Journal of STI Policy and Management

Publication details, including instructions for authors and subscription information: http://www.stipmjournal.org/

Structural Equation Model: Intention to Use Mobile Banking of Bottom of Pyramid Customer

Dian Kusumaningrum, Dewi Saraswati, Seprianus

Prasetiya Mulya University, Indonesia

Version of record first published: 15 July 2019

To cite this article: Kusumaningrum, D., Saraswati, D., Seprianus (2019). Structural Equation Model: Intention to Use Mobile Banking of Bottom of Pyramid Customer. *Journal of STI Policy and Management,* 4(1), 51–64

To link to this article: http://dx.doi.org/10.14203/STIPM.2019.156

ISSN 2540-9786 (Print); ISSN 2502-5996 (online)

Accreditation Number: 21/E/KPT/2018

JOURNAL OF SCIENCE, TECHNOLOGY AND INNOVATION POLICY AND MANAGEMENT (STIPM JOURNAL), Volume 04, Issue 01, July 2019

FOREWORD by EDITOR-in-CHIEF

We are very pleased to inform the readers that Journal of *Science, Technology, & Innovation Policy and Management* (STIPM Journal) Vol. 4, No. 1, July 2019 edition is now ready for public reading and views. STIPM Journal is an online research journal managed by the Research Center for Science, Technology, and Innovation Policy and Management, Indonesian Institute of Sciences (RC-STIPM-LIPI).

The journal provides scientific information that needed mostly by the research scholars as well as STI policy makers. As a peer reviewed journal, STIPM provides free access to research thoughts, innovation, and original discoveries. In this issue, we bring together research findings on development and adoptation of science, technology, and innovation policy and management from Malaysia and Indonesia.

First article is composed by **Wati HERMAWATI** entitled *Technology Transfer from Public Research Institute to Community: A Case Study*. This research article examines the technology transfer mechanisms into practical applications of the community. The success of technology transfer to community itself were demonstrated by the increased ability of recipients namely SMEs and farmers to replicate the technologies, increased their production, enlarge their market as well as increased new knowledge, skills, and productivity.

Second research article entitled *A Scientometric Study on Biodiesel Development in Indonesia*. This article is presented by **Mesnan SILALAHI et al.** The article describes the results of scientometric studies in the energy sector, especially in the field of biodiesel in Indonesia by using a mixed method through content analysis and in-depth interview. Quantitative research uses bibliometric basics and content analysis, where text mining is triangulated with the results from in-depth interview with several prominent Indonesian researchers in this field. Content analysis is conducted by topic modeling method by analysing the papers' abstract. This article reports on the results of a scientometric study, based on publications indexed in Scopus in the energy sector, especially in the field of biodiesel in Indonesia.

Nor Ashikin Mohamed YUSOF et al. present an article entitled *Theoretical and Practical Gaps in Policy Making Process in Five Organizations*. This article reports case studies involving five national policy documents and internal policies at several key governmental department and organizations. The findings from the study enables the researchers to make a comparison between the theory of policy making and the practice of policy making in Malaysia. The findings show that there is still a huge gap between theory and practice in policy making and policy studies in Malaysia.

The fourth article with the title *Innovative Strategy to Disseminate Science Information to Policy makers* is presented by **Azmi HASSAN.** There exists a huge gap between science and technology discovery and the formulation of public policy mostly due to the poor understanding on how to disseminate

the news not only to policy makers but also to the general public. To bring accurate, relevant information from the front lines of research to the policy makers, this paper describes how innovative strategies that use the media as the conduit are formulated in more systematic ways.

Dian KUSUMANINGRUM et al. present an article entitled *Structural Equation Model: Intention to Use Mobile Banking of Bottom of Pyramid Customer*. The purposes of the study are to identify the predicting factors influencing the intention to use mobile banking and empirically validate a model explaining the behavioral intention to use it, especially on the bottom of pyramid (BOP) segment. The model used was structural equation model (SEM) based on partial least square (PLS). The data used for developing the model was based on a survey to 100 BOP households. The results show that the variables that have the highest significant effect on BOP's customer intention to use mobile banking are involuntary barriers, followed by perceived risk, and attitude. This result can be further used by researchers and mobile banking providers to evaluate the existing mobile banking services to improve its contribution in providing better market penetration and more appropriate financial services for BOP and ultimately financial inclusion in Indonesia.

Lastly, **Karlina SARI et al.** present an article entitled Indonesia in *Drivers of Industry Convergence: The Case of Functional Food Industry in Indonesia* This paper presents the overview of functional food industry in Indonesia. It analyzes the prospect of Indonesian functional food industry from demand, supply, and regulation perspective. The result of this study is Indonesia should have a good prospect as both the market and the player in functional food industry. Currently, baby food and toddler are Indonesia's biggest market of functional food for baby formula milk and baby food. Another functional food market segment prospective to be penetrated is elderly who have bigger risk of disease, such as hypertension and arthritis

The journal is indexed by Google Scholar, ISJD, IPI, DOAJ, BASE, and OCLC World Cat, which makes wider journal dissemination. We would like to express our immense gratitude to our international editorial board members, reviewers, and authors for their contribution to this issue. We hope this publication will prove useful for readers and contribute to the enhancement of science, technology, and innovation. We expect that STIPM will always provide a higher scientific platform for authors and readers with a comprehensive overview of the most recent STI Policy and Management research and development at the national, regional, dan international level.

Jakarta, July 2019

Editor-In-Chief

JOURNAL OF STI POLICY AND MANAGEMENT

Volume 4, Number 1, July 2019

LIST OF CONTENTS

LIPI
STI POLICY AND MANAGEMENT
Journal homepage: http://www.stipmjournal.org
STIPM STI Policy and Management

Structural Equation Model: Intention to Use Mobile Banking of Bottom of Pyramid Customer

Dian Kusumaningrum[1,2], Dewi Saraswati[2], Seprianus[3]
[1]*Prasetiya Mulya University, Indonesia*
dian.kusumaningrum@pmbs.ac.id
[2]*Prasetiya Mulya University, Indonesia*
dewi.saraswati@pmbs.ac.id
[3]*Prasetiya Mulya University, Indonesia*
seprianus@pmbs.ac.id

ARTICLE INFO

Article History:
Received : 25 January 2019
Revised : 19 May 2019
Accepted : 27 June 2019
Available online : 15 July 2019

Keywords:
Mobile banking
Intention
Structural equation model

ABSTRACT

The economy is shifting into digital economy and to overcome it, the banking industry competes through innovation and digital strategy. Smartphone-based mobile banking is the key component of the digital strategy with 70% of the Indonesian banks agree to focus their strategy on a mass customer segment. The purposes of the study are to identify the predicting factors influencing the intention to use mobile banking and empirically validate a model explaining the behavioral intention to use it, especially on the bottom of pyramid (BOP) segment. The model used was structural equation model (SEM) based on partial least square (PLS). The data used for developing the model was based on a survey to 100 BOP households. The results of this study show that the variables that have the highest significant effect on BOP's customer intention to use mobile banking are involuntary barriers, followed by perceived risk, and attitude. This result can be further used by researchers and mobile banking providers to evaluate the existing mobile banking services to improve its contribution in providing better market penetration and more appropriate financial services for BOP and ultimately financial inclusion in Indonesia.

