

The Effect Of Gamification On Brand Engagement And Brand Loyalty Of Tokopedia Application Users

Dandi Awan¹, Andry Stepahnie Titing², Ismanto³

^{1,2,3} Management Departement, Universitas Sembilanbelas November Kolaka, Indonesia

e-mail: dandiawan522@gmail.com¹, andriestephan85@gmail.com², ismanto@usn.ac.id³

ARTICLE INFO

Keywords :

Brand Engagement; Brand Loyalty; E-commerce; Gamification; Tokopedia

*Email Corresponding Author : dandiawan522@gmail.com

Received : July, 29 - 2025

Accepted : July, 21 - 2026

Published : July, 22 - 2026



10.37802/jamb.v7i1.1178

Journal of Applied Management and Business (JAMB)

<https://e-journals.dinamika.ac.id/jamb/index>

e-ISSN : 2745-6382



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Dinamika

ABSTRACT

Aims :

The aim of this study is to analyse the impact of implementing gamification features on brand engagement and brand loyalty amongst Generation Z users of the Tokopedia app in Bombana Regency.

Design/Methodology/Approach :

This quantitative study collected data from 190 Generation Z respondents selected using purposive sampling. Data analysis was carried out using the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach with the aid of SmartPLS 3.0 software.

Findings :

The results of the hypothesis testing show that gamification has a positive and significant effect on brand engagement ($\beta = 0.739$, $T = 18.376$, $p = 0.000$) and brand loyalty ($\beta = 0.684$, $T = 16.121$, $p = 0.000$). The relationship has an effect size (f^2) classified as 'large', indicating that gamification is a key factor driving users' emotional attachment and purchasing commitment.

Research Limitations/Implications :

The limitations of this study lie in the fact that the sample was restricted to Generation Z in suburban areas. The practical implications provide strategic guidance for e-commerce management and SMEs on how to optimise experience-based marketing to improve customer retention in developing regions.

Originality / Value :

The novelty of this research lies in the integration of Self-Determination Theory to explain the phenomenon of e-commerce gamification amongst Generation Z in non-metropolitan areas.

Introduction

The rapid growth of the digital economy in Indonesia has transformed the e-commerce landscape from a mere platform for conventional buying and selling transactions between sellers and buyers into a digital space that prioritises user experience. Increasingly fierce competition amongst e-commerce platforms, such as Tokopedia, Shopee and TikTok Shop, means that companies can no longer rely solely on price wars or conventional, short-term discount strategies [1], [2]. Today's consumers, particularly Generation Z who make up the majority of digital users, tend to be highly price-sensitive yet exhibit low levels of loyalty if a platform fails to provide an emotional appeal [3]. The urgency of this research lies in the importance of identifying sustainable customer retention strategies through an experience-based marketing approach, given that the cost of acquiring new users is far higher than that of retaining existing ones.

On the other hand, a key issue has emerged regarding consumer behaviour in non-metropolitan areas such as Bombana Regency, Southeast Sulawesi. Generation Z in suburban areas exhibits unique characteristics, where the limited availability of physical entertainment venues means that digital applications serve not only as a means of fulfilling shopping needs (utilitarian), but also as a source of daily entertainment (hedonic) [4]. However, the greatest challenge for e-commerce platforms is how to transform users who were initially passive into actively engaged users (brand engagement), thereby fostering a commitment to repeat purchases (brand loyalty) [5]. The implementation of gamification features such as daily check-ins, daily missions and interactive games based on point accumulation is an innovative solution offered by Tokopedia to address the challenge of fostering this emotional connection with consumers [6].

The state of the art regarding gamification in e-commerce has so far been dominated by studies in major (metropolitan) cities, focusing on the Technology Acceptance Model (TAM) or its direct impact on purchase intention [7], [8]. Most previous research has treated gamification merely as a promotional tool without exploring the underlying psychological motivations. Research linking gamification to emotional attachment and brand loyalty amongst Generation Z in developing regions remains relatively limited [9]. Consequently, there is a research gap regarding the extent to which game elements can foster consumer engagement and loyalty when applied outside major economic centres [10].

