

What Drives Customer Intention in Digital Banking? Evidence from Trust, Security Risk, and Technological Innovation

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Abstract

This study examines the determinants of digital banking adoption intention among Book IV bank customers in Indonesia, focusing on the interplay between trust, security risks, and technological innovation. Using Smart PLS-SEM with data from 385 respondents, we investigate how technological innovation influences customer trust and perceived security risks, which subsequently affect digital banking usage intention. Results reveal that technological innovation significantly enhances trust while reducing security risk perceptions. Trust emerges as the strongest predictor of digital banking intention, while security risks negatively impact adoption. The study contributes theoretical insights into technology acceptance in emerging markets and provides practical implications for banks developing digital transformation strategies in competitive environments.

Keywords: *Digital banking, trust, security risk, technological innovation, Book IV banks, Indonesia*

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1. Introduction

The Indonesian banking sector has undergone significant digital transformation, particularly accelerated by the COVID-19 pandemic and regulatory initiatives promoting financial technology adoption (Nguyen et al., 2024). Book IV banks, representing commercial banks with the largest capital base (minimum IDR 30 trillion), face intense pressure to innovate their digital banking offerings to maintain competitive advantage and meet evolving customer expectations. Despite substantial investments in digital infrastructure, these banks encounter persistent challenges in driving customer adoption of digital banking services, with trust deficits and security concerns identified as critical barriers (Kumar et al., 2023).

Digital banking represents a fundamental shift in how financial services are delivered, eliminating physical branch dependencies while introducing new vulnerabilities related to data privacy and cybersecurity (Sharma & Sharma, 2024). The urgency of understanding adoption drivers intensifies as Indonesian consumers increasingly demand seamless, secure digital financial experiences, while regulatory frameworks continue evolving to balance innovation with consumer protection. Book IV banks, with their significant market share and systemic importance, must navigate this complexity to sustain growth and customer loyalty.

Existing research has examined digital banking adoption through various theoretical lenses, including the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and trust-based frameworks. However, limited empirical evidence exists on how technological innovation specifically influences trust formation and security risk perceptions in the Indonesian Book IV banking context (Alzahrani & Mahmud, 2023). Furthermore, the mediating mechanisms through which innovation affects adoption intention remain underexplored, particularly in emerging markets characterized by diverse digital literacy levels and cultural contexts (Chauhan et al., 2024).

This study addresses these gaps by investigating: (1) How does technological innovation influence customer trust and perceived security risks in digital banking? (2) What are the direct and indirect effects of trust and security risks on digital banking adoption intention? (3) How do these relationships function within Indonesia's Book IV banking environment? By employing a comprehensive structural equation modeling approach, we provide nuanced insights into the psychological and technological factors shaping digital banking adoption among Indonesia's most established banking customers.

2. Literature Review

2.1 Theoretical Framework

Digital banking adoption represents a complex behavioral decision influenced by technological, psychological, and contextual factors. This study integrates innovation diffusion theory, trust theory, and risk perception frameworks to explain how technological innovation shapes customer attitudes and behavioral intentions toward digital banking services.

Technological Innovation refers to the introduction of novel digital features, enhanced user interfaces, artificial intelligence-driven personalization, and seamless omnichannel experiences that differentiate banking services (Alshamsi et al., 2024). In digital banking, innovation encompasses biometric authentication, real-time notifications, predictive analytics, and integrated financial management tools that enhance service quality and operational efficiency.

Trust represents customers' willingness to be vulnerable to digital banking providers based on expectations of integrity, competence, and benevolence (Luo et al., 2023). In digital environments lacking face-to-face interaction, trust becomes paramount as customers must rely on technological systems and institutional safeguards to protect their financial assets and personal information.

Security Risk encompasses perceived vulnerabilities to cyber threats, data breaches, unauthorized access, and financial fraud in digital banking transactions (Alalwan et al., 2023). These perceptions significantly influence adoption decisions, particularly in markets with publicized cybersecurity incidents or limited regulatory enforcement.

Digital Banking Intention reflects customers' likelihood to adopt and consistently use digital banking channels for financial transactions, account management, and service access (Sharma et al., 2024). Intention serves as a proximal predictor of actual usage behavior in technology adoption models.

2.2 Hypothesis Development

H1: Technological Innovation positively influences Trust

Innovative digital banking features signal institutional commitment to service excellence and customer-centricity, fostering trust through demonstrated competence and reliability (Geebren et al., 2023). When banks successfully implement cutting-edge technologies that enhance user experience while maintaining security, customers perceive greater institutional trustworthiness. Previous research confirms that technological sophistication positively correlates with trust in digital financial services (Alkhowaiter, 2024).

