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The role of gamification in enhancing mobile payment adoption intention among Generation Z: An integrated UTAUT2 and risk perspective

Desak Made Indy Vanessa Dana

Faculty of Economics and Business, Udayana University, Denpasar, Indonesia
Corresponding Email: indyvanessa09@gmail.com

Dodik Ariyanto

Faculty of Economics and Business, Udayana University, Denpasar, Indonesia

Abstract--This study aims to provide empirical evidence on the effects of performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived risk on individuals' intention to adopt mobile payment, as well as to examine the moderating role of gamification in the relationships among these variables among Generation Z in Bali. This research employs a quantitative associative approach by distributing online questionnaires to 167 Generation Z respondents in Bali Province using purposive sampling. The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS software. The latent variables identified include performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived risk as exogenous variables; behavioral intention as the endogenous variable; and gamification as the moderating variable. The results indicate that performance expectancy, effort expectancy, social influence, and facilitating conditions have a positive and significant effect on individuals' intention to use mobile payment. Conversely, perceived risk has a negative and significant effect on adoption intention. A key finding of this study is that gamification positively moderates the relationships between all independent variables and mobile payment usage intention. Technically, game elements such as points and interactive challenges act as a multiplier effect that strengthens rational driving factors while simultaneously serving as a psychological mitigation mechanism to reduce perceived risk barriers.

Keywords---gamification, mobile payment, adoption intention, Generation Z, UTAUT2, perceived risk.



Introduction

In recent years, the rapid development of the internet and smartphones has transformed global transaction systems, leading to a significant increase in electronic commerce worldwide (Himel et al., 2021). This transformation has been further accelerated by the Industrial Revolution 4.0, which has enhanced the practicality and efficiency of payment systems (Karjaluo et al., 2020). In Indonesia, the advancement of digital technology has driven substantial changes across various sectors, particularly in the financial industry, where cashless payment systems such as mobile payment (m-payment) have experienced rapid growth (Rahman et al., 2024; Manurung et al., 2022; Savitri et al., 2022).

The COVID-19 pandemic has further intensified this digital transformation by accelerating financial digitalization and encouraging broader adoption of digital payment platforms due to mobility restrictions and social distancing policies (Akhtar et al., 2023). Consequently, mobile payment has become an essential component of daily transactions, offering convenience, efficiency, and accessibility compared to traditional cash-based systems (Hamdani et al., 2022; Ting et al., 2016). This shift has also contributed to financial inclusion and the development of the digital economy (Manurung et al., 2022).

In Indonesia, the proliferation of e-wallet services such as GoPay, OVO, Dana, LinkAja, and ShopeePay reflects the increasing adoption of mobile payment technologies (Denaputri & Usman, 2020). The number of e-wallet users continues to grow significantly, with Indonesia projected to become the largest e-wallet market in Southeast Asia (GoodStats, 2025). Notably, Generation Z represents a dominant user group due to their high digital literacy and dependence on technology in daily life. Their preferences for efficiency, convenience, and seamless digital experiences make them a key segment in understanding mobile payment adoption behavior.

From a theoretical perspective, the adoption of mobile payment can be explained using the Unified Theory of Acceptance and Use of Technology (UTAUT2), which highlights performance expectancy, effort expectancy, social influence, and facilitating conditions as key determinants of behavioral intention (Venkatesh et al., 2003; Lutfi et al., 2022). Previous studies have consistently demonstrated that these factors significantly influence the intention to use mobile payment (Chresentia & Suharto, 2020; Laywill et al., 2020; Migliore et al., 2022; Ming Ming et al., 2021; Soodan & Rana, 2020; Syifa & Tohang, 2020). However, despite the benefits offered by mobile payment, its adoption remains constrained by perceived risk, which includes concerns related to financial security, privacy, and system reliability (Akhtar et al., 2023). High levels of perceived risk have been shown to negatively affect adoption intention, acting as a significant psychological barrier (Hidayat et al., 2020; Migliore et al., 2022; Rodiah & Melati, 2020).

To address this issue, recent studies have introduced gamification as an innovative approach to enhance user engagement and reduce adoption barriers. Gamification refers to the application of game elements, such as points, rewards, and interactive challenges, in non-game contexts to motivate user behavior (Akhtar et al., 2023; Rahman et al., 2024). In the context of mobile payment,

gamification has been shown to increase user motivation, engagement, and satisfaction, thereby encouraging continued usage (Bitrián et al., 2021; Behl & Pereira, 2021; Hsu & Chen, 2018). Moreover, gamification can function as both a motivational driver and a psychological mechanism to mitigate perceived risk by shifting users' focus toward rewarding experiences (Ayyash & Herzallah, 2023).