The novelty of this study lies in the integration of Self-Determination Theory (SDT) to explain the phenomenon of e-commerce gamification amongst Generation Z consumers in a suburban area (Bombana Regency) [11]. Unlike previous studies, which have generally focused on large urban areas, this study offers a fresh local perspective on how the fulfilment of basic psychological needs namely autonomy, competence and relatedness through digital games can transform consumer behaviour in developing regions. The conceptual framework developed comprehensively evaluates the role of gamification in relation to two levels of consumer response simultaneously: brand engagement and brand loyalty [12], [13]. This study aims to analyse and empirically demonstrate the impact of the implementation of gamification features on brand engagement and brand loyalty among Generation Z users of Tokopedia in Bombana Regency [13].

The academic benefits of this research lie in enriching the literature on digital marketing management regarding the application of psychological motivation theory within the e-commerce ecosystem in suburban areas. This research also provides strategic guidance for e-commerce platform management and local MSME operators in designing

digital interaction mechanisms that are effective, efficient and capable of increasing customer retention without relying on costly discount strategies.

Literature Review and Hypothesis

Self-Determination Theory (SDT)

According to [14] posits that human motivation is understood through the fulfilment of three basic psychological needs: autonomy, competence and relatedness. Within the digital marketing landscape, the application of this theory explains how gamification features on the Tokopedia app are able to stimulate users' intrinsic and extrinsic motivation [15]. When consumers experience freedom in choosing gaming activities (autonomy), feel a sense of satisfaction upon successfully completing challenges or missions (competence), and are able to share their achievements with other users (relatedness), interaction patterns that were initially rigidly transactional are transformed into close and lasting psychological bonds [16].

Gamification

Gamification refers to the use of game design elements in non-game contexts to guide behaviour and enhance the user experience [17], [18]. On e-commerce platforms, gamification is not merely a supplementary entertainment feature, but an interactively managed strategy designed to provide both economic incentives and psychological satisfaction [19]. Gamification is built around six key dimensions: social interaction, a sense of control, goals, progress tracking, rewards, and prompts. These six dimensions work synergistically to provide interactive encouragement, clarity regarding achievement targets, and immediate rewards that motivate users to continue interacting with the application [15], [20].

Brand Engagement

The direct impact of this high level of gamification dynamics leads to the development of brand engagement, which reflects the depth of consumers' emotional, cognitive and behavioural relationships with a brand [21]. Brand engagement describes the extent to which consumers devote their cognitive focus whilst using the app, experience emotional joy or pride, and invest real time and energy through repeated actions [22]. Through enjoyable interactive experiences within the game features, consumers do not merely browse products; rather, they internalise the brand's values into their daily activities and habits [20].

Brand Loyalty

Furthermore, psychological attachment that is consistently built has the potential to foster brand loyalty, namely consumers' long-term commitment to continue using the Tokopedia platform and their reluctance to switch to competitors [17]. This loyalty manifests itself in two main dimensions: attitudinal loyalty, which takes the form of emotional preference and resistance to competitors' promotions; and behavioural loyalty, which is demonstrated through the intention to make repeat purchases and a willingness to provide positive recommendations (word-of-mouth) [23]. Consumers who have experienced the dual benefits of gamification tend to regard the cost of switching to another platform as too high [24].

Hypothesis Development

- a) The Effect of Gamification on Brand Engagement (H₁). The incorporation of gamification elements into e-commerce applications provides users with a high level of sensory and emotional stimulation. When users engage in interactive gaming activities, their cognitive and emotional attention is focused on the platform. According to Self-Determination Theory, immediate feedback (progress tracking) and incentives (rewards) trigger psychological satisfaction that drives intensive behavioural activation among consumers.
H₁ = Gamification has a positive and significant impact on brand engagement among Gen Z users of Tokopedia.
- b) The Impact of Gamification on Brand Loyalty (H₂). The consistently enjoyable experiences gained through gamification features foster habits and a sense of psychological ownership of the brand. Consumers who experience both economic benefits and entertainment from game-based features tend to be reluctant to switch to other platforms due to the potential sunk costs associated with their achievements or accumulated points. This gradually fosters long-term commitment and user loyalty.
H₂ = Gamification has a positive and significant effect on brand loyalty amongst Generation Z users of Tokopedia.

