

## **Fostering Digital Banking Growth: Understanding User Willingness**

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### **ABSTRACT**

The increasing reliance on digital banking has made mobile banking a vital financial service. This study examines the factors influencing mobile banking adoption in Indonesia, focusing on Perceived Usefulness, Perceived Ease of Use, Perceived Security, and Trust within the Technology Acceptance Model (TAM) framework. A quantitative approach was used, with data collected from 250 mobile banking users and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that all four factors significantly impact adoption, with perceived usefulness and trust playing key roles. Users are more likely to adopt mobile banking when they perceive it as beneficial, easy to use, secure, and supported by a reliable institution. Banks should enhance functionality, security, and transparency to strengthen consumer confidence. Future research may explore additional factors, such as social influence and service quality, to gain more profound insights into mobile banking adoption.

**Keywords:** mobile banking adoption; perceived usefulness; perceived ease of use; perceived security; trust.

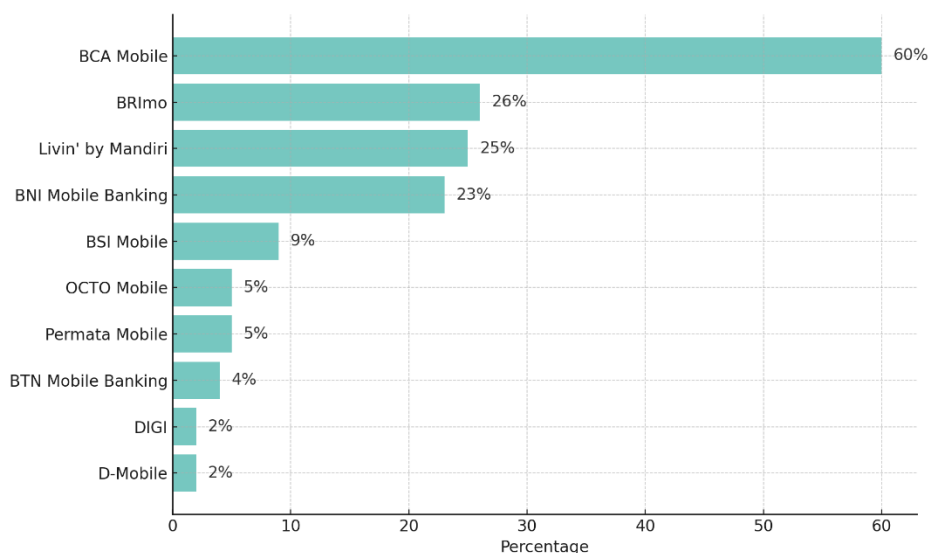
### **INTRODUCTION**

Financial services are advancing via digital innovation, propelled by technical developments that are rapidly reshaping the banking industry. To enhance customer service delivery and boost efficiency, banks are increasingly using information and communication technology (Purbaya, 2022). The advent of electronic banking (e-banking) is a significant outcome of this shift, enabling users to perform financial transactions over electronic channels. E-banking offers unique characteristics, such as 24/7 access to financial services from any place, which are

unavailable in conventional offline banking (Carranza *et al.*, 2021). Mobile banking has emerged as a pivotal financial innovation, significantly transforming customer interactions with banks and other e-banking services (Fadlan & Dewantara, 2018).

Bank Indonesia reports a substantial rise in the popularity of mobile banking in Indonesia in recent years. The aggregate value of mobile banking transactions rose from over IDR 2.856 trillion in 2018 to IDR 8.355 trillion in 2022. This growth positions mobile banking as one of the fastest-growing electronic banking services, mostly due to its ability to meet customers' demands for flexible and efficient transactions (Angelia, 2022). Simultaneously, Indonesia's digital infrastructure and user demographic have seen significant expansion. In 2022, the Badan Pusat Statistik (BPS) performed a nationwide poll indicating that 66.48% of Indonesians had internet connectivity, an increase from 62.10% in 2021. Furthermore, 67.88% of the population had an active mobile phone, reflecting an increase from 65.87% in 2021. These statistics highlight a conducive atmosphere for mobile banking adoption, as the widespread use of smartphones and internet access allows an increasing number of clients to integrate digital banking into their financial practices (BPS, 2022). Moreover, mobile banking services are currently offered by almost all major banks in Indonesia, with BCA Mobile being the most widely used application, representing 60% of all users in 2022 (Angelia, 2022).

**Chart 1.** Top 10 Most Used Mobile Banking Applications in Indonesia (2022)



Source: Angelia (2022)

The importance of mobile banking stems from its effectiveness, convenience, and role in promoting financial inclusion. Mobile banking obviates the need for clients to physically visit bank offices, enabling them to do financial transactions at any time and from any place using

a smartphone (Aeni & Purwantini, 2019). Furthermore, it accelerates banking procedures for clients by allowing several transactions inside a single application (Amanda & Ibadillah, 2023). Consequently, it enhances efficiency. In emerging economies like Indonesia, where a substantial segment of the population is unbanked, mobile banking offers personal advantages while also fostering financial inclusion. Through the use of mobile technology, banks may extend their financial services to underserved populations, thus integrating a larger population into the formal financial system (Bertagnoli, 2011). The simultaneous enhancement of user experience and expansion of financial access is why mobile banking has emerged as a strategic goal in the digital transformation of the banking industry.