A. INTRODUCTION

The economy is shifting into the digital economy. This shifting has changed the way people consume, make money, do business, and activities. It also changes people needs and expectation. To overcome this shifting, the banking industry competes through innovation and formulate their digital strategy. Bank Mandiri, as the bank who has the biggest asset in Indonesia, has reported that the digital transaction volume has grown significantly in 2017, especially on the electronic money and mobile banking services that can be seen in Table 1 (Bank Mandiri, 2018). According to PricewaterhouseCoopers (PwC, 2018), 66% of banks in Indonesia have developed digital strategy as part of corporate strategy. Digital strategy is a business strategy which leverage the information and technology (IT) strategy and digital resources in functions within the firm (including operation, marketing, and supply chain) to gain

http://dx.doi.org/10.14203/STIPM.2019.156

Table 1. The of Amount of Digital Transactions Per Product

Digital Transaction	Transaction		
	2017	2016	Growth
ATM	1.161.807.204	975.797.635	19%
SMS/Mobile	382.964.756	278.720.836	37%
Personal Internet Banking	142.237.094	151.081.572	-6%
Business Internet Banking	598.723.282	440.932.564	36%
Electronic Data Capture (EDC)	104.744.272	101.743.363	3%
Electronic Money***	7.342.236	4.636.395	58%

Source: Bank Mandiri (2018)

competitive advantage and strategic differentiation (Bharadwaj, Sawy, Palvlou, & Venkatraman, 2013). Whereas in banking, smartphone-based mobile banking is one of the key components of digital strategy. The main purpose of the strategy is to achieve better customer service level and new customer acquisition with 70% of the banks focusing their strategy on mass customer segment (PWC, 2018).

The digital banking is an alternative solution to increase financial service penetration, especially on rural areas, supporting the government's financial inclusion program. Nevertheless, there are challenges to manage in digital banking strategy, especially on mobile banking, which include potential user skepticism about technology, uncertainty about the costs, security in transactions, payment merchant channels, support from telecommunications operators, lack of experience, and familiarity (IFC, 2010).

The purposes of the study are to identify predicting factors influencing the intention to use mobile banking and empirically validate a model explaining the behavioral intention to use mobile banking of the mass customer segment, especially the bottom of pyramid (BOP) customer segment who live in rural areas. Bank Indonesia defines the BOP group as people with low and irregular incomes, living in remote areas, disabled people, workers who do not have legal identity documents, and marginalized communities (Bank Indonesia, n.d.).

B. ANALYTICAL FRAMEWORK

The Technology Acceptance Model (TAM) proposed by Davis (1989) is considered as the primary theoretical frameworks for understanding and explaining the individual's adoption behavior of new technology. TAM suggests perceived usefulness and perceived ease of use are instrumental in explaining the variance in user's intentions to use technology (Davis, 1989). According to Davis (1989), perceived usefulness or performance expectancy is the degree to which a person believes that using the system or technology will help him or her to accomplish and improve the job performance. For example, mobile banking, a user consider it will be easier to conduct financial transaction, such as transfer and payment, anywhere at any time. Perceived ease of use (effort expectancy) refers to anticipated complexity of the technology and the degree of energy needed to use it. Perceived ease of use also defined as the degree to which given technology is perceived as easy to understand and operate (Lin, 2011). The significant and positive association between performance expectancy and the ease of use into the intention to use technology also been confirmed by Hew, Lee, Ooi, and Wei (2015). The user's perception of the usefulness of an application would directly influences the user-friendliness of the application; hence, attract the potential user to use it.

TAM is developed and expanded in the context of mobile banking technology adoption during the period of 2003–2016. Luarn and Lin (2005) extended the existing TAM with three additional significant influences on the intention to use mobile banking which consists of perceived self-efficacy, perceived financial cost, and perceived credibility. Those additional variables reflect the user's distress about their knowledge and financial resources needed to use mobile banking, and are confidence factors, from the user perspective, regarding the security and privacy protection provided by mobile banking technology. Using the framework of TAM and diffusion of innovation (DOI), Pham and Ho (2015) proved that the effect of product-related attributes, which consist of perceived usefulness, compatibility, additional value, trial-ability, and perceived risk, had stronger impact on intention

to use mobile banking, especially the near field communication (NFC) mobile payment that can enable consumers to turn their smartphones into digital wallets, compared to other personal-related factors. Perceived risk is a customer perception of uncertainty and adverse consequences of conducting a transaction with the vendor or developer (Gupta & Kim (2010), in Mūnoz-Leiva, Climent-Climent, & Liébana-Cabanilas, 2017). The theoretical model of TAM integrated with DOI was also used by Mūnoz-Leiva, Climent-Climent, and Liébana-Cabanilas (2017). The result showed that attitude is the only construct that has a direct effect to the intention to use mobile banking application discarding usefulness and perceived risk as the factor to improve its use.

Moreover, the study from Zhou (2011) indicates that structural assurance and information quality are the main factors affecting initial trust, whereas information quality and system quality significantly affect perceived usefulness. Initial trust affects perceived usefulness and both factors predict the usage intention of mobile banking.

According to the literature review study conducted by Shaikh and Karjaluoto (2015), compatibility or perceived ease of use, perceived usefulness, and attitude are the most significant drivers of intentions to adopt the mobile banking services in developed and developing countries. In addition, Baptista and Oliveira (2016) also proposed attitude, initial trust, perceived risk, and performance expectancy as the most effective predictors of the intention to use mobile banking out of 29 most used constructs relationship on mobile banking acceptance studies. Figure 1 shows the conceptual framework of mobile banking acceptance proposed by them.

