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**GAMIFICATION AND CUSTOMERS' VALUE CO-CREATION INTENTION:
THE ROLES OF MEDIATING AND MODERATING FACTORS**

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CHAPTER 1: RESEARCH OVERVIEW

1.1. Practical Context

The swift expansion of digital payment services is transforming the competitive environment in consumer financial services. E-wallets are no longer just simple cash substitutes, but are playing more as an integrated payment, money transfer, shopping, promotion, and retention type platform. As of 2023, the e-wallet market in Vietnam is estimated to have several billion transactions with the value of approximately VND 1,895.56 trillion processed by payment intermediary entities. Compared to 2022, the number of transactions increased by 47.15 percent, and the value of transactions surged by 41.78 percent (Phạm Anh Tuấn, 2024). In 2024, e-wallets represented 53% of the e-commerce transaction value and 32% of the point-of-sale transaction value in the world (Worldpay, 2025).

Still, in Vietnam, an increase in the number of e-wallets does not necessarily mean an increase in long-term use. By the end of September 2025, 49.57 million e-wallets had been activated, but only approximately 30.35 million e-wallets are still in use, representing 61.26% (Hải Linh, 2025). This means that attracting users to register does not ensure they will keep using the service, especially as it is harder and harder to tell the simplest e-wallets apart. Users are still worried about privacy, quality of service, and convenience of use of digital payments (Vietnam E-commerce and Digital Economy Agency, 2022).

In line with this trend, Gamification has also been integrated into e-wallet providers to stimulate engagement with tasks, progress mechanics, and rewards. “MoMo City” drew nearly 8 million participants, with the “Vòng quay ‘deal’ luyện” promotion getting over 4 million takers and 100 million spins (Bùi Phương Linh, 2023). “MoMo Academy” reached more than six million players within its first two weeks (MoMo, 2020). These figures illustrate the ability of Gamification to attract users and extend interaction beyond conventional payment activities.

However, all these metrics, players, visits, and transactions are fundamentally short-term outcomes, and give little indication as to whether users develop perceived value, remain engaged, or continue to contribute post-campaign. If tasks and rewards simply motivate users to receive promotional perks, the impact of Gamification may be limited to short-lived behavioral effects. Meanwhile, Gamification might lead to value co-creation beyond promotional incentives when it assists users in exploring platform features, lowers their cost, or enhances their positive experience. Users can also give feedback, report technical issues, submit improvements, or share their experience to help the service evolve over time (Tuệ Minh, 2022).

Along with Gamification, data-driven personalization is also being implemented more and more to customize content, promotional offerings, and rewards in line with what users want. While personalization can add relevance to a service experience, it also raises challenges around transparency, data security, and end users’ control over their own data. Concerns about data abuse or financial deception might damage trust and discourage users from engaging with the platform (Authority of Information Security, 2024). The e-wallet providers, therefore, must find a way of balancing the importance of personalized experiences and the protection of user privacy. These changes led to an interesting practical question: whether Gamification can mediate an increase of responses over perceived value, engagement, and Value Co-Creation Intention (VCCI), and in what way this process could depend on perceived personalization and privacy concern. Investigating such a dynamic in the settings of Vietnamese e-wallets could equip firms with solutions to win over users more efficiently, and encourage more sustained forms of user participation

1.2. Theoretical Context

Value co-creation refers to the process through which firms and customers jointly participate in creating value rather than maintaining separate roles as value providers and recipients (Vargo & Lusch, 2004). From this perspective, customers contribute knowledge, skills, experience, and other resources through activities such as seeking and sharing information, providing feedback, offering support, interacting with others, and advocating for the firm or user community

(Yi & Gong, 2013). In digital environments, continuous interaction and real-time data exchange further expand the active role of customers in the creation, adjustment, and diffusion of service value (Zhang et al., 2017). For firms, value co-creation also provides information about customer behavior, experiences, and needs, which can support service improvement and innovation (Hijazi, 2022; García-Magro et al., 2023).

This dissertation focuses specifically on VCCI and distinguishes it from actual value co-creation behavior. Whereas behavior refers to contributions that have already taken place, VCCI reflects users' willingness to participate in, learn about, recommend, or encourage others to join future value-creating activities with the platform. It therefore represents a shift from the conventional role of service user toward a more active role in the relationship with the firm.

In digital environments, Gamification is used to make service interactions more engaging and goal-oriented. Elements such as tasks, points, progress indicators, and rewards can help sustain attention, increase participation, and encourage users to interact more actively with the platform (Tabaeeian et al., 2024). Related reviews show that Gamification could enable value co-creation, create collaborative classrooms, and foster innovation (Jun et al., 2020; Rodrigues et al., 2021). In this thesis, Gamification is studied from the perceptual user's perspective and is defined as the degree to which users think their experience with the e-wallet is game-like, and not only as an evaluation of the existence of game elements.

A key process of how Gamification could work is through perceived value. Positive evaluations of an experience are suggested to be more likely to result from utilitarian or hedonic value associated with it, wherein even greater willingness to interact or collaborate with the platform may ensue (Abror et al., 2023a; Zhao et al., 2019). Chen and Lee (2023) revealed that both the utilitarian and hedonic values are related to the value co-creation behavior, but differently. Utilitarian value may facilitate cooperation during service use, whereas hedonic value may encourage voluntary contributions such as recommendations or support for the user community.

However, perceived value primarily captures users' evaluation of the benefits they receive and does not fully reflect the extent to which they invest their own resources in the relationship with the platform. Engagement refers to customers' cognitive, emotional, and behavioral investment during interactions with a brand or service (Ferm & Thaichon, 2021). Higher levels of engagement may increase customers' tendency to contribute to the improvement of products and services (Behnam et al., 2021; Yen et al., 2020). Accordingly, positioning perceived value and engagement within a sequential mechanism makes it possible to distinguish the process through which benefit evaluation develops into relational investment before VCCI is formed.

The relationship between perceived value and engagement may also depend on technological and data-related conditions. Perceived personalization can make a service more relevant to individual users' needs and preferences, thereby strengthening the extent to which perceived value translates into engagement (Henkens et al., 2021; Ciftci et al., 2024). In contrast, privacy concern may weaken this process when users believe that their personal data are being collected or used without sufficient transparency (Liu et al., 2021; Lei et al., 2022; Alalwan et al., 2024).

Although previous studies have examined Gamification, perceived value, engagement, and value co-creation, evidence regarding these relationships remains somewhat inconsistent, and much of the existing research has examined individual relationships or separate mediating mechanisms (Qian et al., 2022; Pandey & Ansari, 2023; Aulia et al., 2024; Wongkitrungrueng et al., 2020). It remains unclear how perceived value and customer engagement work together as a sequence in the process linking gamified experiences to VCCI. Users who report similar levels of perceived value may still differ considerably in how strongly they engage with the platform. This suggests that perceived value alone may not fully explain how gamification is related to VCCI.

To address this issue, the dissertation draws on Service-dominant logic (SDL) and the Stimulus-Organism-Response (S-O-R) framework. SDL provides the broader view that users can actively contribute resources during value

creation, while the S-O-R framework helps explain how this process may unfold. In the proposed model, gamification represents the stimulus, whereas perceived value and customer engagement represent two internal states that occur at different stages of the user experience. VCCI is treated as the behavioral response that follows these states. Privacy Calculus Theory (PCT) is used to extend this explanation by considering the data-related conditions under which the relationship between perceived value and customer engagement may vary. In particular, perceived personalization represents the benefit that users may obtain from the use of personal data, whereas privacy concern reflects the possible risk associated with such use. Bringing these perspectives together allows the study to examine not only whether gamification is related to VCCI, but also how perceived value and customer engagement are involved in this relationship and whether the process changes under different levels of perceived personalization and privacy concern.

1.3. Research Objectives

The main objective of this study is to examine the effect of gamification on users' VCCI in the e-wallet context. The study also investigates the roles of perceived value and customer engagement in explaining how this relationship develops. In addition, it examines whether perceived personalization and privacy concern change the strength of the relationship between perceived value and customer engagement. Based on the empirical findings, the study proposes managerial implications to support e-wallet service providers in using gamification to enhance perceived value, strengthen customer engagement, and foster users' VCCI.

Specific objectives:

- To examine the direct effect of gamification on e-wallet users' VCCI.
- To examine the indirect mechanism through which gamification affects VCCI via the sequential mediating roles of perceived value and customer engagement.
- To examine the moderating roles of perceived personalization and privacy concern in the relationship between perceived value and customer engagement.
- To propose managerial implications based on the findings to help e-wallet service providers optimize gamification, thereby enhancing perceived value, strengthening customer engagement, fostering users' VCCI, improving the relevance of personalization, and addressing privacy concerns.

1.4. Research Questions

1. How does perceived gamification directly affect e-wallet users' VCCI?
2. How do perceived value and customer engagement sequentially mediate the effect of perceived gamification on e-wallet users' VCCI?
3. How do perceived personalization and privacy concern moderate the relationship between perceived value and customer engagement?
4. What managerial implications can be proposed to help e-wallet service providers use gamification to enhance perceived value, strengthen customer engagement, improve perceived personalization, address privacy concerns, and thereby foster users' VCCI?

1.5. Research Focus and Scope

Research scope in terms of geographical context: Our research is conducted in the Vietnamese e-wallet market, with five popular platforms, namely MoMo, ZaloPay, Viettel Money, ShopeePay, and VNPAY. The space was one of fast-paced change, competition, and a fair amount of gamified interactions; it is the right place to look into gamification and its connection with users' VCCI.

Research scope in terms of time: The research covers the period from 2023 to 2026.

1.6. Research Methods

The dissertation employs a primarily quantitative methodology, with a qualitative stage to adapt the measurement

scales and confirm their appropriateness for the context of Vietnamese e-wallets.

The qualitative stage was established upon a theoretical background and previously validated scales for six constructs. Seven experts participated in this study, recruited through snowball sampling. These lecturers, researchers, and industry practitioners were experts. Data collection was halted when we reached saturation. The results of these interviews were to evaluate and revise the content validity of the constructs in order to fine-tune the measurement items and to confirm the scales.

