

# The Application of Technology Acceptance Model to Assess the Role of Complexity Toward Customer Acceptance on Mobile Banking



Gustita Arnawati Putri, Ariyani Wahyu Wijayanti, and Kurnia Rina Ariani

**Abstract** This study wants to prove complexity's role as an external variable in accepting the use of mobile banking using the TAM model framework. The sample included BCA, BRI, Mandiri, and BNI mobile banking customers in Indonesia in the sum of 200 respondents. The hypothesis used in this study was tested using structural equation modeling (SEM) method. The results reveal that perceived ease of use has a positive effect on perceived usefulness and attitude toward using perceived usefulness has a positive impact on attitude toward using, behavioral intention to use, and perceived usage. Besides, attitude toward using influences behavioral intention to use and behavioral intention to use affects perceived usage. The external variable, complexity, affects perceived usefulness and perceived usage but negative uses.

**Keywords** Technology accepted model (TAM) · Complexity · Mobile banking

## 1 Introduction

Information technology is currently developing very fast, one of which is evidenced by the rapid use of cell phones, or commonly known as mobile phones or smartphones. The Indonesian people's positive response to this development is implicit in the results of the Fintech Financial Forum (2018) meeting, which explains that digital economic growth in Indonesia is five times faster than the global average: the most rapid. Besides, the results of the e-marketer research university in 2018 also support these findings by revealing the number of diligent smartphone users in Indonesia

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that are hundreds of millions. Based on data from the Ministry of Communication and Information Technology in 2018, Indonesia ranks fourth as the biggest diligent smartphone user in the world.

Nowadays, many aspects of life gain advantages by using the Internet, mobile media, and the banking industry. The positive community responses to information and technological development in the form of the extensive use of the smartphone provides an open opportunity for the banking sector to put mobile banking in hand as a part of people's daily life—advantages by Google Play Store (for the Android system) and Apple Store (for IOS system) users.

The banking service in hand, namely electronic Banking (e-banking) and mobile banking (m-banking), aims to increase client access to banking products and transactions in ease. M-banking serves as a facility available on mobile communication devices such as mobile phones provide benefits for several parties such as their customers and the bank itself. For customers, m-banking services conveniences to them at banking transactions, i.e., balance checking, money transfers, and so on, which previously delivered manually by personal attending in the bank. These cutoff activities consider as time and costs savers and likewise, the benefits for the bank as a stakeholder, i.e., new business models, business expansion, competitive advantage, customer loyalty, revenue and cost improvement, and fee-based income.

## 2 Literature Review and Hypothesis Development

There is an approach that determines the ease of acceptance of new technology—the technology acceptance model [1] TAM models are used most often in information systems research because of their ability to declare proven validity. Gardner and Amoroso developed TAM by adding four external variables to test customer acceptance of Internet technology use. These four external variables are complexity, gender, volunteerism, and experience [2] (Fig. 1).

Another study conducted in 2004, located in Finland [3] on the customers interests in using of mobile banking, provides us results which state that the perceived ease of use, perception of usability, perceived pleasure, digital banking information, privacy, and security significantly influenced the customer interest in using the M-banking [3]. The influencing factors to the customer's interest in using mobile banking have also investigated [4] in Sabah, Malaysia, inform us that credibility, pleasure, and self-efficacy serves as more critical factors than technology ease and technological usefulness [4].

Empirical studies conducted to examine the relationship between perceived usefulness, perceived ease of use, attitude towards the adoption of information systems technology provide us with mixed results. Such a study [1, 2, 5–12] investigations result in a positive and significant effect. However, research conducted [13] dan [14] show different results.

H<sub>1</sub>: (PE) affects (PU) in implementing mobile banking.