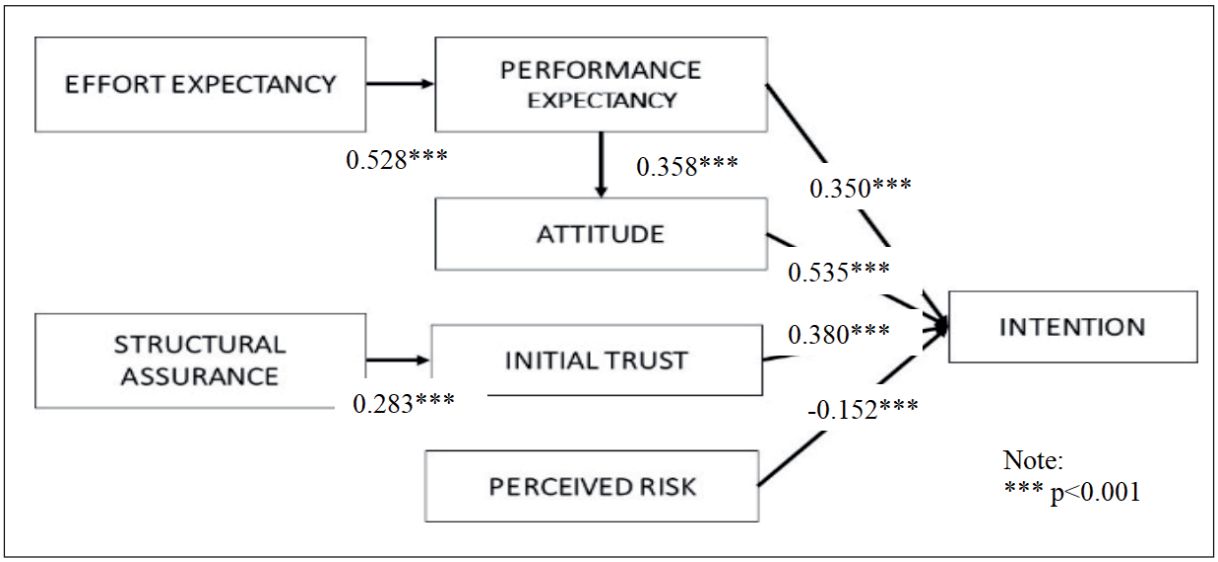
They also suggested adding task technology fit as constructs that influence performance expectancy as an expansion of the previous conceptual framework. The study on financial inclusion by Allen, Demirguc-Kunt, Klapper, and Peria (2016) concluded that banking service acceptance is influenced by the presence of barriers that consists of voluntary and involuntary barriers. Voluntary barriers are the negative motivation that triggered a person to be voluntary self-excluded from the formal financial system. The circumstance of voluntary barriers includes religious reason and low level of cash due to no adequate cash incomes. The motive of the financially excluded person from formal financial service, which triggered as a result of market failures, such as asymmetric information regarding the product price, the accessibility of products, and also the complexity of product mechanism and administration requirement are considered as involuntary barriers.

In addition, the study on customer centricity for financial inclusion (Kilara & Rhyne, 2014) showed that perceived product fit also influences a user's acceptance of banking products and services. Financial needs differ by customer segment. To be fitted with the customer segment, a financial product have to be created based on broad insight into the financial behavior of customers and operates around the customer experience. For example, a savings product for low-income individuals allowed customers to maintain an account with no minimum balance requirement for each transaction. In addition, the financial products have a simple feature and require fewer documents to reduce the formality and complexity. The product is designed free of charges and distributed nearby the customer's living area, thus increasing its accessibility and affordability. Therefore, perceived product fit is considered as an indicator to measure the involuntary barriers of using banking services or products, including the mobile banking services.

Therefore, based on the recommendations of the previous research above, we propose an expansion on the previous conceptual framework (Figure 2) in order to obtain a better model for understanding the main factors that affect the intention to use mobile banking. Our model is also specifically designed to capture the intention to use mobile banking of BOP. The model development along with the specific characteristics of the study will be considered as the novelty of this research.

C. METHODOLOGY

This part will explain the analytical approach, variables operationalization, and methods for collecting, processing, and analyzing data.



Source: Baptista and Oliveira (2016)

Figure 1. Meta and Weight Analysis Conceptual Framework Mobile Banking Acceptance

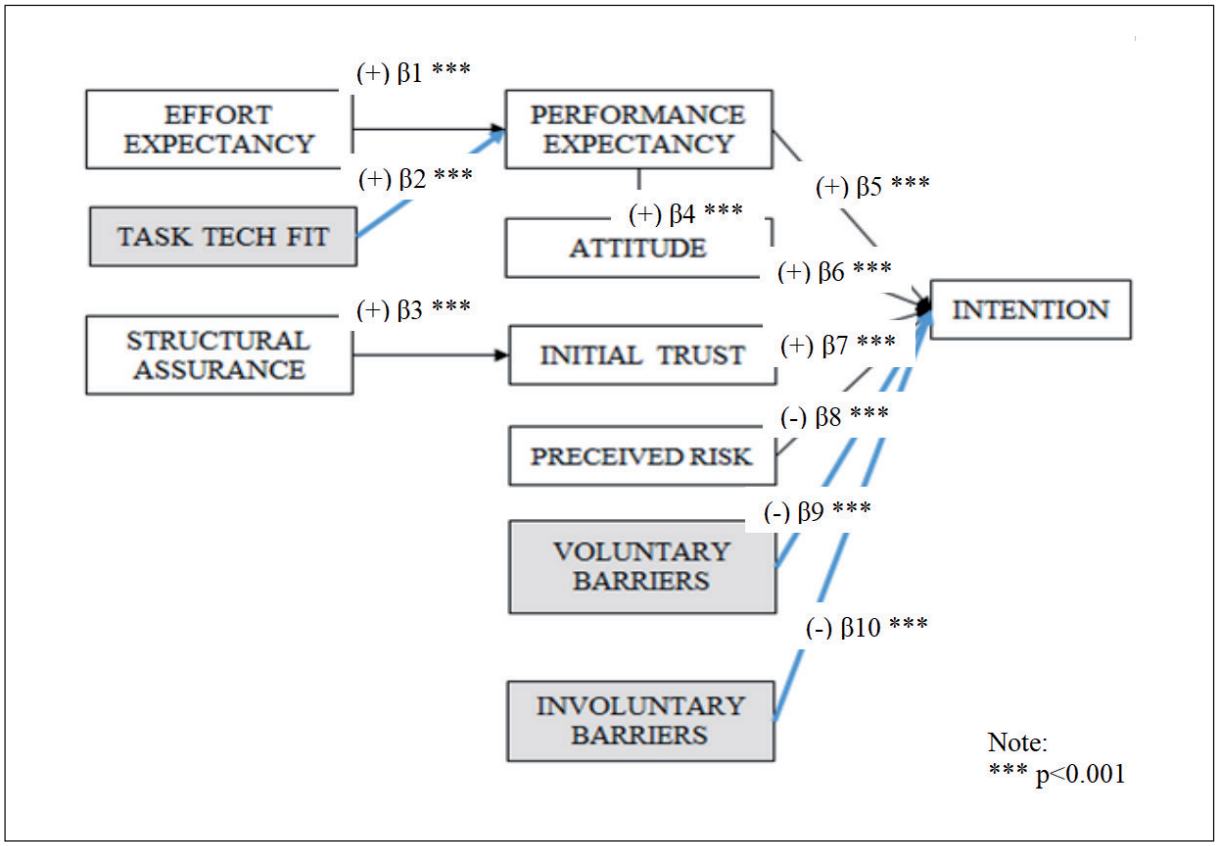


Figure 2. Proposed Mobile Banking Acceptance Model

1. Sampling Procedure

This research was based on a survey of the bottom of pyramid respondents living in rural areas of Bogor Regency, which include Cibinong, Dramaga, and Cibungbulang. It is known that in a survey researchers collect information from a sample by asking through questionnaires or interviews to describe various aspects of the population.

