

Gamification Elements and GoPay User Retention Among Generation Z in Bandung

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Abstract

Purpose: This study aimed to examine the effect of gamification elements on GoPay user retention among Generation Z in Bandung. The analysis focuses on three core gamification components: the reward system, challenge and mission, and social interaction.

Research Methodology: This quantitative study was conducted in Bandung, Indonesia, targeting Generation Z users of the GoPay digital wallet application. Data were collected from 325 respondents using structured questionnaires based on the established literature on gamification and user retention. The data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with SmartPLS 4.0 to evaluate the relationships between constructs.

Results: The results demonstrated that gamification elements positively influenced user retention. The reward system, challenge and mission, and social interaction significantly affected user satisfaction, loyalty, and usage frequency. The reward system exhibited the strongest effect among the variables.

Conclusions: The study concludes that well-designed gamification strategies can enhance user engagement and strengthen the long-term retention of GoPay users, particularly among Generation Z in Bandung.

Limitations: This study focused on Generation Z users in Bandung, which restricts the generalizability of the findings to other demographic segments, age groups, or geographic regions. Differences in cultural background, digital literacy, and financial behavior across populations may produce varying outcomes if the model is applied in different contexts.

Contributions: This study contributes to the literature on digital marketing and financial technology by providing empirical evidence of the role of gamification in improving user retention. It also offers practical insights for GoPay and other fintech companies in designing effective gamification strategies.

Keywords: *Financial Technology, Gamification, Generation Z, GoPay, User Retention*

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1. Introduction

The rapid digital transformation of the financial sector has significantly reshaped consumer payment behavior, particularly through the expansion of digital wallet service. In Indonesia, increasing Internet penetration and smartphone adoption have accelerated the shift toward cashless transactions. Electronic money transactions continue to grow at a double-digit rate annually, reflecting the deeper integration of digital payment systems into everyday economic activities (Ao, Chunyan, Chen, & Zhide, 2026). Projections further indicate that the total value of digital wallet transactions may surpass IDR 1,000 trillion, highlighting the expanding scale of Indonesia's digital payment ecosystem (Aysan et al., 2025).

Despite this rapid growth, maintaining an active user base remains a major challenge for digital wallet providers. Platform-based digital markets are characterized by low switching costs and high competition. Consequently, user retention has become a key determinant of long-term platform performance, rather than merely a supporting metric. User retention refers to a company's ability to encourage repeated usage over time and is closely associated with customer loyalty and long-term profitability ([Bing, Al Mughairi, Karim, & Karim, 2024](#)). Strong retention increases Customer Lifetime Value and reduces acquisition costs, strengthening a firm's competitive advantage ([Reichheld & Kenny, 1990](#)). Previous studies have also demonstrated that even small improvements in retention rates can significantly increase profitability ([Isen et al., 2026](#)).

In response to these challenges, many fintech platforms have adopted gamification strategies to enhance user engagement and encourage continuous use. Gamification integrates game-like elements, such as rewards, missions, and social interaction, into non-game environments to motivate user participation. Prior research on digital services and fintech platforms shows that gamification can improve engagement, satisfaction, and long-term user retention by creating more interactive and enjoyable user experiences ([Hamari, Koivisto, & Sarsa, 2014](#)).

Tabel 1. Day-30 retention rates of applications

Category	Platform	Day 1 (%)	Day 3 (%)	Day 7 (%)	Day 14 (%)	Day 30 (%)
Utility & Productivity	iOS	13.19	6.97	5.07	3.51	2.37
	Android	11.34	4.88	3.07	2.02	1.23
Health & Fitness	iOS	23.18	10.32	6.45	3.98	2.44
	Android	16.58	6.87	4.16	2.64	1.46
Finance	iOS	17.54	9.09	6.83	5.51	4.34
	Android	13.37	6.11	3.84	2.65	1.72
Entertainment	iOS	26.19	14.38	9.70	6.36	3.76
	Android	17.43	7.71	4.69	2.88	1.64
Business	iOS	13.17	6.19	4.30	3.00	1.86
	Android	16.89	8.60	6.23	4.58	2.12

Despite the increasing number of digital wallet users in Indonesia, industry data reveal that maintaining user engagement remains problematic. Based on Table 1, the AppsFlyer App Retention Benchmarks Report indicates that financial applications demonstrate relatively low Day-30 retention rates compared to other categories ([Lamichhane, Ward, Shrestha, & Bhattacharjee, 2026](#); [Trukshanina, Bandarenka, & Gourinovitch, 2025](#)). In the Indonesian market, the retention rate of finance applications on Android devices remains particularly limited, suggesting that most users discontinue usage within the first month after installation. This discrepancy between high adoption and declining sustained engagement highlights a fundamental strategic issue in the FinTech industry.

Digital platforms have increasingly adopted gamification as an engagement strategy in response to retention challenges. Gamification is defined as the use of game design elements in non-game contexts to enhance motivation and participation ([Levy, 2022](#)). Core elements, such as rewards, challenges, and social interaction, are designed to stimulate both intrinsic and extrinsic motivation. Reward systems can foster continued engagement by reinforcing user behavior ([Vassileva, 2012](#)), while the fulfillment of psychological needs for competence and recognition strengthens intrinsic motivation within Self-Determination Theory ([Deci, Olafsen, & Ryan, 2017](#)). Numerous empirical studies have reported the positive outcomes of gamification, including increased engagement and satisfaction across digital environments ([Hamari et al., 2014](#)). Reward-based mechanisms have been shown to enhance application usage frequency, whereas challenge-oriented features strengthen emotional attachment to digital platforms.

However, the effectiveness of gamification remains contested. Excessive reliance on extrinsic rewards may undermine intrinsic motivation over time ([Mekler, Brühlmann, Tuch, & Opwis, 2017](#)). Poorly designed gamification systems can reduce participation and long-term commitment ([Kazhamiakin, Marconi, Martinelli, Pistore, & Valetto, 2016](#)). The impact of gamification is highly context-dependent and influenced by user characteristics, platform type, and industry dynamics ([Koivisto & Hamari, 2019](#)). These inconsistent findings indicate the need for a contextualized investigation, particularly within the fintech sector, where financial decision-making and trust considerations may interact differently with game-based incentives.

Although gamification has been widely studied, most empirical investigations have been conducted in sectors such as education, health, and e-commerce rather than in fintech. Game elements enhance motivation on educational platforms ([Mauliansyah & Amelia, 2025](#)), while achievement-based mechanisms improve adherence to digital health applications ([Dicianno, Henderson, & Parmanto, 2017](#)). In the e-commerce context, gamification increases engagement and purchase intention ([Fayola, Graciela, Chandra, & Sukmaningsih, 2024](#)). However, these settings differ fundamentally from digital wallet services, where financial risk, trust, and transactional reliability shape user behavior patterns.

The empirical evidence on the long-term effectiveness of gamification is also inconsistent. Positive effects on engagement and loyalty have been documented ([Hamari et al., 2014](#)), whereas excessive extrinsic rewards may weaken this intrinsic motivation ([Mekler et al., 2017](#)). Poorly designed gamification systems can reduce sustained participation ([Kazhamiakin et al., 2016](#)). These divergent findings suggest that the impact of gamification is highly context dependent.