H2: Technological Innovation negatively influences Security Risk

Advanced technological innovations incorporate robust security protocols, encryption standards, and fraud detection mechanisms that mitigate perceived vulnerabilities (Raza et al., 2024). Biometric authentication, multi-factor verification, and artificial intelligence-driven anomaly detection reduce customers' security concerns by providing tangible protective measures. Evidence suggests that visible security innovations decrease perceived risk in digital banking contexts (Nguyen et al., 2024).

H3: Security Risk negatively influences Trust

Heightened security risk perceptions undermine trust by signaling potential institutional incompetence or insufficient protective measures (Sharma & Sharma, 2024). When customers perceive digital banking platforms as vulnerable to cyber threats, their confidence in the institution's ability to safeguard assets diminishes. Research consistently demonstrates negative relationships between security concerns and trust in digital financial services (Kumar et al., 2023).

H4: Security Risk negatively influences Digital Banking Intention

Perceived security vulnerabilities create psychological barriers to digital banking adoption by activating loss aversion and protective behaviors (Luo et al., 2023). Customers minimize exposure to potential financial harm by avoiding channels perceived as insecure, regardless of their convenience benefits. Empirical studies confirm that security risk perceptions significantly inhibit digital banking adoption intentions (Alalwan et al., 2023).

H5: Trust positively influences Digital Banking Intention

Trust reduces uncertainty and perceived vulnerability in digital banking transactions, facilitating adoption by lowering psychological barriers (Geebren et al., 2023). When customers trust digital banking providers, they demonstrate greater willingness to engage with self-service channels and reduce dependence on physical branches. Meta-analyses consistently identify trust as a critical predictor of digital banking adoption (Alshamsi et al., 2024).

H6: Technological Innovation positively influences Digital Banking Intention through Trust

Technological innovation indirectly promotes adoption by building trust, which subsequently drives usage intentions (Alkhowaiter, 2024). This mediation pathway highlights that innovation's effectiveness depends on successfully converting technological capabilities into customer confidence. Recent studies confirm trust's mediating role between innovation characteristics and adoption outcomes (Chauhan et al., 2024).

H7: Technological Innovation negatively influences Digital Banking Intention through Security Risk

Innovation reduces security risk perceptions, which in turn facilitates adoption intentions by removing psychological barriers (Raza et al., 2024). This negative indirect effect demonstrates that security-focused innovations are particularly valuable for overcoming adoption resistance. Research supports security risk's mediating function in technology acceptance processes (Sharma et al., 2024).

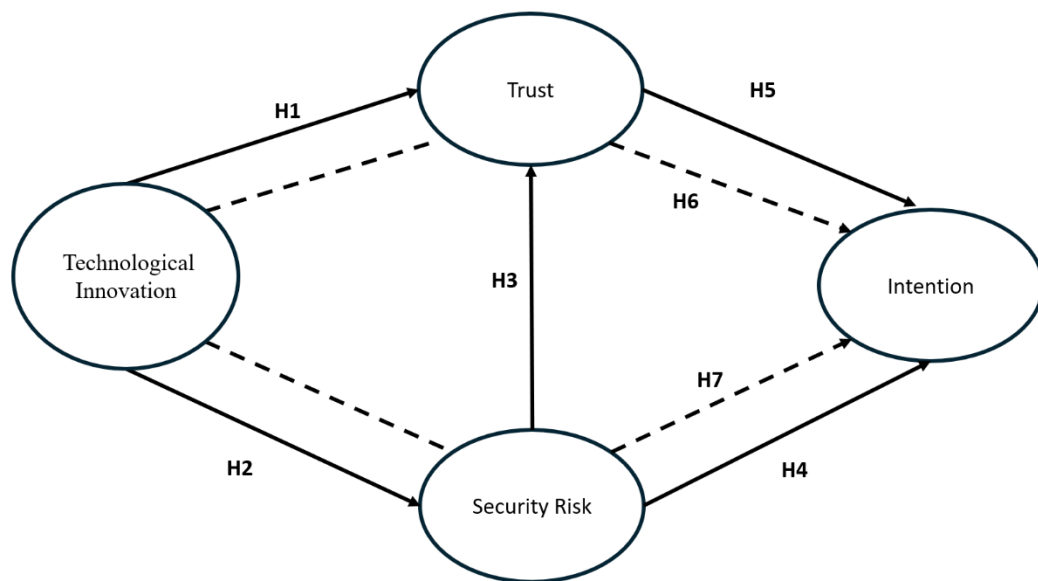


Figure 1 Framework

3. Research Methods

3.1 Research Design and Data Collection

This study employed a cross-sectional survey design using quantitative methods to examine relationships among technological innovation, trust, security risk, and digital banking intention. Data were collected from Book IV bank customers in Jakarta, Jawa Barat, Banten using purposive sampling with specific criteria: active account holders, minimum six months' relationship with the bank, and awareness of digital banking services. The final sample comprised 385 respondents, exceeding the minimum requirement for structural equation modeling based on the "ten times rule" (Ringle et al., 2023).

