The Application of Technology Acceptance Model to Asses The Role of Complexity toward Customer Acceptance on Mobile Banking

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Abstract. This study aims to examine the role the Complexity, as an external variable, in accepting the use of mobile banking using the TAM model framework. The sample in this study was BCA, BRI, Mandiri, BNI mobile banking customers in Indonesia in the sum of 200 respondents. The hypothesis Testing applied in this study is the 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 effect 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, has a negative influence on perceived usefulness and perceived usage.

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, which means: the fastest. Besides, the results of the Digital Marketing Emarketer research institute in 2018 also support these findings by revealing the number of active smartphone users in Indonesia that are more than 100 million people. With such a large number, Indonesia became the country with the fourth largest active smartphone user in the world after China, India, and America (Indonesian Ministry of Communication and Information Technology, 2018).

Nowadays, many aspects of life gain advantages by using the internet and mobile media, as well as 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 industry 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 customer access to banking products and transactions in ease. M-banking serves as a facility available on mobile communication devices such – mobile phones provides benefits to both users: the banks and their customers. 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 cut-offs activities consider as time and costs savers. Likewise, the benefits for the bank as a stakeholder, i.e., business expansion, customer loyalty, revenue and cost improvement, competitive advantage, new business models, and fee-based income.

2 Literature Review and Hypothesis Development

There is one approach to determine the ease of acceptance of new technology – it is the Technology Acceptance Model, in short: TAM (Davis, Bagozzi, & Warshaw, 1989). The acknowledged as the most widely used model in information systems research since its ability to produces good validity. It was an adaptation of the theory developed by Fishbein – the Theory of Reasoned Action (TRA). TAM adds two primary constructs to the TRA model; they are Perceived Usefulness and Perceived Ease of Use. TAM argues that these two additional constructs determine individual acceptance of information technology systems.

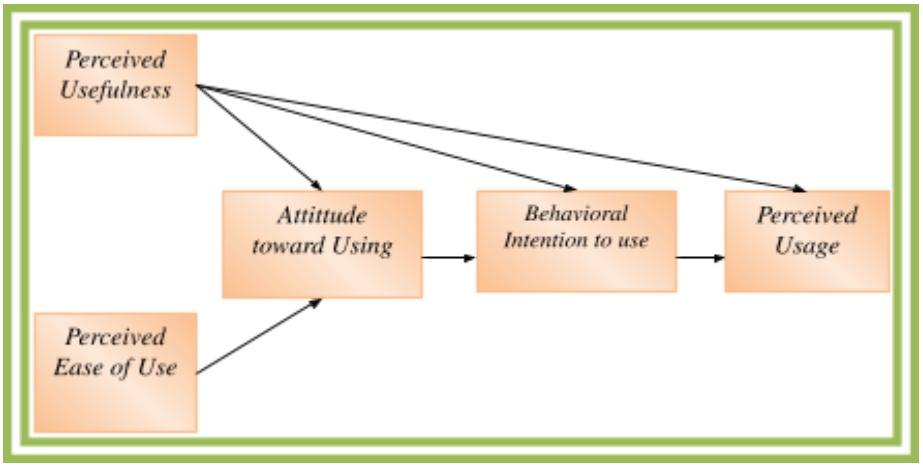

Fig 1: ***Technology Acceptance Model*** **(TAM)**

Gardner and Amoroso develop the TAM by adding four external variables to examine customer acceptance on internet technology use. These four external variables are Gender, Experience, Complexity, and Voluntariness (Gardner & Amoroso, 2004).