This was followed by a focus group session involving 10 e-wallet holders in Ho Chi Minh City, who were purposively selected based on certain eligibility criteria. It was to evaluate the readability of the questionnaire and the contextual and practical relevance to users' real experience with e-wallets. The quantitative study was conducted in two phases. The initial survey used convenience sampling with contact made via email, Zalo, and Facebook. Following the screening process, 245 qualified responses were retained and subjected to analysis using SPSS 26 for the purpose of examining the reliability and validity of the measurement scales prior to the conduct of the main survey.

The main survey was administered through an online questionnaire using a combination of convenience and purposive sampling. Participants were reached through training programs at selected institutions in Ho Chi Minh City, social media channels, the researcher's personal and professional networks, and online communities of e-wallet users. Following data screening, 1,247 valid responses were retained for the final analysis.

The main dataset was analyzed using SmartPLS 4.1.1.5 following the PLS-SEM procedure. The analysis included the assessment of the measurement model and structural model, as well as hypothesis testing for direct, indirect, mediating, and moderating effects. For higher-order constructs, the study applied the disjoint two-stage approach. The sample size was determined with reference to established recommendations for structural equation modeling and was maintained at a sufficiently large level to improve the stability and robustness of the empirical results.

1.7. Research Significance

1.7.1. Theoretical Significance

First, the dissertation extends research on gamification and VCCI through SDL. Rather than focusing on value co-creation behaviors that have already occurred or on specific forms of participation, the study emphasizes VCCI as a pre-behavioral state that reflects users' willingness to actively contribute their time, attention, experience, feedback, and sharing to the platform (Jun et al., 2020; García-Magro et al., 2023; Tabaeian et al., 2024; Zhang et al., 2025). The findings show that gamification has a positive effect on VCCI, thereby extending the application of SDL to the e-wallet context and to routine digital consumption interactions.

Second, the dissertation refines the application of the S-O-R framework by establishing a sequential mediating mechanism between gamification and VCCI. Gamification is the input stimulus (S) in our model, with perceived value and customer engagement as the two organism states (O) and VCCI as the output response (R). The results show that the influence of gamification is partially mediated by the sequence of perceived value, customer engagement, and VCCI. This layering also makes a functional distinction between the two organism states; perceived value embodies users' perception of the usefulness and the value of what they get, while customer engagement denotes the cognitive, emotional, and behavioral extent of users' participation in the interface.

Third, the thesis contributes to PCT by investigating perceived personalization and privacy concern as two competing boundary conditions of the relationship between perceived value and customer engagement (as opposed to perceived personalization as a single boundary condition in the previous research). Findings reveal that perceived personalization moderates the relationship, while privacy concern does not significantly moderate the relationship. This implies that the development of customer engagement might be influenced by data-related factors in a different way, not necessarily in a symmetrical way.

In general, the deployment of SDL and the S-O-R framework and PCT allows the thesis to address three interrelated questions within the same theoretical framework: how users actively participate in value co-creation, how gamified experience is converted to VCCI, as well as the data-related constraints in e-wallet.

1.7.2. Practical Significance

From a practical standpoint, the research has implications that e-wallet providers in Vietnam can utilize in designing and managing a gamified experience to motivate users' VCCI. The results indicate that gamification is applicable not only for enhancing user participation but also for motivating users to become more active contributors in value-creating activities with the platform. As such, companies should try to design game mechanisms that are associated with meaningful user behaviors (e.g., playing a role, such as providing feedback, offering suggestions, recommending services, or joining the user community), beyond just participation or the amount of rewards.

The research also elucidates the importance of perceived value and customer engagement in the process of transferring gamification effects into VCCI. This means that companies should not evaluate gamification programs purely based on operational metrics such as the number of plays, jobs completed, or rewards redeemed. In addition, they need to determine if the experience creates utilitarian and hedonic value and if it enhances users' cognitive, emotional, and behavioral engagement. This enables us to designate the quality of the gamified experience as a priority in place of simply increasing gamification activities.

Lastly, the results on the moderating effect of perceived personalization and privacy concern offer further advice on how to handle customer data. Adequate personalization can amplify the transformation of perceived value into customer engagement; however, concerns regarding personal data still need to be mitigated. Therefore, the providers of e-wallets should apply personalization in a relevant, transparent, and permissible way. Such an approach can improve the user experience while helping to sustain customer engagement and users' willingness to participate in value co-creation activities.

1.8. Structure of the Dissertation

The dissertation is organized into five chapters: Chapter 1, Research Overview; Chapter 2, Theoretical Foundations; Chapter 3, Research Design; Chapter 4, Research Findings and Discussion; and Chapter 5, Conclusions and Managerial Implications.

CHAPTER 2: THEORETICAL FOUNDATIONS AND RESEARCH MODEL

2.1. Concepts

2.1.1. E-wallet

An e-wallet or digital wallet is an application or software platform that allows users to perform online financial transactions such as payments, money transfer, etc. on Internet-enabled mobile devices (Ramli, 2021; Chawla & Joshi, 2019). Some literature refers to e-wallets as digital equivalents of physical wallets that are capable of holding payment information, identification information, and transactional information (Yaakopa et al., 2021). E-wallets are considered payment intermediary services in Vietnam, which provide identified accounts for customers to open electronic accounts for storing and managing balances. The e-wallets are commercially backed by the funds maintained in the service providers' payment guarantee account on a 1:1 basis (State Bank of Vietnam, 2024).

In this thesis, the e-wallet is the service, which is established under the digital infrastructure, offered by a regulated entity, that the user avails as a medium for depositing and withdrawing money, making payments, sending and receiving money, amongst other digital services. E-wallet practitioners, individuals who use e-wallets E-wallet users are individual consumers who have directly availed the application for their personal use. This is particularly relevant to the study because in the case of the e-wallet, the transaction tool also appears as an interactive service platform for users to experience gamification, leave feedback, and share information while users are a part of value creation processes.

2.1.2. Value Co-creation Intention

Intention.

Intention is the state of readiness to perform a particular behavior (Fishbein & Ajzen, 1975; Ajzen, 1991) and refers to a person's orientation toward a particular behavior in the form of effort expectations (Fishbein, 1967). It arises from one's aims, motivations, and degree of commitment to a future course of action (Searle, 1983; Armitage & Conner, 2001). Even though the conversion of intention to performance may still be influenced by resources, opportunities, and situational conditions, intention is still a significant predictor for explaining and forecasting consumer behaviors.

Value Co-creation.

The concept of value co-creation is fundamental to service marketing and has been largely popularised through the works of Pahalahad and Ramaswamy (2004) and Vargo and Lusch (2004) in recent times. In contrast to the classical perspective that assumes firms as the source and possessor of value, value co-creation highlights value as the outcome of interaction, collaboration, and resource integration among multiple actors.

In this view, customers are not just the end result of value, but they also can engage with firms and other stakeholders to co-create and enhance value. SDL sees services as the basis of exchange, firms as predominantly value propositions, and value as co-created through resource integration, primarily between actors in a service ecosystem (Lusch et al., 2007). This lens expands the dyadic firm–customer view of value co-creation to a networked structure involving all actors as potential resource integrators, where each actor is able to mobilize and integrate resources.

However, this dissertation does not treat every service-use activity as value co-creation. Grönroos and Voima (2013) differentiate value-in-use, which is created as the customers apply their own resources to achieve their own ends, from value co-creation, which is said to occur in an interactional space where both parties contribute together and affect the creation or modification of value. On the behavioral aspect, Yi and Gong (2013) define two types of customer behavior: customer participation behavior and customer citizen behavior, such as seeking and sharing information, feedback, helping other users, recommending, and advocating for the firm.

In terms of limitations, the study adopts Ranjan and Read (2016) to underline users' active role and engagement with the service providers, whether on their own or mediated through the platform. Accordingly, in the e-wallet context, value co-creation is understood as a process in which users actively interact, collaborate, and contribute resources together with e-wallet providers and other relevant actors to create, modify, or enhance the value of e-wallet services.

Value Co-creation Intention

VCCI is a pre-behavioral state that reflects the individual's will and conscious mental state on the future participation in an interactive, cooperative, and resource-sharing service with other actors for the joint creation or extension of value. It is a contrast to value co-creation activity as such in that it represents an individual's disposition and inclination to action, such as engaging in co-creation itself or similar behaviors, as opposed to those contributions that have already occurred (Ajzen, 1991; Zhao et al., 2019). Based on AbdelAziz et al. (2023), this dissertation defines VCCI in the e-wallet domain as the degree of users' willingness to continue to take part in value co-creation activities in the future, including actively seeking information or knowledge to enhance their participation capability and bringing friends to join. In this sense, VCCI reflects users' orientation toward actively contributing to the creation, modification, or enhancement of e-wallet service value.

2.1.3. Gamification

Applications have dealt with different worldviews of gamification, from a consideration of the level of game design elements to the consideration of gamifying as a whole. Werbach (2014) as "the process of becoming game-like. From the perspective of service, Huotari and Hamari (2017) describe gamification as a process of service improvement by means of a gameful attitude that can trigger gameful experiences and support value creation by service users. From

this standpoint, gamification is not a substitute for the service's basic purpose. Rather, it introduces elements such as rewards, tasks, progress markers, feedback, competition, or collaboration that may transform the social nature of the interaction. In e-wallets, by contrast, users continued to make payments and carry out financial transactions, but these tasks were shaped to suggest progress, accomplishment of goals, feedback, or established patterns of reward (Zhang et al., 2023). Based on Werbach (2014) and Huotari and Hamari (2017), this study defines gamification as the degree to which the activity of interacting with a non-game service over time is. Interaction with a non-game service becomes game-like in use. To be sure, the conceptualization in this article is similar to that used by Akhtar et al. (2024) for measurement in mobile payment.