Despite its potential, empirical findings regarding the role of gamification in mobile payment adoption remain inconsistent. While some studies report significant positive effects, others suggest limited impact due to insufficient exploration of gamification elements within financial technology contexts (Dikcius et al., 2021; Purohit et al., 2022; Yang et al., 2023). Furthermore, prior studies have not fully integrated gamification as a moderating variable within the core UTAUT2 framework, particularly in emerging markets such as Indonesia. This gap highlights the need for a more comprehensive model that examines how gamification interacts with key adoption determinants and perceived risk.

Therefore, this study aims to develop and empirically test an integrated model that incorporates UTAUT2 variables and perceived risk, with gamification as a moderating variable, in the context of mobile payment adoption among Generation Z in Bali. By doing so, this research seeks to provide theoretical contributions by extending the UTAUT2 framework and practical implications for digital payment providers in designing more engaging and user-centered financial technologies.

Literature Review and Hypothesis Development

Performance expectancy refers to the extent to which individuals believe that using a system enhances their performance (Venkatesh et al., 2003). Within the UTAUT2 framework, it represents a key determinant of technology adoption, as users are more likely to adopt systems that improve efficiency, productivity, and outcomes. Empirical studies consistently confirm that performance expectancy significantly influences the intention to use mobile payment (Chresentia & Suharto, 2020; Hidayat et al., 2020; Laywillia et al., 2020; Migliore et al., 2022; Ming Ming et al., 2021; Soodan & Rana, 2020; Syifa & Tohang, 2020). Therefore, higher perceived performance benefits are expected to increase individuals' intention to use mobile payment.

H1: Performance expectancy has a positive effect on individuals' intention to use mobile payment.

Effort expectancy reflects the perceived ease of using a system and the extent to which it reduces time and effort (Venkatesh et al., 2003, 2012). In the context of mobile payment, ease of use plays a crucial role in encouraging adoption, particularly for new technologies. Prior studies demonstrate that effort expectancy has a positive and significant effect on usage intention, as users are more motivated to adopt systems that are simple and convenient (Chresentia & Suharto, 2020; Hidayat et al., 2020; Laywillia et al., 2020; Migliore et al., 2022; Syifa & Tohang, 2020). Thus, higher perceived ease of use is expected to enhance behavioral intention toward mobile payment.

H2: Effort expectancy has a positive effect on individuals' intention to use mobile payment.

Social influence refers to the extent to which individuals perceive that important others encourage them to use a particular technology (Venkatesh et al., 2003, 2012). In mobile payment adoption, recommendations and support from peers, family, or society serve as social validation that reduces uncertainty and increases trust. Empirical evidence indicates that social influence significantly affects behavioral intention to use mobile payment (Hidayat et al., 2020; Laywilla et al., 2020; Migliore et al., 2022; Ming Ming et al., 2021; Soodan & Rana, 2020). Consequently, stronger social influence is expected to positively drive individuals' intention to adopt mobile payment.

H3: Social influence has a positive effect on individuals' intention to use mobile payment.

Facilitating conditions refer to the extent to which individuals believe that the necessary resources and infrastructure are available to support system use (Venkatesh et al., 2003). These include access to devices, technical support, and user knowledge, which are critical for successful technology adoption. Previous studies confirm that facilitating conditions significantly influence behavioral intention, as adequate support increases users' confidence and reduces barriers to usage (Hidayat et al., 2020; Laywilla et al., 2020; Migliore et al., 2022; Ming Ming et al., 2021; Soodan & Rana, 2020). Therefore, stronger facilitating conditions are expected to positively influence mobile payment adoption intention.

H4: Facilitating conditions have a positive effect on individuals' intention to use mobile payment.

Perceived risk refers to the uncertainty and potential negative consequences associated with using new technologies, including financial, privacy, and security concerns (Akhtar et al., 2023). Drawing from the Theory of Planned Behavior (Ajzen, 1991), perceived behavioral control suggests that higher perceived risk reduces individuals' willingness to adopt a system. Empirical studies consistently show that perceived risk negatively affects mobile payment adoption intention (Akhtar et al., 2023; Hidayat et al., 2020; Karjaluoto et al., 2020; Migliore et al., 2022; Rodiah & Melati, 2020; Setiawan et al., 2020). Thus, higher perceived risk is expected to decrease behavioral intention.

H5: Perceived risk has a negative effect on individuals' intention to use mobile payment.