The quality and quantity of the sample greatly determine the quality of the results of a study, since the sample character is the character of a population to be generalized as a result of research. Lind, Marchal, and Wathen (2015) introduces a general formula that can be used to determine the sample size when estimating the sample size

$$n = \left(\frac{Z\sigma}{e}\right)^2 \ldots\ldots..(1)$$

where n is the required sample size for the desired level of precision, e is the effect size, Z is the degree of confidence, and σ is the standard deviation of a population. In this research, given a random sample from a population of 640,000 (BPS, 2015) is defined by a standard deviation of 100, the desired confidence level of 1.96 (significance level of 0.05), and a size effect of 20. Based on the above information the required sample size is $\left(\frac{100*1.96}{20}\right)^2\left(\frac{100*1.96}{20}\right)^2 = 96$.

In choosing the area of survey we have focused on finding an area that has high poverty rate due to the focus of this research was finding factors that influence the intention to use of mobile banking of the BOP. Based on BPS data of 2016, Bogor Regency has the largest number of poor people (11.62%) in West Java. Bogor Regency has the largest number of population aged 15 years old and above in West Java, which is the target of financial inclusion strategy. Therefore, it was chosen as the main study area. Three districts in Bogor Regency were chosen, each of which is expected to capture the characteristics of different types of respondents, representing the target population of the survey. Cibinong sub-district represents industrial laborers area, while sub-district of Dramaga and Cibungbulang sub-district represent agriculture area. For each sub-district there were four villages randomly chosen. As for the number of samples for each village ranged from 5 to 20 household samples.

The selection of households in this survey was based on systematic random sampling. This technique was used in this research because it is a useful sampling option for sampling from a very large population. Systematic sampling is a method where only the first element of the sample is randomly chosen while the next elements are systematically selected according to a particular pattern. The sampling process, each sequence to "K" from a randomly selected starting point, where K = N / n. N notes the number of the population while n noted the number of samples.

2. Surveys and Measurement Scales

The design of the questionnaire was divided into three parts. Part one explores the respondent's personal demographic information, such as age, gender, education, and occupation. Part two explores the respondent's previous experience with mobile phone, mobile banking, level of financial literacy, and financial goals, and preference. Part three explores the indicator of each latent variables demonstrated in the conceptual model. Most of the questions used were based on a Likert-type measurement scale with a range from 1 to 10, where 1 indicated strongly disagree and 10 indicated strongly agree. Not all of the questions in the questionnaire were in Likert measurement form, some were open answer questions, multiple response questions, and also multiple choice options which were dependent on the context of the questions. The data collected for these measurement scales were analyzed using Smart PLS software

3. Data Preprocessing and Descriptive Statistics

Data preprocessing is an important step before further data processing. Data-gathering methods are often loosely controlled, resulting out-of-range, impossible data combination, and missing values. Analyzing data that has not been carefully screened for such problems can produce misleading results. Data preprocessing in this research

includes cleaning, instance selection, data transformation feature extraction, and selection.

As for the first stage of analysis, we have used descriptive statistic to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data.

4. Partial Least Square (PLS)

The partial least squares (PLS) approach to structural equation model (SEM) offers an alternative to covariance-based SEM, which especially suited for situations when data is not normally distributed. PLS path modeling latent variable (LV) scores are estimated as exact linear combinations of their associated manifest variables (MVs) and treats them as error-free substitutes for the manifest variables. PLS path modeling is referred to as a soft-modeling-technique with minimum demands regarding measurement scales, sample sizes and residual distributions. There are four stages in PLS modeling,

a. specify the structural model and bootstrapping,
b. check the outer model or the reliability and validity of indicator to measure the latent variables based on the composite reliability (CR) values, Cronbach's Alpha (CA), AVE, and VIF,
c. check the significance of the structural model based on the p-value of each construct and latent variable relationship, and
d. evaluate the inner model based on the value of R-Square, F-Square, Q-Square, and goodness of fit (GOF)

D. RESULTS AND DISCUSSION

1. Descriptive Analysis

This study focused on behavior of the bottom of pyramid society, a group of people with low income. We identify the income level of the respondents based on the electricity expense and electrical power installed. This assumption was based on Nazer and Handra (2016), who confirmed that household income is the most significant determinant of energy consumption in urban areas. Therefore, high electricity expenses will indicate higher electronic devices ownership and consumption, thus indicating higher income.

Most of the BOP households have a 450 volt electrical power installed, which is the lowest house hold voltage electricity instalment in Indonesia. As for the electricity expenses, BOP respondents have low average monthly electricity expenses, which is about IDR130,000. As for educational background, 63% of the samples considered as very low education with elementary school as the last formal education. The highest formal education of the observed respondents is high school (33%).

The respondents also have very low financial literacy with average score of 14%. During the survey, the respondents were required to answer five questions related to financial knowledge, including interest and compounding (the effect of interest rate on the future value of money), inflation, risk and diversification on investments, mortgage and instalment, and knowledge regarding the impact of interest rate on bond price (bond pricing). Interest and compounding are the most common financial knowledge among the BOP (34% of the respondents gave correct answer), followed by understanding on the impact of inflation to their buying power (18%), and mortgage and instalment (16%).

The mobile phone is considered as common technology owned by the respondents (68%), with different level of mobile phone technology starts from the basic phone and messaging function into internet access (42%), and feature to download and/or upload files (19%). Despite the fact that many BOPs own a mobile phone, only 13% of the respondents have previous experience with mobile banking. This number is considered low therefore it supports the objective of our research to analyse the factors affecting intention to use mobile banking in order to influence more people to use mobile banking.

As for the financial activities, cash basis transaction is still dominating in the way the respondents receive their salary or revenue payment (51%). Non-formal financial services are still more preferred than the formal financial