Despite the rapid expansion of digital payments in emerging markets, empirical studies linking specific gamification elements to user retention on digital wallet platforms remain limited. Indonesia presents a particularly relevant setting because of its accelerating fintech growth, competitive e-wallet landscape, and distinct consumer behavior patterns. Consequently, examining gamification within this context is necessary to clarify inconsistent prior findings and provide industry-specific evidence of its effectiveness in strengthening user retention.

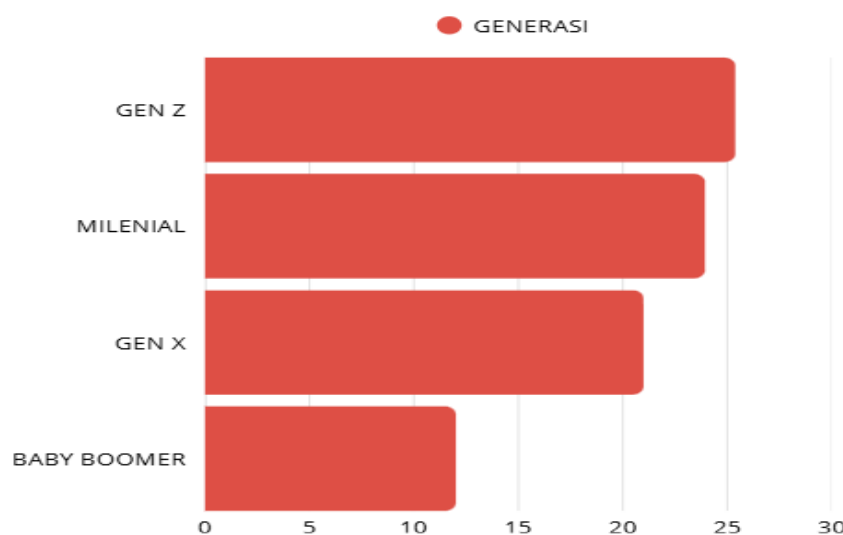


Figure 1. Generational population structure of Bandung City

Generation Z represents a strategically significant segment of Indonesia's digital economy because of its high technological adaptability and responsiveness to interactive digital features ([Hinduan, Anggraeni, & Agia, 2020](#)). According to Figure 1, the Central Bureau of Statistics of Bandung City reports that Generation Z constitutes the largest demographic group in Bandung, totaling 657,583 individuals out of approximately 2.59 million residents ([Bandung, 2024](#)). This demographic dominance, combined with national survey data indicating that over 90 percent of Generation Z in Indonesia actively uses digital wallets, highlights their strong reliance on mobile-based financial services. Despite their

intensive digital engagement, limited empirical research has specifically examined how gamification elements influence retention behavior among this cohort in the fintech industry.

GoPay, one of Indonesia's leading digital wallet platforms under the GoTo Financial ecosystem, provides a relevant context for this investigation. Corporate reports indicate sustained growth in monthly transacting users and transaction value; however, industry-wide retention challenges remain evident ([Pereira, 2023](#)). Although GoPay integrates gamified features such as reward systems, interactive challenges, and social engagement mechanisms, empirical evidence regarding their effectiveness in fostering long-term retention among Generation Z is insufficient.

Accordingly, this study examines the impact of reward systems, challenges and missions, and social interaction on GoPay user retention among Generation Z in Bandung. By situating gamification within an emerging market fintech context, this study contributes theoretically by addressing inconsistencies in prior findings and extending engagement-based retention models. Practically, this study provides strategic insights for fintech providers seeking sustainable retention strategies in an increasingly competitive digital wallet market.

2. Literature Review and Hypotheses Development

2.1 Theory User Retention in Financial Technology Platforms

User retention in financial technology has evolved from a satisfaction-centered construct to a broader behavioral outcome that reflects psychological attachment and habitual usage. Expectation Confirmation Theory (ECT) provides an early explanation for continuance behavior, arguing that users persist when perceived performance confirms prior expectations ([Hossain & Quaddus, 2011](#)). In digital wallet platforms, confirmation typically concerns the transaction speed, reliability, and security. When these attributes meet expectations, users experience satisfaction that supports their continued use.

However, ECT primarily explains cognitive evaluation and assumes rational cost–benefit reasoning. In contemporary fintech ecosystems, characterized by minimal switching barriers and intense competition, functional equivalence across platforms reduces differentiation based solely on performance. Users can easily migrate between services that offer similar transactional capabilities, suggesting that cognitive confirmation alone cannot sufficiently explain sustained loyalty.

To address this limitation, Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) extends post-adoption theory by incorporating hedonic motivation and habit as determinants of continued behavior ([Gaber, Elbadrawy, Mostafa, & Oreiky, 2026](#)). Unlike the Technology Acceptance Model, which centers on perceived usefulness and ease of use ([Davis, 1989](#)), UTAUT2 recognizes that enjoyment and behavior reinforcement persist through user engagement. In mature digital markets, usability has become a baseline expectation rather than a strategic advantage, shifting the explanatory emphasis toward experiential value and repeated interaction patterns.

Empirical fintech research has identified trust, perceived value, and perceived economic benefits as predictors of continued usage. Trust and risk perception significantly influence mobile payment continuance ([Pal et al., 2019](#)). Perceived financial benefits strengthen reuse intention in digital payment services ([Narahdita, Aisjah, & Kusniyah, 2020](#)). Trust also reinforces loyalty behavior in digital financial contexts ([Jawad, Muhammad, & Latif, 2025](#)). While these findings clarify utilitarian drivers, they largely overlook the motivational and engagement-based mechanisms that sustain long-term behavioral persistence.

Although these studies provide important explanations of cognitive and economic drivers, they pay comparatively limited attention to engagement-oriented mechanisms that encourage sustained interactions with digital platforms. Existing research on gamification suggests that motivational design elements can strengthen user engagement and long-term interactions on platforms. However, empirical investigations specifically examining gamification within fintech environments remain relatively limited ([Yang, Yang, Hou, Li, & Sun, 2023](#)). This indicates that the role of motivational design elements

in shaping long-term behavioral persistence, particularly among Generation Z users, requires further empirical exploration. This theoretical gap is more pronounced when examining Generation Z users. As digital natives, they exhibit strong preferences for interactivity and immersive digital experiences ([Ivasciuc, Sequeira, Brown, Ispas, & Peyré, 2025](#)). For this cohort, continued platform engagement extends beyond transactional efficiency and financial incentives; it increasingly depends on psychologically stimulating environments that foster habitual interaction.

Recent scholarship has positioned gamification as a mechanism capable of bridging this gap. Gamification in digital wallets has been conceptualized as an innovation that integrates motivational design with a financial service architecture to stimulate sustained engagement ([Yang et al., 2023](#)). Empirical evidence further supports this perspective, showing that structured gamified features significantly enhance continuance intention among mobile payment users ([Neiva, Ferreira, & Azevedo, 2026](#)). Additional mobile payment research indicates that interactive game elements are positively associated with user retention, suggesting a shift from purely utilitarian use toward an experiential commitment. In the Indonesian context, gamified digital finance interactions have been found to strengthen engagement and loyalty, reinforcing the practical relevance of motivational design in emerging FinTech markets ([Rahman, Nguyen-Viet, Nguyen, & Kamran, 2024](#)).