This research used the Technology Acceptance Model (TAM) as its principal theoretical framework to investigate the determinants affecting the adoption of mobile banking, considering its increasing significance. Davis (1989) developed the Technology Acceptance Model (TAM), renowned for its capacity to clarify individual acceptance of new technologies. According to this framework, consumers' attitudes towards technology adoption are shaped by two fundamental constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Usefulness refers to the level to which a person feels that using a system would improve their productivity, while Perceived Ease of Use denotes the degree to which the system is user-friendly and necessitates little effort to use (Davis, 1989). Hermawan *et al.* (2020) assert that users are much more likely to use a mobile banking application they see as beneficial and user-friendly (TAM). The concept has undergone extensive validation across several settings and is especially relevant to mobile banking, where effectiveness and user-friendliness are crucial determinants of adoption (Siswoyo & Irianto, 2023).

Perceived security and trust are essential variables that affect the adoption of mobile banking, alongside its ease of use and functionality. User trust in digital financial transactions is often affected by security apprehensions, since mobile banking functions via internet networks vulnerable to cyber attacks (Karnadi *et al.*, 2018). Perceived security refers to an individual's confidence in a system's ability to protect their personal information and ensure transaction security (Merhi *et al.*, 2019). Consumers' hesitation to use mobile banking services has been intensified by the increase in security breaches, such as phishing attempts (Indonesia Anti-Phishing Data Exchange, 2023). Consequently, the adoption of stringent encryption, authentication protocols, and fraud deterrence systems is crucial for enhancing customers' propensity to use mobile banking (Wandi *et al.*, 2020). Similarly, trust is an essential element in the adoption of mobile banking. Users' confidence in the safe and reliable operation of the

financial institution and its digital platform is encapsulated by trust (McKnight *et al.*, 2002). Individuals are more likely to accept and sustain their use of mobile banking services when they view risks as reduced (Kholid & Soemarso, 2018). Establishing trust is essential for banks to enhance customer participation in mobile banking, given that financial services are risk-sensitive and intangible (Nurdin *et al.*, 2021).

Despite substantial study on mobile banking usage, prior studies have shown conflicting results about the influence of these elements, highlighting the need for more inquiry. While several research have shown the positive influence of Perceived Usefulness and Ease of Use on mobile banking adoption, others have shown negligible or context-specific impacts (Putra & Sari, 2020; Saputra & Rekarti, 2021). Likewise, although several studies demonstrate that Perceived Security and Trust significantly influence adoption intention, others propose that they may not consistently serve as the decisive factors (Nurdin *et al.*, 2021; Junaedi & Neneng, 2023). Wandu *et al.* (2020) found that the adoption of mobile banking was favorably affected by heightened perceived security, whereas Junaedi & Neneng (2023) determined that consumers' desire to use mobile banking was not significantly impacted by security apprehensions. Trust has been shown to exert both substantial and negligible impacts in different research, depending on the user's digital literacy and experience (Hernández-Ortega, 2011). The disparities suggest that the influence of TAM conceptions and security concerns may be influenced by cultural, demographic, and technical variables, highlighting the need for more empirical study in the Indonesian setting.

Although prior research has investigated mobile banking adoption using the Technology Acceptance Model (TAM), there is a paucity of studies that explicitly address the influence of perceived security and trust within the Indonesian setting. Considering the increasing prevalence of cyber risks and financial crime, understanding the impact of security perceptions on adoption is crucial. Moreover, confidence in financial institutions is a crucial factor; nevertheless, its influence on mobile banking participation in Indonesia remains inadequately examined. This research seeks to address these gaps by investigating how perceived utility, convenience of use, security, and trust influence mobile banking adoption behavior in an emerging market context.

## LITERATURE REVIEW

### Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a prevalent theoretical framework for comprehending the uptake of novel technology. Proposed by Davis (1989) as a modification of the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM) asserts that two primary perceptions—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—influence an individual's intention to accept and use a technology (Davis, 1989). Perceived Usefulness (PU) signifies the extent to which users believe that utilizing a particular technology will improve their productivity or performance, whereas Perceived Ease of Use (PEOU) indicates the extent to which users consider a technology easy to operate with minimal effort (Venkatesh & Davis, 2000). The Technology Acceptance Model (TAM) posits that perceptions affect user attitudes towards technology, subsequently influencing behavioral intentions and ultimately adoption (Davis, 1989).

