



Determinants of Mobile Banking Adoption Intention among Rural Non-Users in Indonesia: An Extended UTAUT Model

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Abstract

Background: This study examines the determinants of mobile banking adoption intention among rural non-users in Indonesia by applying an extended Unified Theory of Acceptance and Use of Technology (UTAUT) model.

Methods: A cross-sectional survey was conducted among 397 rural smartphone owners aged 20–59 years who had never used mobile banking, selected through purposive sampling. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS, with 10,000 bootstrap subsamples and one-tailed significance tests.

Results: The findings indicate that awareness, facilitating conditions, and performance expectancy exert positive and significant effects on behavioral intention, whereas technology anxiety exerts a significant and substantively meaningful negative effect ($f^2 = 0.027$). Perceived risk also shows a significant negative effect, but its effect size is negligible ($f^2 = 0.016$), indicating only a marginal practical contribution despite statistical significance. By contrast, effort expectancy and social influence do not show significant effects. The model explains a moderate proportion of variance in behavioral intention ($R^2 = 0.568$) and demonstrates an acceptable model fit (SRMR = 0.049).

Conclusion: The results suggest that mobile banking adoption intention among rural non-users is shaped more by perceived usefulness and enabling conditions, with technology anxiety acting as the most practically important psychological barrier and perceived risk playing a comparatively minor role. In contrast, ease of use and social influence appear to be less decisive factors. These findings provide empirical support for inclusion-oriented outreach strategies that prioritize anxiety reduction and confidence building, alongside clear value communication and structured onboarding support.

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INTRODUCTION

Financial inclusion is a strategic pillar for inclusive and sustainable growth in Indonesia. Recent banking digitalization, supported by national and sectoral policy roadmaps, has expanded access to digital financial services. However, adoption gaps remain pronounced in rural areas, where cash preferences, uneven digital literacy, and infrastructure constraints persist (Indonesia, 2024; Keuangan, 2024; Statistik, 2024). This literacy gap is visible in Indonesia's National Survey of Financial Literacy and Inclusion (*Survei Nasional Literasi dan Inklusi Keuangan, SNLIK*) 2024, where the rural financial literacy index (58.55%) remains below the urban level (69.61%), indicating that rural communities may have a more limited understanding of financial services,

including digital services (Keuangan, 2024). Mobile banking, with its useful functionality and flexibility, is a key channel for scaling financial access because smartphone ownership continues to rise outside major urban centers (Statistik, 2025).

Central Java has strong potential for expanding mobile banking usage. Data from Indonesia Statistics show that rural mobile phone ownership in Central Java is already comparable to (and slightly above) the national rural average. Jaten District in Karanganyar Regency was purposively selected as the study site because it represents a prototypical rural-suburban transition area in Central Java: it sits adjacent to Surakarta City, a major urban center, while retaining predominantly agricultural and small-trade livelihoods (Karanganyar, 2025; Statistik, 2025). This proximity to an urban hub gives Jaten District above-average telecommunication infrastructure and rural smartphone penetration, yet formal digital banking usage remains low, making it a relevant empirical setting for examining the gap between technical readiness and actual adoption behavior (Karanganyar, 2025). In this sense, Jaten District can be regarded as an illustrative case of Indonesia's broader digital transition regions, where 4G/5G network readiness is already widespread, but actual mobile banking adoption is still constrained primarily by psychological factors such as limited awareness, perceived risk, and technology anxiety rather than infrastructural access (Statistik, 2025). However, wider access does not automatically translate into the adoption of mobile banking: rural households may still perceive digital banking as risky, difficult, or unnecessary for their everyday transactions (Ivanova & Kim, 2022; Mohapatra et al., 2020; Tiwari et al., 2021). Taken together, the coexistence of rising rural residents' phone ownership and lower rural financial literacy indicates that the adoption challenge is less about access and more about capability and psychological readiness, which motivates the inclusion of awareness, perceived risk, and technology anxiety in the proposed model (Keuangan, 2024; Statistik, 2025). From a service sustainability perspective, this matters because app-based financial services depend heavily on sustained usage rather than one-time adoption (Veronika et al., 2025).

The Unified Theory of Acceptance and Use of Technology (UTAUT) proposes that performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) shape behavioral intention (BI) and technology use behavior (UB) (Kang et al., 2026; Venkatesh et al., 2003, 2012). Empirical findings in mobile banking are often heterogeneous across countries, demographics, and adoption stages. Such heterogeneity is also visible across the broader mobile app literature, where evidence on intention to use applications or continuance-related behavior is described as fragmented and sometimes conflicting, signaling the need for clearer contextual boundary conditions and more cumulative and logically coherent explanations (Veronika et al., 2025). Studies among existing users frequently find strong utilitarian effects (e.g., PE) and sometimes significant ease-of-use or normative effects (Wati et al., 2024; Wu et al., 2022). In contrast, research focusing on rural or first-time adopters remains limited and typically highlights enabling resources and barriers such as risk perception, limited awareness, and anxiety about making mistakes (Muchandigona & Kalema, 2023; Saprikis et al., 2022; Tiwari et al., 2021).

It is also theoretically relevant to explain why social influence may be weakened in a setting such as Jaten District. In rural Javanese communities, financial matters are commonly governed by strong norms of discretion, where household income, savings, and debt are rarely discussed openly outside the immediate family (Khatun et al., 2024; Oktavianita & Siregar, 2021). Because the core social influence mechanism in UTAUT assumes that visible peer or family endorsement shapes intention, this local norm of financial privacy can theoretically attenuate the salience of social influence, since individuals have fewer observable cues from their social circles regarding mobile banking use and instead rely more heavily on their own risk assessment and self-confidence (Purwanto & Loisa, 2020; Wu et al., 2022).