Research Methods

Research Design

This study employs a quantitative approach using a survey method to empirically investigate the relationship between digital marketing features and consumer behaviour. The nature of this study is purely explanatory, as it aims to establish, test and explain the causal relationships and path dependencies between the independent variable (Gamification) and the two dependent variables (Brand Engagement and Brand Loyalty) [23], [25]. By adopting a cross-sectional survey design, this study collects data at a single point in time to test hypotheses derived from the existing literature, thereby ensuring a highly structured and objective framework for evaluating the user experience within mobile e-commerce applications [26].

Population, Sample, and Sampling Technique

The target population for this research comprises all Generation Z individuals who are active users of the Tokopedia e-commerce platform. Geographically, the sample is confined to users residing within Bombana Regency, Southeast Sulawesi. A non-probability purposive sampling technique was deployed to select respondents based on specific inclusion criteria, ensuring that participants were not only within the Generation Z age bracket but had also actively interacted with Tokopedia's in-app game features within the last month. The final sample size consists of 190 respondents. This sample size is theoretically and statistically adequate for Variance-Based Structural Equation Modelling (PLS-SEM), safely exceeding the widely accepted 10-times rule proposed by [29], as the maximum number of structural paths directed at any latent construct in the research model is two.

Data Collection and Instrumentation

Data were collected via the distribution of a highly structured online questionnaire directly to the qualified respondents. The measurement instrumentation utilizes a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), allowing respondents to express their level of agreement regarding each statement. The operationalization of the constructs is detailed as follows: Gamification (G) is measured as a first-order construct using six distinct dimensions represented by six indicators (X₁–X₆), which evaluate social interaction, sense of control, goals, progress tracking, rewards, and prompts. Brand Engagement (BE) is operationalized through five indicators (Y_{1.1}–Y_{1.5}) that capture the cognitive, emotional, and behavioural aspects of user involvement, such as absorption and enthusiasm. Brand Loyalty (BL) is assessed using five indicators (Y_{2.1}–Y_{2.5}) that evaluate the long-term commitment of the user, including repeat purchase intentions and positive word-of-mouth recommendations.

To ensure data credibility, the instrumentation underwent rigorous evaluation. Indicator validity was confirmed as all outer loading values exceeded the minimum threshold of 0.7, while discriminant validity was verified using both cross-loading checks and the Fornell-Larcker criterion. Construct reliability was established through Cronbach's Alpha and Composite Reliability, with all variables comfortably surpassing the standard threshold of 0.7, proving the instrument to be exceptionally stable and free from measurement errors.

Data Analysis Technique

The empirical data were systematically processed using Structural Equation Modelling with Partial Least Squares (SEM-PLS) executed via the SmartPLS 3.0 software package. The statistical analysis followed a rigorous two-step evaluation procedure consisting of the measurement model (outer model) and the structural model (inner model). First, the outer model was evaluated to confirm the validity and reliability of the latent constructs through loading factors, Average Variance Extracted (AVE), cross-loadings, and composite reliability metrics. Second, the inner model was analyzed using path analysis to calculate the r^2 (R-Square) values, which determine the variance explained in the dependent variables. Finally, to test the hypothesized structural relationships, a non-parametric bootstrapping procedure was performed. This test generates the Path Coefficients (Original Sample Estimate), Mean of Sub-Sample, Standard Deviations, T-statistics, and exact P-values. The hypotheses are formally accepted if the T-statistic is greater than 1.96 with a corresponding P-value of less than 0.05.

Structural Equation Modelling with Partial Least Squares (SEM-PLS) analysis was used to arrive at the study's conclusions. By using this approach, the researchers were able to investigate intricate correlations between factors, which finally led to the creation of the path diagram seen in Figure 1 below.