2.2 Theory Gamification in Digital Wallet Applications

Gamification has become a strategic mechanism for strengthening engagement on digital platforms by integrating game design principles into service systems. It refers to the incorporation of structured game elements within non-game environments to influence motivation and behavior ([Kordyaka, Karaosmanoglu, & Laato, 2026](#)). Rather than functioning as short-term promotional stimuli, this approach operates through psychological reinforcement, which shapes interaction patterns and sustains participation. Its theoretical grounding is closely linked to Self-Determination Theory, which explains that behavior is driven by the fulfillment of competence, autonomy, and relatedness needs ([Ryan & Deci, 2000](#)). Digital environments that support achievement, feedback, and social connections stimulate intrinsic motivation, thereby encouraging continued interaction. In service platforms, goal attainment strengthens perceived competence, structured incentives provide evaluative feedback, and peer-based features reinforce the relational bonds.

Empirical evidence supports the role of motivational design in fostering persistent use. Structured game-based mechanisms have been shown to increase activity levels across digital systems ([Hamari et al., 2014](#)). The meaningful integration of these mechanisms further enhances behavioral persistence ([Koivisto & Hamari, 2019](#)). Although these findings are largely derived from generalized online environments, emerging fintech research indicates similar patterns. Gamified digital wallets have been conceptualized as innovations that embed motivational architecture within financial service design ([Yang et al., 2023](#)). Large-scale evidence from mobile payment platforms shows that structured interactive features significantly improve continuance intention, suggesting that engagement-oriented design can transform transactional usage into a recurring behavioral commitment ([Neiva et al., 2026](#)).

Despite the growing body of literature on gamification, several limitations remain in the existing research. Much of the empirical evidence has been derived from general digital platforms such as online communities, education systems, and e-commerce environments rather than financial technology services ([Hamari et al., 2014](#)). Subsequent studies have emphasized that the effectiveness of gamification may vary across contexts depending on user motivation and platform characteristics ([Koivisto & Hamari, 2019](#)). In the fintech sector, research remains relatively limited and often examines gamification as a broad construct rather than analyzing the distinct behavioral roles of specific game elements ([Yang et al., 2023](#)). Consequently, further investigation is needed to clarify how individual gamification components influence sustained usage behavior in digital wallet platforms.

In digital wallet applications, gamification is operationalized through three primary elements: reward systems, challenges and missions, and social interaction. Reward systems provide extrinsic reinforcement through incentives such as cashbacks, digital coins, or loyalty tiers, thereby strengthening

repeated behavior ([Hamari et al., 2014](#)). Challenge and mission structures emphasize progress and goal completion, activating intrinsic motivation through competence fulfillment ([Ngala, Lapalelo, & Imran, 2025](#)). Social interaction mechanisms facilitate peer visibility, collaboration, and referral dynamics, reinforcing the relatedness and normative influence within platforms ([Koivisto & Hamari, 2019](#)). Collectively, these elements function as motivational drivers embedded in financial transactions.

2.2.1 Reward System as Extrinsic Motivational Mechanism

Reward systems constitute a core element of gamified digital platforms and function as structured motivational drivers that are embedded within service design. Contemporary gamification research conceptualizes reward mechanisms as behavioral design components that stimulate repeated interactions rather than merely short-term incentives ([Koivisto & Hamari, 2019](#)). In digital wallet applications, rewards typically appear as cash-back programs, digital coins, tier-based benefits, or milestone incentives integrated into transactional activities.

Recent empirical studies in high-impact journals have demonstrated that performance-contingent rewards significantly increase engagement intensity and behavioral persistence when meaningfully embedded in digital ecosystems. Reward structures enhance perceived competence and strengthen continued participation ([Sailer et al., 2017](#)). Rewards also influence behavioral persistence when users perceive them as feedback on achievements rather than controlling incentives ([Mekler et al., 2017](#)). Within the framework of self-determination theory, extrinsic rewards can support intrinsic motivation when they reinforce competence without undermining autonomy ([Deci et al., 2017](#)). In digital service contexts, reward systems that signal progress and achievement contribute to sustained engagement by strengthening psychological investment rather than solely providing financial gains.

In financial technology research, perceived economic benefits consistently predict continued usage intention. Perceived value significantly influences mobile payment continuance behavior ([Pal et al., 2019](#)), and economic incentives affect reuse intention in fintech services ([Narahdita et al., 2020](#)). However, these studies frame rewards primarily as utilitarian value drivers and do not conceptualize them as structured gamification mechanisms embedded within the platform architecture.

Recent fintech-specific research has begun to address this limitation. Gamified reward features significantly improve users' continuance intention by increasing their interaction frequency with mobile payment systems ([Neiva et al., 2026](#)). These findings indicate that when rewards are integrated into system design rather than offered as isolated promotions, they contribute to habitual user engagement.

2.2.2 The Impact of Challenge and Mission on User Retention

Challenge and mission structures represent goal-oriented gamification elements that stimulate user engagement through task completion and progress-tracking. Unlike reward systems that primarily activate extrinsic reinforcement, challenge mechanisms enhance intrinsic motivation through competence fulfillment. Self-Determination Theory explains that individuals experience sustained engagement when activities satisfy their need for competence, defined as the perception of effectiveness and mastery ([Ryan & Deci, 2000](#)). When digital platforms provide structured goals and measurable progress, users perceive accomplishments, which strengthens their voluntary participation.

Empirical evidence supports the motivational role of goal-based gamification in learning. Structured challenges significantly enhance perceived competence, which, in turn, increases engagement levels in digital systems ([Sailer et al., 2017](#)). Challenge-oriented design can also induce flow experience, a psychological state associated with deep involvement and persistence ([Yokozawa, Nguyen, & Phung, 2026](#)). Flow enhances behavioral continuity by reducing cognitive resistance and increasing intrinsic enjoyment of the task.

Within digital financial platforms, mission-based mechanisms are typically embedded in spending targets, transaction milestones or time-bound achievement programs. These structured tasks encourage repeated interactions by framing routine transactions as goal-directed activities. Gamified goal structures increase behavioral persistence when users perceive meaningful progress rather than random

incentives ([Koivisto and Hamari, 2019](#)). However, most prior studies have examined challenge mechanisms in online communities, learning platforms, or gaming environments rather than in high-stakes financial ecosystems.

Fintech environments present a distinct behavioral context in which trust, risk perception, and financial responsibility influence usage decisions. While utilitarian drivers, such as perceived value, explain initial adoption, intrinsic engagement mechanisms may better explain continued interaction in competitive digital wallet markets. Recent mobile payment research suggests that structured interactive features increase continuance intention by strengthening user involvement ([Neiva et al., 2026](#)). Nevertheless, empirical evidence explicitly linking challenge-based gamification to user retention in fintech remains limited, indicating a contextual gap in the research.