The Technology adoption Model (TAM) has been extensively used to analyze user adoption of mobile banking services. Research conducted by Shaikh & Karjaluoto (2015) and Wang & Goh (2017) shown that both Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) substantially affect customers' propensity to use mobile banking services. Customers are more inclined to accept mobile banking when they regard it as beneficial, including time efficiency, accessibility, and enhanced financial management (Sakala & Phiri, 2019). Likewise, when mobile banking services exhibit ease of use—characterized by intuitive navigation, straightforward transaction processes, and user-centric design—consumer adoption increases (Zhou *et al.*, 2010). These results confirm the relevance of the Technology Acceptance Model in the adoption of digital banking.

This study concentrates on perceived usefulness, ease of use, security, and trust, which have been consistently recognized as key determinants of technology adoption, despite previous research examining additional factors such as social influence, service quality, and digital literacy in mobile banking adoption (Shaikh & Karjaluoto, 2015; Davis, 1989; Venkatesh & Davis, 2000). In Indonesia's digital banking sector, security concerns and trust problems have become more pertinent owing to escalating cyber threats. This research enhances the Technology Acceptance Model by including two more components, so offering a more comprehensive explanation of mobile banking uptake in this setting.

## **Gaps in Existing Research**

Notwithstanding the extensive literature on mobile banking use, many research gaps persist:

1. Some research indicate that perceived usefulness (PU) and perceived ease of use (PEOU) substantially influence adoption, while others reveal weak or non-significant correlations, indicating that contextual variables (e.g., technical literacy, demographic variations) may attenuate these effects (Putra & Sari, 2020).
2. Numerous research assess behavioral intention instead of actual adoption, which may inadequately reflect long-term mobile banking adoption behavior (Nurdin *et al.*, 2020).
3. Some research see security and trust as distinct entities, while others integrate them into more comprehensive categories, such as perceived credibility (Gefen *et al.*, 2003). The exact correlation among security, trust, and adoption is yet inadequately examined.

## **Perceived Usefulness and Mobile Banking Adoption**

The Technology Acceptance Model (TAM) asserts that Perceived Usefulness (PU) is a key factor influencing technology adoption (Davis, 1989). PU is the degree to which a person perceives that using a system will improve their performance or provide tangible advantages. In mobile banking, perceived usefulness is the degree to which clients believe that mobile banking facilitates efficient, convenient, and effective financial transactions (Venkatesh & Davis, 2000).

Empirical research regularly demonstrates the substantial impact of perceived usefulness on mobile banking uptake. Shaikh & Karjaluo (2015) performed a meta-analysis of mobile banking studies and found that perceived usefulness was a significant predictor of adoption, as consumers were more likely to embrace mobile banking when they saw it as advantageous. Sakala and Phiri (2019) indicated that the adoption of mobile banking in Zambia was mostly influenced by perceived usefulness, as consumers emphasized the capacity for immediate transactions, remote access to account balances, and bill payments.

In Indonesia, the growing dependence on digital banking services indicates that users are more inclined to embrace mobile banking if they see it as beneficial for financial management without the need of visiting a physical bank branch (Pamungkas & Kusuma, 2017). Consequently, PU is anticipated to positively influence the uptake of mobile banking.

**H<sub>1</sub>:** Perceived Usefulness positively influences mobile banking adoption.

## **Perceived Ease of Use and Mobile Banking Adoption**

A fundamental element of TAM is Perceived Ease of Use (PEOU), defined as the extent to which a person perceives a system as effortless and user-friendly (Davis, 1989). The more straightforward and user-friendly a mobile banking application is, the greater the probability of its adoption (Venkatesh *et al.*, 2003).

Numerous studies demonstrate that perceived ease of use significantly enhances mobile banking adoption. Zhou *et al.* (2010) discovered that user-friendly navigation, transparent transaction procedures, and straightforward authentication techniques enhanced the adoption rates of mobile banking services in China. Similarly, Wang & Goh (2017) indicated that in Taiwan, customers had a greater propensity to embrace mobile banking services when apps included user-friendly interfaces, smooth transactions, and clear menus.

In Indonesia, where technical literacy differs across populations, a user-friendly and intuitive mobile banking application is more likely to be adopted by clients. This is especially significant for senior users or anyone unacquainted with digital banking systems (Putra & Sari, 2020). Consequently, the following hypothesis is posited:

**H<sub>2</sub>:** Perceived Ease of Use positively influences mobile banking adoption.

## **Extensions of TAM: Incorporating Security and Trust**

Although TAM's fundamental components (PU and PEOU) successfully forecast technology adoption, researchers contend that TAM alone inadequately elucidates mobile banking adoption due to the presence of supplementary security risks and trust-related issues inherent in financial services (Gefen *et al.*, 2003). Thus, trust and perceived security have been identified as essential extensions of the Technology Acceptance Model (TAM) in the context of e-banking and mobile banking studies (Luarn & Lin, 2005; Muñoz-Leiva *et al.*, 2010).