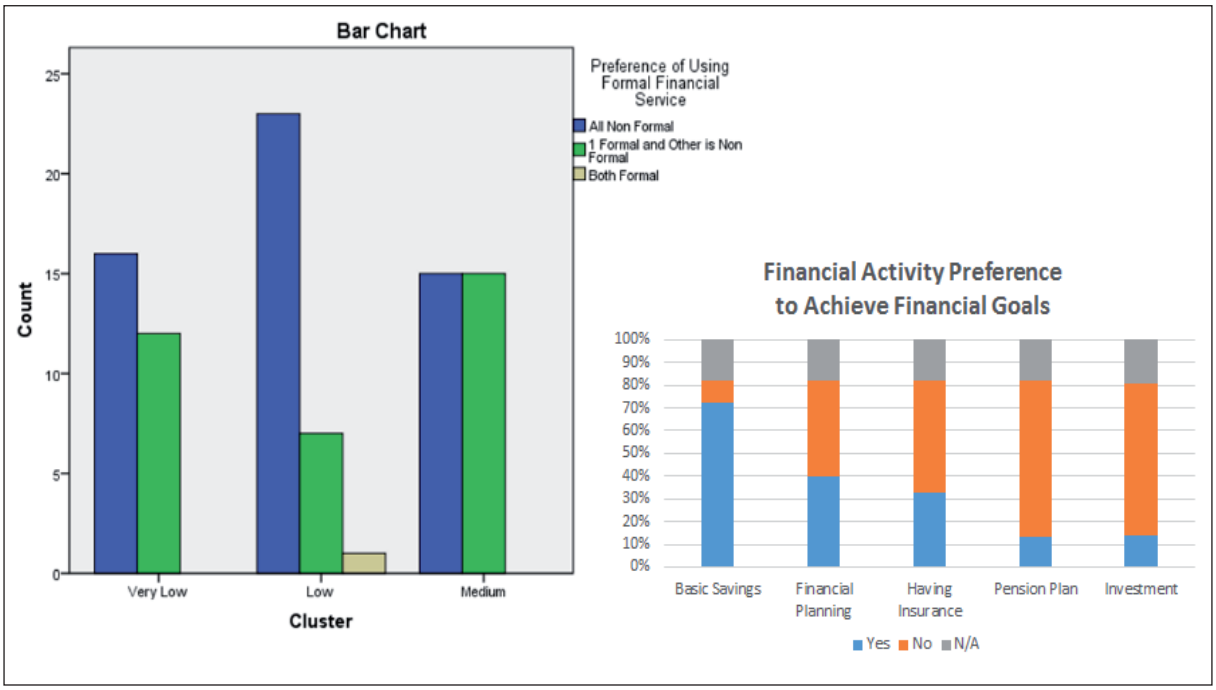


Figure 3. BOP's Financial Service Preference

services (i.e. bank) and the basic saving account is the way most people rely on to achieve their future financial goals (Figure 3).

2. Conceptual Framework Model Evaluation

a. Reliability and Validity of Indicator (Outer Model Evaluation)

The quality of the proposed measurements is measured using the reliability and validity test of indicators and latent variables in the model. The detail reliability and validity indicator results are presented in Table 2. To measure the reliability of the scales, the Cronbach's Alpha (CA) was used considering the reference value 0.6 (Malhotra, 1997, in Mūnoz-Leiva, Climent-Climent, & Liébana-Cabanilas, 2017) or to be more restrictive 0.7 (Nunnally, 1978, in Mūnoz-Leiva, Climent-Climent, & Liébana-Cabanila, 2017). The composite reliability (CR) values of 0.70 and 0.90 are also considered satisfactory (Hair Jr., Sarstedt, Hopkins, & Kupplewieser, 2014). The CA and CR value of the latent variables from the models are above 0.7, therefore considered as fit in exploratory studies. Convergent validity of the observed indicator was assessed by the factor loadings. The loads between the latent and observed indicator are high in all cases ($\lambda > 0.7$). The reliability of the scales can be evaluated based on a series of indicators extracted from the confirmatory analysis include the analysis of variance extracted (AVE). The result shows that AVE of all the constructs exceeds the threshold reference 0.5. There is no multicollinearity problem confirmed by variance inflation factors (VIF) value < 10. Therefore, we can conclude that the proposed model is adequate.

b. Evaluation of the Relationship between Latent Variables

Having accessed the quality of the proposed measurements, we evaluate the relationship between constructs (latent variables) to test the proposed model hypotheses. The statistical significance of its structural loads was analysed. Table 2, Figure 4, and Figure 5 show the applied empirical result of the model hypothesis. The p-value < 0.05 indicates that exogenous variables have a significant effect on the endogenous variables or quasi-significant when p-value range 0.05–0.10 (Henseler, Ringle, & Sinkovics, 2009). The results show that all the relationships are significant, except for three relationships which are performance expectancy and intention to use, initial trust and intention to use, and voluntary barriers and intention to use.

c. Inner Model Evaluation

The structural (inner) model was checked against four indicators that consist of Pearson's determination (R^2), Cohen's indicator size effect (f^2), goodness of fit (GOF), Stone-Geisser indicator or predictive validity (Q^2). The detailed procedure, criteria, and interpretation of those four indicators are presented in Table 3. The Cohen's indicator size effect for both models are presented in Table 4.

Table 2. Reliability and Validity of Indicator

Latent Variable	Indicator	Outer Loadings	Cronbach's α	CR	AVE	VIF
ATT (Attitude)	ATT_1	0,80	0,88	0,91	0,62	2.12
	ATT_2	0,92				5.17
	ATT_3	0,82				2.30
	ATT_4	0,86				3.98
	ATT_5	0,89				4.54
	ATT_6	0,78				2.66
EE (Effort Expectancy)	EE_1	0,92	0,95	0,95	0,95	3.77
	EE_2	0,95				4.87
	EE_3	0,90				2.66
INT (Intention)	INT_1	0,98	0,98	0,99	0,95	6.23
	INT_3	0,98				6.23
IT (Initial Trust)	IT_3	0,84	0,93	0,94	0,60	3.64
	IT_4	0,73				3.51
	IT_5	0,81				4.33
	IT_6	0,80				2.85
	IT_7	0,76				4.46
	IT_8	0,80				4.99
	IT_9	0,74				2.44
	IT_10	0,82				3.40
	IT_11	0,75				2.41
	IT_12	0,71				2.84
PE (Performance Expectancy)	PE_1	0,92	0,88	0,92	0,74	4.62
	PE_2	0,84				3.09
	PE_3	0,89				2.98
	PE_4	0,80				1.90
PR (Perceived Risk)	PR_3	0,89	0,81	0,89	0,73	2.25
	PR_4	0,92				2.56
	PR_5	0,74				1.47
SA (Structural Assurance)	SA_1	0,93	0,90	0,94	0,84	5.80
	SA_2	0,94				5.87
	SA_3	0,88				1.95
IVB (Involuntary Barriers)	Invol_10	0,96	0,92	0,95	0,87	5,33
	Invol_11	0,91				3,08
	Invol_9	0,93				3,69
VB (Voluntary Barriers)	Vol_1	0,76	0,84	0,88	0,65	3,21
	Vol_2	0,76				3,04
	Vol_3	0,77				1,48
	Vol_4	0,92				2,01
TTF (Task Technology Fit)	TTF_2	0,95	0,89	0,89	0,90	2,86
	TTF_3	0,95				2,86

Table 3. Relationship between Latent Variables

Relationship Hypothesis	Path Coefficient		p-value		Result
	Model 1	Model 2	Model 1	Model 2	
Direct Effect					
ATT → INT	0,31	0,19	0,009	0,065*	Supported
EE → PE	0,57	0,35	0,000	0,002	Supported
IT → INT	-0,09	-0,10	0,434	0,280	Not Supported
PE → ATT	0,60	0,59	0,000	0,000	Supported
PE → INT	0,07		0,566		Not Supported
PR → INT	-0,37	-0,26	0,002	0,056*	Supported
SA → IT	0,70	0,70	0,000	0,000	Supported
TTF → PE		0,33		0,006	Supported
IVB → INT		-0,34		0,010	Supported
VB → INT		-0,10		0,376	Not Supported
Indirect Effect					
EE → ATT	0,338	0,208	0,000	0,009	Supported
EE → INT	0,142	0,04	0,054*	0,176	Not Supported
PE → INT	0,182	0,11	0,008	0,069*	Supported
SA → INT	-0,061	-0,067	0,445	0,293	Not Supported
TTF → ATT		0,198		0,008	Supported
TTF → INT		0,038		0,107	Not Supported

