

# **An empirical investigation of mobile banking adoption in Jakarta: Theory Acceptance Model**

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## **Abstract**

This study employed the Technology Acceptance Model' (TAM). The purpose is to re-examine the TAM model in terms of mobile banking acceptance in Jakarta. The sample was 242 m-banking users with convinience sampling technique. The study found (1) Perceived ease of use had a positive and significant effect on Perceive usefulness. (2) Perceive usefulness and Perceived ease of use had a positive and significant effect on Attitude, (3) Perceived usefulness had a positive and significant effect on Attitude, behavioral intention and actual use. (4) Attitude had a positive and significant effect on behavioral intention, and (5) Behavioral intention had a positive and significant effect on Actual usage. TAM could explain the variance of behavioral intention of 63,9 percent and actual use of 71.2 percent.

*Keywords: Technology Acceptance Model (TAM), Mobile Banking, Actual Use.*

## **1. Introduction**

Technology is evolving at a breakneck pace in today's digital age. This necessitates everyone moving quickly to keep up with technological developments. According to a survey 196.71 million people, or 73.7 percent of the total population in Indonesia, were connected to the Internet in 2019. (APJII, 2020). This demonstrates that the number of internet users has increased significantly since 2018, when there were 171.17 million internet users. The banking industry is one that has benefited from technological advancements in its banking applications, such as internet banking. This internet banking service is an attempt to meet the needs of customers. Along with the advancement of smartphones and the ease with which they can be obtained, it encourages the banking industry to develop a banking application, namely mobile banking. In comparison to other banking applications, mobile banking is now one of the fastest growing banking services. This application is capable of meeting the needs of customers. It enables customers to transact at any time and from any location, without regard for time or space constraints. The Mobile Banking application can help the bank cut operational costs. It is not surprising that almost all banks now offer Mobile Banking services.

Users of digital banking applications such as SMS banking, Internet banking, and m-banking are increasing rapidly in Indonesia. The Financial Services Authority (OJK) reported a significant increase in the use of digital transactions during the COVID-19 pandemic. The Covid-19 pandemic has brought changes in social behavior and community mobility. This is evidenced by shifts in customer behavior as they begin to use virtual transactions. Data from several large banks showed an increase in digital transactions, both in terms of the number of transactions and the volume of transactions. The number of transactions increased by 320 percent in March 2020. Then, in April 2020, it would have risen to 480 percent. This demonstrates that digital service transactions, which are rapidly increasing, are accelerating digital services in a number of banks. However, according to an APJII survey conducted in 2020, the growth of mobile banking users is not proportional to the growth of internet users and the smartphone market, with only 9.7 percent of internet users accessing banking services (APJII, 2020). This means that, despite the company's significant investment in developing a mobile banking system, the use of mobile banking services remains far below expectations (Luarn & Lin, 2005). Therefore, it is necessary to identify the factors influencing m-banking acceptance. As a result, the purpose of this research is to identify these factors. In this regard, M-banking service providers must have a thorough understanding of the factors influencing this new trend. The current study aims to test the factors influencing M-banking adoption by Indonesian customers.

Studies related to m-banking adoption have been conducted by (Baabdullah et al., 2019; Baptista & Oliveira, 2015; Gary Mortimer, Larry Neale, 2015; Rahayu et al., 2020; Saparudin, 2020; Saparudin et al., 2020; Slade et al., 2015). These studies generally produced inconclusive results, indicating that previous research had revealed a lack of consensus on the factors influencing customers' decisions to use mobile banking (Saparudin et al., 2020). The main cause is the difference in the constructs and models used in these studies.