Recognized Security denotes a user's assurance that their personal and financial information is safeguarded from fraud, identity theft, and cyber dangers (Karnadi *et al.*, 2018). As mobile banking transactions transpire across digital networks, clients must be certain that security protocols—such as encryption, biometric identification, and fraud detection—are implemented (Ngo & Le, 2023). Numerous research affirm that perceptions of security significantly influence the adoption of mobile banking. Muñoz-Leiva *et al.* (2010) identified insufficient security as a primary obstacle to e-banking adoption, but Wandi *et al.* (2020) demonstrated that improved security features significantly elevated users' propensity to utilize mobile banking services.

Trust is essential for the adoption of mobile banking, since financial transactions need faith in the bank's integrity and the technology's dependability (McKnight *et al.*, 2002). Users must have confidence that their bank will execute transactions precisely and that the mobile banking system will operate safely (Gefen *et al.*, 2003). Pamungkas and Kusuma (2017) examined Indonesian banking clients and found that trust was a significant predictor of mobile banking adoption, with elevated trust levels promoting sustained use. Similarly, Warsame & Ileri (2016) established that confidence in digital banking systems favorably impacted real mobile banking use in Kenya.

### **Perceived Security and Mobile Banking Adoption**

Security concerns are among the most critical barriers to mobile banking adoption. Perceived Security (PS) refers to users' confidence that a mobile banking service is safe from fraud, cyberattacks, and unauthorized access (Karnadi *et al.*, 2018). Since financial transactions involve sensitive personal data, users tend to avoid mobile banking if they perceive security risks (Muñoz-Leiva *et al.*, 2010).

Studies indicate that strong security measures enhance mobile banking adoption. Ngo & Le (2023) found that perceived security was the most influential factor driving mobile banking adoption in Vietnam, as users were more inclined to trust and use mobile banking when platforms offered secure authentication, end-to-end encryption, and fraud detection systems. Similarly, Wandi *et al.* (2020) demonstrated that high security perception significantly increased user confidence in mobile banking services in Indonesia.

As cyber threats continue to rise, Indonesian users may be hesitant to adopt mobile banking if they perceive security vulnerabilities (Nurdin *et al.*, 2021). Conversely, banks that provide strong security assurances, such as biometric authentication and multi-factor security protocols, are likely to boost adoption rates. Therefore, the following hypothesis is proposed:

**H<sub>3</sub>:** Perceived Security positively influences mobile banking adoption

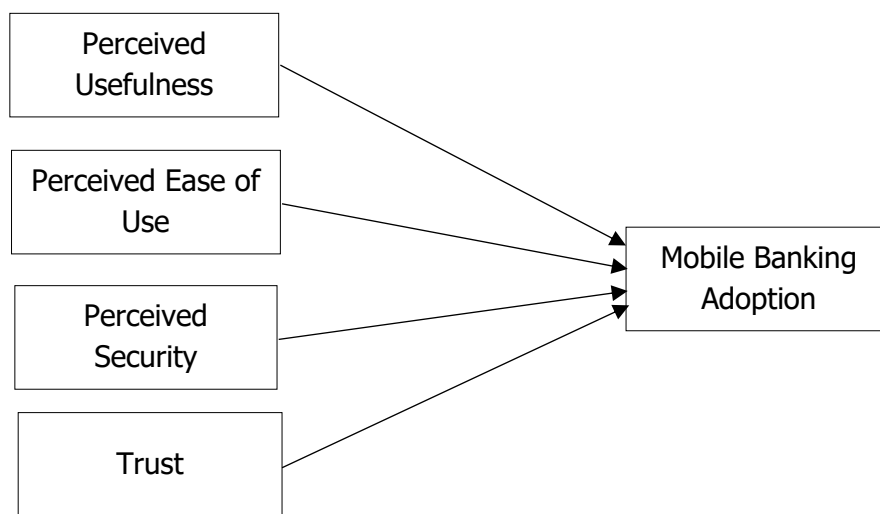
### **Trust and Mobile Banking Adoption**

Security apprehensions constitute one of the foremost obstacles to the adoption of mobile banking. Perceived Security (PS) denotes customers' assurance that a mobile banking service is safeguarded against fraud, cyberattacks, and illegal access (Karnadi *et al.*, 2018). Due to the involvement of sensitive personal data in financial transactions, consumers often refrain from mobile banking when they perceive security dangers (Muñoz-Leiva *et al.*, 2010).

Research demonstrates that robust security protocols facilitate the uptake of mobile banking. Ngo & Le (2023) revealed that perceived security was the predominant factor influencing mobile banking adoption in Vietnam, as consumers exhibited a greater propensity to trust and use mobile banking when platforms provided secure authentication, end-to-end encryption, and fraud detection systems. Wandu *et al.* (2020) similarly found that a heightened impression of security significantly enhanced user trust in mobile banking services in Indonesia.