Note: *p-value < 0.10

Table 4. Structural Model Indicator

Indicator	Procedure Purpose	Referential Values/Criteria	Result
Pearson's determination (R^2)	Evaluate the portion of variances of the endogenous variables, which is explained by the structural model.	For the area of social and behavioral sciences, R2=2% is classified with a small effect, R2=13% as a median effect and R2=26% as a large effect (Cohen, 1988).	R-square > 26%, Indicating large effect (Figure 4 & Figure 5)
Size of the effect (f^2) or Cohen's Indicator	Evaluate how much each construct is useful to the model adjustment.	Values of 0.02, 0.15 and 0.35 are considered as small, medium, and large (Hair et al, 2014).	Table 4
Goodness of Fit (GoF)	It is a score of the global quality of the adjusted model.	GoF > 0.36 (adequate) (Tenenhaus et.al, 2005; Wetzels; Oderkerken-SchÖrder; Oppen, 2009).	GoF model 1 = 0.553 GoF Model 2 = 0.57 Indicating an adequate model
Predictive Validity (Q^2) or Stone-Geisser indicator.	Evaluates the accuracy of the adjusted model.	Q2 > 0 (Hair et al.,2014)	Q2 = 0.851 Indicating that the model is adequate

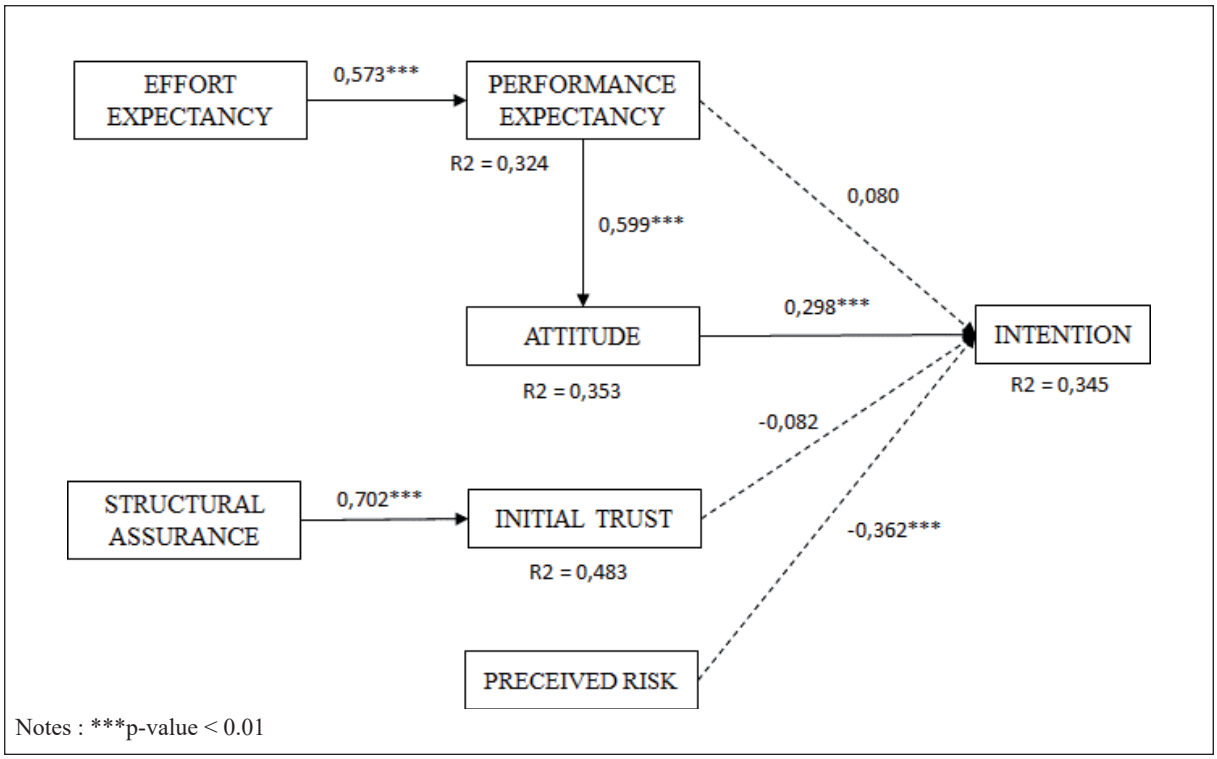


Figure 4. Mobile Banking Acceptance Model 1

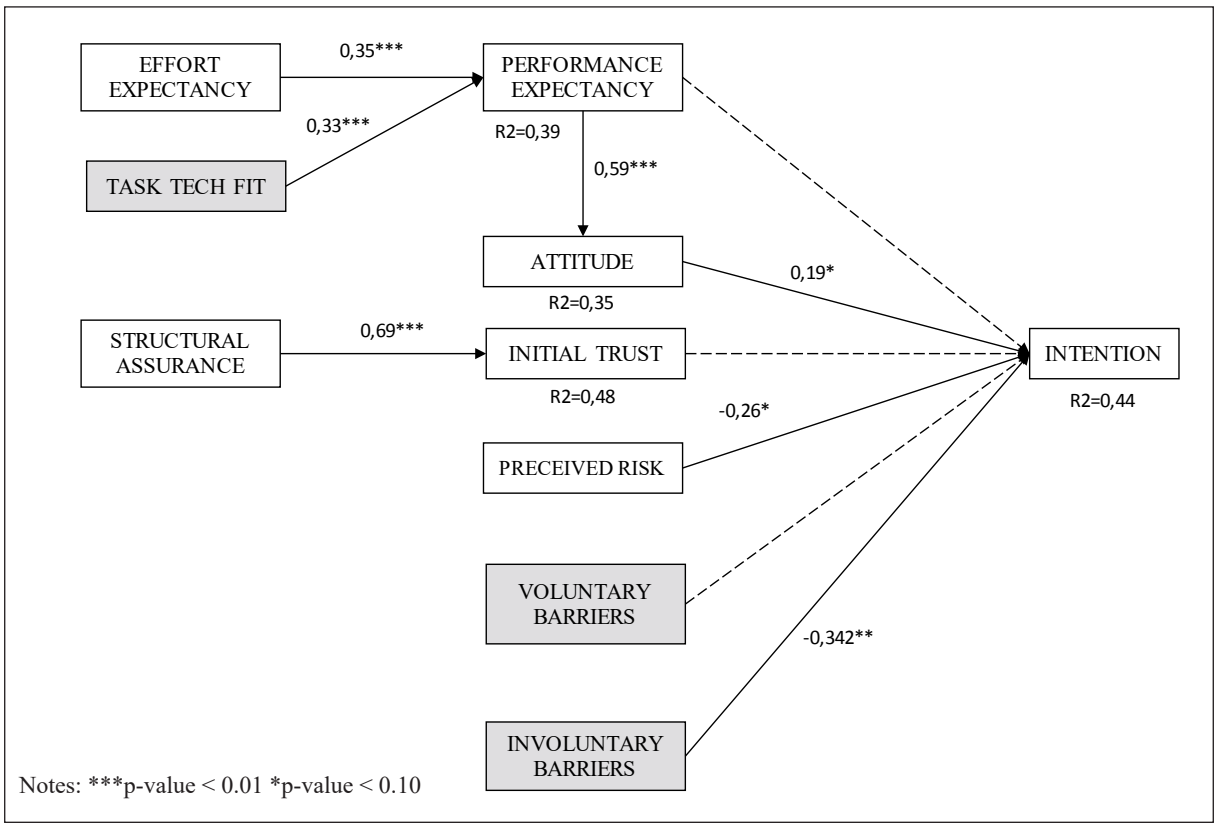


Figure 5. Mobile Banking Acceptance Model 2 (Extended)