2.2.3 Social Interaction as a Relatedness and Social Influence Mechanism

Social interaction constitutes a structured gamification element that shapes continued use through relational reinforcement and normative influence. Self-Determination Theory (SDT) identifies relatedness as a fundamental psychological need, referring to the desire to feel socially connected and valued ([Ryan & Deci, 2000](#)). The updated SDT framework clarifies that sustained engagement emerges when external systems support competence and relatedness in ways that facilitate internalization rather than control ([Deci et al., 2017](#)). In digital environments, socially embedded features, such as peer recognition and visible participation, can strengthen internalized motivation.

Empirical research has confirmed the behavioral relevance of socially embedded mechanisms. Social comparison and interaction significantly increase persistence on gamified platforms ([Koivisto & Hamari, 2019](#)). This indicates that the visibility of peer activity enhances continued engagement. Socially interactive features also intensify the flow experience, which is associated with deeper behavioral commitment to digital services ([Yang et al., 2023](#)). Flow reduces disengagement tendencies by increasing experiential immersion.

The technology continuance literature further emphasizes the role of social influence in sustained use. Social influence has been identified as a determinant of post-adoption behavior, particularly when technology use is observable within social networks ([Gaber et al., 2026](#)). In fintech settings, social influence significantly predicts the intention to continue using mobile banking services ([Narahdita et al., 2020](#)). Evidence from mobile payment platforms also shows that socially integrated interactive features strengthen continuance intention by embedding usage within peer contexts ([Neiva et al., 2026](#)).

Digital wallet applications operationalize social interactions through referral programs, shared incentives, leaderboard systems, and collaborative transaction features. These mechanisms activate network effects, whereby the perceived value of platform participation increases as more users engage in it. Research on digital platform ecosystems indicates that network-based interactions strengthen user attachment and reduce switching behavior in competitive markets ([Narahdita et al., 2020](#)). When participation becomes socially embedded, engagement shifts from isolated transactional activities to relationally reinforced behaviors.

Therefore, the theoretical mechanism can be articulated as follows: Social interaction features enhance perceived relatedness. Perceived relatedness strengthens users' psychological attachment to the platform ([Deci et al., 2017](#)). Psychological attachment increases engagement intensity ([Koivisto and Hamari, 2019](#)). Sustained engagement contributes to habit formation, which is a key determinant of continued technology use ([Gaber et al., 2026](#)). Through this pathway, social interaction functions as a motivational driver of user-retention. Although gamification research has documented positive social effects in generalized digital environments. Most prior studies have analyzed social influence as a contextual predictor rather than a structured gamification element embedded within financial platforms ([Narahdita et al., 2020](#)). By conceptualizing social interaction as an intentional design component within fintech systems, this study extends recent high-impact research and provides context-specific insights into its role in sustaining user retention.

2.3 Hypotheses Development

The conceptual framework of this study positions gamification as a hierarchical construct formed by three primary elements: reward systems, challenges and missions, and social interaction. These elements represent distinct motivational mechanisms that collectively shape the user engagement. Drawing on Self-Determination Theory, the integration of extrinsic reinforcement, competence fulfillment, and relatedness support fosters internalization and sustained behavioral commitment ([Deci et al., 2017](#)). When embedded within digital wallet platforms, this integrated motivational architecture strengthens habitual engagement and reduces switching tendencies, ultimately leading to user retention. Accordingly, gamification is conceptualized as a second-order construct that directly influences user retention in fintech environments.

2.3.1 Reward System and User Retention

Reward systems operate through extrinsic reinforcement by providing structured incentives that are embedded within transactional activities. Incentive-based gamification enhances behavioral persistence when rewards are perceived as meaningful indicators of progress ([Koivisto & Hamari, 2019](#)). Extrinsic rewards support sustained engagement when they reinforce competence, rather than exert control ([Deci et al., 2017](#)). In fintech contexts, gamified reward features significantly increase the intention to continue using mobile payment platforms ([Neiva et al., 2026](#)). Repeated interactions reinforced by structured incentives contribute to behavioral automaticity, which technology continuance models identify as a predictor of long-term usage ([Gaber et al., 2026](#)). Therefore, reward mechanisms are theoretically positioned as drivers of retention through reinforcement and habit-building.

Within the proposed theoretical framework, reward systems are conceptualized as gamification-based motivational stimuli that support competence satisfaction, as described in Self-Determination Theory [Ryan and Deci \(2000\)](#), while simultaneously reinforcing habitual usage in post-adoption technology models ([Sarkar, 2025](#)). This integration suggests that structured incentives can strengthen behavioral persistence and ultimately improve user retention on digital wallet platforms.

H₁: Reward system positively influences user retention in digital wallet platforms

2.3.2 Challenge and Mission and User Retention

Challenge and mission structures primarily activate intrinsic motivation by fulfilling the psychological need for competence. Self-Determination Theory explains that individuals sustain engagement when activities enhance perceived mastery and goal achievement ([Deci et al., 2017](#)). Goal-oriented gamification increases perceived competence and strengthens engagement ([Sailer et al., 2017](#)). More recent evidence indicates that structured challenges intensify the flow experience, a state associated with deep involvement and behavioral continuity. Flow reduces disengagement tendencies by increasing experiential immersion.

In digital financial services, goal-based mechanisms transform routine transactions into achievement-oriented activities. Interactive features in mobile payment systems enhance the intention to continue using them by increasing user involvement ([Neiva et al., 2026](#)). By stimulating competence-based intrinsic motivation, challenge mechanisms encourage voluntary repetition, contributing to habit development and sustained retention. This pathway provides a theoretical bridge between motivational activation and post-adoption behaviors.

Within the proposed theoretical framework, challenge and mission elements represent gamification mechanisms that enhance intrinsic motivation through competence fulfillment, as explained in Self-Determination Theory ([Deci et al., 2017](#)). Simultaneously, repeated goal-oriented interactions strengthen behavioral habits that support continued platform usage in post-adoption technology models ([Gaber et al., 2026](#)).

H₂: Challenge and mission positively influence user retention in digital wallet platforms

2.3.3 Social Interaction and User Retention

Social interaction mechanisms leverage relational reinforcement and normative influences to shape behavioral persistence. Self-Determination Theory identifies relatedness as a driver of internalization, reinforcing commitment when individuals feel socially connected ([Deci et al., 2017](#)). Peer visibility and comparison increase persistence in gamified systems ([Koivisto & Hamari, 2019](#)), whereas social influence significantly predicts the intention to continue using mobile financial services ([Narahdita et al., 2020](#)).

When participation becomes socially embedded, platform usage shifts from isolated transactions to relationally reinforced behaviors. Network-based interactions increase perceived value as more users engage, thereby strengthening psychological attachment. Technology continuance research confirms that socially reinforced behavior contributes to sustained usage patterns ([Gaber et al. 2026](#)). Through this mechanism, social interaction enhances retention by embedding financial activities within peer networks.