Due to the increasing prevalence of cyber dangers, Indonesian customers may be reluctant to embrace mobile banking if they identify security weaknesses (Nurdin *et al.*, 2021). In contrast, banks that provide robust security measures, like biometric identification and multi-factor security methods, are expected to enhance adoption rates. Consequently, the following hypothesis is posited:

**H<sub>4</sub>:** Trust positively influences mobile banking adoption



**Figure 1.** Research Model

## METHOD

This research utilizes a quantitative methodology. A cross-sectional survey methodology was used to gather data from mobile banking customers at a certain moment in time. The quantitative method was selected due to its capacity for systematic gathering and analysis of numerical data to discern statistical correlations among variables (Creswell & Creswell, 2018). The sample size was established according to Hair *et al.* (2017), who recommend a minimum

of 5–10 participants for each observed variable in Structural Equation Modeling (SEM) research. This research, which encompasses four independent variables, requires a minimum sample size of 200 respondents. To augment statistical power and address probable non-replies, 300 questionnaires were sent, resulting in 250 completed responses included into the final analysis.

Primary data was gathered using a structured online questionnaire disseminated via Google Forms and various media sites. The use of an online survey was suitable due to the digital context of the research, confirming that participants were existing mobile banking users (Saunders *et al.*, 2019). The questionnaire was self-administered, enabling respondents to complete it at their leisure.

Each component was assessed using established scales derived from prior research to guarantee content validity and reliability. The following instruments were employed:

**Table 1.** Variables Measurement

<b>Variable</b>	<b>Indicators</b>	<b>Source</b>
Perceived Ease of Use	1. Easy to learn 2. Controllable 3. Flexible 4. Clear and understandable	Davis (1989); Venkatesh <i>et al.</i> (2003).
Perceived Usefulness	1. Increase performance 2. Increase productivity 3. Increase effectivity 4. Usefulness	Venkatesh & Davis (2000).
Perceived Security	1. Data security 2. Protection from threat 3. System reliability 4. Transaction security	Luarn & Lin (2005); Muñoz-Leiva <i>et al.</i> (2010)
Trust	1. Reliability of service 2. Integrity of the system 3. Dependability 4. Security assurance	McKnight <i>et al.</i> (2002); Gefen <i>et al.</i> (2003)
Mobile banking adoption	1. Actual usage frequency 2. Transaction type 3. Intention to continue using	Shaikh & Karjaluoto (2015)

This study's hypotheses were evaluated using Structural Equation Modeling (SEM) via SmartPLS 3.0, due to its proficiency in managing intricate models with multiple relationships, simultaneously assessing measurement and structural models, and delivering robust estimations even with smaller sample sizes (Hair *et al.*, 2017). Moreover, SmartPLS 3.0 is especially conducive to exploratory research and predictive analysis, making it a suitable instrument for this investigation (Ringle *et al.*, 2015).

## RESULT AND DISCUSSION

### Respondent Demographics

Demographic data on gender, age, education level, employment, and frequency of mobile banking use were gathered to enhance the understanding of mobile banking customers in Indonesia. This information elucidates the variety of the respondent group and contextualizes the study's conclusions. Table 2 provides an overview of the demographic distribution of participants, guaranteeing equal representation across all user categories.

**Table 2.** Demographic Characteristics of Respondents

Demographic Factor	Category	Frequency (n=250)	Percentage (%)
Gender	Male	122	48.8%
	Female	128	51.2%
Age Group	18 – 25 years	84	33.6%
	26 – 35 years	96	38.4%
	36 – 45 years	47	18.8%
	Above 45 years	23	9.2%
Education Level	High school diploma	60	24.0%
	Bachelor's degree	137	54.8%
	Postgraduate degree	48	19.2%
	Other	5	2.0%
Occupation	Student	73	29.2%
	Private sector employee	97	38.8%
	Government employee	31	12.4%
	Entrepreneur	39	15.6%
	Others	10	4.0%
Mobile Banking Usage	Frequent user (>10 transactions/month)	126	50.4%

<b>Demographic Factor</b>	<b>Category</b>	<b>Frequency (n=250)</b>	<b>Percentage (%)</b>
	Moderate user (5–10 transactions/month)	82	32.8%
	Occasional user (<5 transactions/month)	42	16.8%

Source: Primary data processed (2023)

### Convergent Validity

Convergent validity evaluates the degree of correlation among various items that assess the same construct. The Average Variance Extracted (AVE) serves as a critical metric, with a suggested threshold of  $AVE > 0.50$  (Fornell & Larcker, 1981) and a loading factor  $> 0.70$  (Sholihin & Ratmono, 2013).