3.2 Measurement Instruments

All constructs were measured using established scales adapted from prior literature and refined for the Indonesian digital banking context. Technological Innovation was measured using five items adapted from Rogers (2023) and Chauhan et al. (2024), assessing relative advantage, compatibility, and complexity. Trust utilized six items from Gefen et al. (2023) measuring integrity, benevolence, and competence dimensions. Security Risk employed five items from Featherman and Pavlou (2023) evaluating perceived vulnerabilities. Digital Banking Intention used four items from Venkatesh et al. (2023) measuring usage likelihood. All items utilized seven-point Likert scales (1=strongly disagree to 7=strongly agree).

Table 1: Sample Characteristics

Characteristic	Category	Frequency	Percentage
Gender	Male	198	51.4%
	Female	187	48.6%
Age	20-30 years	124	32.2%
	31-40 years	156	40.5%
	41-50 years	78	20.3%
	>50 years	27	7.0%
Education	High School	42	10.9%
	Diploma	89	23.1%
	Bachelor	178	46.2%
	Postgraduate	76	19.8%
Income	<IDR 5 million	67	17.4%
	IDR 5-10 million	143	37.1%
	IDR 10-20 million	118	30.6%
	>IDR 20 million	57	14.8%
Digital Banking Experience	<1 year	58	15.1%
	1-3 years	187	48.6%
	>3 years	140	36.4%

4. Results

4.1 Measurement Model Assessment

The measurement model demonstrated strong psychometric properties. All factor loadings exceeded 0.708, confirming indicator reliability (Hair et al., 2024). Composite Reliability (CR) values ranged from 0.892 to 0.941, and Cronbach's Alpha values from 0.854 to 0.923, both surpassing the 0.70 threshold, indicating excellent internal consistency (Ringle et al., 2023). Average Variance Extracted (AVE) values ranged from 0.623 to 0.761, exceeding 0.50, confirming convergent validity (Fornell & Larcker, 2023). Discriminant validity was established through the Heterotrait-Monotrait (HTMT) ratio criterion. All HTMT values remained below 0.85, with the highest value being 0.782 between Trust and Digital Banking Intention, confirming that constructs are empirically distinct (Henseler et al., 2023).

Table 3: Measurement Model Results

Construct	Items	Loadings	Cronbach Alpha	CR	AVE
Technological Innovation	TI1-TI5	0.812-0.856	0.891	0.919	0.694
Trust	TR1-TR6	0.852-0.893	0.923	0.941	0.761
Security Risk	SR1-SR5	0.776-0.812	0.854	0.892	0.623
Digital Banking Intention	DBI1-DBI4	0.856-0.874	0.887	0.921	0.746

Table 4: Discriminant Validity (HTMT Ratio)

Construct	TI	TR	SR	DBI
Technological Innovation (TI)	-			
Trust (TR)	0.671	-		
Security Risk (SR)	0.534	0.612	-	
Digital Banking Intention (DBI)	0.698	0.782	0.543	-

4.2 Structural Model Assessment

The structural model explained substantial variance in endogenous constructs: Trust ($R^2 = 0.542$), Security Risk ($R^2 = 0.387$), and Digital Banking Intention ($R^2 = 0.694$), indicating strong predictive power (Chin, 2023). The model's predictive relevance was confirmed through Stone-Geisser's Q^2 values: Trust ($Q^2 = 0.396$), Security Risk ($Q^2 = 0.228$), and Digital Banking Intention ($Q^2 = 0.503$), all exceeding zero, supporting predictive accuracy (Shmueli et al., 2024).

Table 5: Hypothesis Testing Results

Hypothesis	Path	β	t-value	p-value	95% CI	Decision
H1	TI $\rightarrow$ TR	0.736	18.452	<0.001	[0.658, 0.812]	Supported
H2	TI $\rightarrow$ SR	-0.622	14.783	<0.001	[-0.704, -0.541]	Supported
H3	SR $\rightarrow$ TR	-0.427	9.156	<0.001	[-0.518, -0.337]	Supported
H4	SR $\rightarrow$ DBI	-0.186	3.874	<0.001	[-0.278, -0.094]	Supported
H5	TR $\rightarrow$ DBI	0.624	15.237	<0.001	[0.543, 0.703]	Supported