Within the proposed theoretical framework, social interaction functions as a gamification mechanism that fulfills the relatedness dimension of Self-Determination Theory by fostering social connection and peer engagement ([Deci et al., 2017](#)). Simultaneously, repeated interactions within social networks reinforce habitual usage patterns that support continued platform engagement in post-adoption technology models ([Gaber et al., 2026](#)).

H₃: Social interaction positively influences user retention in digital wallet platforms

2.3.4 Gamification elements and User Retention

While each gamification element operates through distinct motivational mechanisms, their combined effect may have a stronger influence on sustained platform usage. According to the self-determination Theory, optimal motivation emerges when competence, relatedness, and autonomy-supportive structures are simultaneously fulfilled ([Deci et al., 2017](#)). Reward systems primarily activate extrinsic reinforcement, challenge mechanisms stimulate competence-based intrinsic motivation, and social interaction satisfies the need for relatedness. When these elements coexist within a unified platform architecture, they may create a reinforcing and motivational ecosystem.

The effectiveness of gamification increases when multiple elements interact synergistically rather than operating in isolation ([Koivisto and Hamari, 2019](#)). Empirical evidence shows that integrated gamified features in mobile payment platforms significantly enhance users' continuance intention ([Neiva et al., 2026](#)). These findings suggest that structured combinations of incentives, interactive tasks, and peer-based features amplify engagement beyond the single-mechanism effects.

From a behavioral perspective, repeated interactions reinforced through multiple motivational channels accelerate habit formation, a key determinant of technology continuance ([Gaber et al., 2026](#)). Therefore, the integrated presence of reward systems, challenge structures, and social interaction mechanisms is expected to exert a stronger collective impact on retention than any single element.

Within the proposed theoretical framework, gamification is conceptualized as a higher-order construct composed of reward systems, challenges and missions, and social interaction. This integrated structure simultaneously fulfills the competence and relatedness needs described in the Self-Determination Theory ([Deci et al., 2017](#)). In addition, repeated interactions reinforced by multiple motivational mechanisms strengthen habitual engagement, as described in post-adoption technology models ([Gaber et al., 2026](#)).

H₄: Gamification elements collectively have a positive and significant effect on user retention in digital wallet platform

3. Methodology

3.1 Research Design

This study employed a quantitative explanatory research design to investigate the causal relationships between gamification elements and user retention in digital wallet platforms. Quantitative explanatory research is appropriate when the objective is to test theoretical relationships among variables and examine predictive effects using statistical modeling ([Fayola et al., 2024](#)). By adopting this design, this study aims to evaluate how specific gamification mechanisms contribute to the sustained usage behavior of digital wallet users.

This study used a survey-based approach because surveys enable the collection of standardized data from a large population and allow the measurement of latent constructs such as motivation, engagement, and retention ([Aysan et al., 2025](#)). The study was categorized as non-experimental because no variables were manipulated, and observations were conducted in natural user settings. It is also cross-sectional because data were gathered at a single point in time, which is commonly applied in technology continuance and FinTech behavioral research ([Hinduan et al., 2020](#)).

The survey was distributed through digital channels commonly used by Gen Z, including social media platforms and online communities ([Rachman & Ariyanti, 2024](#)). The questionnaire link was shared through Instagram, WhatsApp groups, and several digital community forums related to university students and young professionals in the city. This approach was adopted because Generation Z users are highly active in online social environments and frequently access digital financial services via mobile devices. To ensure the relevance of the sample, screening questions were included at the beginning of the questionnaire to confirm that respondents were active GoPay users and belonged to the Generation Z age group. The use of multiple digital distribution channels helped increase response diversity while maintaining alignment with the targeted population of digital wallet users ([Rahmayanti & Kencana, 2025](#)).

The conceptual framework of this study is grounded in post-adoption technology theory and Self-Determination Theory. Post-adoption models emphasize habit and continuous intention as determinants of sustained technology usage ([Gaber et al., 2026](#)). Self-Determination Theory (SDT) explains that sustained engagement emerges when the psychological needs for competence and relatedness are supported within digital environments ([Deci et al., 2017](#)). Integrating these perspectives, this study conceptualizes gamification as a motivational architecture that reinforces behavioral persistence through reward systems, challenge mechanisms, and social interaction features.

Consistent with recent gamification research, these elements are treated as independent predictors and as dimensions forming a higher-order gamification construct ([Koivisto & Hamari, 2019](#)). This hierarchical perspective allows for the examination of both individual motivational pathways and the integrated influence of gamified design on retention. Empirical fintech studies indicate that interactive and incentive-based features significantly enhance the intention to continue using mobile payment platforms, supporting the relevance of this explanatory approach ([Neiva et al., 2026](#)). Accordingly, this study tests the theoretical model through the following hypotheses:

- H₁*: Reward system positively influences user retention in digital wallet platforms
- H₂*: Challenge and mission positively influence user retention in digital wallet platforms
- H₃*: Social interaction positively influences user retention in digital wallet platforms
- H₄*: Gamification elements collectively have a positive and significant effect on user retention in digital wallet platforms

To evaluate these relationships, this study employs Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM is suitable for predictive research, complex models, and hierarchical constructs, particularly in emerging research domains such as FinTech and digital engagement ([Hinduan et al., 2020](#)). This approach enables the simultaneous assessment of measurement reliability and structural relationships, making it appropriate for examining integrated motivational frameworks.

3.2 Population and Sample

The study population consisted of Generation Z individuals residing in Bandung who actively used the GoPay digital wallet. Generation Z represents a strategically important segment of the digital economy because of their high technological familiarity, mobile dependency, and responsiveness to interactive digital features. Population data show that individuals aged 12–27 years reached 657,583, accounting for approximately 30% of Bandung's total population ([Bandung 2024](#)). This demographic dominance highlights Gen Z as the primary driver of financial technology adoption at the city level.

Empirical evidence further supports the relevance of this population group. The majority of respondents in Bandung actively use e-wallet services, with GoPay being one of the most frequently utilized platforms owing to its perceived convenience, ecosystem integration, and feature completeness ([Mauliansyah & Amelia, 2025](#)). The widespread use of digital wallets in this demographic suggests that retention, rather than adoption, has become a more critical managerial challenge. Consequently, focusing on Generation Z GoPay users provides an appropriate context for examining sustained usage behaviors. The sample size was determined using the Lemeshow formula, which is widely applied in behavioral and public research involving large populations and proportion estimates ([Vassileva, 2012](#)). The formula is expressed as follows:

$$n = \frac{z^2 p(1-p)}{d^2} \quad (1)$$

where n denotes the minimum required sample size, Z represents the confidence level, p refers to the estimated population proportion, and d indicates the margin of error. The calculation applied a 95% confidence level ($Z = 1.96$), an estimated e-wallet usage proportion of 0.694, and a margin of error of 0.05. Based on these parameters, the minimum sample size required for this study was 325 respondents.

This sample size is considered appropriate for explanatory quantitative research and is consistent with recommendations for Partial Least Squares Structural Equation Modeling, which prioritizes predictive accuracy and performs reliably with moderate sample sizes ([Narahdita et al., 2020](#)). In addition, the sample exceeded the commonly referenced “10-times rule” in PLS-SEM, indicating sufficient statistical power for estimating hierarchical constructs and structural relationships ([Hinduan et al., 2020](#)).

