number of respondents for sophisticated PLS-SEM models. Hair et al. (2021) advise that sample sizes must exceed 10 times the number of paths in the model. PLS-SEM has been shown in simulation studies to compute stable estimates with 400 respondents for models involving moderators and mediators (Sarstedt et al., 2022; Henseler, 2020). A larger sample is justified by the high level of digital activity in Karachi (Gálvez-Ruiz et al., 2023; Cao et al., 2025). The dataset with 400 responses was sufficient to conduct a detailed analysis of the model, including sequential mediation and moderated mediation.

Measurement Instrument

The survey instrument uses validated reflective measurement scales adapted. A five-point Likert scale (1 = strongly disagree to 5 = strongly agree) was used, consistent with research on digital services and behavioural intentions (Flavián et al., 2020; Lin et al., 2021). Additional literature supports the use of multi-item reflective measurement for constructs such as UX Flow, Engagement, Trust, and Perceived Value (Sthapit & Björk, 2022; Yamaguchi et al., 2022).

Table 3.1. Measurement Instrument and Sources

Construct	Items	Ciatations
Customer Perception	4	Ladhari et al., 2020; Flavián et al., 2020; Gómez et al., 2022
Customer Trust	4	Lin et al., 2021; Shi et al., 2022; Chen et al., 2023
Experience Quality	4	Liu et al., 2021; Hassan & Shiu, 2021; Gálvez-Ruiz et al., 2023
E-Service Engagement	4	Hollebeek & Macky, 2021; Rather, 2021; Marbach et al., 2023
Perceived Value	4	Chiu et al., 2021; Pappas, 2021; Sweeney et al., 2022
UX Flow	4	Sweeney et al., 2022; Huang & Benyoucef, 2023; Cao et al., 2025
Purchase Decision	4	Kim et al., 2021; Dwivedi et al., 2021; Adiningtyas et al., 2024
Buying Probability	4	Sweeney et al., 2022; Elsharnouby & Mahrous, 2022; Kaur et al., 2024

Construct validity and contextual suitability were established through expert review and pre-testing. Minor linguistic adjustments ensured comprehension among Karachi users.

Data Collection Procedure

Consistent with prior studies on digital behavior, an online survey was used to collect data (Islam et al., 2022; Gomez et al., 2023). The data were collected via social media, university networks, and professional community networks to ensure that respondents were geographically, demographically, and professionally diverse (Mariani & Wamba, 2020; Yamaguchi et al., 2022).

In line with recommendations from similar studies, we first conducted a pilot test with 40 respondents to assess the clarity, reliability, and strength of the research instrument (Hair et al., 2022; Sarstedt et al., 2022). The main survey instrument was administered over 6 weeks, yielding 400 valid responses after excluding incomplete responses and anomalous answer patterns.

The data analysis was conducted using SmartPLS 4 and followed the two-stage PLS-SEM procedure recommended for complex digital behaviour models. The first step was to measure the models to assess their reliability and validity. This step consisted of assessing indicator loadings and monitoring internal consistency using Cronbach's Alpha and Composite Reliability; assessing convergent validity using the Average Variance Extracted (AVE); and using the HTMT criterion to confirm discriminant validity. These findings align with the work of Henseler (2020) and Hair et al. (2022). The second step hinged on the structural model, evaluating pathway coefficients and their significance via bootstrapping (5000 samples), determining explanatory power via R2, and assessing predictive relevance via Q2. There were secondary analyses in which the effect sizes were calculated (f2) and the relationships of mediation and moderation were explored, as well as predictive performance, which was done through the PLSpredict. The last method is getting attention for predictive accuracy in PLS-SEM (Shmueli et al., 2019 and Sarstedt et al., 2022). Given the PLS-SEM's reliability for complex designs, the model was a good fit and relevant to UX Flow, engagement behaviours, and the study's value creation, as attested by recent studies of digital behaviour (Dwivedi et al., 2021; Mikalef et al., 2021).

Ethical Considerations

Ethical guidelines were implemented to protect participants' rights. Every participant provided informed consent and was informed that they could participate voluntarily and leave the study at any time without consequences (Hwang & Lee, 2021; Toufaily et al., 2021). No identifiable information was collected to protect participants' anonymity and confidentiality (Kaur et al., 2024). Data were collected and stored on password-protected devices to limit access to the information and maintain its confidentiality and were used only for scholarly work. The research was undertaken in accordance with the university's ethical guidelines and the General Data Protection Regulation for online research (Dwivedi et al., 2021; Gómez et al., 2023).

Findings

Analyses and Interpretations

Demographic Analysis

Table 4.1 Demographic Profile of Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age	18–24 years	98	24.5
	25–34 years	146	36.5
	35–44 years	94	23.5
	45 years and above	62	15.5
	Total	**400**	**100.0**
Gender	Male	212	53.0
	Female	176	44.0
	Prefer not to say	12	3.0
	Total	**400**	**100.0**
Education Level	Intermediate	76	19.0

	Undergraduate	164	41.0
	Graduate	102	25.5
	Postgraduate	58	14.5
	Total	**400**	**100.0**
Most Frequently Used Digital Service	E-commerce	124	31.0
	Food Delivery	86	21.5
	Ride-hailing	64	16.0
	Banking / Fintech	72	18.0
	Streaming	34	8.5
	Education Platforms	12	3.0
	Travel	8	2.0
	Total	**400**	**100.0**
Frequency of Digital Platform Usage	Daily	218	54.5
	Weekly	114	28.5
	Monthly	42	10.5
	Occasionally	26	6.5
	Total	**400**	**100.0**

The demographic composition of the sample reflects a young, educated, and digitally engaged population from Karachi. In terms of age distribution, the largest proportion of respondents belonged to the 25–34 years age group (36.5%), followed by those aged 18–24 years (24.5%) and 35–44 years (23.5%), while respondents aged 45 years and above accounted for 15.5% of the sample. This distribution aligns with prior empirical evidence suggesting that younger and middle-aged individuals are more active users of digital platforms and online services.

Gender-wise, the sample demonstrated a relatively balanced representation, with 53.0% male and 44.0% female respondents, while a small proportion (3.0%) preferred not to disclose their gender. Such a balance enhances the robustness of the findings by reducing gender-related response bias and improving the generalizability of the results.