2.1.4. Perceived Value

Based on Karjaluoto et al. (2019), we consider two aspects of perceived value: utilitarian value and hedonic value. Utilitarian value is characterized by practical advantages and the degree to which a service facilitates users reaching their objectives. Conversely, hedonic value relates to the excitement, curiosity, leisure time, and enjoyment associated with utilizing services.

2.1.5. Customer Engagement

From the perspective of psychology, engagement is considered an internal state or condition of connection and is developed through continuous interaction over time, rather than being manifested in observable behavior or momentary satisfaction (Ramey et al., 2019). Customer engagement occurs at three different levels: cognitive, emotional, and behavioral engagement. The cognitive dimension reflects the attention, concentration, and interest that customers direct toward a brand. The affective dimension represents feelings of fondness, closeness, and emotional attachment, and the behavioral dimension indicates customer choice, survival, and participation in the service. Therefore, customer engagement is a state in which customers devote their cognitive, emotional, and behavioral resources to their relationship with a brand or firm (Brodie et al., 2011; Behnam et al., 2021)

2.1.6. Perceived Personalization

Perceived personalization is the degree to which users feel or experience that a service has been customized according to their own needs and preferences (Henkens et al., 2021). Like a number of other previous studies (Alalwan et al., 2024), we define perceived personalization as the extent to which users consider that the products, services, and experiences offer an individualized experience tailored to their personal needs, preferences, and patterns of behavior.

2.1.2. Privacy Concern

Privacy concern is the perception or feeling of an individual with regard to the risk/fear of uncertainty and adverse consequences about future events related to his/her provided information to a certain organization or service provider (Ioannou et al., 2020). Ciftci et al. (2024) state that privacy concern suggests how much a person is worried or concerned that their personal information might be gathered, stored, managed, or utilized in a way that they do not want, or that somehow compromises their security.

2.2. Theoretical Foundations

2.2.1. Service-Dominant Logic (SDL)

In SDL, value was seen as not being embedded in products or technologies a priori but instead was co-created in use, through interaction and resource integration among actors within a service system (Vargo & Lusch, 2016). In this view, consumers are active agents who engage in value co-creation with producers by sharing their knowledge, experiences, capabilities, feedback, and other personal resources (Ranjan & Read, 2016). In this dissertation, gamification is considered as an assemblage of service resources that enables experience and interaction. Tasks, rewards, or progress mechanics can only generate value when they are noticed by users and aligned with their personal needs, goals, and environment of use (Huotari & Hamari, 2017). The perceived value represents the users' estimation of the

value that is formed from this process; customer engagement indicates the degree to which users devote cognitive, emotional, and behavioral efforts; and VCCI represents their intention to keep contributing resources to the platform.

2.2.2. Stimulus-Organism-Response (S-O-R) Model

The S-O-R model of Mehrabian and Russell (1974) brings individual response under three parts: stimulus (S), which is an environmental factor, organism (O), which is a physical and emotional state of a person, and response (R), which is a behavioral response to the environment. Environmental features may shape behavior not only directly, but also indirectly when people perceive, appraise, and process them through cognitive, affective, and/or psychological states of mind before a response is generated. Stimuli can be technological features and attributes of the interaction in digital contexts. The organism is the appraisals and psychological experiences derived from these interactions, and the response is the approach or avoidance intentions and behaviors. In this thesis, gamification is the stimulus (S), perceived value and customer engagement are two organism states (O), and VCCI is the response (R). Hence, the S-O-R model elucidates how a gamified experience could be transformed into VCCI via users' value evaluation and the subsequent formation of customer engagement.

2.2.3. Privacy Calculus Theory (PCT)

PCT argues that personal data recipients' decisions are influenced by a privacy calculus based on the trade-off between the expected benefits and the perceived privacy risks of disclosing personal information (Laufer & Wolfe, 1977). When the benefits are perceived as higher than the risks, the users are more likely to keep submitting data and using the services. On the other hand, if privacy threats are more pronounced, users may limit what information they disclose or how much they engage. Benefits in digital contexts can entail convenience, efficiency, and customized services, while risks are related to over-collecting data, misusing personal information, or losing control of personal data (Choi et al., 2015; Kezer et al., 2022). In this thesis, perceived personalization stands for the positive side, and privacy concern stands for the negative side. Thus, we use PCT to model how these two elements may moderate the perceived value-customer engagement nexus.

Hence, SDL, the S-O-R model, and PCT serve as a coherent theoretical base for the conceptual framework of this study. These three perspectives are complementary: SDL describes the nature of value creation and the active role of users; the S-O-R framework describes the process by which stimuli are transformed into internal processed and then behaviors; and the PCT explains under which data-related conditions these processes are changed.

2.3. Related Studies

2.3.1. The Effect of Gamification on Value Co-creation: An Overview

The PRISMA method was used for the selection process to guarantee full traceability and to obtain reliable results when searching and selecting for studies on gamification and value co-creation. The search of the literature was performed in Scopus on November 28, 2025. A total of 381 records were initially retrieved, and the selection was limited to peer-reviewed articles written in English within the relevant subject areas. Following title and abstract screening of full text where available, studies that reported gamification or value co-creation as marginal issues were excluded, resulting in a total of 29 articles. Four additional studies identified through ScienceDirect and Google Scholar brought the final sample to 33 articles, including 23 Q1, 6 Q2, 2 Q3, and 2 Q4 publications.

A supplementary search was conducted in the Vietnamese Science and Technology Information System using corresponding Vietnamese keywords, but no relevant studies were identified. This finding suggests that the relationship between gamification and value co-creation remains insufficiently examined, particularly in the Vietnamese context.

(1) Research themes

Gamification and VCC within organizations: This stream of research focuses on the role of gamification in promoting collaboration among stakeholders, thereby supporting innovation and improving organizational performance.

Promoting innovation within organizations: Gamification can create an interactive environment in which customers, suppliers, designers, and managers exchange ideas, provide feedback, and jointly develop solutions. Through these interactions, gamification can support value discovery, stimulate new ideas, and contribute to innovation within the service ecosystem (Colabi et al., 2022; Patricio et al., 2020; Bellosi et al., 2023). It may also encourage users to create content, participate in loyalty programs, and spread positive information, thereby expanding opportunities for value co-creation (Warnick & Bui, 2019; Lopes et al., 2024).

Organizational management and development: Gamification can strengthen collaboration, knowledge sharing, and engagement among employees, partners, and customers. These effects may facilitate resource integration, improve the effectiveness of value co-creation activities, and contribute to competitive advantage (Piligrimiene et al., 2015; Rodrigues et al., 2021; Ferenhof et al., 2024).

However, the generalizability of this stream of research remains limited because much of the existing evidence is based on qualitative studies and highly specific contexts. Issues such as cultural differences, innovation readiness, data integration, and information security have received relatively limited attention.

Gamification and VCC for social and sustainable development: This stream of research focuses on the use of gamification to encourage individuals and communities to participate in social, environmental, and sustainability-oriented goals.

Social value and sustainable behavior: Gamification can foster continued intention to participate in social value co-creation, green value co-creation, and socially responsible activities through mechanisms such as intrinsic passion, personal growth, community contribution, and emotional energy (Jun et al., 2020; Zhou et al., 2023; Lu et al., 2024b; Zhang et al., 2025). Collaborative, competitive, and interactive features can help translate individual motivation into collective action directed toward social and environmental objectives.

Urban planning and design: When combined with virtual reality or simulation technologies, gamification can strengthen community participation and support learning, knowledge sharing, evaluation of alternative solutions, and the provision of feedback in planning processes (Fox et al., 2022; Kavoures et al., 2023; Ng et al., 2024). This approach may also contribute to education, consensus building, and a stronger sense of community responsibility.

However, existing studies remain limited in terms of sample size, long-term validation, and the diversity of participants.

Gamification and VCC in customer-behavior research:

Studies on the effect of gamification on value co-creation in customer behavior represent part of a larger shift focusing on the role of customers, where customers are regarded as passive service recipients and spenders of a firm's resources to active actors in the value-creation process. Gamification not only grabs attention but can also enhance interaction, customer involvement, and value co-creation behavior in different consumption contexts.

In retail: gamification has been borrowed from entertainment and serves as a mechanism to design the experience and create emotional responses, extend engagement time, and make consumers collaborate in co-creating value. In fashion retail, gamified experiences have the potential to increase ownership, pride, emotional connection, and self-expression, resulting in a stronger bond between customers and the brand (Wang et al., 2023). In online retail, the effects of gamified e-service quality may also extend beyond enjoyment, as such experiences can influence purchase intention through relationship quality and value co-creation.

In branding and community building: Gamification can expand the customer's role from receiving brand messages to contributing knowledge, feedback, word-of-mouth, community support, and participation in brand-initiated activities. In loyalty programs, gamification can provide a way to combine commercial objectives with social and community-related benefits (Dreher & Ströbele, 2023). In financial platforms, gamification value and the seamlessness of the

experience have been found to be associated with interaction and brand value co-creation (Luan-Thanh Nguyen et al., 2025). Gamification can also help firms collect customer ideas, identify emerging needs, and maintain two-way interaction with users (Nobre & Ferreira, 2017; Merhabi et al., 2021). Notably, customer engagement has been identified as an important mediating mechanism between gamified experience and brand value co-creation (Rather et al., 2023). Nevertheless, there is still limited longitudinal evidence regarding the durability of customer engagement and its effects on brand-level outcomes such as loyalty or business performance.

Through emotional mechanisms: Recent studies suggest that gamification may promote value co-creation through psychological states such as enjoyment, intimacy, sense of belonging, and emotional connection. These responses may strengthen users' interaction, collaboration, and contribution rather than functioning merely as secondary outcomes of the experience. On the XingYe AI platform, the gamified experiences establish intimacy between users and the virtual characters, prompting users to interact in a timely manner and jointly create value (Ge & Hu, 2025). In other digital contexts, these positive feelings also facilitate conversation, information sharing, and the users' intention to engage in activities of value co-creation (García-Magro et al., 2023). In a sports context, gamification mechanisms, emotions, and service design demonstrate that psychological state is even more salient in how users perceive their experiences in the value-creation (Martín-Peña et al., 2024). Conversely, the definitions and the assessments of emotions are still varied within the literature. Furthermore, extracting emotional information to personalize services raises significant transparency, ethical, and user protection challenges.