This study utilized theory of acceptance model (TAM) because It is one model that is frequently used to assess how individuals accept new technology (F. Muñoz-Leivaa,\*, S. Climent-Climentb & A, 2016). This model focuses on users' attitudes toward the use of technology and information by developing it based on perceived advantages and ease of use (Davis, 1989). This model can explain in detail the process of accepting a new technology in comparison to previous ones. This model has two sides to it. The first are perceptions of ease of use (PEOU) and perceived usefulness (PU) (PU). The second category includes attitude, intent to use behavior, and usage behavior. PU and PEOU are the most relevant to the attitude of technology acceptance (Davis, 1989).

## **2. Literature Review**

### **TAM**

TAM introduced by Fred D. Davis in 1986, is an adaptation of TRA which was made specifically for modeling user acceptance of information systems (Davis, 1989). TAM was developed from psychological theory. the main purpose of TAM is to provide a basis for exploring the influence of external factors on user beliefs, attitudes, and goals. TAM considers that there are 2 individual beliefs, namely perceived usefulness (PU) and perceived ease of use (PEOU). From these two variables can explain aspects of user behavior. So by looking at the ease and benefits of using information technology, it can be used as a reason for someone to behave or act as a benchmark in accepting information technology. The easier the use of information technology indicates that less effort must be made in improving its performance using information technology. Likewise, the more benefits that are felt by users, the more influence they have in using information technology.

### **Perceived Usefulness**

Perceived benefits are a person's belief that using an information technology system can improve their performance (Wang et al., 2005). Perceived usefulness is measured by indicators such

as increased performance, the level of convenience and the level of benefits of technology (Davis, 1989). If someone believes that the service can be useful in its performance, then the customer will use the service. However, if the customer believes that using the service is less useful for his work, then the customer will not use it. Perceived usefulness can be measured using indicators such as: being able to provide fast, timely, reliable, low-cost, secure, and accurate service. discipline

### **Perceived Ease of Use**

The level at which a person believes that using information technology will make it easier for him to complete his work is referred to as perception of ease of use (Davis, 1989). Easy to learn, easy to control, easy to understand, flexible, easy to apply, and easy to use are some indicators of perceived ease of use. Other researchers measured perceived ease of use by using indicators such as being able to support operations, having up-to-date information, lowering the error rate, ease of operation, and the support of additional equipment. Motivation

### **Attitude Towards Using**

Davis et al (1989) revealed that attitude toward using as an attitude towards the use of the system in the form of acceptance or rejection of information technology (Davis, 1989). A person's attitude of acceptance or rejection of information technology depends on the level of trust that a person has. If someone has a high level of trust in an information technology, then that person will show a positive attitude in the form of accepting a technology and vice versa.

Attitudes can influence the behavior of customers. If the customer has a positive attitude towards a service, it is possible that the customer will decide to use the service. and vice versa, if the customer has a negative attitude towards a service, it is possible that the customer will decide not to use the service. So that banks that issue technology-based services are required to be able to form positive customer attitudes towards services (Singh & Kaur, 2013).

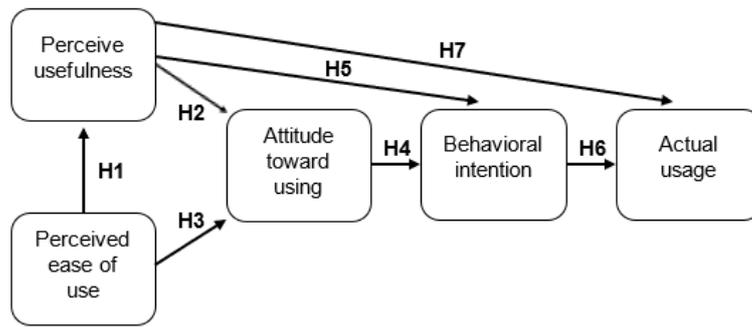
### **Behavioral Intention**

According to Davis (1989) behavioral intention to use technology is a person's desire to perform a certain behavior (Davis, 1989). A person will perform a behavior (behavior) if he has the desire or intention (behavioral intention) to do so. Previous studies have shown that behavioral intention is a good predictor of technology use by system users and it is also a measure of the strength of a person's intention to perform a certain behavior (Icek Ajzen and Martin Fishbein, 1970). Behavioral intention refers to an individual's willingness to perform or not perform a specific future behavior. Behavioral Intention is an individual's desire to use it and continue to use technology, and that factor determines the use of technology (Venkatesh & Davis, 2000). A study of consumer intentions provides a critical foundation for forecasting consumer behavior on the path to a specific action. As a result, studying and examining consumer behavior and choices in selecting products and services is an important aspect of marketing strategies.