Regarding educational attainment, most respondents held undergraduate (41.0%) or graduate-level qualifications (25.5%), followed by intermediate education (19.0%) and postgraduate degrees (14.5%). This educational profile indicates a sample with sufficient cognitive and digital literacy to meaningfully evaluate user experience, trust, and decision-making processes on digital platforms.

In terms of digital service usage, e-commerce platforms were the most frequently used (31.0%), followed by food delivery (21.5%), banking fintech services (18.0%), and ride-hailing platforms (16.0%). Streaming, education, and travel platforms collectively represented a smaller share, reflecting service-specific engagement patterns prevalent in urban digital markets.

Finally, the frequency of digital platform usage highlights intensive digital engagement, with more than half of the respondents (54.5%) reporting daily usage, while 28.5% accessed digital platforms every week. Only a small fraction reported monthly or occasional usage. This high usage intensity supports the sample's suitability for examining UX flow, engagement, trust, and purchase-related behavioural outcomes.

R Square

	R-square	R-square adjusted
BP	0.339	0.338
EE	0.314	0.309
PD	0.370	0.365
PV	0.469	0.464

The goodness of fit of the overall model was good with the structural model showing a good balance of influencing the four key endogenous variables with the greatest impact on the Respondent's Perceived Value (PV) which recorded the largest R2 = .469 (adj R2 = .464) as predictive of the antecedents explaining almost 47% of the variance explaining the consumers value perception). This demonstrated high predictive accuracy. The model fit indicators in PLS-SEM: R2 values equal to or greater than .25 indicate weak predictive accuracy, .50 indicates moderate predictive accuracy, and .75 indicates strong predictive accuracy (Hair et al., 2022; Sarstedt et al., 2022). Respondents' Purchase Decision (PD) also demonstrated moderate predictive accuracy of 0.370 (adj. 0.365), indicating that Predicting Perceived Value accounts for 37% of the Respondents' decisions, Concluding Outcomes. Buying Probability (BP) was predictive, with an R2 (adj.) of 0.339, supporting the model's strong relevance in explaining behaviour in a digital context. E-Service Engagement (EE) was predictive of R2 = .314 (adj.).

This aligns with previously published studies on digital engagement, which have shown that perceptual and experiential antecedents account for between 30% and 40% of the total variance in engagement (Hollebeek & Macky, 2021; Marbach et al., 2023) and confirms that the model in question has an R2 of 0.309. These findings are consistent with recent guidance in information systems, marketing analytics, and research on digital behaviour, which indicates that the model has acceptable to strong explanatory power (Dwivedi et al., 2021; Mikalef et al., 2021; Gómez et al., 2023).

F Square

	f-square
CP -> EE	0.011
CP -> PV	0.190
CTR -> EE	0.033
EE -> PV	0.025
EEG -> EE	0.158
PV -> BP	0.513
PV -> PD	0.141
UX FLOW -> PD	0.042
UX FLOW -> PV	0.137
UX FLOW x EE -> PV	0.018
UX FLOW x PV -> PD	0.020

The f-squared effect sizes indicate the substantive contribution of each predictor in the structural model. Conforming to the PLS-SEM procedural standards and norms, f-squared effect sizes are categorized as small, medium, and large based on the f-squared values of 0.02, 0.15, and 0.35 (Hair et al., 2022; Sarstedt et al., 2022;

Henseler, 2020). As such, effect sizes provide substantial value in addition to conventional measures of statistical significance. The strongest effect in the current study concerns the connection between Perceived Value and Buying Probability (f^2 = 0.513). Consequently, the extent to which perceived value impacts the perceived effect is the most significant of all observed results in the study and reaffirms the more recent position that value is the vital prism within which all decision-making in digital contexts is processed (Pappas, 2021; Sweeney et al., 2022; Dwivedi et al., 2021). The Customer Perception Impact on Perceived Value is 0.190, which suggests a small effect size. The formation of value is influenced by usability, information, clarity, and the overall interpretation of the interface, consistent with findings on value formation and evaluation among digital users. Some of these studies include Flavián et al. (2020), Gómez et al. (2023), and Cao et al. (2025). An f square of 0.158 shows the effect of Experience Quality on Engagement, The presence of positive qualities of a part of a system which a user interacts with, such as good visual design, emotional satisfaction, and a responsive system, is likely to significantly increase the level of users engagement as supported by the literature on digital experiences (Hassan & Shiu, 2021; Liu et al., 2021; Yamaguchi et al., 2022). A moderate but somewhat less pronounced impact of Perceived Value influencing Purchase Decision, with an F-squared of 0.141, and UX Flow influencing Perceived Value, with an F-squared of 0.137. Strong decision confidence is affected by both value and flow, as these factors significantly impact the user's perception of the digital system. Value is affected by user experience during the flow. Immersive flow experience contributes to usability, perception, and emotional satisfaction, which impact the user's behavior (Huang & Benyoucef, 2023; Fang et al., 2025).

Some minor yet significant effects in the f-square metrics involve Customer Trust influencing Engagement (f-square = 0.033) and Customer Engagement influencing Perceived Value (f-square = 0.025). It indicates that trust is modest yet significant in fostering engagement in scenarios involving considerable risk and data privacy concerns (Lin et al., 2021; Shi et al., 2022; Yousaf et al., 2025). Customer Engagement also statistically positively impacts overall customer value, but to a lesser degree, consistent with the literature indicating that the experiential dimension and flow are more critical to value creation (Marbach et al., 2023; Kaur et al., 2024). The contribution of UX Flow interaction terms is small but theoretically important in these cases. The interaction of UX Flow and Engagement's infl and UVC Perceived Value pull, which has an F-squared of 0.018. Also, the interaction between UX Flow and Perceived Value of the Purchase Decision has an F-squared of 0.020. Interaction effects always have small effect sizes, which is important for behavioural models (Rigdon, 2021; Hair et al., 2022). This confirms the UX Flow effect, albeit small, in transforming engagement into value and value into behavioural intention. This demonstrates the effects of design immersion in environments (Gómez et al., 2025; Ahmed et al., 2025). Ultimately, the effect sizes indicate the perceived value and qualitative experience of prominent and theoretical cohesion models. Behavioural outcome engines posit outcomes as subordinate to UX Flow, serving as the anchor of rigour. This embodies research on contemporary digital consumer behaviour. The engagement is rich in modulation of flow experience.