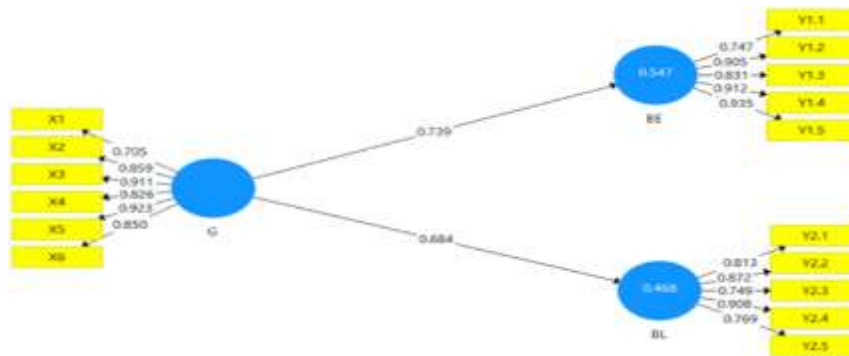


Figure 1 Path Diagram
Sources: Output SmartPLS 3.0

Result and Discussion

This section presents the results of the empirical data analysis, which was evaluated through two main stages of PLS-SEM analysis. The evaluation of the measurement model (outer model) and the structural model (inner model). All statistical findings are presented in detail to demonstrate the validity and reliability of the instruments, whilst also addressing the research hypotheses regarding the effect of gamification on engagement and brand loyalty.

Table 1. Results of the Convergent Validity Test (Outer Loadings)

Variabel Laten	Indikator	Nilai Outer Loading	Status Validitas
Gamification (G)	X1	0,705	Valid
	X2	0,859	Valid
	X3	0,911	Valid
	X4	0,826	Valid
	X5	0,923	Valid
	X6	0,850	Valid
Brand Engagement (BE)	Y1.1	0,747	Valid
	Y1.2	0,905	Valid
	Y1.3	0,831	Valid
	Y1.4	0,912	Valid
	Y1.5	0,935	Valid
Brand Loyalty (BL)	Y2.1	0,813	Valid
	Y2.2	0,872	Valid
	Y2.3	0,749	Valid
	Y2.4	0,908	Valid
	Y2.5	0,769	Valid

(Sources: Output SmartPLS 3.0)

The results of the convergent validity test presented in Table 1 show that all indicators within the constructs of Gamification, Brand Engagement and Brand Loyalty met the criteria for excellent validity. All outer loading values were recorded as being above the threshold of 0.70, indicating that each indicator was able to reflect the latent variables being measured consistently and accurately. The measurement instruments in this study are deemed suitable for use in further analysis as they are capable of capturing the concepts of gamification, brand engagement and brand loyalty in accordance with the theoretical definitions formulated in the literature review.

For gamification, the six indicators (X1–X6) showed outer loadings ranging from 0.705 to 0.923, with some indicators, such as X3 and X5, having values above 0.90,

indicating very high measurement strength. This range of values confirms that the dimensions of social interaction, sense of control, goals, progress tracking, rewards and prompts are clearly perceived by respondents as a cohesive, integrated experience on Tokopedia. This means that respondents are not only aware of the existence of the game features, but also feel that these features are enjoyable, challenging and add value to their use of the app, so that the gamification elements truly serve as a source of motivation for users to continue interacting with the platform.

In the Brand Engagement dimension, the five indicators (Y1.1–Y1.5) have outer loadings ranging from 0.747 to 0.935, indicating that the cognitive, affective and behavioural aspects of engagement with the Tokopedia brand are very well reflected by the instrument used. These high loading values imply that feelings of enthusiasm, a strong interest in the brand, and a tendency to participate actively and interact repeatedly with Tokopedia have been accurately captured by these indicators. Consequently, the engagement that emerges in the context of using gamification features is not merely a fleeting transactional activity, but has evolved into a form of psychological attachment that makes users willing to devote time, energy and focus to maintaining their relationship with the brand.

Meanwhile, Brand Loyalty, measured using five indicators (Y2.1–Y2.5), also showed strong outer loadings, ranging from 0.749 to 0.908. These results indicate that users' long-term commitment to Tokopedia reflected in their intention to repurchase, preference for using Tokopedia over other platforms, price tolerance, and willingness to recommend it to others has been consistently measured. The high outer loading values suggest that the positive experiences built through gamification do not stop at the level of engagement, but have been translated by respondents into tangible loyal behaviour, namely repeat usage, resilience to competitors' offers, and support in the form of positive word-of-mouth. Thus, Tokopedia has not only succeeded in attracting users' attention through its features, but has also been able to foster long-term consumer loyalty.