Although studies on mobile banking adoption in emerging economies have increased recently, two important knowledge gaps remain. First, much of the empirical work on rural adoption has been conducted in South Asian or Chinese settings (Mohapatra et al., 2020; Shankar & Kumari, 2016; Wu et al., 2022), where institutional arrangements, government-led digital finance programs, and everyday payment ecosystems can differ materially from rural Indonesia. Second, most prior research has examined existing or mixed-experience users, leaving non-users in the pre-adoption stage comparatively understudied. Non-users warrant separate investigation

because, unlike current users, they form intention without hands-on experience to calibrate their judgments; consequently, constructs such as awareness, perceived risk, and technology anxiety are theoretically more decisive at this stage, since potential adopters must rely on second-hand information, anticipated risk, and imagined discomfort rather than direct usage experience to decide whether to adopt mobile banking (Saprikis et al., 2022; Tiwari et al., 2021). In settings such as Jaten District, dense local social ties coexist with strong norms of financial discretion and household-based decision-making, which may attenuate social influence mechanisms that are more salient in other contexts (Saprikis et al., 2022).

This study focuses on rural non-users in Jaten District (Karanganyar, Central Java), a rural-suburban Javanese community with mixed livelihoods, and proposes an extended UTAUT model that adds three constructs particularly salient in pre-adoption stages: awareness (AW), perceived risk (PR), and technology anxiety (TA). Awareness reflects whether potential users know about mobile banking, its functions, and how it can be used in daily life; limited awareness is frequently cited as a bottleneck in rural digital finance diffusion (Anene & Okeji, 2021; Samantaray & Khandelwal, 2026). Perceived risk is expected to capture concerns about fraud, financial loss, and data misuse, which can suppress adoption of financial technologies (Mer & Virdi, 2021; Mohapatra et al., 2020). Technology anxiety is expected to capture fear or discomfort in using digital services and remains relevant for non-users even when smartphone ownership is high (Saprikis et al., 2022).

This study is expected to contribute by providing context-specific evidence for a rural non-user segment in Indonesia and translating the findings into actionable insights for banks and regulators. The research questions are: (RQ1) Does performance expectancy influence BI? (RQ2) Does effort expectancy influence BI? (RQ3) Does social influence influence BI? (RQ4) Do facilitating conditions influence BI? (RQ5) Does awareness influence BI? (RQ6) Does perceived risk influence BI? and (RQ7) Does technology anxiety influence BI?

METHOD

In mobile banking research, UTAUT and UTAUT2 are widely used to explain intention and usage behavior. Empirical evidence generally confirms that performance expectancy (or perceived usefulness) increases behavioral intention (Sharma et al., 2025; Wati et al., 2024), while the effects of effort expectancy and social influence are more context-dependent and may vary across populations and stages of adoption (Wu et al., 2022). Facilitating conditions are also frequently relevant, particularly in settings where resources, network reliability, and access to assistance vary and shape perceived feasibility (Dash & Mohanta, 2024; Muchandigona & Kalema, 2023). In rural and emerging-market contexts, adoption is further conditioned by local infrastructure and service ecosystems, including differences in digital finance availability (Khatun et al., 2024; Mohapatra et al., 2020). For non-users in pre-adoption contexts, several studies extend UTAUT by incorporating constructs that capture perceived barriers and psychological readiness; perceived risk and technology anxiety are among those considered to reflect concerns about fraud, financial loss, and fear of making mistakes prior to any hands-on experience (Muchandigona & Kalema, 2023; Saprikis et al., 2022). Meanwhile, awareness has been linked to adoption-related outcomes in mobile banking studies (mostly in user-based or mixed samples), with findings suggesting that familiarity and knowledge can reduce hesitation even when access is available (Saprikis et al., 2022; Shankar & Kumari, 2016; Tiwari et al., 2021). Theoretically, perceived risk, technology anxiety, and awareness are modeled as direct predictors of behavioral intention rather than as moderators of the core UTAUT relationships, because non-users have no usage experience through which these factors could condition existing belief-intention links; instead, in the absence of hands-on experience, these cognitive and affective evaluations directly substitute for the experiential basis that current users would otherwise rely on when forming intention (Saprikis et al., 2022; Tiwari et al., 2021). Building on these insights, the proposed model retains the four core UTAUT constructs and incorporates additional pre-adoption factors that reflect informational readiness, perceived barriers, and psychological readiness in a rural non-user context.

The study uses a quantitative, cross-sectional survey design with a total of eight constructs (PE, EE, SI, FC, AW, PR, TA, and BI), each measured with three items, yielding 24 questionnaire

items in total. The study context is Jaten District, Karanganyar Regency, Central Java, an area near Surakarta with rural-suburban characteristics and diverse livelihoods, including agriculture and private-sector employment. This setting is relevant because the telecommunications infrastructure is relatively good, smartphone penetration is increasing, but the use of formal digital banking services remains uneven, reflecting a realistic pre-adoption segment for mobile banking diffusion (Statistik, 2024, 2025).