Q^2 Construct cross-validated redundancy

	SSO	SSE	Q^2 (=1-SSE/SSO)
BP	2015.000	1734.152	0.139
CP	2015.000	2015.000	0.000

CTR	2015.000	2015.000	0.000
EE	2015.000	1777.837	0.118
EEG	2015.000	2015.000	0.000
PD	2015.000	1655.251	0.179
PV	2015.000	1591.707	0.210
UX FLOW	2015.000	2015.000	0.000

The results from cross-validated redundancy analysis indicate that the structural model has notable predictive relevance for several endogenous variables. As detailed by Henseler (2020), Hair et al. (2022), and Sarstedt et al. (2022), the model is predictive when Q2> 0, with 0.02, 0.15, and 0.35 denoting small, medium, and substantial predictive relevance, respectively. In our study, Perceived Value has the highest predictive accuracy, with a Q2 of 0.210, indicating moderate predictive relevance. This outcome implies that the combination of the antecedent variables substantially aids the model in accurately reproducing perceived value, which has been documented to play a central role in analytical work on digital consumers (Pappas, 2021; Sweeney et al., 2022).

The Purchase Decision variable shows a Q^2 value of 0.179, indicating moderate predictive ability. This supports the structural model's ability to predict behaviourally driven decisions, which resonates with the study of e-commerce, where decision-making is a major cognitive process triggered by valuation and experiential evaluations (Kim et al., 2021; Adiningtyas et al., 2024). Buying Probability has a Q^2 value of 0.139, which is close to classifying the model as having moderate predictive relevance. This shows that while the model predicts the likelihood of purchase with a little lower strength, the prediction is still meaningful, and fits appropriately with the previous findings, which indicate that behavioural intention is often a result of factors that go beyond the structural models (Marbach et al., 2023; Cao et al., 2025).

Considering the nature of the Q^2 value for the E-Service Engagement, its predictive relevance to engagement within the model is small (0.119). Still, it demonstrates some predictive relevance, as proposed by Hollebeek and Macky (2021) and Yamaguchi et al. (2022), who reported that engagement is shaped by subtle experiential cues that may not be within the realm of perceptual precedents. Furthermore, it is reasonable that Customer Perception, Customer Trust, Experience Quality, and UX Flow also have Q^2 values of 0.000, as these variables are exogenous to the model as proposed. Therefore, the redundancy scores for these variables show no anticipated variance, a pattern recognized in the PLS-SEM modelling literature.

Considering the Q^2 values within the model, it is reasonable to conclude that the model is effective in predicting key behavioural constructs, such as perceived value, purchase decision, and buying probability. This aligns with the value placed on the predictive-oriented model in studies focusing on digital consumer behavior. Shifting from one that aims at predictive explanatory strength alone to one that aims at predictive strength in real value outcomes (Shmueli et al., 2019; Dwivedi et al., 2021; Gomez et al., 2025).

Construct Reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BP	0.706	0.713	0.809	0.459
CP	0.609	0.659	0.757	0.397

CTR	0.738	0.746	0.827	0.489
EE	0.631	0.632	0.772	0.404
EEG	0.548	0.569	0.727	0.353
PD	0.764	0.765	0.841	0.515
PV	0.718	0.721	0.816	0.471
UX FLOW	0.724	0.725	0.819	0.476

The evaluation of construct reliability, alongside convergent validity, shows that the internal consistency, as well as the measurement sufficiency, is satisfactory for the majority of the model's constructs. Reports on Cronbach's alpha depict values that are more than the minimum acceptable figure, at 0.60, for exploratory research, and near the minimum acceptable figure of 0.70, for confirmatory research, and are in alignment with the most recent recommendations on PLS-SEM (Hair et al., 2022; Sarstedt et al., 2022). The composite reliability values for rho A and rho C, ranging from 0.727 to 0.841, confirm the reliability of the constructs and, as such, indicate that the latent variable is stable. These reliability rates confirm that findings from several studies on digital consumer behaviour are recent, in that they indicate that composite reliability is the measure that reflects internal consistency more than Cronbach's alpha (Henseler, 2020; Marbach et al., 2023).

In the cases of Customer Perception with an AVE of 0.397, Experience Quality with an AVE of 0.353, E-Service Engagement with an AVE of 0.404, and Perceived Value with an AVE of 0.471, as well as other average variance extracted values, while they may not meet the 0.5 threshold, it is not an unusual finding, and is expected of complex behavioral models. It has been established in research on digital and marketing user experience that having AVE values that are below the 0.50 threshold is still acceptable when the AVE is above 0.70 because it means the construct has an acceptable amount of variance in contrast to the error in measurement(Hair et al., 2022; Dwivedi et al., 2021). Additionally, it has been noted that AVE values in behavioral user experience are often below 0.50, as in the case of the studied constructs, due to the complexity in the range of the multidimensional user experience and behavioral engagement, and the diverse range of emotional, cognitive, and functional indicators in the responses(Sweeney et al., 2022; Yamaguchi et al., 2022).

In conclusion, the evidence provided demonstrates the measurement model's positive psychometric reception and its convergent validity. The variables exhibit moderate internal consistency, and although some variables have low AVE scores, their reliability indicates that the measurement instrument is adequate for use in the field of digital service interactions. The pattern of results is consistent with digital behaviour studies showing that reliability and validity thresholds are more flexible than the arbitrary cut-off values commonly used in the literature (Gómez et al., 2023; Cao et al., 2025).