**Table 3.** Convergent Validity

<b>Variable</b>	<b>Indicators</b>	<b>Loading</b>	<b>AVE</b>	<b>Conclusion</b>
Perceived Usefulness	PU1	0.82	0.65	Valid
	PU2	0.85		
	PU3	0.80		
	PU4	0.83		
Perceived Ease of Use	PEOU1	0.81	0.68	Valid
	PEOU2	0.84		
	PEOU3	0.79		
	PEOU4	0.82		
Perceived Security	PS1	0.78	0.63	Valid
	PS2	0.80		
	PS3	0.75		
	PS4	0.79		
Trust	Tr1	0.83	0.66	Valid
	Tr2	0.85		
	Tr3	0.81		
	Tr4	0.84		
Mobile Banking Adoption	MBA1	0.86	0.70	Valid
	MBA2	0.88		
	MBA3	0.84		

Source: Primary data processed (2023)

All AVE values  $> 0.50$  and loading factor of all indicators  $> 0.70$ , indicating strong convergent validity for all constructs.

### Discriminant Validity

Discriminant validity confirms the distinctiveness of constructs from one another. The Fornell-Larcker Criterion is employed, indicating that the square root of the Average Variance Extracted (AVE) must exceed the inter-construct correlations (Fornell & Larcker, 1981).

**Table 4.** Discriminant Validity (Fornell-Larcker Criterion)

Variable	PU	PEOU	PS	Tr	MBA
Perceived Usefulness	<b>0.81</b>	0.52	0.48	0.55	0.60
Perceived Ease of Use	0.52	<b>0.82</b>	0.46	0.51	0.57
Perceived Security	0.48	0.46	<b>0.79</b>	0.50	0.53
Trust	0.55	0.51	0.50	<b>0.81</b>	0.58
Mobile Banking Adoption	0.60	0.57	0.53	0.58	<b>0.84</b>

Source: Primary data processed (2023)

The diagonal values (bolded) indicate the square root of AVE, which exceeds the correlations in the corresponding rows and columns, thereby confirming discriminant validity (Fornell & Larcker, 1981).

### Internal Consistency Reliability

Internal consistency reliability confirms that all indicators assessing a construct exhibit a high degree of correlation. The two primary metrics are Cronbach’s Alpha greater than 0.70, which is deemed acceptable (Nunnally & Bernstein, 1994), and Composite Reliability exceeding 0.70, signifying good reliability (Hair *et al.*, 2010).

**Table 5.** Internal Consistency Reliability

Variable	Cronbach’s Alpha	Composite Reliability	Conclusion
Perceived Usefulness	0.86	0.90	Reliable
Perceived Ease of Use	0.88	0.91	Reliable
Perceived Security	0.84	0.88	Reliable
Trust	0.87	0.89	Reliable
Mobile Banking Adoption	0.90	0.92	Reliable

Source: Primary data processed (2023)

All Cronbach’s Alpha and Composite Reliability > 0.70, confirming high internal consistency and construct reliability (Hair *et al.*, 2010).

## Hypothesis Testing

**Table 6.** Hypothesis Testing Results

<b>Hypothesis</b>	<b>Path Coefficient (<math>\beta</math>)</b>	<b>t-value</b>	<b>p-value</b>	<b>Result</b>
H <sub>1</sub> : PU → MBA	0.42	5.89	<0.001**	Supported
H <sub>2</sub> : PEOU → MBA	0.31	4.52	<0.001**	Supported
H <sub>3</sub> : PS → MBA	0.28	3.98	<0.001**	Supported
H <sub>4</sub> : Trust → MBA	0.36	4.75	<0.001**	Supported

Source: Primary data processed (2023)

The data presented in the table indicates that all hypotheses are supported, as the p-value is below 0.05, signifying statistical significance. The positive direction of the coefficients indicates that the relationships between variables are consistent with the proposed theoretical framework.

Of the four factors analyzed, perceived usefulness and trust demonstrated the greatest influence on the adoption of mobile banking. This indicates that users value the functional advantages and the dependability of financial institutions in their interactions with digital banking services. Conversely, although perceived security was identified as significant, its influence was relatively minimal, suggesting that users may continue to utilize mobile banking despite moderate security apprehensions if they regard the service as highly beneficial and reliable. The findings corroborate earlier studies that identify trust and perceived usefulness as primary factors influencing sustained engagement with digital financial platforms (Shaikh & Karjaluoto, 2015; Ngo & Le, 2023).

## Discussion

This study's findings align with prior research on mobile banking adoption. Shaikh & Karjaluoto (2015) identified perceived usefulness as a significant factor influencing mobile banking adoption across diverse global markets, which is consistent with our findings in the Indonesian context. Warsame and Ireri (2016) underscored the significance of trust in mobile banking services, noting that users are more inclined to utilize platforms they consider reliable. In contrast to the findings of Muñoz-Leiva *et al.* (2010), which identified security concerns as a primary barrier to adoption, our results indicate that while security is important, it exerts a lesser influence compared to usefulness and trust. This suggests that Indonesian consumers may exhibit a greater propensity to adopt mobile banking, despite security concerns, if they perceive the service as beneficial and trustworthy.