The target population comprises residents of Jaten District aged 20–59 years who have a bank account, own smartphones, and have never used mobile banking. Using purposive sampling, respondents were screened against these criteria before completing a structured questionnaire; enumerators provided clarification when needed to reduce misunderstanding among participants with varying literacy levels. The rationale for using these criteria is to ensure that the study captures the core determinants of intention to use mobile banking among individuals who already have smartphones, are of productive age, and have not yet adopted mobile banking. Respondents were recruited door-to-door across all villages (*desa*) in Jaten District, with the number of respondents per village allocated proportionally to village population size to maintain geographic representativeness. Trained local enumerators, assisted by village officials for initial introductions, approached households and administered a brief eligibility screening covering age, bank-account ownership, smartphone ownership, and prior mobile banking use before proceeding with the full questionnaire; individuals who did not meet all four criteria were excluded from the study. The questionnaire was administered face-to-face in Bahasa Indonesia (with Javanese clarification when needed) to accommodate respondents with limited literacy, and data collection continued until the minimum sample size determined using the Slovin formula was met across the district, ensuring reasonable representativeness of the rural non-user population in Jaten District.

The target population consists of 47,802 residents of Jaten District aged 20–59 years, drawn from a total district population of 83,501 in 2024. The minimum sample size was determined using the Slovin formula (Rodgers & Milton, 2026; Sevilla, 2007), and a total of 397 valid responses were obtained and included in the analysis.

Table 1. Respondents Profile

Feature	Description	Frequency	Percentage
Gender	Male	227	57.18%
	Female	170	42.82%
Age	20–29 years	105	26.45%
	30–39 years	120	30.23%
	40–49 years	118	29.72%
	50–59 years	54	13.60%
Education	No formal schooling	15	3.78%
	Primary school	72	18.14%
	Junior secondary	131	33%
	Senior secondary	140	35.26%
	Higher education	39	9.82%
Occupation	Private-sector employee	165	41.56%
	Farmer/Livestock raiser	118	29.72%
	Entrepreneur/Trader	50	12.59%
	Civil servant	26	6.55%
	Retired	15	3.78%
	Not employed	13	3.27%
	House wife	10	2.52%

Source: Research Data

The sample of the population was almost balanced by gender (57.18% male; 42.82% female) and concentrated in the working-age range (30–49 years: 59.95%). Educational level was predominantly junior to senior secondary level (68.26%). Livelihoods were mixed, with private-sector employees (41.56%) and farmers/livestock raisers (29.72%) forming the two largest

groups, followed by entrepreneurs/traders (12.59%), civil servants (6.55%), and smaller proportions of housewives, retirees, and non-employed respondents.

All constructs were measured using multi-item reflective indicators on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). UTAUT constructs (PE, EE, SI, FC) were adapted from the UTAUT/UTAUT2 literature. Awareness (AW), perceived risk (PR), and technology anxiety (TA) were adapted from prior technology adoption and mobile banking studies that emphasize informational readiness, risk barriers, and psychological readiness for first-time users (Mer & Viridi, 2021; Saprikis et al., 2022; Shankar & Kumari, 2016; Tiwari et al., 2021).

The model is grounded in UTAUT, which argues that intention is shaped by four core beliefs: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) (Kang et al., 2026; Venkatesh et al., 2003, 2012). In the context of rural non-users, these beliefs can be interpreted as follows: PE captures whether mobile banking is perceived as worth adopting because it improves everyday financial tasks; EE reflects whether the service is perceived as easy enough to start using; SI represents whether close social circles encourage or normalize adoption; and FC captures whether users perceive that they have sufficient resources and support (device and internet readiness and access to help) to make first-time use feasible.

Across mobile banking and rural digital finance studies, PE is frequently reported as a central driver, suggesting that individuals are more likely to form intention when they can clearly connect mobile banking to concrete gains (e.g., faster transfers, fewer branch visits, more flexible payments), although the strength of this effect varies by adoption stage and environment (Lutfiyanah et al., 2025; Mohapatra et al., 2020; Shankar & Kumari, 2016; Wati et al., 2024; Wu et al., 2022). In contrast, evidence for EE and SI tends to be more heterogeneous. EE often matters when differences in digital literacy are salient, but it may weaken or even change direction when respondents do not yet have hands-on experience and rely on general assumptions about “apps,” or when other frictions dominate pre-adoption judgment (Ivanova & Kim, 2022; Mer & Viridi, 2021; Mohapatra et al., 2020; Mukarromah & Setyono, 2024; Samartha et al., 2022; Shankar & Kumari, 2016). SI can be influential in socially embedded communities, yet it may be attenuated when financial decisions are treated as private, when individuals rely more on self-efficacy than peer cues, or when digital tools are already normalized in daily life (Mohapatra et al., 2020; Purwanto & Loisa, 2020; Sebayang et al., 2024; Tiwa et al., 2025; Wu et al., 2022). FC is expected to be relevant when intention depends on practical feasibility, such as perceived availability of reliable internet/device capability and clear help channels; yet FC may appear less decisive when infrastructure is already “good enough” or when psychological and risk barriers remain the primary hurdle (Ivanova & Kim, 2022; Lutfiyanah et al., 2025; Mohapatra et al., 2020; Mukarromah & Setyono, 2024; Shankar & Kumari, 2016; Tiwa et al., 2025; Wu et al., 2022).