The results in Table 1 present a conceptual model of the research, which positions gamification as a multidimensional factor that plays a key role in driving brand engagement and brand loyalty. The convergent validity across all indicators demonstrates that the operationalisation of the variables aligns with the theoretical framework employed; this ensures that the structural relationships analysed in the subsequent stage (for example, via path coefficients and R-squared) are grounded in a validly measured foundation. This provides methodological assurance that the empirical findings regarding the influence of gamification on brand engagement and loyalty are not merely the result of statistical coincidence, but rather reflect the actual psychological reality and behaviour of Tokopedia users.

Table 2. Reliability Test Results

Latent Construct	Cronbach's Alpha	Composite Reliability	Status Reliabilitas
Gamification	0,921	0,939	Reliabel
Brand Engagement	0,918	0,939	Reliabel
Brand Loyalty	0,881	0,914	Reliabel

(Sources: Output SmartPLS 3.0)

A construct reliability assessment was carried out to ensure that all measurement instruments for the latent variables (Gamification, Brand Engagement and Brand Loyalty) possessed high internal consistency and were free from measurement error [27]. Based on

the results of data analysis using SmartPLS 3.0, as presented in Table 2, all research constructs were found to meet the criteria for excellent reliability. This is demonstrated by the Cronbach's Alpha and Composite Reliability values for each variable, which significantly exceeded the required minimum threshold of 0.70.

Specifically, the Gamification variable recorded a Cronbach's Alpha value of 0.921 and a Composite Reliability of 0.939, indicating that its six constituent indicators (X1–X6) possess a very strong level of internal consistency in reflecting the dimensions of social interaction, control, purpose, progress tracking, rewards, and interactive encouragement. Furthermore, the Brand Engagement variable achieved a Cronbach's Alpha value of 0.918 and a Composite Reliability of 0.939, demonstrating that the cognitive, emotional, and behavioural indicators of user engagement (Y1.1–Y1.5) are consistently aligned in measuring consumers' psychological attachment to the Tokopedia brand. Meanwhile, the Brand Loyalty variable recorded a Cronbach's Alpha value of 0.881 and a Composite Reliability of 0.914. Although these values are slightly lower than those of the other two variables, they still fall within the very high reliability category and are capable of accurately measuring consumers' long-term commitment and intention to make repeat purchases (Y2.1–Y2.5).

The high Composite Reliability values, ranging from 0.914 to 0.939, provide methodological confirmation that the questionnaire distributed to 190 respondents is highly stable and consistent, without rigidly assuming equal indicator weights [28]. It can therefore be concluded that all measurement instruments in this study have been shown to be highly reliable, free from instrument bias, and perfectly suitable for proceeding to the stage of structural model evaluation (inner model) and hypothesis testing.

Table 3. Results of the Discriminant Validity Test (Fornell–Larcker Criteria)

Konstruk	Brand Engagement	Brand Loyalty	Gamification
Brand Engagement	0,869		
Brand Loyalty	0,765	0,825	
Gamification	0,739	0,684	0,849

Note: The values on the diagonal are the square roots of the AVE (Square Root of AVE).

(Sources: Output SmartPLS 3.0)

Discriminant validity testing using the Fornell-Larcker criteria was carried out to ensure that each latent construct is empirically distinct and capable of measuring phenomena that differ from those of other constructs in the research model. According to the Fornell-Larcker criteria, discriminant validity is deemed to be met if the square root of the Average Variance Extracted (AVE) for each construct (indicated by the bold figures on the main diagonal) is consistently greater than the correlation coefficient between that construct and the other latent constructs in the model [29]. Based on the data analysis results in Table 3, all latent constructs were found to fully meet the Fornell–Larcker criteria. Specifically, the AVE value for the Brand Engagement construct was recorded at 0.869, which is significantly higher than its correlation coefficients with the Brand Loyalty (0.765) and Gamification (0.739) variables.