### **Perceived Usefulness to Mobile Banking Adoption**

Perceived usefulness serves as a crucial factor in the adoption of mobile banking, as individuals are inclined to embrace technologies that offer tangible advantages and improve efficiency (Davis, 1989; Venkatesh & Davis, 2000). Users are more likely to incorporate mobile banking into their financial routines when they acknowledge its convenience in facilitating transactions without the limitations of time and location. This is consistent with the findings of Shaikh and Karjaluoto (2015), which indicate that perceived usefulness is a significant predictor of mobile banking adoption in various studies.

Sakala and Phiri (2019) demonstrated that in Zambia, the likelihood of users adopting mobile banking increased significantly when they viewed it as a more efficient alternative to traditional banking methods. Wang and Goh (2017) found that mobile banking users in Taiwan prioritized the capacity for remote and efficient transactions, resulting in higher adoption rates. The findings indicate that mobile banking services that offer tangible benefits, including expedited transactions, enhanced financial control, and round-the-clock accessibility, significantly increase user motivation for utilization.

Financial institutions can enhance perceived usefulness by integrating functionalities such as automated savings plans, financial analytics, and AI-driven customer support. Ensuring seamless interoperability with other digital payment platforms and facilitating a smooth transaction experience will enhance the perception of mobile banking as an essential financial tool (Ngo & Le, 2023).

### **Perceived Ease of Use to Mobile Banking Adoption**

The perceived ease of use notably influences mobile banking adoption, as individuals are more inclined to utilize technologies that necessitate minimal operational effort (Venkatesh & Bala, 2008). A well-designed application featuring a clear layout, intuitive navigation, and an efficient transaction process enhances user confidence and promotes repeated usage. Previous research indicates that the ease of use significantly impacts users' attitudes toward mobile banking, especially among those with limited experience in digital financial services (Zhou *et al.*, 2010).

Research by Wang & Goh (2017) emphasized the significance of perceived ease of use (PEOU), revealing that mobile banking applications with well-structured interfaces resulted in increased adoption rates in Taiwan. Putra & Sari (2020) found that in Indonesia, the adoption

of mobile banking was significantly affected by user-friendly interfaces, as customers appreciated the ease of completing transactions with minimal complexity. Research suggests that systems requiring lower cognitive effort are more likely to be adopted by users.

Financial institutions should invest in improving the user experience of mobile banking platforms to address this factor. This involves minimizing redundant steps in transactions, providing instructional guides for novice users, and enhancing mobile applications for optimal performance across various devices. Mobile banking providers can enhance their reach to a wider demographic, including those with lower digital literacy, by emphasizing accessibility and usability (McKnight *et al.*, 2002).

### **Perceived Security to Mobile Banking Adoption**

Perceived security is essential for mobile banking adoption, as users need to be confident that their financial and personal information is safeguarded against cyber threats (Karnadi *et al.*, 2018). Security concerns are often identified as a major factor deterring users from adopting mobile banking. Research indicates that apprehensions regarding fraud, hacking, and unauthorized access adversely affect adoption rates (Muñoz-Leiva *et al.*, 2010).

Ngo and Le (2023) discovered that in Vietnam, users exhibited a significantly higher likelihood of utilizing mobile banking when they had confidence in the security measures of the platform. Luarn and Lin (2005) demonstrated that implementing robust authentication protocols, including biometric security and two-factor verification, enhances trust in mobile banking services. The findings support the notion that the adoption of digital banking is dependent on users' trust in the platform's capacity to safeguard against financial loss and unauthorized transactions.

Financial institutions must strengthen cybersecurity measures to address security concerns. This includes implementing real-time fraud detection, ensuring transaction encryption, and providing customer education programs on safe banking practices. Transparent communication regarding security protocols and the provision of immediate support during instances of suspicious activity can enhance user reassurance, thus promoting increased adoption of mobile banking services (Wandi *et al.*, 2020).

## **Trust to Mobile Banking Adoption**

Trust significantly influences mobile banking adoption, as users need to have confidence that both the banking institution and the digital platform will function reliably and prioritize their interests (Gefen *et al.*, 2003). Research has demonstrated that trust plays a crucial role in users' engagement with mobile banking. Individuals are more inclined to utilize services from institutions they view as transparent, reliable, and dedicated to safeguarding their financial interests (McKnight *et al.*, 2002).

Pamungkas and Kusuma (2017) identified trust as a significant factor influencing mobile banking adoption in Indonesia, indicating that users are more inclined to utilize banking services when they possess confidence in the institution's credibility. Warsame and Ireri (2016) found that in Kenya, trust in mobile banking providers significantly influenced customer behavior, especially in markets characterized by concerns regarding fraud and financial mismanagement. The findings indicate that the establishment of trust leads to increased user engagement with mobile banking platforms and fosters long-term relationships with financial institutions.