Gamification, defined as the application of game elements in non-game contexts, enhances user engagement and motivation (Akhtar et al., 2023; Rahman et al., 2024; Bitrián et al., 2021). When combined with performance expectancy, gamification adds hedonic and social value to functional benefits, thereby amplifying perceived usefulness. Empirical studies indicate that gamification strengthens user engagement and moderates the relationship between performance-related factors and behavioral intention (Bitrián et al., 2021; Akhtar et al., 2023; Ayyash & Herzallah, 2023). Therefore, gamification is expected to strengthen the positive effect of performance expectancy on mobile payment adoption intention.

H6: Gamification strengthens the positive relationship between performance expectancy and individuals' intention to use mobile payment.

Gamification enhances user experience by transforming ease of use into an engaging and enjoyable interaction (Akhtar et al., 2023; Rahman et al., 2024; Bitrián et al., 2021). When effort expectancy is high, the addition of gamification elements such as intuitive interfaces and instant rewards reinforces users' sense of control and competence. Prior research suggests that gamification significantly moderates the relationship between effort expectancy and user engagement (Bitrián et al., 2021; Akhtar et al., 2023; Ayyash & Herzallah, 2023). Thus, gamification is expected to strengthen the positive relationship between effort expectancy and behavioral intention.

H7: Gamification strengthens the positive relationship between effort expectancy and individuals' intention to use mobile payment.

Gamification incorporates social elements such as leaderboards, achievements, and sharing features, which amplify social interaction and visibility (Akhtar et al., 2023; Rahman et al., 2024; Bitrián et al., 2021). These features transform social pressure into an engaging and rewarding experience, reinforcing individuals' motivation to conform to social norms. Empirical evidence suggests that gamification enhances social-driven engagement and moderates the influence of social factors on behavioral intention (Bitrián et al., 2021; Akhtar et al., 2023; Ayyash & Herzallah, 2023). Therefore, gamification is expected to strengthen the positive effect of social influence on mobile payment adoption intention.

H8: Gamification strengthens the positive relationship between social influence and individuals' intention to use mobile payment.

Gamification enhances facilitating conditions by providing interactive guidance, feedback, and motivational reinforcement (Akhtar et al., 2023; Rahman et al., 2024; Bitrián et al., 2021). When users already possess adequate resources and support, gamification further increases their sense of competence and engagement through game-based features such as progress tracking and rewards. Prior studies confirm that gamification strengthens user engagement and moderates structural support factors in technology adoption (Bitrián et al., 2021; Akhtar et al., 2023; Ayyash & Herzallah, 2023). Thus, gamification is expected to strengthen the positive relationship between facilitating conditions and behavioral intention.

H9: Gamification strengthens the positive relationship between facilitating conditions and individuals' intention to use mobile payment.

Gamification can mitigate perceived risk by shifting users' focus from potential threats to rewarding and engaging experiences (Akhtar et al., 2023; Rahman et al., 2024; Bitrián et al., 2021). Features such as instant feedback, rewards, and progress visualization create a sense of control and reduce psychological uncertainty. Empirical studies suggest that gamification enhances trust and moderates the negative impact of perceived risk on user behavior (Bitrián et al., 2021; Akhtar et al., 2023). Therefore, gamification is expected to weaken the negative effect of perceived risk on mobile payment adoption intention.

H10: Gamification weakens the negative relationship between perceived risk and individuals' intention to use mobile payment.

Methods

This study employs a quantitative associative research design to examine the relationships between performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived risk on behavioral intention to use mobile payment, with gamification as a moderating variable. A descriptive approach is also applied to characterize the variables under investigation.

The research was conducted in Bali, Indonesia, over a three-month period from October to December 2025. The population of this study consists of Generation Z individuals (born between 1997 and 2012) residing in Bali. Due to the absence of precise population data, the population size is considered unknown. The sample was determined using accidental sampling, resulting in 167 respondents, which satisfies multiple sampling criteria, including Green's formula, the 10-times rule, and G*Power analysis.

Primary data were collected באמצעות an online questionnaire distributed via Google Forms. The measurement instrument employed a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The constructs measured include performance expectancy, effort expectancy, social influence, facilitating conditions, perceived risk, behavioral intention, and gamification. All measurement items were adapted from established studies, particularly Venkatesh et al. (2012) and Akhtar et al. (2023).

A pilot test was conducted with 30 respondents to ensure the validity and reliability of the instrument. The validity test used Pearson correlation (≥ 0.30), while reliability was assessed using Cronbach's alpha (≥ 0.70), indicating that all constructs were valid and reliable.

Data analysis was performed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. The analysis includes evaluation of the outer model (measurement model) through convergent validity, discriminant validity, and composite reliability, as well as evaluation of the inner model (structural model) using path coefficients, R^2 , effect size (f^2), and predictive relevance (Q^2). Hypothesis testing was conducted bootstrapping with a significance level of 5% (t-statistic ≥ 1.96). Moderation effects were examined by analyzing interaction terms and their significance in influencing behavioral intention.