Furthermore, the Brand Loyalty construct has an AVE value of 0.825, which is also higher than its correlation coefficient with the Gamification variable (0.684). Similarly, for the Gamification variable, the AVE value obtained is 0.849, which consistently exceeds the correlation coefficients of this variable with Brand Engagement (0.739) and Brand Loyalty (0.684). The fulfilment of all the Fornell-Larcker criteria provides methodological

confirmation that the measurement model (outer model) in this study is free from issues of overlap between latent concepts. Consequently, it can be concluded that the variables Gamification, Brand Engagement and Brand Loyalty possess very strong discriminant validity and have been convincingly demonstrated to be independent and precisely measurable variables.

Table 4. Nilai R-Square (Koefisien Determinasi)

Variabel Endogen (Dependen)	Nilai R-Square	Category: Influence
Brand Engagement (BE)	0,547	Moderate (54.7%)
Brand Loyalty (BL)	0,468	Moderate (46.8%)

(Sources: Output SmartPLS 3.0)

The evaluation of the structural model (inner model) began by calculating the coefficient of determination (R^2) to determine the extent to which the variance of the endogenous variables (Brand Engagement and Brand Loyalty) could be explained by the exogenous variable (Gamification). In PLS-SEM analysis, the criteria for categorising the predictive strength of R^2 refer to the guidelines set out by [30], whereby an R^2 value above 0.67 is categorised as strong (substantive), above 0.33 as moderate, and below 0.33 is categorised as weak. Based on the results of data processing using SmartPLS 3.0, as presented in Table 4, the R^2 value for the Brand Engagement variable was recorded as 0.547.

The results shown in this table indicate that 54.7% of the variance in changes to Tokopedia users' brand engagement is directly explained by the gamification variable, whilst the remaining 45.3% is influenced by other variables or factors outside the scope of this research model. Meanwhile, the Brand Loyalty variable achieved an R^2 value of 0.468, meaning that 46.8 per cent of the variance in consumer brand loyalty can be explained by the application of gamification features, whilst the remaining 53.2 per cent is determined by other factors not examined within this framework. Both R^2 values are above the 0.33 threshold and are therefore categorised as having a moderate influence. Consequently, the Gamification variable possesses substantial and relevant predictive capability in fostering psychological attachment and long-term commitment among users of the Tokopedia app in Bombana Regency. The structural model developed in this study has been shown to possess good predictive accuracy and is suitable for progression to the stage of testing the significance of the hypotheses (path coefficients).

Table 5. Hypothesis Testing Results (Path Coefficients & Bootstrapping)

Hi p.	Relationships Between Variables	Original Sample (O)	Mean Sub-Sample (M)	Standard Deviation	T-Statistic	P-Value	Decision: Hypothesis
H ₁	Gamification -> Brand Engagement	0,739	0,740	0,040	18,376	0,000	Accepted
H ₂	Gamification -> Brand Loyalty	0,684	0,683	0,042	16,121	0,000	Accepted

(Sources: Output SmartPLS 3.0)

Hypothesis testing was carried out using the bootstrapping procedure in SmartPLS 3.0 to evaluate the significance and direction of the relationships between constructs in the structural model, with the hypothesis accepted if the T-statistic was > 1.96 and the P-

value was < 0.05 [29]. Based on the results of the data analysis in Table 5, the first hypothesis (H₁), which states that gamification has a positive and significant effect on brand engagement, was accepted, as indicated by a path coefficient (Original Sample) of 0.739, a T-statistic of 18.376, and a P-value of 0.000.

The results outlined above indicate that there is a direct improvement in the quality and appeal of features, which drives users' cognitive, emotional and behavioural engagement with the Tokopedia app. Meanwhile, the second hypothesis (H₂), which states that gamification has a positive and significant effect on brand loyalty, was also found to be accepted, with a coefficient of 0.684, a T-statistic of 16.121, and a P-value of 0.000. These findings confirm that the implementation of gamification has been empirically proven to be a key driver in fostering long-term commitment, repeat purchase intent, and user loyalty among Tokopedia's Generation Z users in Bombana Regency.