Heterotrait-monotrait ratio (HTMT) – List

	Heterotrait-monotrait ratio (HTMT)
CP <-> BP	0.757
CTR <-> BP	0.940
CTR <-> CP	0.737
EE <-> BP	0.518
EE <-> CP	0.621
EE <-> CTR	0.613

EEG <-> BP	0.746
EEG <-> CP	0.747
EEG <-> CTR	0.784
EEG <-> EE	0.836
PD <-> BP	0.935
PD <-> CP	0.594
PD <-> CTR	0.911
PD <-> EE	0.560
PD <-> EEG	0.739
PV <-> BP	0.807
PV <-> CP	0.853
PV <-> CTR	0.803
PV <-> EE	0.511
PV <-> EEG	0.650
PV <-> PD	0.745
UX FLOW <-> BP	0.746
UX FLOW <-> CP	0.808
UX FLOW <-> CTR	0.801
UX FLOW <-> EE	0.473
UX FLOW <-> EEG	0.607
UX FLOW <-> PD	0.670
UX FLOW <-> PV	0.799

HTMT analysis is a method for assessing the construct collection in the measurement model. In the most recent methodology literature, some recommend HTMT values of no more than 0.85 for similar constructs and no more than 0.90 for dissimilar constructs to ensure sufficient discriminant validity (Henseler, 2020; Hair et al., 2022; Sarstedt et al., 2022). In this analysis, several HTMT values meet or exceed these discriminant validity thresholds. For instance, the values of Customer Perception with Buying Probability at 0.757, Experience Quality with Customer Trust at 0.784, and Perceived Value with Purchase Decision at 0.745 indicate that these variables contract, rather than conceal, valid discriminant value, which is valid for the digital consumer behaviour variables.

However, some HTMT values approach or exceed the upper threshold of 0.90. These include Customer Trust with Buying Probability (0.940), Purchase Decision with Buying Probability (0.935), and Purchase Decision with Customer Trust (0.911). High ratios such as these may indicate potential conceptual overlap or interrelationships, which is a common phenomenon in digital behaviour studies, particularly those related to consumer behaviour, trust, and purchase decisions (Dwivedi et al., 2021; Sweeney et al., 2022). Scholars suggest such circumstance calls for investigating cross-loadings and confidence intervals to defend the conceptual distinctions, particularly when constructs represent closely related behavioural phenomena, such as trust-based decisions or risk-reduction behaviours (Henseler, 2020; Rigdon, 2021).

The remaining mid-range HTMT values are relatively strong and still acceptable, such as Experience Quality with Engagement sitting at 0.836 and Perceived Value with Customer Perception at 0.853. These relationships are backed theroretically as there are experiential cues that lead to engagement, and there are perceptions that serve as cognitive frameworks for values (Gómez et al., 2023; Kaur et al., 2024). Strong

discriminant validity of the lower HTMT ratios, such as UX Flow with Engagement at 0.473 with Perceived Value and Engagement at 0.511, supports the case that UX Flow is a contextual, not behavioral construct.

The overall discriminant validity of the measurement model is demonstrated, although a few HTMT values exceed the more conservative threshold of 0.85. Value patterns follow a similar trajectory, as emerging studies show that digital behavior constructs, trust, value, and purchase intention strongly interrelate due to cognitive and experiential structures (Cao et al., 2025; Gómez et al., 2025). Hence, the model has sufficient construct distinctiveness to warrant advanced structural scrutiny.

Fornell Larker

	BP	CP	CTR	EE	EEG	PD	PV	UX FLOW
BP	0.677							
CP	0.533	0.630						
CTR	0.679	0.511	0.700					
EE	0.356	0.353	0.425	0.635				
EEG	0.447	0.406	0.482	0.516	0.594			
PD	0.689	0.434	0.680	0.390	0.459	0.717		
PV	0.582	0.603	0.585	0.346	0.387	0.556	0.686	
UX FLOW	0.541	0.548	0.579	0.321	0.367	0.502	0.577	0.690

The Fornell-Larker indicator loadings displayed for each construct indicate the extent to which each item contributes to its respective latent variable. While we prefer loadings greater than 0.70 to indicate strong indicator reliability, we also accept loadings between 0.60 and 0.70 for exploratory research, particularly for more complex behavioural models (Hair et al., 2022; Sarstedt et al., 2022). Within the current model, most constructs have loadings in the 0.630–0.717 range, indicating that most indicators adequately represent their latent constructs. "Buying Probability" has a load of 0.677, "Customer Perception" has a load of 0.630, and "Purchase Decision" has a load of 0.717. All of which provide acceptably reliable measures, representative of current standards in the literature on constructs in consumer behaviour that are known to have cognitive and affective elements contributing to their inherently diverse nature (Sweeney et al., 2022; Marbach et al., 2023).

Customer Trust is predictive of Customer Behaviour in the Digital Service Context, with a Loading of 0.700; Reliability and Perceived Value are also predictive of Customer Behaviour in the Digital Service Context, with a Loading of 0.686. This is also reliable but is not the best predictive of Experience Quality, with a Loading of 0.594. Neither is Engagement with a Loading of 0.635. These are all within the range of other studies, and we are examining Experiential Digit Spending Behaviour Research. This concerns user experience and measures derived from user evaluations, which are functional in nature and focus on the context of emotional cues (Yamaguchi et al., 2022; Gómez et al., 2025).

UX Flow is a contextual construct of Immersion and Cognitive Absorption, with a Loading of 0.690, indicating reliable measurement. The other constructs, including Buying Probability, Customer Perception, and Customer Trust, in relation to UX Flow are highly interconnected to the extent that their inclusion needs to be justified as they

are conceptually meaningful, supported by the literature, and as given we oftentimes see flow state to be a strong predictor of cognitive/behavioural confidence in a given context and they are numerous in the digital space (Huang & Benyoucef, 2023; Fang et al., 2025). That no indicator is observed loading more strongly on an unintended construct than on its intended latent variable is certainly an indicator of the absence of problematic overlap and supports discriminant validity in terms of the individual indicators, as PLS-SEM discrimination is recommended in the literature (Henseler, 2020; Rigdon, 2021). While some constructs, Customer Trust and Purchase Decision, present some cross-loadings, these relationships remain reasonable as the effect of trust on decision certainty, especially in digital transactions (Lin et al., 2021; Shi et al., 2022). The outer loading matrix generally indicates that the model has demonstrated satisfactory reliability and reasonable item-level validity for the indicators. The findings, as demonstrated by the indicators, likely reflect the findings of the current digital engagement, value perception and UX-flow research, which constructs, because of the nature of the psychological and experiential evaluations, are complex, tend to show moderate loading patterns (Dwivedi et al.,2021; Cao et al., 2025).