Sampling was conducted using a purposive approach to ensure that the participants had direct and relevant experience with digital wallet usage. The study targeted Generation Z individuals living in Bandung who had actively used GoPay in the previous three months. Focusing on users with recent interactions is important for capturing informed perceptions of gamification features and their role in shaping continued platform engagement. Purposive sampling is commonly employed in technology behavior research, where the investigation requires participants who are familiar with the phenomenon under study rather than a broad representation of the general population ([Baard, 2002](#)). By selecting respondents who regularly interact with the platform, this study reduced the risk of speculative responses and improved the accuracy of behavioral measurements.

3.3 Data Collection and Analysis

Data were collected using a structured questionnaire developed from the established literature on gamification, engagement, and technology continuance. All constructs were operationalized as reflective latent variables measured using a five-point Likert scale ranging from strongly disagree to strongly agree. This study conceptualizes gamification as a hierarchical construct composed of three first-order dimensions: reward system, challenge and mission, and social interaction. These dimensions capture distinct motivational mechanisms that reflect extrinsic reinforcement, competence fulfillment, and relatedness support, as outlined in the Self-Determination Theory ([Deci et al., 2017](#)). User retention was measured using indicators representing continued usage intention, habitual interaction, and resistance to switching, consistent with post-adoption technology research ([Gaber et al., 2026](#)).

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used for data analysis using SmartPLS 4. This technique is suitable for predictive research, complex structural relationships, and

hierarchical construct modeling, which are commonly applied in fintech and digital behavior studies (Narahdita et al., 2020). The analytical procedure followed a two-step approach.

Measurement model evaluation

1. Convergent validity (outer loading, AVE)
2. Reliability (Cronbach's alpha, composite reliability)
3. Discriminant validity (HTMT)

Structural model evaluation

1. Path coefficients
2. Coefficient of determination (R^2)
3. Effect size (f^2)
4. Predictive relevance (Q^2)

Gamification was modeled as a second-order construct using a two-stage approach, allowing for the examination of both individual element effects (H_1 – H_3) and the integrated effect of gamification on retention (H_4). This approach provides a more comprehensive understanding of how multiple motivational mechanisms shape sustained platform usage. Ethical considerations were followed throughout the research process. Respondents were informed about the purpose of the study and their right to withdraw at any time. No personally identifiable information was collected, and all data were used only for academic purposes. Ensuring confidentiality and voluntary participation supports the credibility and integrity of research findings.

4. Results and Discussions

4.1 Result

4.1.1 Measurement Model Evaluation (Outer Model)

The measurement model was assessed to evaluate construct validity and reliability using Partial Least Squares Structural Equation Modeling (PLS-SEM). The evaluation included assessments of convergent validity, discriminant validity, reliability, and multicollinearity.

4.1.1.1 Convergent Validity

The outer loading value is used to assess the level of closeness of the relationship between the indicator and latent construct being measured. The following are the outer loading value data:

Table 2. Outer model result

Item	Challenge & Mission	User Retention	Reward System	Social Interaction
$X_{1.1}$			0.761	
$X_{1.2}$			0.754	
$X_{1.3}$			0.797	
$X_{1.4}$			0.741	
$X_{2.1}$	0.727			
$X_{2.2}$	0.759			
$X_{2.3}$	0.782			
$X_{2.4}$	0.813			
$X_{3.1}$				0.774
$X_{3.2}$				0.792
$X_{3.3}$				0.779
$X_{3.4}$				0.788
$Y.1$		0.773		
$Y.2$		0.742		
$Y.3$		0.727		
$Y.4$		0.730		

Y.5		0.782		
Y.6		0.756		

Based on Table 2, all indicators demonstrated outer loading values above the recommended threshold of 0.70. The loading values ranged from 0.741 to 0.797 for Challenge & Mission, 0.727 to 0.813 for Reward System, 0.774 to 0.792 for Social Interaction, and 0.727 to 0.782 for User Retention. These findings confirm that all indicators strongly and consistently reflect the latent constructs. Therefore, the measurement quality was considered robust, and no indicators required elimination. The Average Variance Extracted (AVE) value is used to measure the proportion of indicator variance that can be explained by the latent construct. The following are the AVE value data:

Table 3. Average Variance Extracted (AVE)

Variables	Average Variance Extracted (AVE)
Challenge & Mission	0.594
User Retention	0.565
Reward System	0.583
Social Interaction	0.613

Based on Table 3, The Average Variance Extracted values are 0.594 for Challenge & Mission, 0.565 for User Retention, 0.583 for Reward System, and 0.613 for Social Interaction. All values exceeded the minimum threshold of 0.50. These results indicate that each construct explains more than 50% of the variance in its respective indicators. Therefore, convergent validity was adequately established across all constructs.

4.1.1.2 Discriminant Validity

Based on the results of the research data processing, discriminant validity testing was conducted to ensure that each construct had adequate differences from the other constructs in the research model. The following are the data from the discriminant validity test results. The Fornell–Larcker Criterion was used to evaluate discriminant validity by comparing the square root of the AVE and the correlation between constructs. The following are the data from the Fornell–Larcker Criterion test:

Table 4. Fornell Larcker criterion

Variables	Challenge & Mission	User Retention	Reward System	Social Interaction
Challenge & Mission	0.771			
User Retention	0.477	0.752		
Reward System	0.300	0.545	0.763	
Social Interaction	0.319	0.521	0.287	0.783

Based on Table 4, the Fornell Larcker criterion, the square root of the AVE for Challenge & Mission is 0.771, User Retention is 0.752, Reward System is 0.763, and Social Interaction is 0.783. Each of these values was greater than the corresponding inter-construct correlations. These findings confirm that each construct demonstrates clear conceptual distinctiveness and that the discriminant validity of the measurement model is satisfactorily established.

Cross Loading is used to evaluate discriminant validity by comparing the loading value of each indicator on its construct with the loading value of that indicator on another construct. The following are the data from the cross-loading test results:

Table 5. Cross loading result

Item	Challenge & Mission	User Retention	Reward System	Social Interaction
$X_{1.1}$	0.222	0.353	0.761	0.227
$X_{1.2}$	0.173	0.410	0.754	0.221
$X_{1.3}$	0.275	0.479	0.797	0.285
$X_{1.4}$	0.238	0.406	0.741	0.135
$X_{2.1}$	0.727	0.346	0.221	0.268
$X_{2.2}$	0.759	0.381	0.257	0.249
$X_{2.3}$	0.782	0.365	0.188	0.206
$X_{2.4}$	0.813	0.376	0.255	0.263
$X_{3.1}$	0.302	0.413	0.218	0.774
$X_{3.2}$	0.199	0.439	0.262	0.792
$X_{3.3}$	0.193	0.378	0.208	0.779
$X_{3.4}$	0.307	0.395	0.208	0.788
$Y.1$	0.343	0.773	0.453	0.468
$Y.2$	0.345	0.742	0.426	0.414
$Y.3$	0.367	0.727	0.393	0.290
$Y.4$	0.429	0.730	0.336	0.363
$Y.5$	0.353	0.782	0.403	0.400
$Y.6$	0.322	0.756	0.439	0.395

Table 5 shows the results of the cross-loading evaluation show that each indicator has the highest loading value on the construct it measures, compared to other constructs. This pattern shows that all indicators consistently represent their respective constructs, without any measurement ambiguity.