Because this study focuses on non-users (pre-adoption), the model is extended to capture determinants that are often decisive before first trial. First, awareness (AW) reflects whether potential users know what mobile banking can do, how it works, and how it fits everyday needs; greater awareness can reduce hesitation by making benefits, costs, and basic “usage scripts” more concrete (Anene & Okeji, 2021; Samantaray & Khandelwal, 2026; Shankar & Kumari, 2016; Tiwari et al., 2021). Second, perceived risk (PR) captures concerns about fraud, mistaken transfers, and data misuse. Prior work commonly treats PR as a barrier in financial technology adoption, although findings are context-dependent and sometimes non-significant in groups that are already digitally ready or in environments where risk is perceived as manageable (Ivanova & Kim, 2022; Mer & Viridi, 2021; Mohapatra et al., 2020; Muchandigona & Kalema, 2023; Rehman & Shaikh, 2020; Samartha et al., 2022; Sebayang et al., 2024; Tiwari et al., 2021; Wu et al., 2022). Third, technology anxiety (TA) represents fear or discomfort when using unfamiliar financial features on a smartphone; anxiety may suppress intention by lowering confidence and increasing avoidance, which is especially plausible for non-users who anticipate the consequences of “making a mistake” without prior experience to calibrate it (Oktavianita & Siregar, 2021; Riandi et al., 2024; Saprikis et al., 2022).

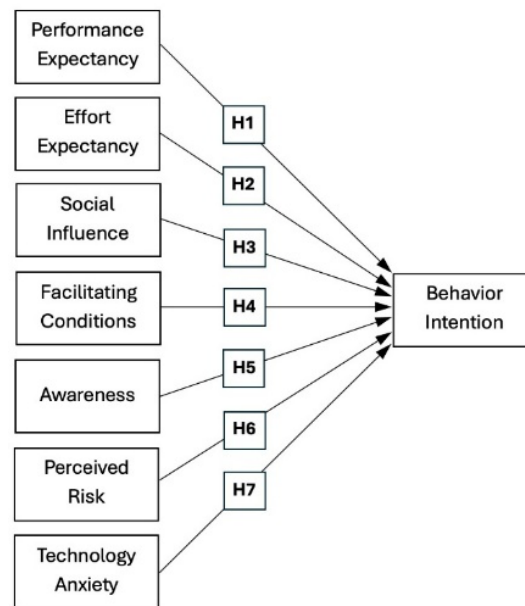


Figure 1. Research Model (extended UTAUT for Rural Non-users).

Source: Research Data

Accordingly, the study tests the following hypotheses:

- H1: Performance Expectancy (PE) positively influences Behavioral Intention (BI).
- H2: Effort Expectancy (EE) positively influences Behavioral Intention (BI).
- H3: Social Influence (SI) positively influences Behavioral Intention (BI).
- H4: Facilitating Conditions (FC) positively influences Behavioral Intention (BI).
- H5: Awareness (AW) positively influences Behavioral Intention (BI).
- H6: Perceived Risk (PR) negatively influences Behavioral Intention (BI).
- H7: Technology Anxiety (TA) negatively influences Behavioral Intention (BI).

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. The measurement model was evaluated through indicator reliability (outer loadings), internal consistency reliability (Cronbach's alpha and composite reliability, ρ_c), convergent validity (Average Variance Extracted, AVE), discriminant validity (Fornell-Larcker criterion and Heterotrait-Monotrait Ratio of Correlations, HTMT), and collinearity assessment (Variance Inflation Factor, VIF), to ensure the measurement model is accurate, internally consistent, statistically distinct, and free from redundant predictors. The structural model evaluation used R^2 and adjusted R^2 to measure the model's predictive power, f^2 effect sizes to evaluate the relative contribution of each construct to the R^2 value, and model fit (Standardized Root Mean Square Residual, SRMR), which represents the average magnitude of the difference between observed and predicted correlations. Hypothesis testing was conducted using bootstrapping with 10,000 subsamples at a 5% significance level using a one-tailed test.

RESULTS AND DISCUSSION

Results

Measurement Model Assessment

The reflective measurement model demonstrates strong psychometric quality, where indicator reliability is satisfactory, with all outer loadings exceeding the recommended minimum threshold and ranging from 0.827 to 0.951. This indicates that each item explains a substantial proportion of its construct variance. In addition, outer model collinearity is within acceptable limits ($VIF < 5$), with the highest observed VIF of 4.667, suggesting that redundancy among indicators is not a concern.

Internal consistency reliability is also robust across constructs. Cronbach's alpha values range between 0.810 and 0.933, while composite reliability (ρ_c) ranges from 0.889 to 0.957. These values exceed commonly accepted cutoffs, indicating coherent measurement of each latent variable. Convergent validity is also established, with AVE values consistently high (0.728–0.881).

This implies that the constructs capture more variance from their indicators than is attributable to measurement error. These reliability and convergent validity results are summarized in Table II.

Discriminant validity is supported using the Fornell–Larcker criterion and HTMT. The Fornell–Larcker criterion indicates that each construct shares more variance with its indicators than with other constructs, and HTMT ratios remain below the conservative threshold of 0.90 (highest HTMT = 0.892 for FC–AW), providing additional evidence that the constructs are empirically distinct in this rural non-user context and suitable for proceeding to the next analytical step. For full transparency, the indicator loading and cross-loading patterns, as well as the complete HTMT matrix, are reported in Tables 2, 3, and 4.