Through user experience: Another major channel for gamification to enhance value co-creation is user experience. Gamification is not just about making an activity fun; the layers of game mechanics can alter the fundamental ways users explore, use, and contribute to a service system. In the tourism context, gamification enhances the destination experience and enables value co-creation between tourists and destinations (Mileva et al., 2021). Studies have shown that gamified activities in universities can motivate students to engage more actively in their learning process and to co-create the learning experience (Bamford & Moschini, 2025). Still, gamified experiences do not necessarily lead to positive results. States of winning/losing may affect value co-creation, while more participation may compensate for the loss of such effect (Leclercq et al., 2018). Gamification can even be used at the ecosystem level to influence the rules and norms of engagement. Well-designed mechanisms may facilitate coordination and resource integration, whereas poorly designed ones may create perceptions of unfairness and weaken customer engagement (Ciuchita et al., 2023)

All in all, consumer behavior research indicates that gamification is a tool to organize experience and interaction, which opens up space for users to move past routine service consumption to contribute feedback, help others, disseminate information, and co-construct value. However, the current evidence is still limited with regard to generalizability, assessment of actual behavior, and evaluation of long-term effects. More research is thus required to elucidate the cognitive, emotional, and engagement-related processes underlying, and to determine the conditions that promote or impede the transfer of experience into sustainable value co-creation in gamified experiences.

(2) Mechanisms linking gamification and VCC

A synthesis of the literature suggests that the effects of gamification on value co-creation are shaped by three main groups of antecedents. First, design mechanisms such as rewards, achievements, competition, collaboration, playfulness, and interaction provide the initial stimulus for participation. Second, technology and service experience, including e-service quality, navigability, emotions, perceived value, and continuity of experience, influence how users perceive and respond to these stimuli. Third, the effectiveness of gamification also depends on its alignment with broader strategic objectives, such as innovation, environmental communication, and sustainable development.

The effects of gamification are mainly transmitted through psychological, experiential, and participation-related mechanisms. Psychological states such as perceived benefits, passion, emotional energy, and engagement reflect the

process through which users internalize the gamified experience. Perceived value, green value, and expectations of personal development represent users' evaluation of the benefits associated with participation. These states are then translated into contribution-related behaviors through customer participation, co-creation participation, open innovation, and digital transformation.

The outcomes of this process can be observed at three levels. The first is intention, including purchase intention, intention to continue participating, and VCCI. The second is behavior, such as brand value co-creation, green value co-creation, and participation in service design. The third is strategic outcomes, including community continuity, sustained participation, and the long-term effectiveness of organizations.

These effects are also contingent on contextual conditions, individual characteristics, psychological states, prior participation experience, and the quality of previous experiences. Gamification should therefore be understood as a multi-level system of influence in which design and technology provide the initial stimuli, psychological and experiential mechanisms shape participation, and these processes subsequently lead to VCCI, behaviors, and broader outcomes.

(3) Theories used in prior studies

A synthesis of the 33 studies shows that the theoretical foundations are relatively diverse, but they can be grouped into four categories according to their explanatory functions: (1) theories related to behavior and motivation, including SDL; (2) approaches to gamification experience design; (3) technology-supporting models and tools; and (4) educational and social theories, such as interaction ritual chain theory. Among the 33 studies reviewed, SDL appears most frequently, highlighting its central role in explaining value co-creation.

(4) Research Methods Used

The analysis of the 33 studies indicates considerable methodological diversity, including qualitative methods (12 studies), quantitative methods (10 studies), mixed methods (3 studies), and review or synthesis studies (8 studies). Overall, research in this area still relies largely on qualitative designs and survey-based approaches, whereas experimental and mixed-method studies remain relatively limited. This pattern suggests the need for future research to make greater use of designs that allow stronger causal testing, longitudinal investigation, and the measurement of actual behavior.

2.3.2. Effects of Gamification on Perceived Value and Customer Engagement

Gamification as a mechanism for creating value in the customer experience: Existing studies view gamification not simply as the addition of points, badges, or rewards, but as a mechanism for restructuring the user experience in ways that allow functional, hedonic, emotional, and social value to emerge (Shi et al., 2022; Kaur et al., 2023; Aulia et al., 2023). However, perceived value has not been conceptualized consistently across studies, and some research still places greater emphasis on economic benefits. This suggests that the effectiveness of gamification depends on the fit between game mechanisms, users' goals, and customer needs.

Perceived value as a mechanism linking gamification to behavioral responses: Studies in e-commerce, on-demand services, and digital payments indicate that perceived value can serve as a bridge between gamification and outcomes such as attitudes, purchase intention, and continuance intention (Wong et al., 2022; Aulia et al., 2023; Pandey & Ansari, 2023). Gamification can enhance utilitarian benefits while also generating enjoyment and a sense of achievement. However, most studies have focused on relatively immediate behavioral responses and relied on cross-sectional data, leaving the longer-term development of customer relationships less clearly understood.

Customer engagement as a relational state and mediating mechanism: Gamification can also function as a relationship-building mechanism that encourages customers to invest cognitive, emotional, and behavioral resources in their interactions with a platform or brand. Customer engagement may therefore be both an outcome of gamification and a mediating mechanism leading to loyalty, word-of-mouth, retention, and value co-creation (Bitrián et al., 2021; Qian et

al., 2022; Rather et al., 2023; Zhang et al., 2023). Nevertheless, customer engagement needs to be clearly distinguished from closely related relational constructs, and its multidimensional nature should be adequately assessed.

The sustainability of gamification effects: The long-term effectiveness of gamification depends not only on rewards but also on whether motivation becomes internalized and whether the experience creates a sense of meaning, competence, autonomy, and social connection (Jun et al., 2020; Cao et al., 2022; Hsu, 2022). Rewards possibly elicit fast-paced interaction, but their impact due to outer motivation may fade. In general, empirical evidence showed that gamification can improve perceived value and user involvement, but not all results are consistent (i.e., Qian et al., 2022; Dzandu et al., 2022; Aulia et al., 2024). Thus, gamification effects across different domains, user categories, and technological and cultural backgrounds need to be further investigated.

2.3.3. Studies on the Effect of Perceived Value on Customer Engagement

Perceived value as an antecedent of customer engagement: The literature so far mostly indicates that service buyers are more prepared to devote their mind, emotions, and actions to engagement when they sense that service is more meaningful to them (Qian et al., 2022; Karjaluoto et al., 2019; Bapat & Hollebeek, 2023). The perceived value is likely to contribute to the functional, economic, social, emotional, and hedonic aspects of the consumer benefits. However, the degree to which each value component impacts in different contexts and the conceptualization of perceived value is not always consistent across different research studies.

The mechanism linking perceived value to customer engagement: The relationship may also be less direct than a simple value-to-engagement path suggests. Some studies indicate that favorable value perceptions first contribute to relational or psychological responses such as satisfaction, trust, commitment, perceived fairness, or relationship quality (Itani et al., 2019; Karjaluoto et al., 2019; Bapat & Khandelwal, 2023; Japutra et al., 2023). These responses may then encourage customers to invest more strongly in their relationship with the brand or platform. Perceived value can therefore be seen as an evaluation of what customers gain from the service, while customer engagement represents a deeper form of cognitive, emotional, and behavioral involvement that may develop from that evaluation.

In digital interactive environments: On digital platforms, value is created not only through the core service function but also through interface design, content, communities, and interaction mechanisms (Qian et al., 2022; Wongkitrungrueng & Assarut, 2020; Lu et al., 2022). Customer engagement may therefore be directed toward the platform, brand, seller, or community, and its target as well as its cognitive, emotional, and behavioral dimensions should be clearly specified. Although most studies report a positive relationship between perceived value and customer engagement, some inconsistent findings indicate that this relationship may vary depending on service characteristics, usage purposes, and the interaction context.

2.3.4. Studies on the Effects of Perceived Value and Customer Engagement on Value Co-creation

Perceived value as an antecedent of value co-creation: Existing studies suggest that customers are more willing to invest their time, knowledge, and experience in value co-creation when they perceive that participation provides meaningful benefits. Perceived value is therefore not merely an outcome of consumption but may also serve as a motivation for customers to continue contributing their resources. Evidence from mobile banking, brand communities, sharing services, and online review settings indicates that service attributes are more likely to encourage value co-creation when users perceive them as generating benefits that are valuable either to themselves or to the wider community (Mostafa, 2020; Zhao et al., 2019; Chen & Lee, 2023; Liu & Meng, 2024).

Customer engagement as a mechanism for promoting value co-creation: Customer engagement reflects the extent to which customers invest cognitive, emotional, and behavioral resources in their relationship with a platform. Highly engaged customers are more likely to share experiences, support other community members, provide feedback, and participate in service improvement. Through these activities, they may move beyond the role of service users and

become active contributors to value creation (Behnam et al., 2021; Ferm & Thaichon, 2021; Yen et al., 2020; Wang et al., 2024).

In digital interactive environments: Digital platforms provide an environment in which perceived value and customer engagement can develop continuously through content, technology, community participation, and social interaction (Jun et al., 2020; El Afi & Ouiddad, 2021; Wang et al., 2024; Zhang et al., 2025). However, adding gamification or interactive features does not automatically lead to value co-creation. Users may participate primarily to obtain rewards while remaining unwilling to contribute knowledge, ideas, or other resources.

The role of contextual conditions: The influence of perceived value and customer engagement can be moderated by trust, self-efficacy, social norms, community features, and organizational support (Nadeem et al., 2021; Abror et al., 2023; Amin et al., 2024). In general, perceived value and customer engagement are key predictors of value co-creation, but the magnitude of their impacts may be different in service types, platforms, user motivations, and technology environments. In fact, some aspects of customer engagement could be too weak to lead to VCCI. Prior research shows that personalization leads to improved experiential value, satisfaction, customer engagement, and continuance intention by providing content, recommendations, or services that better fit individual preferences (Gao et al., 2023; Zhu et al., 2021; Alalwan et al., 2024).