### **Actual Use**

A person's behavior (behavior) is an action they take toward something. The actual use of a technology in the context of information technology systems is referred to as behavior. Actual system usage is defined as an external psychomotor response measured by a person with real-world experience (Davis, 1989). Actual usage is measured based on repeated use and more frequent use. Users of an application will be more likely to use a system if they believe it is simple to use and has been shown to increase a user's productivity.

**3. Research Framework**



**Figure 1. Research Framework**

Hypothesis:

- H1 : Perceived ease of use has an effect on perceived usefulness
- H2 : Perceive usefulness has an effect on customers’ attitude
- H3 : Perceive ease of use has an effect on customers’ attitude
- H4 : Attitude has an effect on behavior intention
- H5 : Perceive usefulness has an effect on behavior intention
- H6 : Behavioral intention has an effect on actual use
- H7 : Perceive usefulness has an effect actual use

**4. Methods**

This study uses a survey method with a causal approach. The sample of this study amounted to 242 respondents who were taken using convenience sampling. The sample is mobile banking users from 5 big banks in Jakarta. The collected data were analyzed using SEM-PLS. Structural Equation Modeling (SEM) is a statistical technique to test and estimate causal relationships using one statistical data with casual assumptions. The measurement model and the structural model test were used in this study as part of a two-step analytical approach.

**5. Results and Discussion**

**Demographic Profile**

**Table 1. Respondent Profile**

Demographic factor	Catagory	Frequency	Percentage
Gender	Male	127	52 %
	Female	115	48 %
Occupation	Private employee	196	81 %
	Government employee	20	8,2 %
	Self employed	12	5%
	others	14	6%
Education	S1	156	64%
	S2	16	7 %
	S3	10	4 %
	D3	36	15%

	SMA	24	9.9 %
Age	20-30 year	103	43%
	31-40 year	95	39%
	41-50 year	36	15%
	51-60 year	8	2%

Table 4.1 indicated that 48 percent were female and 52 per cent were male. As for age, most of respondents were in their 20-30 (43 per cent) followed by 30-40 (39 percent). Regarding their educational level, most of them (90.1 per cent) were at the university level. Furthermore, the majority of respondents (81 percent) were private employees.

**Measurement Model**

The measurement model was initially tested for convergent validity using factor loadings, average variance extracted (AVE), and composite reliability (CR). As shown in Table 4.2, all of the item loadings were greater than 0.70, the AVE values were well above 0.5, and the CR values were greater than the commonly used 0.70 threshold, indicating that the measures were convergent (Hair et al., 2017). To test the discriminant validity in this study used the model of Fornel and lacker (Fornell and Larcker, 1981). The results of Table 4.3 showed that the discriminant validity criterion for all construct was met.

**Table 2. Measurement Model Evaluation**

	Actual usage	Attitude toward using	Behavioral intention	Perceive usefulness	Perceived ease of use	CR	AVE
ATU1		0.908				0.942	0.745
ATU2		0.903					
ATU3		0.863					
ATU4		0.822					
ATU5		0.922					
ATU6		0.854					
ATU7		0.756					
AU1	0.963					0.959	0.891
AU2	0.930						
AU3	0.949						
AU4	0.933						
BI1			0.783			0.911	0.652
BI2			0.799				
BI3			0.814				
BI4			0.859				
BI5			0.837				
BI6			0.876				
BI7			0.665				
PE1				0.896		0.968	0.780
PE10				0.928			
PE2				0.934			
PE3				0.680			
PE4				0.905			