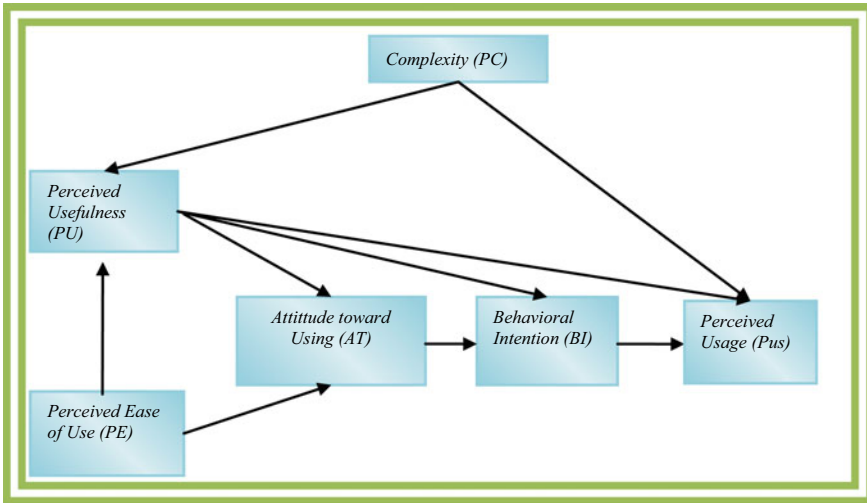


Fig. 1 Hypothesis framework

- H<sub>2</sub>: (PU) influences (AT) in implementing mobile banking.
- H<sub>3</sub>: (PE) affects (AT) in implementing mobile banking.
- H<sub>4</sub>: (AT) influences (BI) in implementing mobile banking.
- H<sub>5</sub>: (PU) influences (BI) in implementing mobile banking.
- H<sub>6</sub>: (BI) affects (PUs) in implementing mobile banking.
- H<sub>7</sub>: (PU) influences (PUs) in implementing mobile banking.
- H<sub>8</sub>: (PC) influences (PU) in implementing mobile banking.
- H<sub>9</sub>: (PC) influences (PUs) in implementing mobile banking.

### 3 Research Methods

#### 3.1 Population and Sample

In this case, the intended research population is bank customers in Indonesia who stands as mobile banking services user in Indonesia and determined samples were customers of Bank Central Asia (BCA), Bank Rakyat Indonesia (BRI), Bank Mandiri, and Bank Negara Indonesia (BNI). The accidental sampling method was chosen as the non-probability sampling technique apply by meeting respondents by coincidence converge to the researcher [15] during data gathering activities.

### **3.2 Operational Definition and Variable Measurement**

#### **Exogenous Construct**

Exogenous construct is known as the source variables or independent variables, which are not recognized by other variables in the model. Within this paper, complexity is the exogenous constructs, which defined as the perceived difficulty level of computer technology to be understood and used by their users [16].

#### **Endogenous Construct**

In this research, endogenous constructs involved, i.e., (PE), (PU), (AT), (BI),(PUs).

## **4 Results and Discussion**

#### **Instrument Quality Test**

Validity test on the six research variables shows that the items in the instrument meet the required validity criteria, classified in good validity as well as the reliability test score. The reliability test resulted is (PU) of 0.858; (PE) of 0.845; (AT) of 0.881; (BI) of 0.828; (PUs) of 0.838; and (PC) of 0.811.

#### **Hypothesis Test**

Hypothesis testing in this study uses the structural equation modeling (SEM) method. Structural equation modeling (SEM) applies to test the hypotheses in this study. Two reasons for the use of SEM for testing hypotheses are the analysis of the suitability of the model and the path coefficient's analysis. With 200 respondents and producing valid statement items 21, the CFI, TLI, and RMSEA values show ethical values, so that the proposed model as a whole is supported.

#### **Path Coefficient Analysis**

Path coefficient analysis indicates that the significance test of all (nine) hypotheses was proven as significantly supported since the overall probability value resulted is smaller than 0.05 at a significance level of 5% (Table 1).

#### **Discussion**

The results of the significance testing and path coefficient analysis in hypothesis 1 found a significant relationship and positive—in line with the results of previous studies [17] dan [18], (PE) has a positive impact on (Pus).

Resulted test of significance and path coefficient analysis on respondent's perceived usefulness (PU) and perceived ease of use (PE) shows that influences attitude toward using (AT) since it shows significant positive results. This indicates that the higher a person's level of trust in the use of mobile banking will be followed

**Table 1** Regression Weights

			Estimate	SE	CR	P
PU	←	PEoU	0.255	0.092	2.788	0.005
PU	←	PC	-0.527	0.150	-3.502	0.000
AtU	←	PEoU	0.257	0.082	3.127	0.002
AtU	←	PU	0.206	0.071	2.913	0.004
BI	←	PU	0.176	0.055	3.193	0.001
BI	←	AtU	0.248	0.085	2.903	0.004
Pus	←	PU	0.214	0.087	2.459	0.014
Pus	←	BI	0.314	0.115	2.730	0.006
Pus	←	PC	-0.320	0.138	-2.323	0.020

by improved performance, the more active they will be to use mobile banking. These results support the previous research by [3, 5–9, 11, 13, 16, 19–22].

The next test for analysis on behavioral intention to use shows that (AT) and (PU) influences (BI) since the path coefficient (standardized regression weight estimate) shows in a positive result. This result refers to the situation that if someone feels they have to use mobile banking, then the more they are interested in using mobile banking. While perceived usefulness is the leading cause of behavioral intention to apply for inexperienced users, also perceived value is the most significant construct of behavioral plans to use. The results of previous studies indicate that attitude toward using it is positive influences behavioral intention to use as the earlier research shows [6, 8, 14, 15, 17, 23–26]. The test on Hypotheses 6 and 7 shows significantly positive results, so it is in conclusion, that (BI) and (PU) affect (PUs). These results support the previous study [27] that perceived use if you have a behavioral intention to use to do it. If someone perceives that mobile banking improves their performance, it will make them use mobile banking continuously. Similar to research finding previously [25], that (PU) is the most significant construct determines the (PUs).