Table 2. Summary of Indicator Loadings and Cross-Loadings

Indicator	Own Construct	Loading on Own Construct	Highest Cross-Loading
PE1–PE3	PE	0.918–0.951	0.342 (on AW)
EE1–EE3	EE	0.862–0.891	0.398 (on FC)
SI1–SI3	SI	0.827–0.869	0.356 (on FC)
FC1–FC3	FC	0.841–0.874	0.512 (on AW)
AW1–AW3	AW	0.856–0.889	0.527 (on FC)
PR1–PR3	PR	0.905–0.941	0.289 (on TA)
TA1–TA3	TA	0.871–0.903	0.341 (on PR)
BI1–BI3	BI	0.912–0.947	0.486 (on AW)

Source: Research Data

Table 3. Heterotrait-Monotrait Ratio (HTMT) Matrix

Construct	AW	BI	EE	FC	PE	PR	SI	TA
AW	-							
BI	0.751	-						
EE	0.589	0.589	-					
FC	0.892	0.738	0.621	-				
PE	0.643	0.701	0.612	0.598	-			
PR	0.445	0.486	0.398	0.412	0.421	-		
SI	0.602	0.523	0.534	0.655	0.487	0.367	-	
TA	0.503	0.519	0.512	0.478	0.456	0.674	0.389	-

Source: Research Data

Table 4. Construct Reliability and Convergent Validity

Construct	Cronbach's alpha	CR (rho_c)	AVE
SI	0.810	0.889	0.728
FC	0.820	0.893	0.735
AW	0.838	0.902	0.753
EE	0.855	0.912	0.775
TA	0.874	0.922	0.798
PR	0.929	0.953	0.872
BI	0.932	0.957	0.880
PE	0.933	0.957	0.881

Source: Research Data

Structural Model Evaluation

Based on the analysis, the structural model shows acceptable fit and stable estimation properties. Model fit, assessed via SRMR, is 0.049 (below the threshold of 0.08), which is commonly interpreted as acceptable for PLS-SEM model approximation. The model explains a moderate proportion of variance in behavioral intention: $R^2 = 0.568$ (adjusted $R^2 = 0.560$). This

indicates that the extended UTAUT predictors collectively capture a meaningful share (56.8%) of intention formation among rural non-users in Jaten District. The R^2 value of 0.568 is considered a moderate and acceptable level of predictive accuracy for behavioral studies.

Collinearity among predictors is acceptable and not problematic. Inner VIF values range from 1.260 to 3.276, well below critical thresholds, implying that the estimated path coefficients are unlikely to be distorted by multicollinearity. In addition, effect size estimates (f^2) provide further insight beyond statistical significance by indicating each predictor's incremental contribution to explaining intention.

Awareness exhibits the largest incremental explanatory contribution ($f^2 = 0.063$) to the model, followed by facilitating conditions (0.045), technology anxiety (0.027), performance expectancy (0.022), and perceived risk (0.016). Meanwhile, effort expectancy (0.002) and social influence (0.005) contribute only marginally to the model's explanatory power. This pattern suggests that, for first-time mobile banking adoption in rural settings, informational readiness and practical feasibility dominate, whereas usability perceptions and social pressure provide limited incremental value once other constraints are accounted for. Although most effect sizes are small (below 0.15) and negligible (below 0.02), they remain statistically meaningful. In complex behavioral models like UTAUT, predictive power is often distributed across multiple variables.

Hypothesis Testing Results

Hypotheses were tested using bootstrapping with 10,000 subsamples and a one-tailed significance test ($\alpha = 0.05$). To complement p-values, this study also reports percentile bootstrap confidence intervals (90% CI; 5th–95th percentiles). A path is considered statistically supported when its direction aligns with the hypothesis and the confidence interval does not include zero.

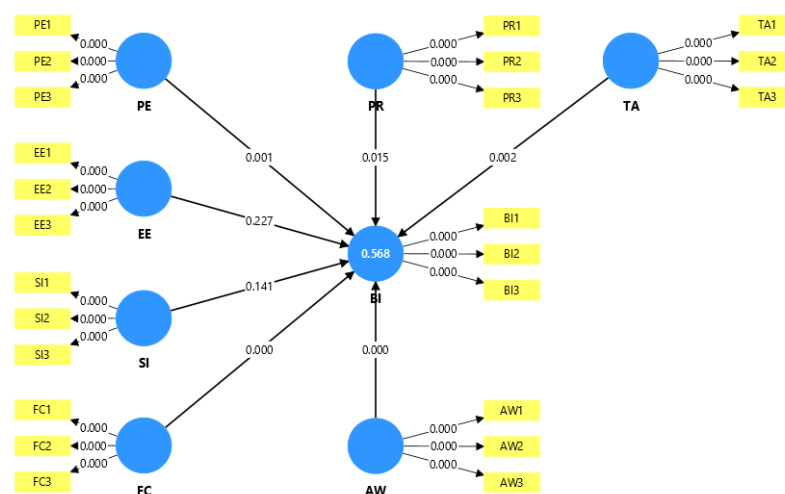


Figure 2. Structural Model Results

Source: Research Data

The results support five out of seven proposed relationships. Awareness positively influences behavioral intention (AW→BI: $\beta = 0.262$, $t = 3.957$, $p < 0.001$; 90% CI [0.152, 0.370]), indicating that informational readiness and familiarity with mobile banking meaningfully strengthen adoption intention among rural non-users. Facilitating conditions also show a strong positive effect (FC→BI: $\beta = 0.246$, $t = 3.710$, $p < 0.001$; 90% CI [0.133, 0.352]), suggesting that access to enabling resources (e.g., guidance, assistance, and supporting infrastructure) is a decisive driver in this context. Performance expectancy remains significant (PE→BI: $\beta = 0.176$, $t = 2.984$, $p = 0.001$; 90% CI [0.078, 0.271]), confirming that perceived usefulness and concrete benefits remain important factors even prior to first-time use.