Table 5. Size of The Effects (f^2)

Path	F-Square		Effect
	Model 1	Model 2 (Model 1 - Expanded)	
ATT → INT	0,08	0,04	Medium Effect
EE → PE	0,48	0,11	Large Effect/ Medium Effect
IT → INT	0,01	0,01	
PE → ATT	0,55	0,55	Large Effect
PE → INT	0,003		
PR → INT	0,13	0,07	Medium Effect
SA → IT	0,93	0,93	Large Effect
TTF → PE		0,10	Medium Effect
IVB → INT		0,10	Medium Effect
VB → INT		0,01	

E. DISCUSSION

The empirical evidence based on the PLS model supports the theoretical hypothesis that effort expectancy (EE) has significant positive, direct, and large effect on performance expectancy (PE). This result confirmed that the degree of anticipated complexity and effort to use mobile banking (EE) will increase the beliefs of BOP market segment. Based on F-square test, the effect is large/medium and even though significant (p-value < 0.001) the effect slightly differs from the Baptista's model. Our model has a slightly lower coefficient, but still having a positive effect which is in line with theory. This indicates that using mobile banking will help BOP to achieve and increase job performance (PE). The job performance includes access to banking products, reduce the transaction cost, and improve productivity in general. Indicators to measure effort expectancy include the ease of language used and the steps of use in mobile banking application.

The performance expectancy (PE) increases intention to use mobile banking via attitude. F-square test show large effect from the relationship of performance expectancy (PE) to attitude and medium effect from attitude to intention to use mobile banking. The coefficients are both positive and significant (p-value < 0.001) and having only a slight difference from the Baptista's model, mainly for the coefficients between attitude and intention to use mobile banking. In this study, attitude includes belief that they will actively use mobile banking and its feature for the daily financial transaction should they have access to it. Attitude factor reduce barriers toward adoption of innovation (Pavlou, 2002; Liebana-Cabanillas, Sanches-Fernandez, and Munoz-Leiva, 2014). The expectation of BOP customers to access banking products easily is to reduce the financial transaction cost and increase daily productivity lead to the higher attitude in using mobile banking.

Perceived risk (PR) has a negative association with the intention to use mobile banking (p-value < 0.10), which is in line with Baptista's model, and also the effects are considered medium based on F-square test. The perceived risk measures the perception about uncertainty and negative consequences of using mobile banking included information privacy, financial impact, security, and application performance. Perceived risk is a barrier to online transaction (Kesharwani & Bisht, 2012). Indicators to measure perceived risk include the level of BOP's perception about uncertainty and negative consequences of conducting the transaction related with information privacy, financial risk, security, and performance risks (Zhao, Hanmer-Lloyd, Ward, & Goode, 2008).

The customer belief that there are legal and technological structures and proper procedure to ensure the transaction security had a positive association with initial trust toward mobile banking. The initial trust included customer's trust toward the mobile banking provider's client orientation, transparency on financial cost, sustainability of a financial product, sustainability of financial institution, and information integrity (Zhou, 2011). Thus, structural assurance had a positive association with potential user's initial trust toward the mobile banking application. In the case of BOP customer segments, empirical evidence showed that both structural assurance and initial trust had no effect on the intention to use mobile banking (p-value > 0.10). The attractiveness of mobile application was not impacted by the initial trust of the BOP customers. The BOP first preference achieve financial goals was basic saving considered as simpler compared to the more advanced or complex financial

products such as insurance, pension plan, and investment. The salary and revenue were mostly received by the BOP customers segments through a cash basis. Therefore, we assume that the urgency to use mobile banking feature is still low, even though, they already have a high degree of initial trust.

The influence from task-technology fit (TTF) and barriers (voluntary and involuntary barriers) are proposed on the extended mobile banking acceptance model based on the suggestion from Baptista and Oliveira (2016). Indicators to measure the task-technology fit in this study was limited on the perceived compatibility of the technology by the BOP user and user accessibility to mobile banking and internet access, and had not evaluated the task characteristics of mobile banking. While, according to Goodhue and Thompson (1995), there are eight factors relevant to measure task-technology fit: quality, locateability, authorization, compatibility, training, production timeliness, systems reliability, and relationship with users. The empirical evidence proved that TTF has significant direct and medium effect (path coefficient 0.33 and f^2>0,102) to performance expectancy (PE). TTF also had a significant indirect impact to increase attitude (path coefficient 0.198, p-value 0.008).

As proposed by Allen, Demirguc-Kunt, Klapper, and Peria (2016), voluntary barriers (VB) and involuntary barriers (IVB) were determinants of financial inclusion. Therefore, both variables are considered to be valued in the mobile banking acceptance model (extended). Figure 5 shows that voluntary barriers or reluctance and negative attitude to use banking products that triggered by the limited financial resource to afford products and family account ownership had no significant effect to intention to use mobile banking. On the contrary, involuntary barriers have negative and significant direct effect to intention to use mobile banking. Involuntary barriers refer to reluctance or negative attitude to use banking products due to the affordability, formality, and perceived product fit.

F. CONCLUSION

Previous research proposed seven factors that influence the mobile banking acceptance model. We have proposed to add three additional relationships on the extended proposed model. We have also tested the proposed the model specifically on BOP. The model developed was based on PLS modelling and indicator checking. PLS was chosen due to relatively small data sets compared to the parameters that need to be estimated in the model.

Results show that most of the relationships are empirically confirmed except for the direct relationship between performance expectancy, initial trust, and voluntary barriers to intention to use mobile banking. Variables that contribute the highest effect on BOP customer intention to use mobile banking were involuntary barriers, perceived risk, and attitude (path coefficient -0.34, -0.26, and 0.19). The path coefficients contribute as a multiplier of those variables' variance impacting the degree intention to use mobile banking. Since the two most influenced variables have negative association with intention to use mobile banking (perceived risk and involuntary barriers), therefore, as the practical implication for mobile banking developer to reduce the perceived risk score through a priority toward information privacy, financial risk, security, and performance risks. As for involuntary barriers, the mobile banking providers have to increase the perceived product fit for BOP customer segments. To increase the intention to use mobile banking, the provider should enhance the attitude and performance expectancy by an improvement strategy on the effort expectancy of mobile banking feature including ease of language used, the step of use, and familiarity. Moreover, the task-technology fit of the application measurement was also important in order to match the capabilities of the technology with the BOP user's tasks and characteristics.