Table 6. Heterotrait-Monotrait Ratio (HTMT)

Konstruk	Brand Engagement	Brand Loyalty	Gamification
Brand Engagement			
Brand Loyalty	0,824		
Gamification	0,792	0,745	

Note: The HTMT criterion value must be below 0.85 or 0.90 to indicate good discriminant validity

(Sources: Output SmartPLS 3.0)

This study also measured the Heterotrait-Monotrait Ratio (HTMT). The HTMT approach is considered to be more sensitive and conservative than the traditional Fornell-Larcker criteria in detecting issues of discriminant validity between latent constructs [31]. According to [30], discriminant validity is considered to be very well met if the HTMT ratio between variables falls below the conservative threshold of 0.85 or the moderate threshold of 0.90.

Based on the results of the data analysis in Table 6, all HTMT ratios between constructs are consistently below the strict threshold of 0.85. Specifically, the HTMT ratio between the Brand Loyalty and Brand Engagement variables was 0.824, the ratio between Gamification and Brand Engagement was 0.792, and the ratio between Gamification and Brand Loyalty was 0.745. As all the values obtained fall below the 0.85 criterion, it can be firmly concluded that this measurement model possesses very strong discriminant validity and that each latent variable is, both conceptually and empirically, truly distinct from the others without any issues of overlapping correlations.

Table 7. F-Square Value (Effect Size)

Hubungan Struktural	Nilai f-Square	Securities Category
Gamification -> Brand Engagement	1,207	Large Effect (> 0.35)
Gamification -> Brand Loyalty	0,879	Large Effect (> 0.35)

Note: Classification of f-square values: 0.02 (small), 0.15 (moderate) and 0.35 (large).

(Sources: Output SmartPLS 3.0)

In addition to testing the significance of the relationships between constructs and the R² values, the evaluation of the structural model (inner model) is supplemented by an effect size test (effect size / f₂). This analysis aims to evaluate the extent of the relative contribution or practical impact of the predictor variable (Gamification) on the variance

in the endogenous variables (Brand Engagement and Brand Loyalty) if that variable were removed from the model [32].

Based on [33], [34] classification guidelines, an f^2 value of 0.02 is categorised as having a small effect, 0.15 as a medium effect, and values above 0.35 as having a large effect. Based on the data analysis results in Table 7, the Gamification variable was found to have a highly dominant and substantially significant impact on both endogenous variables in the research model. In the structural relationship between Gamification and Brand Engagement, an f^2 value of 1.207 was obtained. This value is well above the threshold of 0.35 and is therefore categorised as a very large effect. This finding indicates that Gamification is a key predictor that plays a crucial role in shaping user engagement with the Tokopedia app. Furthermore, in the relationship between Gamification and Brand Loyalty, the f^2 value achieved was 0.879, which also falls within the 'large effect' category [34].

These results confirm that the addition or removal of gamification features has a very significant impact, both theoretically and practically, on the development of brand loyalty amongst Generation Z users of Tokopedia in Bombana Regency. Overall, the high f^2 values for both pathways demonstrate that gamification strategies are not only statistically significant ($P\text{-value} < 0.05$) but also possess exceptionally strong practical relevance in fostering users' emotional attachment and commitment.

Discussion

The empirical findings of this study reinforce the framework of Self-Determination Theory (SDT) developed by [14], whereby the fulfilment of basic psychological needs namely autonomy, competence and relatedness is capable of simultaneously driving users' intrinsic and extrinsic motivation. Within the Tokopedia app, gamification elements such as daily check-ins, daily missions, and interactive features (such as 'Panen Telur' or 'Tap-Tap Mantap') do not merely serve as supplementary features, but act as psychological stimuli that transform transactional interactions into enjoyable, hedonistic experiences. Academically, these findings demonstrate that amongst Generation Z in developing regions such as Bombana Regency, the relationship between consumers and e-commerce platforms has shifted from a purely utilitarian model to an experience-driven, relational model [35]. The highly dominant predictive power of gamification on engagement and brand loyalty underscores that user retention in the digital age is largely determined by the extent to which a platform is able to foster emotional lock-in through the design of intuitive and participatory mechanisms [36].