2.3.5. Studies on the Moderating Effects of Perceived Personalization and Privacy Concern

The role of perceived personalization: Perceived personalization has also been studied as a potential moderating factor that may influence the relationships between perceived usefulness, perceived value, or technology experience and outcomes such as satisfaction, customer engagement, and use intention in several digital environments (Henkens et al., 2021; Balan & Mathew, 2022; Albashrawi & Motiwalla, 2019).

The role of privacy concern: Existing research suggests that privacy concern serves as a lens through which users evaluate the perceived benefits and risks, influencing satisfaction, consumer engagement, privacy management, and continuance intention (Li et al., 2019; Liu et al., 2021; Lim et al., 2022). Hence, privacy concerns should not be considered as merely a negative response, at least for its effects, but also a potential moderator for the impact of perceived value and user experience.

The inconsistency of moderating effects: Findings on the moderating roles of perceived personalization and privacy concern are not uniform. In some studies, personalization strengthens positive relationships between service perceptions and user outcomes, while in others the interaction effect is weak or statistically insignificant. Similarly, privacy concern may weaken favorable user responses, yet its influence can become limited when perceived benefits or trust in the platform are sufficiently strong (Henkens et al., 2021; Abdalla, 2024; Albashrawi & Motiwalla, 2019; Li et al., 2019). These mixed findings suggest that such moderating effects may depend on service type, technological context, data sensitivity, and user characteristics.

2.4. Research Gaps

2.4.1. The role of gamification in customers' value co-creation intention

Previous studies suggest that gamification can promote interaction, support continued use, and facilitate value co-creation across a range of digital contexts (Wong et al., 2022; Zhang et al., 2023; Tabaeian et al., 2024). However, the evidence remains inconclusive as to whether a gamified experience necessarily leads users to become more willing to participate actively in value co-creation (Leclercq et al., 2018; Lopes et al., 2023). Most prior studies have focused on value co-creation behaviors that have already occurred or on specific forms of intention, such as social and green value co-creation intentions (Jun et al., 2020; Zhang et al., 2025). By comparison, VCCI as a broader pre-behavioral state, has received relatively limited empirical attention. The first research gap, therefore, concerns the lack of direct quantitative evidence on the effect of gamification on customers' VCCI in digital service settings, particularly in the e-wallet context.

2.4.2. The sequential mediating mechanism linking gamification to value co-creation intention

Prior research indicates that gamification may influence perceived value, customer engagement, and value co-creation, yet most studies have examined these relationships separately or tested independent mediating mechanisms (García-Magro et al., 2023; Rather et al., 2023; Tabaeian et al., 2024). At the same time, findings regarding the effects of gamification on perceived value, customer engagement, and value co-creation remain somewhat inconsistent (Qian et al., 2022; AbdelAziz et al., 2023; Aulia et al., 2024). The second research gap therefore lies in the limited empirical evidence on the sequential mediating roles of perceived value and customer engagement in the relationship between gamification and VCCI. The dissertation tests this sequence to clarify how a gamified experience may first shape users' value evaluations, then strengthen customer engagement, and ultimately increase their willingness to participate in value co-creation.

2.4.3. The moderating roles of perceived personalization and privacy concern in the effect of perceived value on customer engagement

In digital services, the relationship between perceived value and customer engagement may vary depending on how users evaluate the benefits and risks associated with data use. Perceived personalization may increase the relevance of a service to individual users and thereby strengthen the relationship between perceived value and customer engagement. In contrast, privacy concern may weaken this relationship when users perceive that their personal data are being collected or used without sufficient transparency (Henkens et al., 2021; Alalwan et al., 2024). However, previous studies have largely examined these two factors separately, and the empirical findings remain mixed. The third research gap is therefore the lack of empirical evidence that simultaneously tests the moderating roles of perceived personalization and privacy concern in the relationship between perceived value and customer engagement.

2.5. Research Hypotheses and Proposed Model

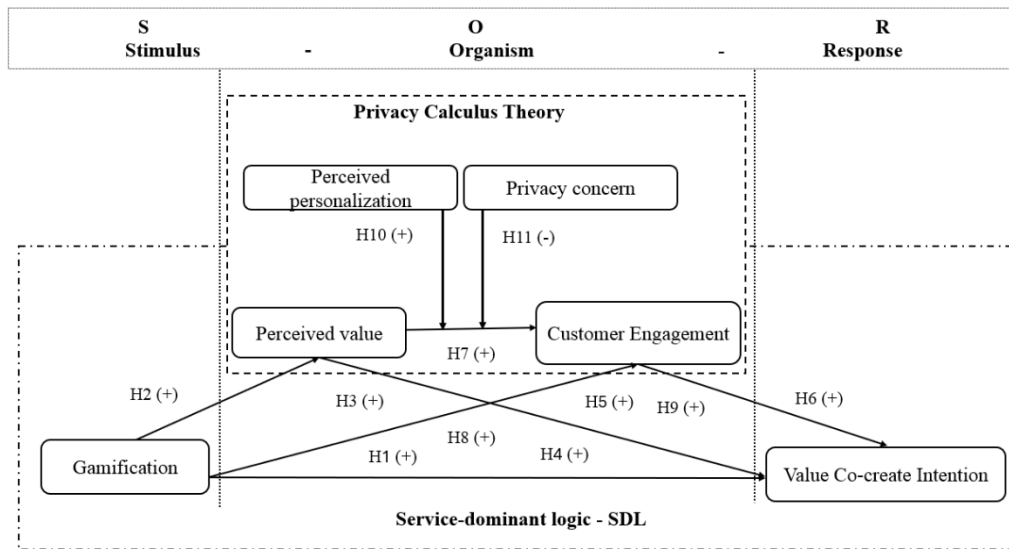


Figure 2.1. Proposed Research Model

H1: Gamification has a positive effect on customers' VCC intention.

H3: Perceived value has a positive effect on customers' VCC intention.

H4: Customer perceived value mediates the effect of gamification on customers' VCC intention.

H5: Gamification has a positive effect on customer engagement.

H6: Customer engagement has a positive effect on VCC intention.

H7: Perceived value has a positive effect on customer engagement.

H8: Customer engagement mediates the effect of gamification on VCC intention.

H9: Gamification affects VCC intention through the sequential mediation of perceived value and customer engagement.

H10: Perceived personalization positively moderates the effect of perceived value on customer engagement.

H11: Privacy concern negatively moderates the effect of perceived value on customer engagement.

CHAPTER 3 RESEARCH DESIGN

3.1. Research Process

The study was conducted following the scale development and validation procedure proposed by Churchill (1979) for marketing research. Based on this approach, the study was carried out in four main stages: (1) reviewing the theoretical background and developing the research model; (2) conducting qualitative research to design and refine the measurement scales; (3) conducting a preliminary quantitative study to provide an initial assessment of the scales; and (4) conducting the main quantitative study to test the research model and hypotheses (Figure 3-1).

3.2. Qualitative Study

Expert In-Depth Interviews

Purpose: Deep interviewing is a qualitative methodology that relies on open-ended questions to investigate participants' views, experiences, and sense-making of the subject matter (Silverman, 2021). In this thesis, expert in-depth interviews were conducted to: (1) understand the conceptual meaning and the contextual application, (2) to scrutinize and enhance the suggested connections of the research model; and (3) to modify the content, wording, and semantic clarity of the adopted measurement scales to cater to e-wallet users in Vietnam.

Procedure: For the purpose of this research, experts were selected from the academic and industry fields who had extensive knowledge about, and/or experience with, the Vietnamese e-wallet environment. Participants were approached using snowball sampling, and the data collection was based on the principle of information saturation. Following the seventh interview, which consisted of three academic experts and four industry practitioners, there was no more substantive knowledge to be gained from additional interviews; therefore, the process of data gathering was halted (Guest et al., 2020). The interviews were semi-structured and explored the significance of constructs, the proposed relationships in the research model, and the measurement instruments. The interview data were analyzed thematically, coded and interpreted in relation to the theoretical framework underpinning the study. Moreover, the Lawshe's (1975) Content Validity Ratio (CVR) was applied to evaluate the necessity for each measurement item and to assist in the finalization of the scales.

Results of the in-depth expert interviews

Regarding the research constructs and measurement structure: The expert feedback largely supported the way the six constructs had been defined in the study. Their comments were broadly consistent with the theoretical literature, but they also helped identify several features that were more specific to e-wallet use in Vietnam. None of the six constructs was considered unnecessary or conceptually inappropriate. The proposed measurement structures were therefore kept, with the final decision based not only on expert judgment but also on their consistency with the theoretical definitions and evidence reported in earlier studies.

Regarding the relationships in the proposed model: In the end, the seven experts rated the suggested relations as theoretically sound and in line with the dynamics of interaction among the users of e-wallets. For example, regarding the influence of privacy concern as a moderator, three experts expressed that its effect might be influenced by users' perceptions of risk related to data and the importance users attached to functional benefits and service convenience. So these dealings should be subjected to statistical examination so as to identify more definitely/explicitly the strength and the orientation of the moderator effect relative to the context of the present study. Based on the integration of expert

opinions and their corroboration with the theoretical ground and previous research, the model and the hypotheses were kept without any alterations.

Regarding the development of measurement scales for the research constructs: To some extent, the adopted measurement scales were considered by the experts to be compatible with the conceptual content of the constructs. Nevertheless, they suggested a few modifications to the wording and context that would enhance clarity, minimize potential misunderstandings, and more accurately capture the experiences of using an e-wallet in Vietnam. For the sake of brevity, the measurement items were already concisely worded, and "e-wallet X" was used throughout to indicate the entity under evaluation unambiguously to the respondents. Most of the changes were related to wording or contextualization and do not affect the meaning of the original scales. The experts also suggested changing the order of several items. More concrete and easily recognizable statements were placed earlier, while broader or more abstract statements appeared later, making the questionnaire easier to follow.