This study presented limitations that generate opportunities for future research on mobile banking acceptance. Firstly, this study has not considered analysing the effect of external factors such as government support, product knowledge, and social influence as an influential factor that will better predict the initial trust and its influence on intention to use mobile banking (Susanto, Lee, & Zo, 2011). Furthermore, future research needs to explore the other potential financial and

e-commerce activities closely related with BOP, such as account balance saving, money transfer, top up prepaid credit for cellular phone or electricity bill, and the frequency of the activities. We also suggest increasing the sample coverage to capture more BOP's job, generation, and culture characteristics.

REFERENCES

Allen, F., Demirguc-Kunt, A., Klapper, L., & Peria, M. S. M. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*, *27*, 1–30.

Badan Pusat Statistik (BPS). (2015). *Data jumlah penduduk miskin Kabupaten Bogor*. Retrieved on December 4th 2018 from https://bogorkab.bps.go.id/statictable.html.

Bank Indonesia (n.d). *Keuangan inklusif*. Retrieved on December 4th 2018 from https://www.bi.go.id/id/perbankan/keuanganinklusif/Indonesia/Contents/Default.aspx.

Bank Mandiri. (2018). *Laporan tahun 2017: Membentang asa sebagai kebanggaan bangsa*. Jakarta: Bank Mandiri. Retrieved October 2018. Retrieved on January 2th 2019 from https://www.bankmandiri.co.id/documents/38265486/38265681/Bank+Mandiri+2017+Annual+Report+-+Indonesia.pdf/7cf15373-9eab-5f22-3dfb-c50e424386a3.

Baptista, G. & Oliveira, T. (2016). A weight and a meta-analysis on mobile banking acceptance research. *Computers in Human Behavior*, *63*, 480–489.

Bharadwaj, A., Sawy, O. A. E., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights, *MIS Quarterly*, *37*(2), 471–482 .

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: Lawrence Erlbaum Associates.

Goodhue, D. L. & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly*, *19*(2), 213–236.

Hair Jr., J. F., Sarstedt, M., Hopkins, L., & Kupplewieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, *26*(2), 106–121. DOI: https://doi.org/10.1108/EBR-10-2013-0128.

Hair, J. F., Hult, T. M., Ringle, C. M., & Sarstedt, M. A. (2014). *Primer on partial least squares structural equation modelling (PLS-SEM)*. Los Angeles, USA: SAGE.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial leaset squares path modeling in international marketing. In R. R. Sinkovics & P. N. Ghauri (Eds.), *Challenges to International Marketing: Advances in International Marketing Volume 20*. Bradford, UK: Emerald Group Publishing, 277–319.

Hew, J. -J., Lee, V. -H., Ooi, K. -B., & Wei, J. (2015). What catalyses mobile apps usage intention: An empirical analysis. *Industrial Management & Data Systems*, *115*(7), 1269–1291.

International Finance Corporation (IFC). (2010). *Mobile banking in indonesia, assessing the market potential for mobile technology to extend banking to the unbanked and underbanked.* Jakarta: IFC. Retrieved from https://www.ifc.org/wps/wcm/connect/1a5695804723d0248b21ab2b131bed2a/Mobile%2BBanking%2BFinal%2BReport.pdf?MOD=AJPERES.

Kesharwani, A. & Bisht, S. S. (2012). The impact of trust and perceived risk on internet banking adoption in India: An extension of technology acceptance model. *International Journal of Bank Marketing*, *30*(4), 302–322. DOI: http://dx.doi.org/10.1108/02652321211236923.

Kilara, T. & Rhyne, E. (2014, June). *Customer-centricity for financial inclusion (English)*. CGAP brief. Washington, DC: World Bank Group, 1–4. Retrieved from http://documents.worldbank.org/curated/en/221421468147873241/Customer-centricity-for-financial-inclusion.

Mūnoz-Leiva, F., Climent-Climent, S., & Liébana-Cabanilas, F. (2017). Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. *Spanish Journal of Marketing–ESIC*, *21*(1), 25–38. DOI: https://doi.org/10.1016/j.sjme.2016.12.001.

Luarn, P. & Lin, H. -H. (2005). Toward an understanding of the behavioural intention to use mobile banking. *Computers in Human Behavior*, *21(6*), 873–891. DOI: http://dx.doi.org/10.1016/j.chb.2004.03.003.

Liébana-Cabanillas, F., Sánchez-Fernández, J., & Munoz-Leiva, F. (2014). Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behaviour*, 464–478.

Lin, H. F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International Journal of Information Management*,

31(3), 252–260. DOI: https://doi.org/10.1016/j.ijinfomgt.2010.07.006

Lind, D. A., Marchal, G. W., & Wathen, S. A (2015). *Statistical techniques in business & economics*. New York, USA: McGraw Hill.

Nazer, M. & Handra, H. (2016). Analisis konsumsi energi rumah tangga perkotaan di Indonesia: Periode tahun 2008 dan 2011. *Journal Ekonomi dan Pembangunan Indonesia*, *16*(2), 141–153.

DOI: https://doi.org/10.21002/jepi.v16i2.588.

Pavlou, P. A. (2002). A theory of planned behavior perspective to the consumer adoption of electronic commerce. *MIS Quarterly*, *30*(1), 115–143.

Pham, T. -T. T., & Ho, J. C. (2015). The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile payments. *Technology in Society*, *43*, 159–172. DOI: https://doi.org/10.1016/j.techsoc.2015.05.004.

PricewaterhouseCoopers (PwC). (2018). *PwC Survey*: *Digital Banking in Indonesia 2018*. Retrieved on November 20th 2018 from https://www.pwc.com/id/en/publications/assets/financialservices/digital-banking-survey-2018-pwcid.pdf.

Shaikh, A. A. & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, *32*(1), 129–142. DOI: http://dx.doi.org/10.1016/j.tele.2014.05.003.

Susanto, A., Lee, H., & Zo, H. (2011*). Factors influencing initial trust formation in adopting internet banking in Indonesia*. Retrieved on October 23th 2018, from https://www.researchgate.net/publication/233389618_Factors_Influencing_Initial_Trust_Formation_in_Adopting_Internet_Banking_in_Indonesia/download.

Zhou, T. (2011). An empirical examination of initial trust in mobile banking. *Internet Research*, *21*(5), 527–540. DOI: https://doi.org/10.1108/10662241111176353.

Zhao, A. L., Hanmer-Lloyd, S., Ward, P., & Goode, M. M. H. (2008). Perceived risk and Chinese consumers' internet banking services adoption. *International Journal of Bank Marketing*, *26*(7), 505–525. DOI:https://doi.org/10.1108/02652320810913864.