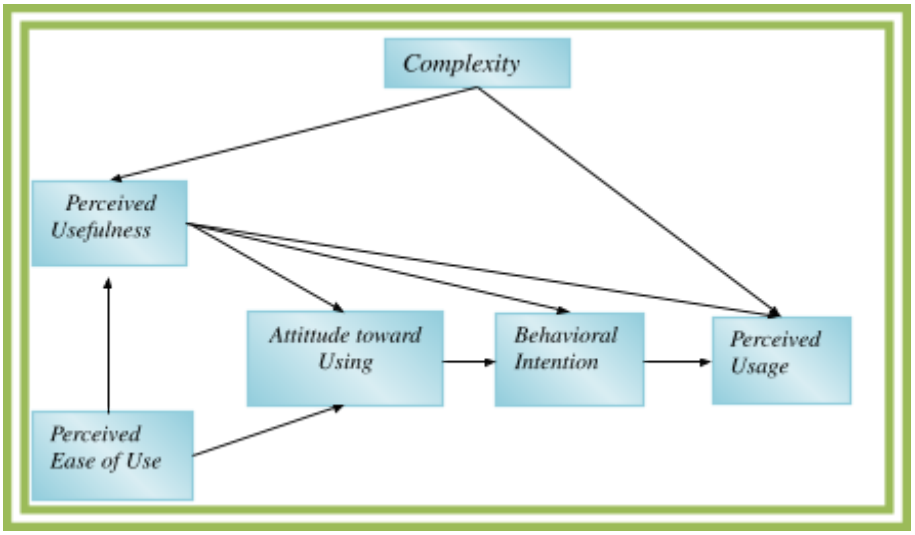

Fig 2: hypothesis framework.

Another study conducted in 2004, located in Finland by Pikkarainen, et al. on the bank customers interests in using of mobile banking, provide us results which state that the perception of usability, perceived ease of use, perceived pleasure, on-line banking information, security, and privacy significantly influenced the customer interest in using the M-banking (Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004). The influencing factors to the customer's interest in using mobile banking have also investigated by Amin, et al. in Sabah – Malaysia, inform us that credibility, pleasure, and self-efficacy serves as more critical factors than technology ease and technological Usefulness (Amin, Supinah, Aris, & Baba, 2012).

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 study by Thompson et al. 1991; Szajna 1994; Igbaria et al. 1995; Maholtra and Galetta, 1999; Vijayasarathy, 2004; Hung, Chang and Yu, 2006; Govindaraju and Indriany, 2007; Yulihasri et al., 2011; Lin and Lu (2000); Lu et al., (2010) investigations result in a positive and significant effect. However, research conducted by Taylor and Todd (1995), Kusuma and Susilowati (2007), and research by Laily (2011) show different results.

H_1: Perceived Ease of Use (PE) affects Perceived Usefulness (PU) in implementing mobile banking.

H_2: Perceived Usefulness (PU) influences Attitude toward Using (AT) in implementing mobile banking.
H_3: Perceived Ease of Use (PE) affects Attitude toward Using (AT) in implementing mobile banking.
H_4: Attitude toward Using (AT) influences Behavioral Intention to Use (BI) in implementing mobile banking.
H_5: Perceived Usefulness (PU) influences Behavioral Intention to Use (BI) in implementing mobile banking.
H_6: Behavioral Intention to Use (BI) affects the Perceived Usage (PUs) in implementing mobile banking.
H_7: Perceived Usefulness (PU) influences Perceived Usage (PUs) in implementing mobile banking.
H_8: Complexity (PC) influences Perceived Usefulness (PU) in implementing mobile banking.
H_9: Complexity (PC) influences Perceived Usage (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 – determined sample 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 (Sugiyono, 2004) 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 predicted by other variables in the model. Within this study, Complexity is the exogenous constructs, which defined as the perceived difficulty level of computer technology to be understood and used by their users (Rogers and Shoemaker, 1971).

Endogenous Construct

Endogenous constructs predict on one or several other endogenous constructs, but endogenous constructs can only be causally related to endogenous constructs. In this study, endogenous constructs involved, i.e., Perceived Ease of Use (PE), Perceived Usefulness (PU), Attitude Toward Using (AT), Behavioral Intention To Use (BI), Perceived Usage (PUs).

Table 1. Theoretical Model Building

Latent Variable	Dimensions
Perceived Ease of Use (PE)	X1 = ease of learning X2 = add something new X3 = clarity and ease of learning X4 = flexibility X5 = ease of use
Perceived Usefulness (PU)	X6 = speed up work X7 = performance improvement X8 = make work easier X9 = increase productivity X10 = increase effectiveness
Attitude toward Using (AT)	X11 = happy to use it X12 = enjoy its use X13 = tired of using it (feeling bored)
Behavioral Intention to use (BI)	X14 = choose to use X15 = planning to use X16 = interested in using X17 = continue to use
Perceived Usage (PUs)	X18 = actual usage X19 = frequency of use
Complexity (PC)	X20 = time required X21 = difficulty level

The questionnaire uses as the research instrument, distributed to research respondents. Likert scale serves as a scale of measurement (Sugiyono, 2004) with the following criteria:

a. Strongly Agree with the represent score of 4.
b. Agree with the represent score of 3.
c. Disagree with the represent score of 2.
d. Strongly disagree with the represent score of 1.

4 Results and Discussion

Instrument QualityTest.

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 are Perceived Usefulness (PU) of 0.858; Perceived Ease of Use (PE) of 0.845; Attitude toward Using (AT) of 0.881; Behavioral Intention to Use (BI) of 0.828; Perceived Usage (PUs) of 0.838 and Complexity (PC) of 0.811.