Focus group discussion

Purpose: The purpose of the focus group session was to study the ways users understood the research constructs and measurement items when applied to e-wallet use. The convergence between the implied message of the scales and the perceived interpretation of the items by users were investigated thoroughly. This allowed us to identify words that were ambiguous, phrasings that were too complex, expressions that sounded too unnatural, as well as items that could be understood in more than one way. The results of the discussion were used to further improve the scales and finalize the questionnaire for the quantitative study.

Procedure: Ten e-wallet users were purposively selected for the discussion. A focus group discussion with 10 purposively selected e-wallet users. This took place at the University of Finance – Marketing in June 2025 and took about 90 minutes. The participants were told the aim of the study, that participation was voluntary, that their responses would be kept confidential, and that they could withdraw from the study at any time. Responding to a battery of open-ended questions, the discourse centered on the clarity, naturalness, simplicity, and relevance of the items to participants' ownership and usage of e-wallets. The feedback was condensed, content analyzed, and contrasted against the theoretical foundation of each construct. Amendments were made where appropriate without deviating from the core concept of the scales.

Results of the focus group discussion: Most measurement items were understood as intended, although several required minor revision. Five items: UV3, HV2, AE1, BE3, and PP4 were modified after the discussion. The changes mainly involved shortening or simplifying sentence structures, making the object of evaluation more explicit, and replacing wording that participants considered less natural in the context of e-wallet use. No new construct was introduced, and the revisions did not change the theoretical meaning of the original scales.

3.3. Preliminary Quantitative Study

Purpose: The preliminary quantitative study was conducted to provide an initial assessment of the reliability and validity of the measurement scales. The results were used as a basis for revising, removing, or supplementing measurement items that did not meet the required criteria. This stage also provided an empirical basis for refining the questionnaire and data collection procedures before the main quantitative study.

Preliminary questionnaire design: In addition to an introduction explaining the purpose of the survey, instructions for completing the questionnaire, and assurances regarding anonymity and confidentiality, the questionnaire consisted of four sections: the screening section, descriptive section, main measurement section, and demographic information section.

Sampling method and sample size: After the questionnaire had been finalized, it was sent to two experts for further review. A pilot test was also conducted with 10 consumers to examine the content, structure, and length of the

questionnaire before the preliminary survey. Data for the preliminary survey were collected using convenience sampling in July 2025. Eligible respondents were required to be at least 18 years old, able to make independent decisions regarding their use of the service, and to have experienced gamified interactions on an e-wallet within the six months preceding the survey. Individuals working in the e-wallet industry or involved in communication, promotional, or review activities related to e-wallet brands for income-generating purposes were excluded. To reduce potential response bias, participants were also required not to have taken part in a similar discussion or study within the previous six months.

According to the inverse square root method proposed by Kock and Hadaya (2018) for PLS-SEM, the minimum sample size was determined based on the smallest path coefficient that the study aimed to detect and was estimated at approximately 160 observations. To ensure that this minimum requirement was met, 265 responses were collected. After data screening, 245 valid responses were retained for the preliminary analysis, while 20 responses were excluded because the respondents gave identical ratings across the questionnaire items.

Data Analysis

Scale reliability: Reliability was assessed using Cronbach's Alpha together with the Corrected Item-Total Correlation. According to Hair et al. (2021), a scale is generally considered acceptable when Cronbach's Alpha is 0.70 or higher, although values from 0.60 may be acceptable in exploratory research. Measurement items with corrected item-total correlations above 0.30 were retained, while items that did not meet this criterion were considered for removal before further analysis.

Exploratory Factor Analysis (EFA): EFA was employed to explore the underlying structure among the measurement items and to provide a preliminary assessment of the scale structure. Data suitability was assessed using a Kaiser-Meyer-Olkin (KMO) value of at least 0.50 (Netemeyer et al., 2003) and a statistically significant Bartlett's test at $p < 0.05$ (Hair et al., 2017). The study used Principal Axis Factoring (PAF) as the extraction method together with Promax oblique rotation. Factors were retained when their eigenvalues exceeded 1, the total variance explained reached at least 50%, and item factor loadings were 0.50 or higher. Items that failed to meet these criteria were considered for removal before subsequent analyses.

Results of the preliminary quantitative study: The measurement scales demonstrated good reliability, with Cronbach's Alpha values ranging from 0.840 to 0.918, while all corrected item-total correlations exceeded the required threshold. The EFA results also supported the appropriateness of the measurement structure. The observed items loaded on their intended factors, no substantial cross-loadings were identified, and all items were retained for the main study.

.3.4. Main Quantitative Study

Purpose: The main quantitative study was conducted to assess and confirm the reliability and validity of the measurement scales for the research constructs. This stage also aimed to test the proposed research model and hypotheses in a systematic manner.

Data collection method: The target respondents were e-wallet users aged 18 years or older who were able to make independent decisions regarding their use of the service and had experienced gamified interactions while using an e-wallet within the six months preceding the survey. This criterion was intended to ensure that respondents had sufficient recent experience to evaluate the gamification-related constructs in the subsequent measurement sections. Respondents were excluded if they worked in the e-wallet industry or were involved in communication, promotional, or e-wallet review activities for income-generating purposes. To reduce potential bias, participants were also required not to have taken part in a similar discussion or study within the previous six months. The questionnaire was administered through Google Forms, with required-response settings applied to avoid missing data. Screening questions were also included to exclude respondents who did not meet the study criteria. Data were collected using a structured questionnaire survey.

(1) Respondents were directly contacted via undergraduate, postgraduate, short-term, and part-time study courses at multiple universities located in the city of Ho Chi Minh, Vietnam, particularly the University of Finance – Marketing, Ho Chi Minh City University of Technology (HUTECH), and the University of Economics Ho Chi Minh City.

(2) The survey link was shared on social networks such as Facebook and Zalo among people known to the researcher both personally and professionally.

(3) The questionnaire was also made available in virtual brand community networks for e-wallet users, in order to target a wider range of respondents who had experience playing with gamified e-wallet applications.

In addition to recruitment of participants by convenience-based approaches, the study consulted market share information for leading e-wallet providers in Vietnam, reported by Decision Lab, to mitigate potential sample skew. From August to October 2025, the main survey data were collected. Following screening and cleaning, a final sample of 1,247 responses was deemed valid for analysis. Of these, 41.13% were from channel (1) and 38.57% and 20.30% were from channel (2), and (3) respectively. Channel (3) was employed as a specific complementary channel. In the actual process, the distribution of responses was observed and checked with the desired sample structure for each e-wallet brand, and more respondents were solicited if needed. This strategy facilitated the mitigation of the imbalance between types of users, the enhancement of the coverage of the survey, and the improvement of the representativeness of the final sample. The final sample of $N = 1,247$ was substantially larger than the minimum required sample size calculated based on the inverse square root method of Kock and Hadaya (2018) and Soper's (2018) sample size calculator.

CHAPTER 4 RESEARCH FINDINGS

4.1. Characteristics of the Study Sample

4.1.1. Descriptive Statistics

The majority of users were young in age, as 74.98% of the respondents fall within the age group of 18–35. The office workers (including students) composed 62.71%, and females were 53.09% of the sample. The majority of respondents had attained a level of education beyond high school (88.13%), and 86.21% indicated a monthly income of less than VND 25 million. In terms of gamification experience, the most reported interaction was mini-games (30.89%), followed by doing tasks and getting rewards (26.88%), and accumulating activities to achieve milestones or levels of progress (19.36%). The respondents' top two reasons for joining were rewards or monetary incentives (29.18%) and fun or entertainment (24.03%). Sixty percent of the respondents played gamified elements with the frequency ranging from once a month to one to two times per day. With regard to e-wallet, MoMo was the most popular platform with 36.25% respondents, followed by ZaloPay (27.51%), Viettel Money (14.43%), ShopeePay (13.39%), and VNPAY (8.42%). This spread suggests that the sample includes users from at least a wide variety of e-wallet platforms.

4.1.2. Distributional Characteristics of the Data

Most of the measurement items showed skewness and kurtosis values between -2 and +2. The distributions were therefore considered reasonably well behaved, with no indication of severe departures from normality.

4.1.3. Assessment of Common Method Bias

Before proceeding with the PLS-SEM analysis, the possibility of common method bias was examined using more than one diagnostic. For Harman's single-factor test, the data first showed adequate suitability for factor analysis, with a KMO value of 0.953 and a statistically significant Bartlett's test ($p < 0.001$). The first unrotated factor explained 33.91% of the total variance, remaining well below the 50% reference level. A further check using full collinearity VIF produced values below 3.3 for all constructs. These results suggest that common method bias is unlikely to be a serious concern. The data were therefore considered appropriate for further assessment of the measurement and structural models using PLS-SEM.

4.2. Measurement Model Assessment

The results indicate that all measurement items demonstrated satisfactory measurement quality. The outer loadings of the AE, BE, CE, GM, HV, PC, PP, UV, and VI scales were all above 0.708. Cronbach's Alpha and composite reliability values exceeded 0.70, while the AVE values of all constructs were above 0.50, supporting internal consistency reliability and convergent validity. All HTMT values were below 0.85, indicating adequate discriminant validity. Accordingly, all measurement items were retained for subsequent analyses.

In terms of customer engagement as a reflective higher-order construct, affective, behavioral, and cognitive engagement loadings were AE = 0.863, BE = 0.830, and CE = 0.811, respectively. Cronbach's $\alpha = 0.783$ and the composite reliability (CR) = 0.873, and AVE = 0.697 were within acceptable levels, hence discriminant validity was established. Consequently, customer engagement was confirmed to be a valid reflective higher-order construct.

For the formative higher-order construct of perceived value, hedonic value and utilitarian value were both significant with outer weights of 0.637 and 0.479, respectively. Both constructs had a VIF of 1.553, indicating that multicollinearity was not a concern. The redundancy test also satisfied the criterion, with $R^2 = 0.702$, which supported convergent validity and explanatory power. For this reason, perceived value passed the evaluation for a formative higher-order construct.