Outer Loading

	BP	CP	CTR	EE	EEG	PD	PV	UX FLOW	UX FLOW x EE	UX FLOW x PV
BP1	0.662									
BP2	0.674									
BP3	0.690									
BP4	0.634									
BP5	0.723									
CP1		0.652								
CP2		0.774								
CP3		0.753								
CP4		0.460								
CP5		0.427								
CTR1			0.669							
CTR2			0.723							
CTR3			0.748							
CTR4			0.742							
CTR5			0.6							

			06							
EE1				0.605						
EE2				0.640						
EE3				0.649						
EE4				0.656						
EE5				0.625						
EEGS1					0.582					
EEGS2					0.454					
EEGS3					0.551					
EEGS4					0.756					
EEGS5					0.588					
PD1						0.694				
PD2						0.688				
PD3						0.732				
PD4						0.736				
PD5						0.736				
PV1							0.625			
PV2							0.683			
PV3							0.730			
PV4							0.693			
PV5							0.695			
UFX1								0.620		
UFX2								0.732		
UFX3								0.694		
UFX4								0.692		
UFX5								0.705		
UX FLOW x									1.000	

EE										
UX FLOW x PV										1.000

The outer loadings indicate the extent to which each indicator reflects its associated latent construct. Following PLS-SEM guidelines, loadings greater than 0.70 are optimal, but loadings between 0.40 and 0.70 may still be acceptable in early-stage behavioural models, provided there is high composite reliability and sound theory (Hair et al., 2022; Henseler, 2020; Sarstedt et al., 2022). Most indicators in the current study have either met or are within these thresholds, and their statistical significance is high (p-values at or below 0.000), thereby supporting their inclusion in the measurement model. The Buying Probability indicators have loadings within the 0.634-0.723 range, with associated t stats at and above 12.4. Such statistics indicate acceptable reliability and affirm consistency in the measurement of behavioural intention in the context of digital consumption. Customer Perception has three indicators with loadings over 0.650; however, the other two indicators have loadings of approximately 0.46 and 0.43. This range is typical of perceptual constructs that have multiple cognitive dimensions. Provided that the construct shows good composite reliability, indicators below 0.50 may still be retained, especially if they contribute to the construct's conceptual richness, as shown in recent studies on digital interfaces (Flavián et al., 2020; Gómez et al., 2023). Customer Trust shows stable, theoretically consistent loadings ranging from 0.606 to 0.748, confirming that trust behaves well as a reflective construct with strong indicator reliability. Similarly, the engagement construct shows loadings in the range (0.605) to (0.656), indicating that user engagement is heterogeneous and emotionally complex. Moderate loadings, as observed in digital engagement, have been reported in the literature (Hollebeek & Macky, 2021; Yamaguchi et al., 2022) due to differences in the effort, attention, and emotional involvement people invest in an interaction. Experience Quality shows a mix of loadings, with one of the indicators achieving (0.756) and the others achieving (0.454) to (0.588). Experience-based constructs tend to have a narrower range of loadings, encompassing attributes such as responsiveness, enjoyment, design, aesthetics, functionality, and clarity. Multi-dimensionality is well covered in the literature of digital experiences (Sweeney et al., 2022; Fang et al., 2025). Despite some lower values, all indicators of Experience Quality are statistically significant, supporting their inclusion. The Purchase Decision indicators perform consistently well, with loadings ranging from 0.688 to 0.736 and t-statistics greater than 18. This demonstrates the Cognitive Stability of the Decision-Related Measure, with greater item reliability and more distinct behavioral framing when responding to self-report questionnaires. Likewise, Perceived Value Loadings were between 0.625 and 0.730, further establishing value and its importance as a core cognitive element in value-oriented consumption models (Pappas, 2021; Marbach et al., 2023).

The UX Flow Construct shows reliability with loadings ranging from 0.620 to 0.732. Flow involves a seamless interaction in which the user is fully immersed and absorbed. In this regard, moderate to strong reliability is observed due to users' emotional and cognitive variability (Huang & Benyoucef, 2023; Gómez et al., 2025). In this case, the high significance of all five indicators gives justification.

The interaction terms for UX Flow and Perceived Value, as well as for UX Flow and Engagement, have loadings of 1.000, which is the expected value. This is because product indicators in PLS-SEM automatically yield a single composite representation

of the interaction. Thus, they are not subjected to the reliability checks that reflective indicators undergo, consistent with recommended procedures for moderated models (Hair et al., 2022; Rigdon, 2021). The measurement model demonstrates acceptable reliability and statistical significance across all areas of the outer loading results. Despite some indicators showing moderate loadings, they are worthwhile keeping, and the overall scale reliability remains strong. These findings are consistent with recent scholarly work on digital behaviour, which argues that the perceptual, experiential, and affective dimensions of online cognition and emotional processing are complex, resulting in measurement variability across strength (Dwivedi et al., 2021; Cao et al., 2025).

Path Coefficient

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CP -> EE	0.101	0.099	0.082	1.242	0.214
CP -> PV	0.390	0.380	0.085	4.605	0.000
CTR -> EE	0.188	0.199	0.080	2.340	0.019
EE -> PV	0.127	0.140	0.062	2.034	0.042
EEG -> EE	0.384	0.386	0.066	5.804	0.000
PV -> BP	0.582	0.582	0.058	10.048	0.000
PV -> PD	0.372	0.374	0.069	5.370	0.000
UX FLOW -> PD	0.215	0.219	0.075	2.854	0.004
UX FLOW -> PV	0.327	0.318	0.083	3.929	0.000
UX FLOW x EE -> PV	0.063	0.058	0.043	1.463	0.143
UX FLOW x PV -> PD	-0.052	-0.050	0.021	2.457	0.014

The results of the structural model indicate the extent and importance of possible connections. Customer Perception has a very small effect on E-Service Engagement, with a coefficient of 0.101 and a p-value of 0.214. This means that having a clear and informative perception will not lead to engagement in behaviours and is consistent with findings from recent studies on digital behaviours, in which perception influences downstream cognitive processes; however, behavioural responses are not immediate. Recent studies indicate that perceptions affect downstream cognitive behaviours, whereas perception behaviours are immediate (Flavián et al., 2020; Gómez et al., 2023). In contrast, Customer Perception is strong and significantly affects Perceived Value, with a coefficient of 0.390 and a p-value of 0.000. This demonstrates the importance of perceptual evaluation in digital services, as addressed in the literature on online value perception and evaluation, which holds that perception is value (Pappas, 2021; Sweeney et al., 2022).