Hypothesis Test.

To test the hypothesis in this study using the Structural Equation Modeling (SEM) method. Structural Equation Modeling (SEM) apply to test the hypothesis in this study. Two things to consider in the use of SEM for hypothesis testing are the analysis of the model suitability and path coefficient analysis. With the sum of respondents of 200 and resulted in valid statement items of 21, the value of CFI, TLI, and RMSEA shows good values, so that the overall proposed model was acceptable.

Goodness-of-Fit

Table 2. Goodness-of-Fit Model Result

Goodness-of-fit Indices	***Cut-off Value***	**Result**	**Explanation**
Chi-Square (|^2)	Expected to be small	230.805	Fit
Degrees of freedom	Positive	176	Fit
Probability level (p)	≥0,05	0.003	Not Fit
CMIN/DF	≤2,0	1.311	Fit
GFI	≥0,90	0.905	Fit
AGFI	≥0,90	0.875	Marginal
TLI	≥0,90	0.959	Fit
CFI	≥0,90	0.965	Fit
RMSEA	≤0,08	0.040	Fit

Path Coefficient Analysis

Table 3. Regression Weights

			Estimate	SE.	CR.	P
PU	<---	PEoU	0,255	0,092	2,788	0,005
PU	<---	PC	-0,527	0,150	-3,502	***
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

Path Coefficient Analysis indicates 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%. There is a positive relationship between variables found in hypotheses 1, 2,3,4,5,6, and 7. For Hypotheses 8, the

estimated effect of Complexity on perceived usefulness uses Path Coefficient Analysis of - 0,527, which means that the relationship between variable Complexity on perceived usefulness is negative. While the estimation results of the effect of Complexity on perceived usage in Hypothesis 9 is -0.320, this shows the negative effect of Complexity on the Perceived Usage.

Discussion

The results of the significance test and path coefficient analysis on hypothesis 1 prove a significant positive relationship – in line with the previous research by Chau (1996) and Davis et al. (1989) – stated that perceived ease of use has a positive effect on perceived usefulness.

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. These indicate that the more someone believes that using mobile banking will improve their performance, they will use mobile banking actively. These results support the previous research by Szajna (1994); Maholtra and Galetta (1999); Vijayasarathy (2004); Gong Xu and Tu (2004); Pikkarainen et al. (2004); Hung, Chang, and Yu (2006); Govindaraju and Indriany (2007); Ngai et al. (2007); Kusuma and Susilowati (2007); Saade, et al. (2008); Lu et al. (2010); Bugembe (2010); Sulistyarini (2013); Istiarni and Hadiprajitno (2014) and Chauhan (2015).

The next test for analysis on Behavioral Intention to Use shows that Attitude toward Using (AT) and Perceived Usefulness (PU) influences Behavioral Intention to Use (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 interested in using mobile banking. While perceived usefulness is the leading cause of behavioral intention to use for inexperienced users and also perceived usefulness is the most significant construct of behavioral intention to use. The results of previous studies indicate that attitude toward using it is positive influences behavioral intention to use as the previous study shows (Mathieson, 1991); Malhotra and Galetta (1999); Tan and Teo (2000); Chau and Hu a(2002); Lee Jihyun (2003); Shih and Fang (2004); Gurung (2006); and Hung, Chang and Yu (2006); Taylor and Todd (1995); Sun (2003); Chau (1996).

The test on Hypotheses 6 and 7 shows significantly positive results, so it is in conclusion that Behavioral Intention to use (BI) and Perceived Usefulness (PU) affects Perceived Usage (PUs). These results support the previous study by Jogiyanto (2007) 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 Sun's research, finding (2003 previously, that perceived usefulness is the most significant construct determines the perceived usage.

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 and there is a strong relationship

between Complexity and perceived usage (Gardner and Amoroso (2004) and Igbaria et al.

5. Conclusion

This study provides an empirical justification for the adoption, acceptance, and use of mobile banking and proposes a structural model that examines the role of different motivators in promoting the use of mobile banking for banking customers. The results then provide substantial support to the motivational model of Perceived Ease of Use, Perceived Usefulness, and Perceived Usage to the variations in the use of mobile banking. This finding confirms the crucial role of perceived usefulness perceived in promoting the use of mobile banking and shows the rational basis of the decision to use mobile banking. It is an explanation that individuals tend to have a positive attitude in using mobile banking if they believe that it will improve their performance 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 reluctant 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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