4.1.1.3 Realibility

Table 6. Cronbach's alpha

Variables	Cronbach's alpha	Composite reliability
Challenge & Mission	0.772	0.773
User Retention	0.846	0.848
Reward System	0.762	0.769
Social Interaction	0.790	0.792

Table 6 shows the reliability test results show that Cronbach's alpha values are 0.772 for Challenge & Mission, 0.846 for User Retention, 0.762 for Reward System, and 0.790 for Social Interaction. The Composite Reliability values were 0.773, 0.848, 0.769, and 0.792, respectively. All values exceeded the recommended threshold of 0.70, indicating that each construct demonstrated strong internal consistency and satisfactory measurement stability.

4.1.2 Structural Model Evaluation (Inner Model)

4.1.2.1 Coefficient of Determination (R^2)

Table 7. R-Square

Variables	R-square	R-square adjusted
User Retention	0.499	0.494

Table 7 shows the coefficient of determination (R^2) was used to measure the proportion of variance in the endogenous construct that was explained by the exogenous variables. The R^2 value for User Retention was 0.499, with an adjusted R^2 of 0.494. This indicates that Challenge & Mission, Reward System, and Social Interaction jointly explain 49.9% of the variance in User Retention. According to PLS-SEM standards, this value falls within the moderate explanatory power category, suggesting that

gamification elements provide substantial but not exhaustive explanatory capacity for the user retention behavior.

4.1.2.2 Predictive Relevance (Q²)

Table 8. Q-Square

Variables	Q ² predict
User Retention	0.484

Table 8 shows the predictive relevance was assessed using the Q² predict value. The Q² value for User Retention was 0.484, which was greater than zero. This result confirms that the structural model has a strong predictive relevance. The model is not only explanatory but also capable of predicting user retention behavior among Generation Z GoPay users in Bandung with satisfactory accuracy.

4.1.2.3 Goodness of Fit (GoF)

The Goodness of Fit (GoF) test is used to assess the overall level of suitability of the model by combining the average value of Average Variance Extracted (AVE) and the average value of R Square. The following are the data from the goodness-of-fit (GoF) test:

$$\begin{aligned}
 GoF &= \sqrt{(AVE \times R^2)} \\
 GoF &= \sqrt{(0,589 \times 0,499)} \\
 GoF &= 0,542
 \end{aligned}
 \tag{2}$$

The GoF value of 0.542 exceeds the recommended threshold of 0.36, indicating a high overall model fit. This confirms that the integration between the measurement and structural models is robust and that the proposed SEM-PLS model adequately represents the empirical data.

4.1.2.4 Path Coefficient

Table 9. Path Coefficient Analysis

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Challenge & Mission → User Retention	0.259	0.261	0.043	5.995	0.000
Reward System → User Retention	0.372	0.372	0.042	8.818	0.000
Social Interaction → User Retention	0.331	0.332	0.040	8.234	0.000

Based on Table 9, among the three gamification elements, the Reward System demonstrated the strongest effect on retention behavior, followed by Social Interaction and Challenge & Mission. This finding indicates that extrinsic incentive mechanisms play a dominant role in sustaining continued usage among Generation Z digital wallet user

4.2 Discussions

4.2.1 The Effect of Reward System on GoPay User Retention among Generation Z in Bandung

The findings reveal that the reward system has a significant positive effect on user retention among Generation Z in Bandung. This result supports reinforcement theory, which explains that positive stimuli strengthen repeated behavior through feedback mechanisms that encourage continued interactions. Reward-based feedback increases activity persistence by signaling progress and achievements, thereby reinforcing usage patterns ([Mekler et al., 2017](#)).

From a motivational perspective, the findings align with the Self-Determination Theory. Rewards can sustain engagement when they support competence, rather than functioning as controlling incentives ([Deci et al., 2017](#)). In digital wallet environments, incentives such as cashbacks, points, and achievement indicators may act as competence-related feedback that facilitates internalization and encourages repeated usage.

Empirical FinTech research provides additional support for this conclusion. Reward-based gamification enhances engagement and continuance intention in digital payment applications by strengthening the perceived value ([Yang et al., 2023](#)). Structured incentive mechanisms embedded within mobile payment platforms increase repeated usage by reinforcing behavioral feedback and perceived progress ([Neiva et al., 2026](#)).

However, the literature highlights the potential limitations of incentive-driven engagement. Rewards may produce short-term activity without necessarily strengthening intrinsic motivation ([Mekler et al., 2017](#)). Externally controlling incentives can weaken internalization when users perceive rewards as promotional ([Deci et al., 2017](#)). Consistent with this perspective, gamification research indicates that reward effectiveness diminishes when incentives lack meaningful feedback or achievement values.

The present findings suggest that GoPay's reward design may help mitigate these limitations. By integrating incentives with progress indicators and achievement feedback, rewards appear to function not only as extrinsic benefits but also as motivational signals ([Sultoni, 2025](#)). This dual role strengthens behavioral repetition while supporting competence perception, thereby contributing to sustained retention among Gen Z users. From a broader theoretical perspective, the results indicate that financial incentives alone do not explain retention in fintech platforms. Instead, reward systems are most effective when embedded within an experiential design that connects economic value with psychological reinforcement. This highlights the importance of designing reward mechanisms that balance promotional appeal with meaningful user progression

4.2.2 The Effect of Challenge and Mission on GoPay User Retention among Generation Z in Bandung

The findings indicate that challenge and mission mechanisms significantly influence the retention of Generation Z GoPay users in Bandung. This result supports the Self-Determination Theory, which explains that the fulfillment of competence needs strengthens intrinsic motivation and encourages sustained engagement ([Deci et al., 2017](#)). Structured tasks and progress-based missions transform routine financial transactions into goal-oriented experiences, allowing users to perceive achievement and mastery during platform interactions.

Empirical research in digital environments has demonstrated that challenge-based gamification enhances the flow experience, which is associated with deeper involvement and behavioral persistence. [Yang et al. \(2023\)](#) showed that goal-oriented interactions increase perceived competence and encourage continued participation in digital platforms. By providing clear milestones and feedback, challenge mechanisms reduce usage monotony and promote habitual behaviors.

These findings align with fintech studies indicating that interactive features strengthen continuance intention by increasing experiential engagement. [Neiva et al. \(2026\)](#) reported that a structured activity design within mobile payment applications contributes to repeated usage by reinforcing progress perception. These results suggest that challenge mechanisms function not only as engagement triggers but also as behavioral anchors that support game retention.