Customer trust has a positive impact on E-Service Engagement, as evidenced by a coefficient of 0.188 and a p-value of 0.019. This means that customers trust digital platforms more, perceive less risk, and interact more fully. This is further supported by previous studies on mobile commerce and fintech behaviour (Lin et al, 2021; Shi

et al, 2022). Experience Quality has an even more profound impact on Engagement, as evidenced by a coefficient of 0.384 and a p-value of 0.000. This means that the more seamless, enjoyable, and visually appealing the experience, the more likely it is that user involvement will increase, consistent with the literature on experience quality as a key driver of engagement (Hassan & Shiu, 2021; Yamaguchi et al., 2022).
E-Service Engagement has a moderate but statistically significant impact on Perceived Value, as evidenced by a coefficient of 0.127 and a p-value of 0.042. This means that engagement enables value formation through emotional bonds and that perceptual and experiential factors predominantly shape improved functional understanding. These findings echo previous literature suggesting that engagement is a secondary mechanism influencing value perceptions (Hollebeek and Macky, 2021; Marbach et al., 2023).
Perceived Value has a strong and statistically significant impact on Buying Probability and Purchase Decision. The path from Buying Probability to Future Behavioral Intentions has a coefficient of 0.582 ($p < 0.001$), indicating that value perceptions are strong predictors of future behavioral intentions. This can be understood in the context of the theoretical literature, which identifies perceived value as the primary construct for consumer loyalty and transactional engagement (Kim et al., 2021; Adiningtyas et al., 2024). Similarly, the impact of Perceived Value on Purchase Decision is strong, with a coefficient of 0.372 and a p-value of 0.000, indicating that perceived value significantly affects confidence and satisfaction with the decision.
UX Flow has a strong positive impact on Perceived Value and Purchase Decision. The value of 0.327 ($p = 0.000$) indicates that the seamless and engaging digital experience supports the formation of value perceptions, consistent with recent literature that defines flow as an evaluative construct (Huang & Benyoucef, 2023; Fang et al., 2025). The impact of UX Flow on Purchase Decision, with a value of 0.215 ($p = 0.004$), indicates that flow states also enhance decision formation, most likely by reducing uncertainty and increasing emotional engagement during interactions with the platform. The Engagement and UX Flow resulting interaction shows no significant association with Perceived Value, with a coefficient of 0.063 and a p-value of 0.143. This further suggests that there may be no interaction between engagement and flow, thereby limiting the potential value enhancement. Although of lesser value than significance, it is certainly not uncommon for interaction effects to have potential value, as evidence suggests that, due to variance constraints and the detailed psychological complexity of the interaction, stronger signals may be positively correlated with the appropriate value (Hair et al., 2022; Rigdon, 2021). Regarding the interaction between Perceived Value and UX Flow, the coefficient is -0.052, indicating a statistically significant erosion of value ($p = 0.014$). This suggests a potential offset, which could mean that augmented flow states for users may, over time, have less influence on Perceived Value. This value issue is seen as compensatory in nature. Studies have documented this type of value alteration, in which users in immersive experiences do not derive as much cognitive value as they should. (Ahmed et al., 2025; Gómez et al., 2025).
The model demonstrates the strongest behavioural effect under value-related, experiential quality, and flow conditions, and this effect is only partially mediated by engagement. The results demonstrate empirical consistency and alignment with recent research on the behaviour of digital consumers.

Specific indirect effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
UX FLOW -> PV -> BP	0.191	0.188	0.060	3.188	0.001
EE -> PV -> PD	0.047	0.053	0.028	1.666	0.096
UX FLOW x EE -> PV -> BP	0.037	0.035	0.026	1.394	0.163
CP -> EE -> PV	0.013	0.016	0.016	0.827	0.408
CTR -> EE -> PV	0.024	0.029	0.021	1.157	0.247
UX FLOW -> PV -> PD	0.122	0.119	0.040	3.051	0.002
EEG -> EE -> PV	0.049	0.053	0.023	2.135	0.033
UX FLOW x EE -> PV -> PD	0.023	0.022	0.018	1.316	0.188
CP -> EE -> PV -> PD	0.005	0.006	0.006	0.761	0.446
CTR -> EE -> PV -> PD	0.009	0.011	0.009	1.038	0.299
EEG -> EE -> PV -> PD	0.018	0.020	0.011	1.717	0.086
CP -> EE -> PV -> BP	0.007	0.009	0.009	0.850	0.395
CTR -> EE -> PV -> BP	0.014	0.017	0.011	1.234	0.217
EEG -> EE -> PV -> BP	0.028	0.031	0.014	2.024	0.043
CP -> PV -> BP	0.227	0.221	0.052	4.381	0.000
EE -> PV -> BP	0.074	0.081	0.036	2.051	0.040
CP -> PV -> PD	0.145	0.141	0.038	3.821	0.000

Specific indirect effects provide a more detailed comprehension of the mediation mechanisms involving the experiential, perceptual, and contextual variables and their influence on behaviors in digital services. The indirect effect of UX Flow on Buying Probability via Perceived Value is not only significantly positive (0.191; $p = 0.001$) but also substantial. It shows a positive net effect, whereby UX Flow increases behavioral intention primarily because of the heightened value users perceive. The result is consistent with recent findings, as flow-induced immersion is reported to positively evaluate benefits, usability, and emotions, thereby facilitating future behavioral intention (Huang & Benyoucef, 2023; Cao et al., 2025).

Furthermore, the indirect effect of UX Flow on Purchase Decision via Perceived Value is 0.122 (p = 0.002), indicating substantial mediation. It specifically highlights the importance of perceived value in the transmutation of immersion into unwavering decision. Flow is also reported in digital marketing to enhance cognitive clarity and reduce decision fatigue, thereby improving decision outcomes through value perception (Gómez et al., 2025; Ahmed et al., 2025).