Banks should prioritize transparency in transactions, communicate service fees clearly, and ensure efficient customer support systems to build trust. Enhancing regulatory compliance, providing fraud protection guarantees, and promoting positive user testimonials can improve the perceived reliability of mobile banking services (Shaikh & Karjaluo, 2015). Establishing and maintaining trust encourages initial adoption and contributes to long-term customer retention and advocacy for digital banking solutions.

## **CONCLUSION**

This research investigates the determinants of mobile banking adoption in Indonesia, focusing on Perceived Usefulness, Perceived Ease of Use, Perceived Security, and Trust. The results indicate that all four factors have a significant impact on users' decisions to adopt mobile banking, thereby underscoring the importance of extensions to the Technology Acceptance Model (TAM) in the context of digital financial services. The findings suggest that users are more inclined to adopt mobile banking when they recognize its advantages for financial management, ease of navigation, security, and endorsement by a reputable financial institution.

This research validates the significance of security and trust as essential extensions of the Technology Acceptance Model (TAM) in the context of mobile banking adoption. This indicates that although perceived usefulness (PU) and perceived ease of use (PEOU) are essential factors, addressing security and trust issues is crucial for enhancing adoption rates. The findings are consistent with previous research highlighting that the success of digital banking relies on technological efficiency and user trust in the system.

Financial institutions can improve mobile banking adoption by prioritizing user-friendly designs, incorporating advanced security features, and building trust through transparent policies and effective customer support. Providing clear value, reducing complexity, and addressing security concerns in mobile banking applications can enhance user acceptance. Moreover, strategies for customer engagement, including financial literacy initiatives, fraud prevention awareness, and responsive customer service, can enhance user trust and confidence in mobile banking platforms.

The findings possess implications for policy, especially concerning regulatory bodies that supervise digital financial services. Enhancing consumer protection laws, ensuring adherence to data security regulations, and promoting uniform standards for mobile banking security may improve public trust in digital banking. Policymakers should consider initiatives that promote financial inclusion by addressing obstacles to mobile banking adoption among underbanked populations.

This study offers important insights into mobile banking adoption; however, it has specific limitations. The utilization of self-reported survey data may lead to response bias, as participants may either overestimate or underestimate their engagement with mobile banking. The study employs a cross-sectional approach, capturing user perceptions at a single moment without considering the evolution of attitudes over time. Future research should incorporate longitudinal studies to investigate the temporal changes in perceptions of usefulness, security, and trust. Furthermore, incorporating factors such as social influence, digital literacy, and service quality may enhance the understanding of mobile banking adoption. Comparative studies across various regions or countries can provide insights into the influence of cultural and economic factors on digital banking behaviors.

To promote increased adoption of mobile banking, financial institutions should concentrate on three primary areas: Enhancing functionality through the introduction of AI-driven financial recommendations, the integration of digital wallets, and the provision of automated bill

payments can augment perceived usefulness. Enhancing security protocols through the implementation of multi-factor authentication, biometric logins, and real-time fraud detection alerts can effectively mitigate security concerns and provide reassurance to users. Building consumer trust requires banks to implement transparent fee structures, communicate clearly regarding data privacy policies, and provide responsive customer support to bolster consumer confidence. Regulators may contribute by implementing more stringent cybersecurity regulations and advancing financial literacy initiatives to inform users about secure mobile banking practices.

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### **Indicators and Survey Questions**

The survey questionnaire was developed based on predefined indicators for each research variable to ensure construct validity and alignment with the study objectives. The questions were designed using a Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), allowing respondents to express their perceptions regarding Perceived Ease of Use, Perceived Usefulness, Perceived Security, Trust, and Mobile Banking Adoption. The detailed mapping of indicators to survey questions is presented as follows.

#### Perceived Ease of Use

1. It is easy for me to learn how to use mobile banking services.
2. I feel that I have full control when using mobile banking applications.
3. Mobile banking services allow me to perform transactions flexibly.
4. The mobile banking system is clear and easy to understand.

#### Perceived Usefulness

1. Using mobile banking helps me perform financial transactions more efficiently.
2. Mobile banking increases my productivity in managing my finances.
3. Mobile banking makes financial transactions more effective.
4. Overall, I find mobile banking useful for my financial needs.

#### Perceived Security

1. I believe that my personal data is secure when using mobile banking services.
2. Mobile banking protects me from potential cyber threats and fraud.
3. I feel that the mobile banking system is reliable and functions securely.
4. I feel safe making financial transactions through mobile banking.

#### Trust

1. I trust that mobile banking services operate reliably and consistently.
2. I believe that the mobile banking system has strong integrity and does not manipulate user data.
3. I find mobile banking services dependable for handling my financial transactions.

4. I feel assured that mobile banking platforms prioritize security and protect my interests.

#### Mobile Banking Adoption

1. I frequently use mobile banking for financial transactions.
2. I use mobile banking for various types of transactions.
3. I intend to continue using mobile banking services in the future.

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