4.2.3 The Effect of Social Interaction on GoPay User Retention among Generation Z in Bandung

The findings indicate that social interaction significantly influences user retention among Generation Z GoPay users in Bandung, Indonesia. This result supports the relatedness component of Self-Determination Theory, which explains that sustained engagement emerges when users experience social connections within digital environments ([Deci et al., 2017](#)). In fintech platforms, socially embedded features such as referrals, peer sharing, and collaborative activities provide relational cues that strengthen psychological attachments.

Empirical research in digital environments demonstrates that challenge-based gamification enhances flow experience, which is associated with deeper involvement and behavioral persistence. Goal-oriented interactions increase perceived competence and encourage continued participation on digital platforms ([Yang et al., 2023](#)). By providing clear milestones and feedback, challenge mechanisms reduce usage monotony and promote habitual behavior.

However, the literature also highlights contextual variability. Some studies indicate that social features may exert weaker effects on utilitarian platforms than on entertainment or social media environments, as financial services are traditionally task-oriented rather than experience-oriented. The positive effect observed in this study suggests that GoPay may successfully integrate experiential elements into transactional contexts, allowing social interaction to function as a motivational driver rather than a peripheral feature ([Walean, Rantung, & Mandagi, 2025](#)).

From a theoretical perspective, these findings reinforce the importance of relatedness in post-adoption behavior. Relational reinforcement facilitates internalization and supports long-term motivation ([Deci et al., 2017](#)). Complementing this view, customer engagement research indicates that socially mediated interactions strengthen emotional attachment and reduce switching tendencies on digital platforms ([Levy, 2022](#)). Therefore, the present results suggest that social interaction contributes to retention by embedding financial behavior within peer networks and reinforcing habitual engagement.

4.2.4 The Effect of Gamification on GoPay User Retention among Generation Z in Bandung

The results show that gamification, consisting of a reward system, challenges and missions, and social interaction, simultaneously influences GoPay user retention among Generation Z in Bandung. This finding confirms that user retention is stronger when gamification elements do not stand alone but work together to create an engaging, meaningful, and sustainable application experience. The synergy between gamification elements strengthens the ongoing user engagement process. The reward system provides incentives and positive feedback, challenges and missions offer goals and a sense of accomplishment, and social interaction fosters social connectedness among users. This combination aligns with the view that effective gamification is built through a balance of motivation, challenge, and interaction, encouraging users to continue participating in the system ([Hamari et al., 2014](#)).

The simultaneous influence of gamification on user retention can be explained using the Customer Engagement Theory. Customer engagement emerges from interactions that simultaneously involve cognitive, emotional, and behavioral dimensions ([Hossain & Quaddus, 2011](#)). The reward system, challenge and mission, and social interaction elements in GoPay collectively create an interactive experience that strengthens emotional engagement and active user participation. This internalized engagement forms the foundation of user loyalty and retention. Fulfilling psychological needs is also central to explaining the gamification's simultaneous effectiveness. According to Self-Determination Theory, long-term motivation develops when the needs for competence, autonomy, and relatedness are satisfied ([Ryan & Deci, 2000](#)). Challenges and missions address competence, the reward system reinforces achievement, and social interaction supports relatedness. The simultaneous fulfillment of these needs strengthens users' intrinsic motivation to continue using the app.

These results align with those of previous studies, confirming the effectiveness of integrated gamification on user retention. The comprehensive integration of gamification features influences user engagement and retention in digital payment applications ([Yang et al., 2023](#)). Gamification also increases motivation and retention when game elements are designed contextually and complement each other ([Hamari et al., 2014](#)). National findings further indicate that the combination of reward elements, missions, and social interaction positively influences the retention of Generation Z e-wallet users ([Rahman et al., 2024](#)). This consistency reinforces the conclusion that simultaneous gamification represents an effective strategy for retaining GoPay users in Bandung, Indonesia.

5. Conclusions

5.1 Conclusion

The results of this study demonstrate that gamification significantly influences GPay user retention among Generation Z in Bandung. Measurement model evaluation indicated adequate construct validity, as Average Variance Extracted values exceeded the recommended threshold of 0.50, including 0.594 for Challenge and Mission, 0.565 for User Retention, 0.583 for Reward System, and 0.613 for Social Interaction. These results confirm that each construct explains more than half of the variance of its indicators, supporting the reliability of the structural results. Among the examined variables, the reward

system was the strongest predictor of user retention. The structural model indicates that incentive-based mechanisms, such as cashbacks, points, and achievement feedback, effectively reinforce repeated usage and strengthen behavioral attachment. This suggests that economic value combined with performance feedback plays a central role in shaping habitual interactions among Generation Z users.

Challenge and mission mechanisms also contribute meaningfully to retention by providing structured goals and progress visibility that enhance perceived competence and engagement. In addition, social interaction features strengthen relational attachment and embed platform usage within peer networks, which supports the intention to continue. These findings highlight that experiential engagement mechanisms complement financial incentives in sustaining platform use. Simultaneously, the integrated effect of gamification demonstrates moderate explanatory power, indicating that retention is strengthened when rewards, challenges, and social interactions operate together. This synergy suggests that gamification functions as a holistic motivational ecosystem that enhances engagement, emotional attachment, and habit-building. Therefore, gamification represents a strategic mechanism for sustaining user retention and strengthening competitive positioning in the fintech industry, particularly among digitally native Gen Z users.

5.2 Research Limitations

This study has several limitations that frame the interpretation of its findings. The sample was confined to Generation Z users in Bandung, a segment highly relevant to digital wallet adoption but contextually specific. Consequently, behavioral responses to gamification may differ across age cohorts, regional settings, and levels of digital maturity, limiting broader generalizations. The research design was cross-sectional, capturing the perceptions and usage behavior at a single time point. While appropriate for examining structural relationships, this design cannot assess the temporal dynamics or long-term causal mechanisms underlying retention. Gamification effects may evolve as users accumulate experience, encounter platform changes, or adapt to shifting promotional environments, indicating the need for a longitudinal investigation.

5.3 Suggestions and Directions for Future Research

From a managerial perspective, fintech providers, particularly GoPay, should approach gamification as an integrated engagement strategy rather than an isolated promotional initiative. Reward mechanisms must be combined with progressive challenges and socially embedded features to simultaneously support achievement, competence, and relational connections. Designing gamification as a continuous user journey can strengthen habit formation, reduce switching behavior, and sustain long-term engagement among Generation Z users in the highly competitive digital wallet market.

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Author Contributions

RSG served as the principal researcher and was responsible for overall research development. RSG contributions included conceptualizing the research problem, conducting an extensive literature review, designing the research framework and methodology, developing the survey instrument and managing the data collection process. RSG also performed the statistical analysis using structural equation modeling-partial least squares (SEM-PLS), interpreted the empirical results, and prepared the original draft of the manuscript. BP contributed to academic supervision and methodological guidance throughout the research process. His role included refining the research design, validating the analytical framework and statistical approach, and ensuring the robustness of methodological procedures. BP also critically evaluated the theoretical framework, contributed to the interpretation of the findings, and

conducted substantive revisions to improve the clarity, coherence, and academic rigor of the manuscript. Both authors collaboratively discussed the research findings and contributed to the final manuscript.

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