Result and Discussion

Respondent Profile

The respondents in this study consist of 167 Generation Z individuals (aged 17–28 years) in Bali Province. Data collection was conducted through an online questionnaire distributed via Google Forms.

Table 1. Respondent Characteristics

No	Characteristics	Classification	Number of Respondents	Percentage (%)
1	Age	17 years	11	6.6
		18 years	7	4.2
		19 years	11	6.6
		20 years	10	6.0
		21 years	14	8.4
		22 years	7	4.2
		23 years	19	11.4
		24 years	21	12.6
		25 years	14	8.4
		26 years	17	10.2
		27 years	15	9.0
		28 years	21	12.6
Total			167	100
2	Gender	Male	74	44.3
		Female	93	55.7
Total			167	100
3	Region	Badung Regency	21	12.6
		Buleleng Regency	27	16.2
		Gianyar Regency	25	15.0
		Tabanan Regency	23	13.8
		Bangli Regency	6	3.6
		Jembrana Regency	10	6.0
		Karangasem Regency	19	11.4
		Klungkung Regency	8	4.8
		Denpasar City	28	16.8
		Total		
4	Mobile Payment Application	GoPay	102	61.1
		OVO	48	28.7
		Dana	73	43.7
		ShopeePay	87	52.1
		LinkAja	40	24.0
5	Number of Applications Used	1 Application	53	31.7
		2 Applications	82	49.1
		3 Applications	27	16.2
		4 Applications	5	3.0
Total			167	100

Primary Data, 2026

Table 1 presents the demographic and behavioral characteristics of the respondents. Based on age distribution, the respondents represent a diverse range within Generation Z, with the most dominant age groups being 24 and 28 years, each accounting for 21 respondents (12.6%). This is followed by respondents aged 23 years (11.4%) and 26 years (10.2%). These findings indicate that the sample is dominated by young adults in their productive age, who are theoretically more dependent on digital technologies for their daily economic activities.

In terms of gender, the majority of respondents are female, comprising 93 individuals (55.7%), while male respondents account for 74 individuals (44.3%). Although both genders are well represented, the slightly higher participation of females may reflect current trends in digital consumption behavior, where female users show greater interest in adopting and exploring mobile payment applications that offer convenience and engaging features.

From a regional perspective, respondents are distributed across all areas of Bali Province, covering eight regencies and one city. Denpasar City contributes the largest proportion with 28 respondents (16.8%), followed by Buleleng Regency (16.2%) and Gianyar Regency (15%). Other regions such as Tabanan, Badung, and Karangasem also contribute significantly. This distribution provides a comprehensive overview of digital technology penetration in Bali, which is known as a dynamic economic and tourism hub supported by well-developed digital infrastructure.

Regarding application usage preferences, GoPay emerges as the most widely used mobile payment application, with 102 users (61.1%). This is followed by ShopeePay (52.1%) and Dana (43.7%), while OVO and LinkAja show lower usage rates. These findings indicate intense competition within the Indonesian digital wallet market, where applications offering broader service integration and interactive features, including gamification, are more successful in attracting Generation Z users.

In terms of the number of applications used, the majority of respondents (49.1%) use two mobile payment applications simultaneously, followed by 31.7% who use only one application. A smaller proportion uses three applications (16.2%) and four applications (3.0%). No respondents reported using five applications. The high proportion of users utilizing more than one application (68.3%) suggests that Generation Z tends to adopt multiple platforms, likely driven by differences in features, promotional offers, and merchant accessibility.

Descriptive Statistics and Measurement Model (Outer Model)

Table 2. Descriptive Statistics and Outer Model Results

No	Variable	Indicator	Mean	Std Dev	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability	Remark
1	Performance Expectancy (X1)	X1.1	3.916	0.885	0.866	0.761	0.896	0.927	Reliable