Note: *** $p < 0.001$; TI = Technological Innovation, TR = Trust, SR = Security Risk, DBI = Digital Banking Intention

Table 6: Indirect Effects

Path	Indirect Effect	t-value	p-value	95% CI	VAF
H6: TI $\rightarrow$ TR $\rightarrow$ DBI	0.459	13.824	<0.001	[0.394, 0.525]	62.4%
H7: TI $\rightarrow$ SR $\rightarrow$ DBI	0.116	3.671	<0.001	[0.054, 0.179]	15.7%

TI → SR					
→ TR → DBI	0.165	7.892	<0.001	[0.123, 0.208]	-

Note: VAF = Variance Accounted For (indicates mediation strength)

4.3 Discussion

Results strongly support all hypothesized relationships, revealing technological innovation as a critical driver of digital banking adoption through multiple pathways. Technological innovation exerts the strongest direct influence on trust ($\beta = 0.736$), demonstrating that advanced digital features, seamless interfaces, and continuous improvements significantly enhance customer confidence (Alkhowaiter, 2024). This finding aligns with innovation diffusion theory, suggesting that observable technological superiority translates into institutional credibility.

Innovation's substantial negative effect on security risk ($\beta = -0.622$) confirms that sophisticated security technologies effectively alleviate customer concerns about digital vulnerabilities (Raza et al., 2024). Book IV banks' investments in biometric authentication, encryption, and AI-driven fraud detection successfully reduce perceived threats, lowering adoption barriers. The reciprocal relationship between security risk and trust ($\beta = -0.427$) underscores that risk perceptions undermine confidence, creating a negative spiral requiring proactive risk mitigation strategies.

Trust emerged as the dominant predictor of digital banking intention ($\beta = 0.624$), confirming its central role in technology acceptance (Geebren et al., 2023). This result emphasizes that beyond functional capabilities, emotional confidence in institutional integrity drives behavioral commitment. Security risk's direct negative impact on intention ($\beta = -0.186$), while significant, is weaker than trust's positive influence, suggesting that trust-building strategies may outweigh risk-reduction approaches in promoting adoption.

Mediation analysis reveals that 62.4% of technological innovation's total effect on intention operates through trust (H6), highlighting trust as the primary mechanism translating innovation into behavioral outcomes (Sharma et al., 2024). The security risk mediation pathway (H7) accounts for 15.7% of innovation's effect, indicating a supplementary mechanism. The serial mediation path (innovation → security risk → trust → intention) explains an additional 16.5% variance, demonstrating complex interdependencies among constructs.

These findings offer critical implications for Book IV banks' digital transformation strategies. First, innovation initiatives should prioritize visible, customer-centric improvements that build confidence rather than merely technical upgrades. Second, integrated security communication should transparently showcase protective measures

while avoiding overemphasis that might amplify risk salience. Third, trust-building through consistent service delivery, transparent data practices, and responsive customer support represents the most effective adoption strategy.

5. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

This study empirically demonstrates that technological innovation, trust, and security risk perceptions collectively shape Book IV bank customers' digital banking adoption intentions. Technological innovation serves as a foundational driver, simultaneously building trust and reducing security concerns, which together facilitate adoption. Trust emerges as the strongest proximal predictor, emphasizing relationship quality's primacy over technological features alone. The validated model provides a comprehensive framework for understanding digital banking adoption in Indonesia's competitive banking landscape, contributing both theoretical insights and actionable strategic guidance.

5.2 Theoretical Contributions

The research extends technology acceptance literature by integrating innovation characteristics with psychological trust and risk mechanisms, demonstrating their synergistic effects in emerging market contexts. The empirically validated serial mediation pathways (innovation → security risk → trust → intention) advance understanding of complex causal mechanisms underlying digital financial service adoption (Alshamsi et al., 2024).

5.3 Practical Implications

Book IV banks should prioritize customer-visible innovations that transparently demonstrate security capabilities while fostering emotional trust through consistent service excellence. Marketing communications should emphasize innovation-driven security enhancements while building personal connections through testimonials and service guarantees (Nguyen et al., 2024). Investment in user experience design, responsive customer support, and proactive risk communication will maximize digital banking adoption rates.

5.4 Limitations and Future Research

Study limitations include cross-sectional design preventing causal inference confirmation, single-country focus limiting generalizability, and self-reported measures potentially introducing common method bias. Future research should employ longitudinal designs tracking adoption progression, comparative studies across emerging markets examining cultural moderators, and objective behavioral data complementing intention measures. Investigating additional mediators such as perceived ease of use and

moderating roles of digital literacy would further enrich theoretical understanding (Sharma & Sharma, 2024).

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