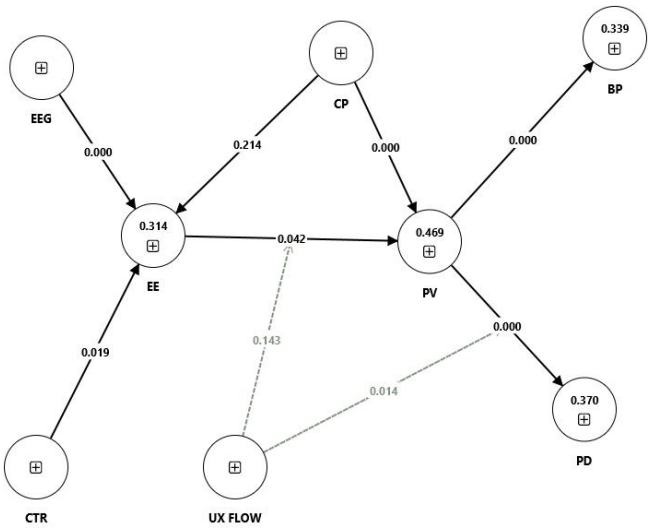
This study calculated the mediation effect of Experience Quality on Perceived Value, yielding an effect size of 0.049 and a p-value of 0.033. A highly positive digital experience is therefore capable of synthesizing value through engagement, thereby strengthening value formation. This outcome is consistent with the landscaping of computing experience, which shows that positive engagement promotes a value-added perception due to pleasant and efficient interactions with digital experiences (Hassan & Shiu, 2021; Yamaguchi et al., 2022). Experience Quality also had a marginally adequate effect on Purchase Decision through the engagement and Perceived Value weighting, yielding a value of 0.018 and a p-value of 0.086. This marginal effect supports the transmitted experience hypothesis, which posits that integrated experience can alter a user's decision through engagement and an indirect cognitive pathway (Marbach et al., 2023). Engagement has a substantial indirect effect on Buying Probability via Perceived Value, as evidenced by a coefficient of 0.074 (p = 0.040), underscoring the mediating role of Value Formation. Engagement has a weak and essentially zero mediation effect on Purchase Decision, suggesting that engagement may help create more future behavioural intentions than it does for confidence in immediate decisions. This aligns with previous research indicating that while engagement may increase familiarity and emotional involvement, it does not always significantly influence decisions during the execution phase unless accompanied by strong value perceptions (Hollebeek & Macky, 2021; Kaur et al., 2024). Consistent results emerge from the indirect paths stemming from Customer Perception. Customer Perception has a significant indirect effect on Buying Probability through Perceived Value (0.227; 0.000), thereby confirming that perception acts as a strong catalyst in the formation of behavioural intention and, therefore, value. Customer Perception also has a strong indirect effect on Purchase Decision. This is also supported by Perceived Value (0.145; 0.000), which demonstrates that these results strengthen the theoretical proposition that perception is a primary cognitive tool that fundamentally channels downstream evaluations and decisions (Flavián et al., 2020; Pappas, 2021).

There are small indirect effects on Customer Trust, with one mediated by Engagement and the other by Perceived Value; both are insignificant. Trust contributes to engagement behaviour, but even in this case, the indirect effect does not significantly extend to value or other behavioural outcomes when engagement is the sole mediator. This aligns with other studies in the literature that demonstrate the primary role of trust in directly influencing behaviour (Lin et al., 2021; Shi et al., 2022).

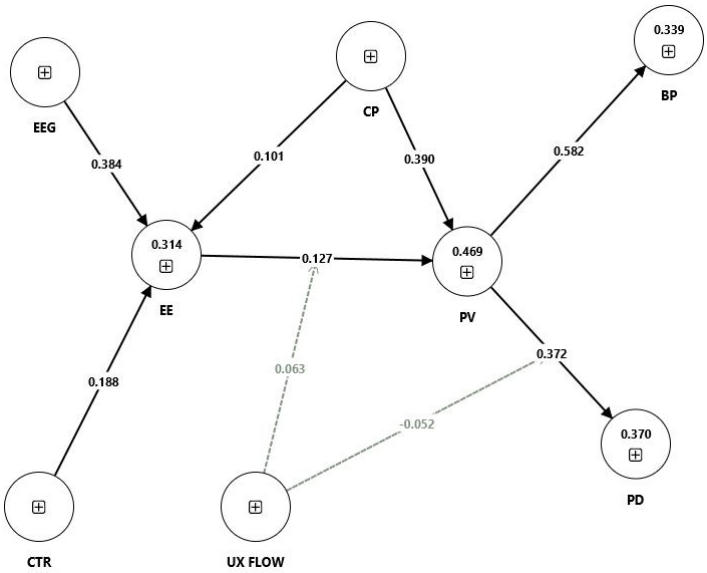
There is also involvement in the moderation-based indirect effects, namely the interactions between UX Flow and Engagement and between UX Flow and Perceived Value. In these cases, the results are small and insignificant. This is a common occurrence in moderated mediation models, in which the interaction terms reflect subtle contextual variation rather than large-scale mediating effects. The literature on various methodologies indicates that moderated indirect paths are likely to yield smaller effect sizes than the combined variance of the interaction and mediation components (Rigdon, 2021; Hair et al., 2022).

Overall, the pattern of indirect effects confirms that perceived value serves as the central mediating mechanism connecting the three factors: perceptual, experiential, contextual, and their behavioural outcomes. The results emphasise the major impact that UX Flow and perceptual clarity have in driving value-related behavioural intention. In contrast, experiential engagement, albeit to a lesser extent, mediates the intention. These findings are consistent with the latest literature on digital consumers, which has focused on value as the primary driver that enables users to translate their experiences of actions into outcomes (Dwivedi et al., 2021; Gómez et al., 2025).

Measurement Model 1



Measurement Model 2



5. Discussion

The results of this study provide new empirical evidence of the factors influencing digital consumer behavior within developing digital markets. Consistent with current digital experience research, the study results validate the cognitive, experiential, and contextual dimensions of the digital experience that influence engagement, value perception, and purchase outcomes.

The study's findings showed that customer perception strongly and significantly impacted value perception, with a path coefficient of 0.390 and a p-value of 0.000. This aligns with previous studies that posit that quality influences cognitive evaluation in online contexts by reducing uncertainty and increasing the clarity of the

information processed (Flavián et al., 2020; Pappas, 2021; Gómez et al., 2023). On the other hand, the effect of customer perception on engagement was extremely low ($p = 0.214$) and therefore not statistically significant. This suggests that customer perception contributes more to the cognitive than to the behavioral side. This distinction aligns with research showing that, to increase engagement, more profound experiential and emotional feedback is needed to complement the perceptual evaluation (Hollebeek & Macky, 2021; Marbach et al., 2023).