No	Variable	Indicator	Mean	Std Dev	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability	Remark
		X1.2	4.012	0.954	0.865				
		X1.3	4.048	0.921	0.867				
		X1.4	4.048	0.888	0.891				
2	Effort Expectancy (X2)	X2.1	3.928	0.919	0.839	0.733	0.879	0.917	Reliable
		X2.2	3.976	0.868	0.852				
		X2.3	4.012	0.875	0.867				
		X2.4	3.982	0.865	0.867				
3	Social Influence (X3)	X3.1	4.036	0.902	0.897	0.791	0.868	0.919	Reliable
		X3.2	4.012	0.916	0.892				
		X3.3	4.060	0.853	0.879				
4	Facilitating Conditions (X4)	X4.1	4.012	0.875	0.787	0.715	0.867	0.909	Reliable
		X4.2	4.090	0.881	0.880				
		X4.3	4.012	0.862	0.844				
		X4.4	4.042	0.850	0.869				
5	Perceived Risk (X5)	X5.1	1.994	0.899	0.862	0.711	0.898	0.900	Reliable
		X5.2	2.012	0.875	0.859				
		X5.3	2.132	0.939	0.833				
		X5.4	2.102	0.880	0.806				
		X5.5	2.012	0.916	0.853				
6	Behavioral Intention (Y)	Y1	4.737	0.516	0.861	0.779	0.858	0.860	Reliable
		Y2	4.042	0.572	0.849				
		Y3	4.341	0.626	0.893				
7	Gamification (M)	M1	4.048	0.947	0.858	0.735	0.881	0.903	Reliable
		M2	4.090	0.908	0.883				
		M3	4.000	0.929	0.832				
		M4	4.018	0.879	0.856				

Primary Data, 2026

Based on Table 2, the Performance Expectancy (X1) variable is measured using four indicators related to the belief that the system enhances performance. The descriptive analysis shows that the highest mean values are found in items X1.3 and X1.4, both with a value of 4.048. These values fall within the “high” category (3.40–4.19), indicating that respondents perceive mobile payment systems as highly useful in improving efficiency and productivity in their daily activities.

The Effort Expectancy (X2) variable is measured using four indicators reflecting the ease of system use. The results show that item X2.3 has the highest mean value (4.012), which is categorized as high. This suggests that respondents

perceive mobile payment systems as easy to use and requiring minimal effort to learn and operate.

The Social Influence (X3) variable is measured using three indicators assessing the influence of the surrounding environment. The highest mean is found in item X3.3 (4.060), which is categorized as high. This indicates that the opinions and encouragement of significant others strongly influence respondents' decisions to use mobile payment services.

The Facilitating Conditions (X4) variable is measured using four indicators related to the availability of resources and infrastructure. The highest mean value is found in item X4.2 (4.090), which is also categorized as high. This suggests that respondents generally have sufficient resources, such as smartphones and internet access, to support the use of mobile payment systems.

The Perceived Risk (X5) variable, measured using five indicators, shows relatively lower mean values compared to other variables. The highest mean is found in item X5.3 (2.132), which falls into the "low" category (1.80–2.59). This indicates that respondents tend to perceive the risks associated with mobile payment as relatively low and still within acceptable limits.

The Behavioral Intention (Y) variable is measured using three indicators reflecting the intention to continue using mobile payment. The highest mean is found in item Y1 (4.737), which falls into the "very high" category (4.20–5.00). This demonstrates a strong commitment among respondents to continue using mobile payment services in the future.

Finally, the Gamification (M) variable is measured using four indicators related to perceived game elements. The highest mean is found in item M2 (4.090), categorized as high. This indicates that reward mechanisms such as points are effective in creating engaging and motivating user experiences. The high mean value of this item suggests that, for Generation Z in Bali, points are not merely functional elements but also provide a psychological sense of achievement. This finding aligns with the concept that gamification can enhance user motivation through meaningful extrinsic rewards.

Outer Model Evaluation

Convergent Validity

Convergent validity aims to evaluate the correlation between latent variables and their indicators. An indicator is considered valid if the loading factor value is greater than 0.7 and the Average Variance Extracted (AVE) value exceeds 0.5 (Hair et al., 2019). The results of the convergent validity test in Table 2 indicate that all indicators of each latent variable meet the convergent validity criteria, as they have outer loading values greater than 0.7. Therefore, all indicators are considered valid. Similarly, the AVE values for each latent variable are greater than 0.5, indicating that all latent variables in this study are valid and meet the requirements of convergent validity.

Discriminant Validity

After testing convergent validity, discriminant validity was assessed to ensure that each construct is distinct from others. Discriminant validity is achieved when the square root of AVE is greater than the correlations between latent variables, as assessed using the Fornell-Larcker criterion. The results are presented in Table 2 below.

Table 3. Discriminant Validity Results

	X1	X2	M	X4	Y	X3	X5
X1	0.872						
X2	0.465	0.856					
M	-0.103	-0.064	0.857				
X4	0.389	0.324	-0.011	0.846			
Y	0.520	0.447	0.231	0.443	0.883		
X3	0.386	0.320	0.086	0.360	0.536	0.889	
X5	-0.453	-0.291	0.060	-0.310	-0.453	-0.293	0.843

Primary Data, 2026

Table 2 shows that all latent variables and indicators meet the Fornell-Larcker criterion. Each latent variable has a square root of AVE greater than its correlations with other variables. Therefore, all constructs are distinct and valid for further analysis.