From the users' perspective, particularly that of Generation Z in Bombana Regency, gamification features offer dual added value in the form of micro-economic incentives and digital entertainment. Generation Z, having grown up in a fully digital landscape, has a strong preference for experiences that are responsive, interactive and provide instant gratification [37]. Amidst limited access to physical entertainment in non-metropolitan areas, the Tokopedia app has successfully positioned itself not merely as a place to shop, but as a space for daily activities (daily routine). Users experience a sense of achievement when they successfully complete missions or collect points and discount vouchers [38]. This engagement gradually fosters habitual behaviour, where opening the Tokopedia app becomes a daily reflex. The financial rewards in the form of cashback or price discounts gained through gamification are seen as a token of appreciation for their loyalty, which ultimately fosters a sense of ownership and emotional attachment to the Tokopedia brand compared to rival platforms [39], [40].

For sellers and MSME operators whose businesses rely on the Tokopedia ecosystem, the high levels of gamification and user engagement have a crucial economic impact. One of the biggest challenges facing regional e-commerce sellers is the high cost of customer acquisition and low dwell time [1]. The gamification mechanisms implemented by Tokopedia indirectly drive organic user traffic to sellers' shopfronts through daily missions or special promotions. When users are encouraged to spend more time within the app to complete gamified missions, exposure to SME products increases significantly [8], [41]. This increase in engagement has been shown to boost the conversion rate from mere browsing to actual purchases. The brand loyalty built at the platform level also creates a spillover effect in the form of loyalty towards the partner shops within it, thereby helping local SMEs to maintain cash flow and ensure long-term business sustainability [42], [43].

From the perspective of policymakers and e-commerce platform developers, the findings of this study provide strategic guidance on the importance of localising and optimising features based on user engagement [44]. For Tokopedia's developers, these findings are crucial for redesigning the app to be network-capacity-friendly in developing regions without compromising its visual appeal and interactivity. Gamification strategies should not be rigidly standardised across metropolitan cities and suburban areas, but must be adapted to accommodate the characteristics and levels of digital literacy of local communities [45]. Meanwhile, for public policymakers and local authorities in Bombana Regency, the prevalence of this phenomenon indicates that the digital ecosystem has successfully transcended geographical boundaries. Local authorities can capitalise on the high levels of public engagement on these digital platforms to accelerate financial inclusion, promote the digitalisation of local SMEs, and build a more equitable infrastructure to support the digital economy [4], [46].

Conclusion

This study was conducted to address the issue of the effectiveness and impact of implementing gamification strategies on brand engagement and brand loyalty among Generation Z Tokopedia users in Bombana Regency, Southeast Sulawesi. Based on the results of empirical testing using the PLS-SEM approach, this study achieved its research objectives, finding that gamification has a proven, positive and highly significant effect on both brand engagement and brand loyalty. Furthermore, the integration of interactive elements into the e-commerce application has successfully transformed rigid transactional interaction patterns into an enjoyable digital experience, thereby fostering emotional engagement and encouraging repeat purchases amongst Generation Z consumers in non-metropolitan areas.

From an academic perspective, these findings enrich the literature on digital marketing management by extending the application of Self-Determination Theory (SDT) to the e-commerce ecosystem in developing regions, where the fulfilment of psychological motivations has been shown to be a key driver of user retention. This research provides benefits for platform developers and local SMEs as a strategic guide in designing experience-based marketing. Gamification strategies serve as a highly efficient tool for increasing dwell time and product exposure without having to rely continuously on discount strategies or price wars.

Although this study makes a significant contribution, it is not without certain limitations. Firstly, the sample was limited to 190 Generation Z respondents in Bombana Regency; therefore, any generalisation of the findings to other age groups or different

geographical areas should be approached with caution. Secondly, this study adopted a cross-sectional approach that captures respondents' perceptions at a single point in time, and focused solely on one e-commerce platform (Tokopedia), meaning it has not yet conducted a comprehensive comparison across platforms.

Based on the results of this study, it is recommended that Tokopedia's management continue to update interactive features and optimise the app's performance to ensure it remains accessible in areas with limited internet infrastructure. For MSME partner sellers, it is recommended that they be more proactive in aligning their shop's promotional programmes with the daily missions within the platform's gamification system. For future research, the researchers should expand the geographical scope of the study to a national level and conduct comparative studies across e-commerce platforms (such as Shopee or TikTok Shop). Furthermore, future model testing is recommended to include mediating or moderating variables, such as brand trust, perceived value, or customer satisfaction, in order to explore consumer psychological mechanisms more comprehensively.

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