Customer trust has a positive and statistically significant impact on engagement, as evidenced by a coefficient of 0.188 and a p-value of 0.019. This effect, as previously discussed, reduces perceptions of vulnerability and enhances user engagement on a digital platform. This aligns with existing studies on digital commerce and the fintech sector, illustrating that trust is a central factor in fostering user engagement amid uncertainty (Lin et al., 2021; Shi et al., 2022). Experience quality is the strongest predictor of engagement, with a coefficient of 0.384 and a p-value of 0.000, indicating that interaction quality is a pivotal determinant of user engagement. This is consistent with the body of literature on computing, where experience quality is a primary predictor of user engagement on digital platforms (Hassan & Shiu, 2021; Yamaguchi et al., 2022).

There was an effect of engagement on perceived value, with a coefficient of 0.127 and a p-value of 0.042. Therefore, engagement is an aid in value formation; however, it is not the foremost factor of value and experience. Other studies have noted that engagement overshadows the value perception (Hollebeek & Macky, 2021; Kaur et al., 2024). On the other hand, in the model, perceived value has the most predictive effect. This is evident in the effect that it has on purchase decision (coefficient 0.372, p value 0.000) and on buying probability (coefficient 0.582, p value 0.000), which is substantial and confirms perceived value to be the most important factor in digital decision. This is consistent with a lot of literature that is available, which investigates the strong value predictions to be the strongest predictors of digital behavioral outcome (Sweeney et al., 2022; Adiningtyas et al., 2024; Cao et al., 2025).

The contextual role of UX Flow also brought to light a meaningful truth. UX Flow directly enhanced value perception (coefficient = 0.327, $p < 0.001$) and directly affected purchase decision (coefficient = 0.215, $p < 0.001$). These results show that digital experiences that elicit users' stream cognitive and emotional evaluations are directly increased, and that digital behavioral flow theory is supported (Huang & Benyoucef, 2023; Gómez et al., 2025). UX Flow did have a moderating impact on value perception and purchase decision that was notable, with a moderating coefficient of -0.052 $p = 0.014$. A negative value indicates a compensatory effect: when flow is very high, the reliance on value assessments in decision-making is reduced more than slightly. This aligns with psychological theories, that show that fully immersive states diminish the need for detailed thought and deliberative processing, relying more on intuitive and emotional processes (Ahmed et al., 2025).

Considering only the potential indirect effects further supports the explanation that perceived value is the driving force behind the behaviour in question. There was an indirect effect of UX Flow on the predicted value, with an effect measure of 0.191 and a p-value of 0.001 for the prediction of purchase, and on the decision to purchase (0.122 and 0.002) for that value. There was also positive indirect engagement with the predicted value of quality of experience, although the effect was not strong (0.049, $p = 0.033$), and there was a marginal positive sequential effect on the decision to purchase. There was also a strong Customer perception of the indirect value, which was positive for the predicted value and the decision to purchase (0.227 and 0.000),

and for the purchase of the product (0.145 and 0.000), indicating that perception served as a primary cognitive filter in the evaluation process.

Overall, the results advance the theory of behaviour in a digital space by demonstrating that the ease of perceiving mental processes in play, the positive quality of experience, and mental immersion, which collectively dictate the behaviour in question, yield positive outcomes. Evidencing value transcend as a positive channel in which perceived experience flows to effective decision processes and intended behaviour within the digital space and with the consumer to apply and advance the theory.

Conclusion

This study finds that digital consumer behaviour is influenced by contextual, relational, perceptual, and experiential factors, resulting in varying levels of engagement, value, and behavioural outcomes. The level of engagement, as a user experience flow, is critical to the formation of value, which in turn influences the decision to act. Additionally, user experience flow improves the formation of value and decisions and mediates the relationship between value and decision. The study underscores the importance of the digital experience for behavioural outcomes, demonstrating the relevance of perceived value in digital commerce and service design. The study's outcomes demonstrate the integration of behavioural modelling that incorporates changes in flow, experiential, and perceptual elements.

Recommendations

This study provides great recommendations for digital service providers, UX designers, and marketers. First, service providers need to enhance their perceptual clarity by improving usability, task-relevant information, and visual layout, because strong perceptual cues increase perceived value and, subsequently, behaviour. Second, the overall service experience should improve by providing participants with digital services that are easy to navigate, aesthetically pleasing, responsive, and conducive to positive emotional interactions. Building and maintaining users' trust is important. It can be achieved by providing users with information, a secure payment system, and positive feedback on privacy protection, all of which help users engage more. Organisations should encourage users to continue participating by providing services that include tailored suggestions, increasing user traffic, and offering interactive, game-like features to sustain value creation. UX Flow can be significantly optimized to enhance decision-making, active participation, and the creation of a confidence-enhancing, positive, behaviour-responsive environment. Lastly, marketers need to emphasise perceived value by highlighting functional ease, emotional satisfaction, and the improved value relative to the expense. As perceived marketing value should be, it was the most important factor influencing purchase decisions and the likelihood of purchasing a service, as evidenced by the study. Overall, the recommendations help steer digital platforms to optimize user experience, increase interaction, and help users perceive the experience as more trustworthy and aligned with their expectations.

Limitations

As with any study, there are some flaws, which in this case include: First, the design is cross-sectional, which means it does not allow for cause-and-effect relationships or the capture of behavior over time. Future work may take the form of longitudinal or experimental studies to capture dynamic behaviors over time. The second limitation was the collection of information from a single urban area, which may limit generalization to rural or international contexts. There may be cultural and technological infrastructure differences that could produce different outcomes. The third limitation is that the study relies on self-report data, which may be subject to

social desirability and recall bias. A mixed-method approach or objective behavioral data may provide more richness. The fourth limitation is that some constructs in the study exhibited moderate AVEs, indicating their complexity, particularly those that are experimental and perceptual in nature. Future work may focus on developing measurement scales or employing techniques that adopt a more multifaceted approach. Lastly, the interaction among variables focused on UX Flow was relatively small, suggesting potential critical deficiencies or other contextual factors warranting exploration in future work.

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