4.3. Structural Model Assessment

Assessment of VIF, R^2 , f^2 , and Q^2

The bootstrapping results based on 10,000 resamples show that all direct effects were statistically significant. Gamification had positive effects on perceived value ($\beta = 0.616$), customer engagement ($\beta = 0.202$), and VCCI ($\beta = 0.349$). Perceived value positively affected customer engagement ($\beta = 0.517$) and VCCI ($\beta = 0.299$), while customer engagement also had a positive effect on VCCI ($\beta = 0.245$). All of these relationships were significant at $p < 0.001$.

The indirect effects through perceived value ($\beta = 0.184$), customer engagement ($\beta = 0.050$), and the sequential pathway from gamification to perceived value, customer engagement, and VCCI ($\beta = 0.078$) were also statistically significant. Because the direct effects remained significant and operated in the same direction as the indirect effects, the mediating relationships can be characterized as complementary mediation.

With respect to moderation, perceived personalization strengthened the effect of perceived value on customer engagement ($\beta = 0.173$; $p < 0.001$). In contrast, privacy concern did not show a statistically significant moderating effect ($\beta = -0.054$; $p = 0.058$).

Assessment of direct and indirect effects

Bootstrapping with 10,000 samples showed that all direct effects were statistically significant. Gamification positively affected perceived value ($\beta = 0.616$), customer engagement ($\beta = 0.202$), and VCCI ($\beta = 0.349$). Perceived value affected engagement ($\beta = 0.517$) and VCC intention ($\beta = 0.299$), while engagement positively affected VCC intention ($\beta = 0.245$); all effects had $p < 0.001$.

The indirect effects through perceived value ($\beta = 0.184$), engagement ($\beta = 0.050$), and the sequential path gamification, perceived value, engagement, VCC intention ($\beta = 0.078$) were all statistically significant. Because the direct effect remained significant and had the same sign as the indirect effects, the mediators exhibited complementary mediation.

Regarding moderation, perceived personalization strengthened the effect of perceived value on engagement ($\beta = 0.173$; $p < 0.001$). In contrast, privacy concern did not have a statistically significant moderating effect ($\beta = -0.054$; $p = 0.058$).

Importance-Performance Map Analysis (IPMA): The IPMA, with VI as the target construct, shows that gamification has the highest importance but a relatively lower performance level (0.661; 72.041), followed by perceived

value (0.425; 76.158) and customer engagement (0.245; 76.499). Gamification should therefore receive the greatest managerial priority for improvement. At the component level, hedonic value and affective engagement appear to offer greater room for further improvement.

Assessment of Unobserved Heterogeneity: The FIMIX-PLS results did not clearly point to the best number of segments, as the model selection criteria were partly contradictory. The two-segment solution was more stable, while the three-segment solution was weakly divided, and the four- and five-segment solutions were less stable, and they generated quite small clusters. Therefore, there is a lack of support for a practically relevant latent segmentation structure. The dissertation, therefore, focuses on the full-sample model for hypothesis testing and interpretation.

Measurement Invariance and Multi-Group Analysis: The required degree of measurement invariance for the assessment of the structural relationships across the groups was supported by the MICOM. The MGA based on gamification experience frequency revealed that only the gamification–perceived value relationship was significantly different across groups. This association was stronger in high-experience-frequency users ($\beta = 0.618$) than in low-experience-frequency users ($\beta = 0.497$; $p = 0.021$). No significant differences were found for the remaining relationships. Likewise, the income-based MGA showed no statistically significant differences between the two income groups ($p > 0.05$).

4.4. Discussion of the Research Findings

4.4.1. Direct Effect of Gamification on Value Co-creation Intention

Gamification has a positive effect on VCCI. This finding is consistent with previous studies suggesting that gamification can foster value co-creation through psychological motivation, positive emotions, and higher-quality interaction (Jun et al., 2020; García-Magro et al., 2023; Tabaeian et al., 2024). Gamification does more than provide rewards; it can also make users' contributions more goal-oriented, visible, and recognized, thereby increasing their willingness to participate in value creation with the platform (Rather et al., 2022; Zhang et al., 2025). In the Vietnamese e-wallet context, mechanisms such as point accumulation, cashback, payment-based tasks, and reward unlocking may create a sense of achievement and recognition. This helps explain the direct positive effect of gamification on users' VCCI.

4.4.2. Mediating Roles of Perceived Value and Customer Engagement in the Effect of Gamification on Value Co-creation Intention

Gamification and perceived value. Higher levels of gamification are associated with more favorable perceived value, both in utilitarian and hedonic terms. Features such as progress, feedback, challenges, and recognition may make the experience not only more enjoyable but also more useful. This finding is consistent with Qian et al. (2022), Nguyen et al. (2024), and Kaur et al. (2023), suggesting that gamification contributes not only to entertainment but also to users' evaluation of the benefits provided by the service.

Perceived value and customer engagement. Perceived value has a positive effect on customer engagement, indicating that when users perceive an e-wallet as both useful and capable of providing a positive experience, they are more likely to invest cognitive, emotional, and behavioral resources in the platform. This result is consistent with Itani et al. (2019), Qian et al. (2022), and Karjaluoto et al. (2019). However, in contrast to Wongkitrungrueng et al. (2020), the strength of this relationship may vary depending on the characteristics of the service and the type of value that is most salient to users.

Gamification and customer engagement. The results also show a positive effect of gamification on customer engagement. When interactions with an e-wallet are perceived as more game-like, users tend to pay greater attention, respond more positively, and participate more actively during service use. This finding is in line with Bitrián et al.

(2021), Zhang et al. (2023), and Rather et al. (2023). In the e-wallet context, the result suggests that gamification can help move the user experience beyond purely transactional activities toward a more engaging form of interaction.

Customer engagement and VCCI. Customer engagement has a positive effect on VCCI, indicating that users who invest more cognitive, emotional, and behavioral resources in the platform are more willing to participate in value-creating activities with the firm. This finding is consistent with Behnam et al. (2021), Ferm and Thaichon (2021), Rather et al. (2023), and Yen et al. (2020). However, the result reflects the effect of overall customer engagement on VCCI and should not be interpreted as evidence of actual value co-creation behavior.

Perceived value and VCC intention: Perceived value and VCCI. Perceived value has a positive effect on VCCI. When users perceive that an e-wallet provides both utilitarian and hedonic benefits, they are more likely to be willing to invest additional resources in value-creating activities with the platform. This finding is consistent with Abror et al. (2023a), Liu and Meng (2024), and Zhang et al. (2025). However, the relative contribution of each value dimension may vary depending on the characteristics of the service and the specific form of value co-creation being examined.

The mediating role of perceived value. Perceived value carries part of the relationship between gamification and VCCIA higher degree of gamification positively correlates with perception of value, which consequently positively correlates with intention to participate in value co-creation. This finding is consistent with Jun et al. (2020) and Zhang et al. (2025), and implies that the effect between gamification and VCCI could be accounted for partially by how users perceive the gains they obtained from the experience. This finding offers statistical support for mediation and should not be interpreted as a causal path.

The mediating role of customer engagement. Gamification has also been found to have a positive impact on customer engagement, which mediates its relationship with VCCI. When the e-wallet experience is considered more as a game, users have a tendency to be more engaged, and higher engagement in turn leads to greater intention to engage in value co-creation. This outcome is in line with the findings of Rather et al. (2023) and predicts that gamification may relate to VCCI through the cognitive, emotional, and behavioral effort exerted by users on the platform.

The sequential mediating roles of perceived value and customer engagement. The results support a sequential mediation effect connecting gamification, perceived value, customer engagement, and VCCI. Among value evaluations, those of higher levels of gamification are more positive; the higher perceived value is linked to more active customer engagement and higher VCCI. This result enhances the previous research that has mainly focused on these mediating mechanisms in an isolated manner. In addition, it is consistent with the S-O-R framework, as perceived value and customer engagement can be conceptualized as two organism states, which have different functions but operate in a theoretically sequential manner.

4.4.3. Moderating Effects on the Relationship Between Perceived Value and Customer Engagement

Perceived personalization has a positive moderating effect. The results show that perceived personalization strengthens the relationship between perceived value and customer engagement. When users perceive that the service is more closely aligned with their individual needs and usage context, the value they receive becomes more salient and meaningful, which is associated with a higher level of engagement. This result is in line with Balan and Mathew (2022), but contrasts with the literature that did not find a significant moderating impact. This indicates that the significance of personalization may lie in the research context and the particular relationship investigated.

Privacy concern does not have a significant moderating effect. There is no significant moderating effect of privacy concern. At the 5% level of significance, there is no empirical evidence to support the predicted adverse moderating effect of privacy concern. According to the Johnson-Neyman procedure, the effect of perceived value on customer engagement remains positive and statistically significant for the full range of privacy concern observed as a tendency of the strength of the association to decrease when privacy concern increases. This finding is partially

consistent with the findings of Li et al. (2019), indicating that the privacy concern scenario does not always attenuate positive reactions of users.

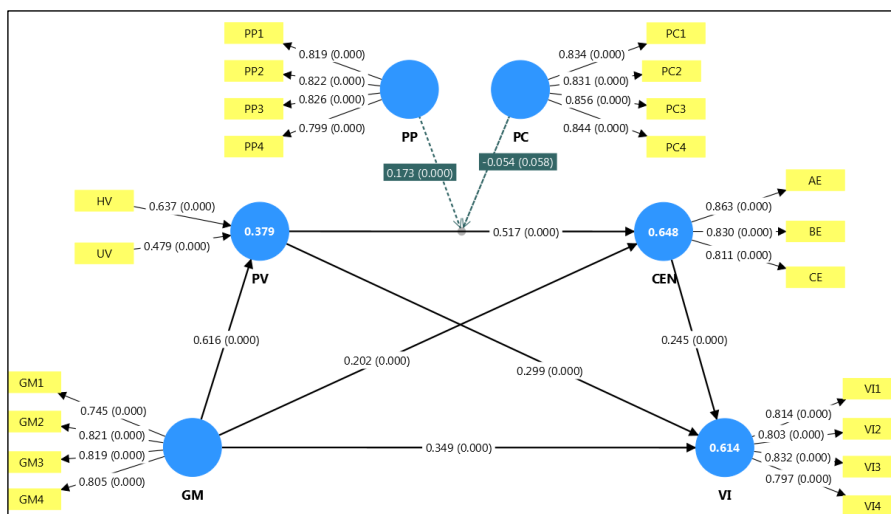


Figure 4.1. Structural Model with Higher-Order Constructs

CHAPTER 5 CONCLUSIONS AND MANAGERIAL IMPLICATIONS

5.1. Conclusion

As evidenced by composite reliabilities, convergent validity, and discriminant validity, all the scales were reliable. Perceived value was a second-order formative construct consisting of utilitarian value and hedonic value, and customer engagement was a second-order reflective construct with cognitive, affective, and behavioral engagement. The results are informative in that they illustrate the formation process of VCCI among e-wallet users and reveal the significant mediating effects of gamification, perceived value, customer engagement, and perceived personalization in digital service.