Composite Reliability

Reliability testing aims to measure the consistency of the indicators. This study evaluates reliability using Composite Reliability and Cronbach's Alpha. A construct is considered reliable if both values exceed 0.7. All latent variables have Cronbach's Alpha and Composite Reliability values above 0.7. This indicates that all constructs meet reliability criteria and are consistent for further analysis.

Inner Model Evaluation

Coefficient of Determination (R^2)

The R-square value measures the extent to which exogenous variables explain endogenous variables. According to Hair et al. (2019), values of 0.75, 0.50, and 0.25 indicate strong, moderate, and weak explanatory power, respectively. The adjusted R-square value for behavioral intention is 0.754, indicating that 75.4% of Generation Z's intention to use mobile payment is explained by performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived risk. This value falls into the strong category, suggesting substantial explanatory power.

Predictive Relevance (Q^2)

The Q^2 value evaluates the predictive relevance of the model. Values above 0 indicate predictive relevance, while values above 0.25 and 0.50 indicate moderate and strong predictive relevance, respectively. The Q^2 value of 0.732 indicates strong predictive relevance, demonstrating that the model has high predictive capability in explaining the endogenous variable.

Hypothesis Testing

Hypothesis testing was conducted using path coefficients and bootstrapping procedures. Path coefficients indicate the direction of relationships, while bootstrapping ensures statistical stability (Hair et al., 2019; Ghozali, 2021). A relationship is significant if T-statistics > 1.96 and P-values < 0.05.

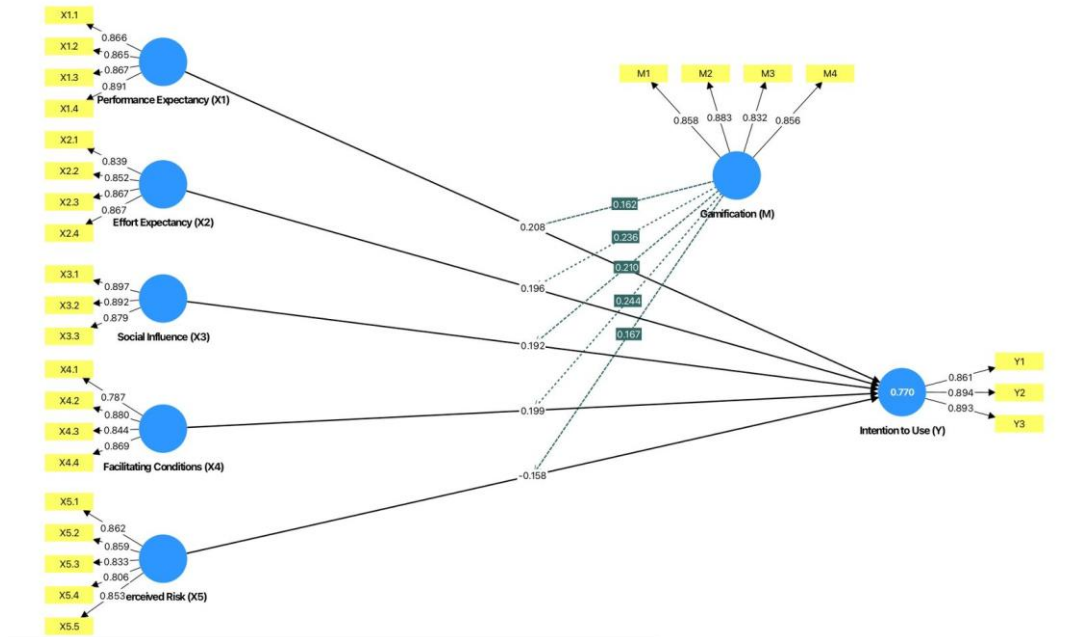


Figure 1. Path Coefficient

Table 2. Results of Adjusted R-square, Q²predict, and Hypothesis Testing

Relationship	Original Sample (O)	Sample Mean (M)	STDEV	T Statistics	P Values	Conclusion
X1 → Y	0.280	0.214	0.059	3.519	0.000	Supported
X2 → Y	0.196	0.200	0.049	3.980	0.000	Supported
X3 → Y	0.192	0.206	0.053	3.614	0.000	Supported
X4 → Y	0.199	0.202	0.050	3.982	0.000	Supported
X5 → Y	-0.158	-0.172	0.050	3.171	0.001	Supported
M×X1 → Y	0.162	0.156	0.071	2.274	0.012	Supported
M×X2 → Y	0.236	0.235	0.057	4.155	0.000	Supported
M×X3 → Y	0.210	0.186	0.070	2.981	0.001	Supported
M×X4 → Y	0.244	0.243	0.062	3.927	0.000	Supported
M×X5 → Y	0.167	0.180	0.066	2.540	0.006	Supported