Table 5. Hypothesis Testing Results for Structural Paths

Hypothesis	Path	Exp. sign	β	t-statistics	p-values	Decision
H1	PE $\rightarrow$ BI	+	0.176	2.984	0.001	Accepted
H2	EE $\rightarrow$ BI	+	0.043	0.749	0.227	Rejected
H3	SI $\rightarrow$ BI	+	0.077	1.077	0.141	Rejected
H4	FC $\rightarrow$ BI	+	0.246	3.710	<0.001	Accepted
H5	AW $\rightarrow$ BI	+	0.262	3.957	<0.001	Accepted
H6	PR $\rightarrow$ BI	-	-0.095	2.167	0.015	Accepted
H7	TA $\rightarrow$ BI	-	-0.126	2.818	0.002	Accepted

Source: Research Data

Two barrier constructs, perceived risk and technology anxiety, exhibit significant negative effects. Perceived risk reduces intention (PR $\rightarrow$ BI: $\beta = -0.095$, $t = 2.167$, $p = 0.015$; 90% CI $[-0.166, -0.026]$), implying that concerns about potential losses, errors, or fraud can inhibit intention to use mobile banking among rural non-users. Technology anxiety also reduces intention (TA $\rightarrow$ BI: $\beta = -0.126$, $t = 2.818$, $p = 0.002$; 90% CI $[-0.200, -0.052]$). This finding highlights that psychological discomfort and lack of confidence in using digital finance tools can meaningfully suppress intention to use mobile banking applications. It is important to interpret the perceived risk finding critically rather than relying on statistical significance alone: although the path is significant at the 0.05 level, its effect size is negligible ($f^2 = 0.016$, below the 0.02 threshold), indicating that perceived risk has only a marginal incremental contribution to explaining behavioral intention once the six other predictors are accounted for. In substantive terms, perceived risk should therefore be regarded as a statistically detectable but practically minor barrier for rural non-users in Jaten District, and this distinction between statistical significance and practical magnitude is carried through consistently in the Discussion and Conclusion sections below.

In contrast, effort expectancy and social influence do not reach statistical significance. Effort expectancy shows a small, non-significant positive coefficient (EE $\rightarrow$ BI: $\beta = 0.043$, $t = 0.749$, $p = 0.227$; 90% CI $[-0.049, 0.140]$), while social influence is also non-significant (SI $\rightarrow$ BI: $\beta = 0.077$, $t = 1.077$, $p = 0.141$; 90% CI $[-0.036, 0.198]$). Importantly, both confidence intervals cross zero, indicating that any positive association is not statistically reliable in this sample. Substantively, these results suggest that intention to use mobile banking among rural non-users is shaped more by readiness and enablement (awareness and facilitating conditions) and by perceived barriers (risk and anxiety) than by perceived ease of use or normative social pressure.

Discussion

The results confirm that utilitarian value remains central: performance expectancy significantly increases intention, consistent with findings across mobile banking and rural digital finance contexts (Sharma et al., 2025; Wati et al., 2024; Wu et al., 2022). This pattern is also echoed in adjacent settings, among Indonesian Generation Z, where performance expectancy emerges as the strongest predictor of mobile banking intention (Lutfiyanah et al., 2025). A similar pattern is observed in rural China, where performance expectancy becomes the strongest predictor of digital finance platform use (Wu et al., 2022) and ICT adoption (Sharma et al., 2025). In practical terms, rural non-users appear to form intention to use mobile banking when they can clearly link it to everyday utility, such as easier transfers, bill payments, and reduced travel time to branches. This aligns with broader evidence that perceived usefulness is often the most stable driver in technology adoption models (Kang et al., 2026; Venkatesh et al., 2003, 2012).

Facilitating conditions also show a significant positive effect, reinforcing the importance of resources and support in rural settings where device availability and capability, network stability, and access to assistance may vary (Dash & Mohanta, 2024; Muchandigona & Kalema, 2023; Shankar & Kumari, 2016). Importantly, official local statistics indicate that villages in Jaten District report strong to very strong cellular signal strength and that available internet access includes 4G/LTE up to 5G (Statistik, 2024), and all survey participants already owned

smartphones. This suggests that, from a device availability and network access standpoint, the technical environment is relatively adequate. However, facilitating conditions in practice are not limited to device or signal availability; they also include the extent to which prospective users can obtain guidance, troubleshooting support, and step-by-step assistance when beginning to use mobile banking. From a policy and service design perspective, this finding implies that adoption programs should not focus solely on persuasion; they should also enhance practical feasibility through responsive customer support, assisted onboarding, and accessible service points that help users resolve problems quickly.

Awareness has one of the more substantively meaningful effect sizes in this model ($f^2 = 0.063$). This finding indicates that knowledge and familiarity can be highly decisive for non-users. Prior work likewise highlights awareness and literacy as bottlenecks for adoption in rural or financially vulnerable groups (Anene & Okeji, 2021; Dash & Mohanta, 2024; Tiwari et al., 2021). This interpretation is reinforced by evidence that consumer awareness directly strengthens intention to use mobile banking and that bank-led awareness initiatives can meaningfully expand adoption beyond traditional channels (Samantaray & Khandelwal, 2026; Shankar & Kumari, 2016). Related findings also suggest that awareness reduces doubt and hesitation underlying non-adoption decisions (Dash & Mohanta, 2024; Tiwari et al., 2021). Given its substantive effect size, awareness-building should move beyond generic promotion toward practical, confidence-building guidance: clear everyday use cases, transparent fee information, and basic troubleshooting steps, delivered in plain language and paired with accessible bank assistance for first-time users.