PE5			0.903
PE6			0.858
PE7			0.850
PE8			0.894
PE9			0.951
PU1	0.829	0.929	0.616
PU10	0.824		
PU2	0.819		
PU3	0.838		
PU4	0.584		
PU5	0.863		
PU6	0.727		
PU7	0.836		
PU8	0.624		
PU9	0.844		

**Table 3. Fornell-Larcker Criterion Discriminant Validity Results**

Variables	AU	ATU	BI	PU	PE
AU	0.944				
ATU	0.910	0.863			
BI	0.802	0.777	0.807		
PU	0.843	0.883	0.826	0.785	
PE	0.837	0.826	0.687	0.818	0.883

**Structural Model**

This study used the path coefficients and their corresponding t-statistics using the bootstrapping procedure, as well as the R2 values for endogenous constructs to evaluate the structural model. According to the findings (table 4.3), PE had a positive and significant effect on PU ( $\beta=0.818$ ;  $p= 0.000$ ). PU significantly affected ATU ( $\beta= 0.624$ ,  $p=0.000$ ), BI ( $\beta= 0.632$ ,  $p=0.000$ ), AU ( $\beta= 0.568$ ,  $p= 0.000$ ). PU and PE both contributed to Attitude to use ( $\beta=0.624$  and  $0.315$ ;  $p=0.000$ ), while attitude and PU had an effect on BI ( $\beta= 0.220$  and  $0.632$  and  $p=0.039$  and  $0.000$ ). The role of both PE and PU in predicting users' attitudes was discovered to be highly predictive (r. Square= $0.812$ ). This study's findings demonstrated that BI and PU all have a significant effect on actual use ( $\beta=0.568$  and  $0.332$ ;  $p= 0.000$  . PU and BI account for 74.5 percent of users' actual usage of m-banking services. Furthermore, the results showed that the model can explain 81.2 percent of the variance in attitude, 69.3 percent of the variance in Behavior intention, and 67 percent of the variance in PU. The results of a blindfolding procedure show that the Q2 value for PU, PE, ATU and BI was greater than zero (0.719), indicating acceptable predictive relevance.

**Table 4. Structural Model Path Analysis**

Hypothesis	Std. $\beta$	t- Statistics	P-value	Decision
Attitude -> B I	0.220	2.069	0.039	Supported
B I -> Actual usage	0.332	3.882	0.000	Supported
P U -> Actual usage	0.568	7.240	0.000	Supported
P U -> Attitude	0.624	8.177	0.000	Supported
P U -> B I	0.632	6.373	0.000	Supported

PEOU -> Attitude	0.315	3.370	0.001	Supported
PEoU -> PU	0.818	31.504	0.000	Supported

Variable	R square
Actual usage	0.745
Attitude toward using	0.812
Behavioral intention	0.693
Perceive usefulness	0.670
<i>Predictive-Relevance (Q<sup>2</sup>)</i>	0.719

In this study, TAM could explain 69.3 percent of the behavioral intention and 71.9 percent of the actual use. These findings are nearly identical to those of (Viswanath Venkatesh, Gordon B. Davis, 2003), who discovered that the model can explain behavioral intentions by 69 percent. These findings indicate that the TAM model has a high level of predictive power.