Primary Data, 2026

The Effect of Performance Expectancy on Behavioral Intention to Use Mobile Payment

The statistical results indicate that performance expectancy has a positive and significant effect on behavioral intention to use mobile payment. This is supported

by high descriptive values, particularly in efficiency and productivity indicators (X1.3 and X1.4 = 4.048), reflecting that Generation Z perceives mobile payment as a useful tool that enhances transaction effectiveness and daily productivity. From a theoretical perspective, this finding aligns with the UTAUT2 framework, which identifies performance expectancy as a primary determinant of technology adoption. When individuals perceive tangible benefits, such as increased efficiency and accuracy, their behavioral intention is strengthened. This result is consistent with prior studies (Hidayat et al., 2020; Migliore et al., 2022; Chresentia & Suharto, 2020), confirming that perceived usefulness is a key driver of mobile payment adoption.

The Effect of Effort Expectancy on Behavioral Intention to Use Mobile Payment

The results show that effort expectancy has a positive and significant effect on behavioral intention, supported by a high mean score on the ease-of-use indicator (X2.3 = 4.012). This indicates that Generation Z perceives mobile payment systems as easy to learn and operate, requiring minimal cognitive effort.

This finding is consistent with UTAUT2, where effort expectancy plays a crucial role in influencing initial technology adoption. The easier a system is to use, the more likely individuals are to adopt it. This result is supported by Venkatesh et al. (2003), as well as Laywilla et al. (2020) and Migliore et al. (2022), which highlight that ease of use significantly enhances user intention in digital payment systems.

The Effect of Social Influence on Behavioral Intention to Use Mobile Payment

The findings reveal that social influence has a positive and significant effect on behavioral intention, with a high mean score on the recommendation indicator (X3.1 = 3.936). This suggests that Generation Z is strongly influenced by their social environment, including family and peers, in deciding to use mobile payment. In line with UTAUT2, social influence reflects the degree to which individuals perceive that important others believe they should use a particular technology. This finding is supported by previous studies (Hidayat et al., 2020; Migliore et al., 2022; Soodan & Rana, 2020), which confirm that social validation enhances trust and accelerates adoption. Therefore, social norms play a significant role in shaping behavioral intention.

The Effect of Facilitating Conditions on Behavioral Intention to Use Mobile Payment

The results indicate that facilitating conditions have a positive and significant effect on behavioral intention, with the highest mean score observed in compatibility (X4.3 = 4.144). This demonstrates that the availability of supporting infrastructure, such as compatible devices and internet access, plays a crucial role in encouraging mobile payment adoption. According to UTAUT2, facilitating conditions represent the extent to which individuals believe that technical and organizational resources support system use. This finding is consistent with Ming Ming et al. (2021) and Laywilla et al. (2020), emphasizing that adequate infrastructure reduces barriers to adoption. Thus, better facilitating conditions lead to stronger behavioral intention.

The Effect of Perceived Risk on Behavioral Intention to Use Mobile Payment

The results confirm that perceived risk has a negative and significant effect on behavioral intention, with high concern regarding data security (X6.1 = 3.968).

This indicates that perceived risk acts as a major psychological barrier in adopting mobile payment.

From a theoretical standpoint, perceived risk represents uncertainty regarding potential negative consequences, such as data breaches or financial loss. This finding is supported by Akhtar et al. (2023) and Rodiah & Melati (2020), which show that risk perception can weaken adoption intention despite perceived benefits. Therefore, trust and security are essential factors in promoting mobile payment usage.

The Moderating Effect of Gamification on the Relationship Between Performance Expectancy and Behavioral Intention to Use Mobile Payment

The results show that gamification positively moderates the relationship between performance expectancy and behavioral intention ($\beta = 0.162$). This indicates that the perceived usefulness of mobile payment becomes more influential when enhanced by gamified features. Theoretically, gamification integrates utilitarian and hedonic values, increasing user engagement and motivation. This finding is supported by Ayyash & Herzallah (2023) and Bitrián et al. (2021), which highlight that gamification enhances user experience. Thus, gamification acts as a multiplier effect that strengthens the impact of performance expectancy on behavioral intention.

The Moderating Effect of Gamification on the Relationship Between Effort Expectancy and Behavioral Intention to Use Mobile Payment

The results indicate that gamification significantly strengthens the relationship between effort expectancy and behavioral intention ($\beta = 0.236$). This suggests that ease of use becomes more impactful when combined with interactive and engaging elements. From a theoretical perspective, gamification enhances users' intrinsic motivation and sense of competence. This finding is supported by Bitrián et al. (2021) and Akhtar et al. (2023), which emphasize that gamification improves user engagement. Therefore, ease of use combined with enjoyable experiences leads to stronger adoption intention.