The result showing that perceived risk negatively affects intention ($\beta = -0.095$, $p = 0.015$) supports a risk-barrier perspective in mobile banking adoption research (Ivanova & Kim, 2022; Mer & Viridi, 2021; Mohapatra et al., 2020). Substantively, even where smartphone ownership is widespread and users already have bank accounts, concerns about fraud, erroneous transfers, and uncertain dispute resolution can discourage first-time use, especially among non-users who lack prior experience to calibrate these risks. At the same time, the magnitude of the effect in this study is relatively modest, and broader literature indicates that risk is not always a decisive factor in mobile banking intention. For example, evidence from Indonesia during the COVID-19 period suggests perceived risk may no longer function as a significant barrier among younger users (Sebayang et al., 2024), and similar non-significant findings have been reported in other contexts (Samartha et al., 2022). Importantly, risk concerns may remain influential not only at entry but also after adoption: a recent study shows that “concern” factors specifically perceived risk and privacy significantly affect intentions to discontinue mobile banking applications (Abbas, 2025). Taken together, these results imply that perceived risk remains relevant for rural non-users, but its salience varies by segment and adoption stage. It may deter initial trial among low-experience groups and undermine continuance when concerns are activated. As familiarity, norms, and consumer protection expectations strengthen, risk may become less constraining, although it still warrants explicit mitigation to prevent both non-adoption and early discontinuation (Abbas, 2025).

These findings should be explicitly linked to effect-size evidence: with $f^2 = 0.016$, below the conventional 0.02 threshold for a small effect, perceived risk’s incremental contribution to explaining behavioral intention is practically minimal despite statistical significance ($p = 0.015$). A plausible theoretical explanation is that, because the sample consists exclusively of non-users who have never operated a mobile banking application, perceived risk captures anticipated rather than experienced hazard. In the absence of direct trial experience, this abstract apprehension is sufficient to register statistically, but it carries less practical weight than concerns grounded in actual usage. Recent evidence similarly finds that perceived risk may not meaningfully alter behavioral intention once performance- and effort-related beliefs are considered, particularly among non-users (Rahmiati et al., 2025).

Technology anxiety also exerts a significant negative effect ($\beta = -0.126$, $p = 0.002$), indicating that psychological readiness can be a binding constraint in mobile banking pre-adoption decisions among non-users (Riandi et al., 2024; Saprikis et al., 2022). This pattern is consistent with broader UTAUT extensions in non-user contexts: evidence from virtual learning environments shows that technology anxiety can impede adoption intention and weaken

performance and effort beliefs, with effects varying across age and gender (Gunasinghe & Nanayakkara, 2021; Lal & Varaprasad, 2026). In the Indonesian digital finance context, research shows that technology-related anxiety reduces intention to continue using Bank 4.0 services, indicating that anxiety can meaningfully shape behavioral intention by amplifying avoidance and uncertainty (Riandi et al., 2024). For rural non-users, this is plausible because unfamiliarity with financial features, fear of making mistakes, and low confidence in resolving errors can deter first-time adoption, even when benefits are recognized. Notably, prior evidence suggests anxiety effects may differ by segment: it can be significant among users but weaker among non-users, implying that perceived readiness and context determine its salience at the intention stage (Saprikis et al., 2022).

Two non-significant paths, effort expectancy and social influence, warrant deeper interpretation. Effort expectancy (H2) does not predict intention in this non-user segment ($\beta = 0.043$, $p = 0.227$). In pre-adoption contexts, respondents may evaluate ease of use in a generic manner, assuming most smartphone applications are similarly manageable rather than based on hands-on experience. This can make perceived usefulness and feasibility more salient than usability at the intention-formation stage. This interpretation aligns with Saprikis et al., (2022) who reported effort expectancy to be non-significant for both users and non-users (Saprikis et al., 2022). It is also plausible that effort expectancy is partly overshadowed by stronger pre-adoption constraints, particularly perceived risk and technology anxiety, which may weigh more heavily when confidence and prior exposure are limited. However, the literature is mixed: Tiwa et al. (2025) found effort expectancy significant in a rural Indonesian village sample (Tiwa et al., 2025), and evidence from rural China also shows a significant effect on digital finance platform use (Wu et al., 2022). Overall, these differences suggest that effort expectancy is context- and segment-dependent, becoming more relevant when interface expectations are clearer and anxiety-related barriers are weaker (Mukarromah & Setyono, 2024; Shankar & Kumari, 2016).

Social influence (H3) is also non-significant ($\beta = 0.077$, $p = 0.141$), suggesting that adoption intention in Jaten District is not strongly driven by normative pressure from peers or family. A plausible explanation is the relatively low social visibility and high perceived privacy of financial decisions: individuals may not openly discuss banking channels, and recommendations may carry less weight than personal risk assessment and self-confidence. This interpretation aligns with evidence that social pressure does not necessarily translate into mobile banking intention even in collectivistic settings, particularly among younger cohorts with more individualistic orientations (Purwanto & Loisa, 2020; Wu et al., 2022). It also aligns with findings from rural China showing that social influence does not affect digital finance platform use, where self-confidence and personal ability outweigh external opinions (Wu et al., 2022). However, the literature is not uniform: in some rural Indonesian communities, trusted local figures significantly increase intention to use BRImo, making social influence a strong predictor (Tiwa et al., 2025), and prior evidence from rural India similarly reports a significant effect (Mohapatra et al., 2020; Raju & Gupta, 2026). Taken together, these mixed results imply that social influence is highly context-dependent, strengthening where adoption is communal and endorsements are salient, but weakening where financial decisions are treated as private and digital tools are already normalized (Khatun et al., 2024; Oktavianita & Siregar, 2021).