## **Discussion**

### **The effect of Perceive ease of use (PE) on Perceived usefulness**

The degree to which a person believes that using a technology will be painless is referred to as perceived ease of use (Davis, 1989). The point is that if someone believes an information system is simple to use, he will use it. However, if a person believes that information technology is difficult to use, that person will not use it. According to the findings of this study that perceived ease of use has a significant positive relationship with perceived usefulness. This was in line with the previous research (Akturan & Tezcan, 2012; Leong et al., 2011; Tahar et al., 2020; Yuan et al., 2014)

### **The effect of Perceive ease of use (PE) and Perceived usefulness on attitude**

The TRA model asserts that attitudes toward behavior are expressed by relevant beliefs and the TAM model accepts this assertion (Davis, 1989). The TAM model places the perception of convenience and the perception of benefits as having a direct influence on the attitude of using internet banking. Perception of convenience refers to a person's belief that a system can be easily understood, while the perception of benefits is related to a person's belief that using a system will improve that person's work performance. Thus, if someone believes that information technology is useful and simple to use, that person will have a positive perception of the technology; conversely, if someone believes that information technology is useless and difficult to use, that person will most likely have a negative perception of the technology. The findings of this study indicate that PE has an impact on PU and customer attitudes. This is consistent with previous (Akturan & Tezcan, 2012; Mohammadi, 2015; Nouri & Soltani, 2019).

### **The effect of Perceived usefulness on attitude, Behavior intention and actual use**

PU is the degree to which a person believes that using information technology can improve his work performance. As a result, if someone believes that information technology is useful, that person will use it. Similarly, if someone believes that information technology is not useful, that person will not use it. PU is an key factor of behavioral intention in many context; internet banking. Furthermore, it has been demonstrated that PU is an important factor in shaping individuals' attitudes and intentions toward using m-banking services (Shaikh & Karjaluoto, 2015). Perceived usefulness is also the most significant construct to determine actual system usage or behavior (Å & Zhang, 2006). The the findings of this study showed that PU has an effect on attitudes, behavioral intentions, and actual usesignificantly. These findings are consistent with (Saparudin et al., 2020; Shaikh & Karjaluoto, 2015).

### **The effect of attitude on Behavior intention**

Davis et al. (1989) define attitude toward using as a person's positive or negative feelings if he has to perform the behavior to be determined. According to TAM, users' attitudes toward technology use influence their behavior. Attitude is a significant determinant of users' intention to use m-banking. Many studies have found a link between attitude and intention (Hamari and Koivisto, 2015; Manser Payne et al., 2018; Wu and Chen, 2017). This study supported the previous research that attitude had a positive effect on behavior intention (Foroughi et al., 2019; Gu et al., 2009; Püschel et al., 2010).

### **The effect of Behavior intention on actual use**

The readiness of an individual to perform specific actions or behaviors is referred to as behavioral intention (Davis, 1989). The intention to behave is a critical construct because it can predict the actual behavior of individual technology users (Yu, 2012). Individuals' behavioral intentions indicate their proclivity and likelihood to engage in specific behaviors; similarly, intentions to use shape consumer opinions and are thought to be direct precursors of the actual behavior itself (Arahita & Hatammimi, 2015). Researchers have discovered that behavioral intentions and individual evaluations drive the majority of technology use (Viswanath Venkatesh, 2012). The stronger the desire to perform a specific behavior, the more likely it is that performance will occur (Ajzen, 1991). The intention to use m-banking services is expected to have a positive effect on actual users in the context of this study. The results of the study concluded that behavioral intentions have an effect on actual use. This is consistent with studies conducted by (Farah, 2018; Odoom & Kosiba, 2020; Purwanto & Loisa, 2020).

## **6. Conclusion**

The results of this study found that perceived ease of use had a positive and significant effect on perceived usefulness. The higher the perceived ease of use of mobile banking, the higher the perceived usefulness. Logically, it can be said that the easier mobile banking is to use, the more benefits and usefulness of m-banking will be felt. Both PE and PU contributed to Attitude to use. The findings of this study also showed that PU has a significant impact on attitudes, behavioral intentions, and actual use. Attitude had an effect on behavioral intention (BI) and BI influenced actual use. Furthermore, the results showed that the model can explain 81.2 percent of the variance in attitude, 69.3 percent of the variance in Behavior intention, and 67 percent of the variance in PU. The whole model can explain the variance of actual use of 71.9. These findings indicate that the TAM model has a high level of predictive power.

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