The Moderating Effect of Gamification on the Relationship Between Social Influence and Behavioral Intention to Use Mobile Payment

The findings reveal that gamification strengthens the effect of social influence on behavioral intention ($\beta = 0.210$). This indicates that gamified features amplify the role of social norms in encouraging technology adoption. Gamification allows users to express social identity through features such as leaderboards and rewards. This finding is supported by Ayyash & Herzallah (2023) and Bitrián et al. (2021), which show that gamification enhances social engagement. Consequently, mobile payment usage becomes a socially driven activity reinforced by interactive elements.

The Moderating Effect of Gamification on the Relationship Between Facilitating Conditions and Behavioral Intention to Use Mobile Payment

The results show that gamification strengthens the relationship between facilitating conditions and behavioral intention, with the highest interaction coefficient ($\beta = 0.244$). This suggests that infrastructure becomes more effective when combined with engaging user experiences. From a theoretical standpoint, gamification enhances the utilization of available resources by increasing

motivation and perceived competence. This finding is supported by Akhtar et al. (2023) and Bitrián et al. (2021). Thus, gamification optimizes the role of facilitating conditions in promoting technology adoption.

The Moderating Effect of Gamification on the Relationship Between Perceived Risk and Behavioral Intention to Use Mobile Payment

The findings indicate that gamification weakens the negative effect of perceived risk on behavioral intention ($\beta = 0.167$). This suggests that gamification mitigates the psychological impact of perceived risks. Theoretically, gamification acts as a psychological mechanism that shifts user focus from risk to positive experiences. Supported by Akhtar et al. (2023) and Bitrián et al. (2021), gamification enhances user engagement and increases risk tolerance. Therefore, gamification plays a crucial role in reducing barriers to mobile payment adoption.

Conclusion

This study provides empirical evidence on the determinants of mobile payment adoption intention among Generation Z by integrating the UTAUT2 model with perceived risk and examining the moderating role of gamification. The findings reveal that performance expectancy, effort expectancy, social influence, and facilitating conditions have positive and significant effects on behavioral intention, while perceived risk has a negative and significant effect. These results confirm that both functional and social factors play a crucial role in shaping technology adoption, whereas perceived risk remains a key barrier.

A significant contribution of this study lies in the role of gamification as a moderating variable. The results demonstrate that gamification strengthens the positive relationships between all UTAUT2 constructs and behavioral intention, while also mitigating the negative impact of perceived risk. This indicates that gamification functions not only as an engagement tool but also as a psychological mechanism that enhances motivation and reduces perceived uncertainty.

Overall, this study extends the UTAUT2 framework by incorporating gamification and perceived risk into a unified model, offering a more comprehensive understanding of mobile payment adoption behavior among Generation Z in the context of digital financial services.

Managerial Implications

The findings of this study provide several practical implications for mobile payment providers, fintech companies, and digital service designers. First, enhancing performance expectancy should be prioritized by clearly communicating the functional benefits of mobile payment, such as speed, convenience, and efficiency. Service providers should continuously improve system reliability and transaction performance to strengthen users' perceived value.

Second, effort expectancy highlights the importance of user-friendly design. Mobile payment platforms should ensure intuitive interfaces, simple navigation, and minimal learning effort to attract and retain Generation Z users. Reducing

complexity in onboarding and transaction processes can significantly improve adoption rates.

Third, the significant role of social influence suggests that companies should leverage social marketing strategies, including influencer endorsements, peer recommendations, and community-based campaigns. Integrating social sharing features within the application can further amplify user engagement and adoption.

Fourth, facilitating conditions emphasize the need for adequate infrastructure and support systems. Providers should ensure seamless integration across devices, stable network performance, and accessible customer support services. Educating users about system features and security measures can also enhance user confidence.

Fifth, given the negative impact of perceived risk, it is essential for service providers to strengthen security systems, enhance data protection, and communicate these safeguards transparently. Building trust through certifications, guarantees, and clear privacy policies can help reduce user concerns.

Most importantly, the moderating role of gamification offers a strategic opportunity. Companies should incorporate gamification elements such as reward points, badges, challenges, and progress tracking to increase user engagement and motivation. Gamification can transform routine transactions into enjoyable experiences, thereby reinforcing positive perceptions and mitigating perceived risks. When designed effectively, gamification serves as a “multiplier effect” that enhances both functional and emotional drivers of adoption.

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