Testing the external hypothesis, complexity as an independent variable to perceived usefulness (PU), and perceived usage (PUs) resulted in significant negative results, indicates that the complexity of a technology (mobile banking) influences by decreasing the use of mobile banking technology. There is a strong relationship between variable complexity and perceived usage [28] dan [1].

## 5 Conclusion

This study provides empirical justification for the acceptance, determination, and application of mobile banking. It offers a structural model that examines the role of various motivators in attracting mobile banking users to banking customers. The results then provide substantial support for the (PE), (PU), and (PUs) models of

variations in the use of mobile banking. This finding confirms the critical role of perceived benefits felt in publicizing the use of m-banking and shows the basis of a strategic decision to use m-banking. This is an explanation that individuals are expected to have a positive attitude in using mobile banking if they believe that it will improve their reputation and productivity. However, the finding that complexity negatively impacts on the use of mobile banking in daily life shows that people are reluctant to it, especially for customers in developing countries. This form of hesitant to complexity on mobile banking applications regarding its complicated user interface assumes that there is a low community interest to learn a new thing even it is potentially will convenience them in the future when they already get familiar with the intended application.

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# Preface

The 1st International Conference on Smart Computing and Cyber Security—Strategic Foresight, Security Challenges and Innovation (SMARTCYBER 2020), took place in Kyungdong University Global Campus, Gosung, Gangwondo, South Korea, during July 7–8, 2020. It was hosted by the Department of Smart Computing, Kyungdong University, Global Campus, South Korea.

The SMARTCYBER is a premier international open forum for scientists, researchers and technocrats in academia as well as in industries from different parts of the world to present, interact and exchange the state of the art of concepts, prototypes, innovative research ideas in several diversified fields. The primary focus of the conference is to foster new and original research ideas and results in the five board tracks: smart computing concepts, models, algorithms, and applications, smart embedded systems, bio-Inspired models in information processing, technology, and security. This is an exciting and emerging interdisciplinary area in which a wide range of theory and methodologies are being investigated and developed to tackle complex and challenging real-world problems. The conference includes invited keynote talks and oral paper presentations from both academia and industry to initiate and ignite our young minds in the meadow of momentous research and thereby enrich their existing knowledge.

SMARTCYBER 2020 received a total of 143 submissions. Each submission was reviewed by at least three Program Committee members. The committee decided to accept 37 full papers. Papers were accepted on the basis of technical merit, presentation and relevance to the conference. SMARTCYBER 2020 was enriched by the lectures and insights given by the following seven distinguished invited speakers: Prof. Prasant Kumar Pattnaik, School of Computer Engineering, Kalinga Institute of Industrial Technology; Professor Ana Hol, Western Sydney University, Australia; Professor Aninda Bose, Senior Editor Springer India; Prof. Evizal Abdul Kadir, UIR, Indonesia; Dr. James Aich S, CEO Terenz Co. Ltd, South Korea; Prof. Mangal Sain, Dongseo University, South Korea; and Prof. Ahmed A. Al-Absi, Kyungdong University Global Campus, South Korea. We thank the invited speakers for sharing the enthusiasm for research and accepting our invitation to share their expertise as well as contributing papers for inclusion in the proceedings.

SMARTCYBER 2020 has been able to maintain standards in terms of the quality of papers due to the contribution made by many stakeholders.

We are thankful to the General Chairs, Prasant Kumar Pattnaik, KIIT Deemed to be University, India; Ahmed A. Al-Absi, Kyungdong University, South Korea; Mangal Sain, Dongseo University. We further thank the Program Chairs, Baseem Al-athwari, Kyungdong University Global Campus, South Korea; Pardeep Kumar, Swansea University, UK; Deepanjali Mishra, KIIT Deemed to be University, India, for their guidance and valuable inputs.

We are grateful to Prof. John Lee, President of Kyungdong University (KDU) Global Campus, South Korea, and Honorary General Chair, SMARTCYBER 2020, for his constant support and for providing the infrastructure and resources to organize the conference. We are thankful to Prof. Sasmita Rani Samanta, Pro-Vice-Chancellor, KIIT Deemed to be University, India, Honorary General Chair, SMARTCYBER 2020, for providing all the support for the conference.

Thanks are due to the Program and Technical committee members for their guidance related to the conference. We would also like to thank the Session Management Chairs, Publications Chairs, Publicity Chairs, Organizing Chairs, Finance Chairs and Web Management Chair who have made an invaluable contribution to the conference. We acknowledge the contribution of EasyChair in enabling an efficient and effective way in the management of paper submissions, reviews and preparation of proceedings. Finally, we thank all the authors and participants for their enthusiastic support. We are very much thankful to entire team of Springer Nature for timely support and help. We sincerely hope that you find the book to be of value in the pursuit of academic and professional excellence.

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