This research tested the influence of gamification on VCCI via perceived value and customer engagement, with due consideration given to the moderating effects of perceived personalization and privacy concern. Data collected from 1,247 respondents were analyzed using PLS-SEM, with the disjoint two-stage approach applied to the higher-order constructs.

The results show that 10 hypotheses were supported, whereas the hypothesis concerning the moderating role of privacy concern was not supported. Gamification was found to have both direct and indirect effects on VCCI through the sequential pathway of perceived value and customer engagement. Perceived personalization strengthened the relationship between perceived value and customer engagement. The model explained 37.9% of the variance in perceived value, 64.8% of the variance in customer engagement, and 61.4% of the variance in VCCI.

The out-of-sample predictive assessment indicates that the model has predictive capability for the outcome constructs. Tests of unobserved heterogeneity and multi-group analysis further helped assess the stability of the structural relationships across user groups with different experience characteristics. In addition, the Importance–Performance Map Analysis (IPMA) identified the relative priorities of gamification, perceived value, and customer engagement in relation to VCCI, providing further support for the development of managerial implications.

5.2. Theoretical Contributions

5.2.1. Advancing Understanding of the Effect of Gamification on Value Co-creation Intention from an SDL Perspective

The dissertation extends gamification research to VCCI, thereby clarifying users' willingness to take an active role in creating value with the platform. Previous studies have mainly focused on participation, realized value co-creation behavior, or specific forms of co-creation intention, while the direct effect of gamification on VCCI in commercial service relationships has received relatively limited attention (Jun et al., 2020; García-Magro et al., 2023; Tabaeian et al., 2024; Zhang et al., 2025). From the view of SDL, users are resource integrators in the process of value co-creation, having multiple resources such as time, attention, experiences, feedback, and sharing. The results reveal that gamification is positively related to VCCI, advancing the notion that the game-like characteristic of a service experience is not merely related to current use or interaction, but also to an antecedent behavioral condition indicative of a user's intention to engage in a service in the future. The research also contributes to the extension of the SDL for the e-wallet situation, which can generate value co-creation from ongoing digital consumption transactions, both dyadic and multi-party. Co-creation value can arise from ordinary online transaction activities rather than being confined to niche communities or formal co-creation exercises.

5.2.2. Extending Understanding of the Mediating Mechanism

The dissertation advances the original S-O-R model with two O states: perceived value, which is an evaluative state, and customer engagement, which is a relational state. In this model, gamification is the stimulus (S), perceived value and customer engagement are two ordered theoretical organism states (O), and VCCI is the response (R). Contrary to prior research that has focused mainly on examining individual relationships or isolated mediating mechanisms, this dissertation demonstrates evidence for the chain of gamification, perceived value, customer engagement, and VCCI. The results suggest that the effect of gamification on VCCI is a part of a larger mechanism related to users' more positive perceptions of the service benefits, which are in turn correlated with greater engagement levels. This contribution differentiates the unique, but complementary roles of the two states of the organism and extends the S-O-R model by conceptualizing the organism as involving multiple, sequential states. However, given the cross-sectional nature of the data, this sequence should be understood as theoretically grounded and empirically supported rather than as evidence of temporal causality.

5.2.3. Extending the Moderating Perspective Through PCT

The dissertation extends PCT by simultaneously examining perceived personalization and privacy concern as two boundary conditions of the relationship between perceived value and customer engagement. Perceived personalization represents the benefit-related aspect of data use, whereas privacy concern reflects the risk-related aspect. The findings show that perceived personalization strengthens the relationship between perceived value and customer engagement, suggesting that the same level of perceived value may be associated with different levels of engagement depending on the extent to which users perceive the service as relevant to their individual needs.

In contrast, privacy concern does not demonstrate a statistically significant moderating effect under a two-tailed test at the 5% significance level. This finding suggests that data-related benefits and risks do not necessarily generate symmetrical effects. In this sense, the dissertation refines PCT by showing that data-related conditions may influence the translation of perceived value into customer engagement in different ways within digital service settings.

5.3. Managerial Implications

5.3.1. Implications of the Direct Effect of Gamification on Value Co-creation Intention

Prioritize the quality of the gamified experience. The IPMA results show that gamification has the highest importance for VCCI, while its performance is relatively lower than that of perceived value and customer engagement. E-wallet providers should therefore place greater emphasis on improving the quality of gamified experiences rather than simply increasing the number of gamification programs. Particular attention should be given to users' sense of earning points or receiving rewards after transactions, the design of tasks, the sequence of interactions, and the overall perception

of game-like features during e-wallet use. Improvements should be made selectively at the level of specific attributes and programs, rather than assuming that a higher degree of gamification will always produce better outcomes.

Link gamification with opportunities for value co-creation. Since the outcome variable in this study is VCCI, firms can incorporate opportunities for users to provide feedback, submit evaluations, offer suggestions, or recommend activities to others at appropriate points in the gamified journey. The platform should also clearly communicate the purpose, process, and participation requirements of these activities so that users can more easily move from experiencing gamification to taking a more active role in value co-creation.

Monitor the intention-behavior gap. Because the study measures intention rather than actual behavior, firms should monitor indicators such as the rate at which users respond to invitations, begin value co-creation activities, and complete them. These indicators can help assess the extent to which the willingness captured in the survey is translated into actual value co-creation behavior.

5.3.2. Mediating Mechanisms of Perceived Value and Customer Engagement

Maintain utilitarian value while prioritizing improvements in hedonic value. Perceived value plays an important mediating role and is closely associated with customer engagement. The utilitarian value indicators show higher performance than those of hedonic value, while the IPMA results indicate that hedonic value has relatively high importance but lower performance. E-wallet providers should therefore maintain the usefulness, efficiency, and convenience of the service while placing greater emphasis on making the experience more enjoyable, engaging, novel, and pleasant.

The data on participation motives also indicate that users are concerned not only with financial rewards but also with enjoyment, exploration, the way activities are structured, and social interaction. Firms should therefore avoid applying a single value proposition across all gamification programs. The MGA results further show that the effect of gamification on perceived value is stronger among users with a higher frequency of gamified experience. Accordingly, different user groups should be monitored separately, and firms should assess whether the benefits of a gamified activity are sufficiently recognized before increasing the intensity of gamification.

Manage perceived value, customer engagement, and VCCI as a connected sequence. The sequential mediation results suggest that these constructs should be managed as interrelated stages rather than as separate objectives. If a program achieves high participation but generates low perceived value, the benefits offered by the experience should be reconsidered. If value perception is strong yet user engagement is somewhat weak, more focus may be necessary on how engagement and relational ties with users are maintained. This method may assist organizations in locating where the user journey is disintegrating rather than accommodating by increasing incentives.

Manage customer engagement as a multidimensional construct. There are cognitive, emotional, and behavioral aspects that make up customer engagement, and hence, it should not be equated to just the number of visits or transactions. Firms should integrate several characteristics with measures of the users' attention, liking, familiarity, preference, and positive affect toward the platform. The results suggest that there is more potential growth for affective engagement, and perhaps it should be treated as a separate field of managerial focus.

5.3.3. Moderating Effects of Perceived Personalization and Privacy Concern

Improve the relevance of personalization. E-wallet providers need to prioritize making deals, content, and recommendations truly relevant to the needs and usage scenarios of their users instead of merely generating more notifications or advancing the technical prowess of personalization. The success of personalization should likewise not be judged only by means of metrics such as notification open rates or clicks on promo offers. They add that firms should track whether users think the content is relevant, whether they get value from the content, and the extent to which they engage after the interaction.

Manage privacy together with personalization. While privacy concern is insignificant at 5% level, it could be observed that the users' concern level is relatively high. Companies ought to be clear on which data they collect, for what purposes they use the data, what rights the users have, and what actions they have taken to protect users' personal information. If personalization is based on transaction history or usage patterns, the platform should identify the basis for its recommendations, the platform says. That can help companies reap the rewards of personalization, while maintaining user trust and keeping users feeling in control of their personal data.

5.4. Limitations and Directions for Future Research

First, the study relies on self-reported data, a cross-sectional design, and non-probability sampling. As a result, common method bias cannot be completely ruled out, and the findings do not provide a sufficient basis for causal inference. Future research could adopt longitudinal or experimental designs and combine survey data with actual behavioral data.

Second, the model does not include user characteristics as control variables and does not directly test for endogeneity. Future studies could incorporate factors such as age, gender, income, experience, usage frequency, or e-wallet brand, while also applying endogeneity assessment procedures that are appropriate for PLS-SEM.

Third, although MICOM, MGA, and FIMIX-PLS were applied, the possibility of unobserved heterogeneity cannot be fully excluded. Future research should replicate the analysis using independent samples and consider additional theoretically grounded criteria for group classification.

Finally, the generalizability of the findings remains limited to the Vietnamese e-wallet context. In addition, the study measures VCCI rather than actual value co-creation behavior and examines gamification at an overall perceptual level. Future research should extend the investigation to other contexts, test specific gamification mechanisms, and examine how VCCI is translated into actual value co-creation behavior.

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