The findings indicate that increasing mobile banking adoption intention among rural non-users should prioritize interventions that strengthen perceived utility (performance expectancy/PE), improve practical feasibility and access to support (facilitating conditions/FC), and expand knowledge and familiarity (awareness/AW). First, since PE is significant, outreach should communicate concrete everyday benefits such as easier transfers, faster bill payments, and reduced travel time, enabling non-users to clearly link mobile banking to daily utility. Second, the positive effect of FC implies that adoption efforts should not rely solely on persuasion; they should ensure that users can access timely guidance and troubleshooting support, particularly during onboarding and initial transactions. This can be supported through assisted onboarding, clear step-by-step instructions (e.g., account setup, OTP verification, PIN management, transfers, and payments), and accessible help channels such as branch assistance, call centers, or chatbots. Third, AW shows a substantively meaningful effect size, underscoring that informational readiness is decisive in pre-adoption contexts. Awareness-building should therefore go beyond promotion and

provide operational knowledge: service features, fees, safety practices, troubleshooting guidance, and support access, enabling users to form concrete usage scripts.

At the same time, the significant negative effects of perceived risk (PR) and technology anxiety (TA) suggest that adoption strategies must explicitly address psychological and risk-related barriers. Because PR reflects concerns about fraud, erroneous transfers, and dispute resolution, service providers should strengthen clear risk-reduction mechanisms such as transparent fee disclosure, transaction confirmations, dispute procedures, and accessible support services (P. R. Indonesia, 2022; Keuangan, 2024). Because TA suppresses intention, programs should incorporate confidence-building strategies such as guided practice, demonstrations, and supportive error-handling assistance. User experience design should also be simplified to enhance confidence in using mobile banking applications.

Given that effort expectancy (EE) and social influence (SI) are not significant, implementation strategies should not prioritize “ease-of-use” messaging or normative appeals. Greater impact is likely to come from strengthening practical support (FC), informational readiness (AW), perceived utility (PE), and mitigation of perceived downside and anxiety (PR and TA) as primary levers for increasing adoption intention among rural non-users.

CONCLUSION

The results indicate that performance expectancy, facilitating conditions, and awareness have significant positive effects on behavioral intention, whereas perceived risk and technology anxiety both significantly reduce intention to use mobile banking, although their practical weight differs considerably: technology anxiety shows a more substantively meaningful contribution ($f^2 = 0.027$), whereas perceived risk, despite being statistically significant, contributes only a negligible incremental effect ($f^2 = 0.016$) and should therefore not be treated as an equally strong barrier. In contrast, the results show that effort expectancy and social influence are not significant, suggesting that within a rural non-user pre-adoption segment, intention to use mobile banking is driven less by generic perceptions of “ease of use” or normative pressure and more by clear perceived utility, informational readiness, and the availability of practical support that makes initial use feasible and safe. The structural model explains a moderate proportion of variance in intention ($R^2 = 0.568$) and exhibits acceptable model fit (SRMR = 0.049). Substantively, these findings imply that strategies to increase adoption in rural contexts should prioritize capability building and anxiety mitigation as the primary psychological levers, with risk mitigation treated as a secondary supporting measure given its more limited practical magnitude. This includes concrete and clear communication of everyday use value, structured awareness-building that translates features into actionable usage scripts, and accessible assistance and support for onboarding and early transactions, rather than relying primarily on persuasive messaging about simplicity or peer endorsement.

This study has several limitations that should be considered when interpreting the findings. First, the analysis is confined to a single rural district (Jaten), which may limit external validity because infrastructure, socioeconomic conditions, and local financial practices can vary substantially across rural Indonesia. Second, the study focuses on behavioral intention rather than observed adoption or continued use; as a result, the model may not fully capture barriers that emerge during actual onboarding, first transactions, and sustained usage. Third, the cross-sectional survey design restricts causal interpretation and cannot track how perceptions (e.g., risk or anxiety) evolve after exposure to training, peer experience, or bank interventions. Finally, the study relies on self-reported measures that may introduce common method and social desirability bias, even though the constructs were operationalized using established instruments.

Future research on mobile banking adoption can build on this work in several directions. A natural extension is to test the model against actual usage behavior and adoption progression using longitudinal or panel designs that follow respondents from pre-adoption to post-onboarding, enabling stronger inference about causal pathways and the persistence of technology anxiety and perceived risk over time. Subsequent studies may also examine heterogeneity by incorporating moderators such as age, gender, education, income, and smartphone experience, as well as context-specific factors (e.g., network quality and proximity to banking agents) to identify which subgroups benefit most from targeted interventions. In addition, integrating trust- and

protection-related constructs, such as perceived security and privacy, institutional trust, and system/service quality, would help clarify how risk perceptions are formed and how they can be mitigated through product design and governance signals in rural settings. Finally, comparative studies across multiple rural areas, different bank or fintech types, and delivery models would strengthen generalizability and provide a clearer basis for scalable policy and managerial recommendations.

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AUTHOR CONTRIBUTION STATEMENT

Hendra Prabha contributed to the conceptualization, research design, data collection, data analysis, and preparation of the original manuscript. Anderes Gui contributed to methodology development, supervision, validation, and critical revision of the manuscript. Both authors collaboratively developed the research framework, interpreted the findings, reviewed the final manuscript, and approved the submitted version.

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