

# Factors Influencing E-Money Adoption

Bambang Supriyanto<sup>1</sup> and Gadang Ramantoko<sup>2</sup>

Magister Management, School of Economic and Business, Telkom University, Bandung, Indonesia

bambang.5upriyanto@gmail.com<sup>1</sup>, gadangramantoko@gmail.com<sup>2</sup>

**Abstract.** *The development of medium of exchange and transfer system today is very rapid and sophisticated. In terms of medium of exchange, beside money, which is still the main medium of exchange in the society, there are other non-cash mediums of exchange, including electronic money (e-money). This study identified and predicted factors influencing Telkomsel customers' adoption of Tcash service using Mobile Payment Technology Acceptance Model (MPTAM) modification model. Valid data was 400 of 983 returned questionnaires with a result showing that the most influential factors on Intention to Use T-Cash were External Influences and Attitude, while moderating variable Age only moderated External Influences and variable Gender moderated Risk and External Influences.*

**Keywords.** *E-Money; Mobile Payment; T-Cash; Modified MPTAM; Adoption; Indonesia.*

## I. INTRODUCTION

The development of medium of exchange and transfer system today is very rapid and sophisticated. In terms of medium of exchange, beside money, which is still the main medium of exchange in the society, there are other non-cash mediums of exchange, including electronic money (e-money) (Bank Indonesia, 2016). The usage of e-money in Indonesia increases every year, but the penetration is small compared with other mediums of exchange. The small penetration of e-money in Indonesia is also supported by the result of MARS Indonesia survey in 2013. The awareness of customers in the 5 surveyed cities on e-money service which was introduced to Indonesian in 2007 was relatively low, only around 23,8% people were aware of it.

Studies on acceptance of mobile payment have been performed many times. Some of them are Rakhi Thakur and Mala Srivastava (2013,) who study Adoption readiness, personal innovativeness, perceived risk and usage intention across customer groups for mobile payment services in India; Yongqing Yang, Yong Liu, Hongxiu Li, and Benhai Yu (2014,) who study Understanding perceived risks in mobile payment acceptance in China; and Francisco Jose Liebana-Cabanillas, Juan Sanchez -Fernandez and Francisco Munoz-Leiva (2014,) who study Role of gender on acceptance of mobile payment in Spain. They use different model constructs but have significant results. Rakhi Thakur and Mala Srivastava (2013) use TAM and Perceived Risk model constructs, Yongqing Yang, Yong Liu, Hongxiu Li, and Benhai Yu (2014) use perceived risk theoretical construct and Francisco Jose Liebana-Cabanillas, Juan Sanchez-Fernandez and Francisco Munoz-Leiva (2014) use TAM model construct.

## I. THE METHODOLOGY USED IN THE RESEARCH

### A. Technology Acceptance Theory

#### Theory of Reasoned Action (TRA)

According to the theory, behavior is determined by behavior intention to create the behavior. There are 2 main factors determining behavior intentions, which are: personal factor or 'attitude' and social factor or 'norm'. In line with expectation-value formulation, the

first component (one's attitude on certain behavior) is proposed as a function of an action regarding consequence received if an action is performed and the result of personal evaluation of the consequence. The second component, subjective norm, consists of behavior perception on special reference used as a basis of action for an individual or group. Subjective norm is one's function of trust (normative) related to every thought reference one has to do and motivation to follow the reference. Relatively important way to act and normative component in determining intention are expected to vary depending on attitude, situation, and individual difference of an actor (Ajzen & Fishbein, 1980).

### Technology Acceptance Model (TAM and TAM 2)

TAM is a model adapted from TRA model for the context of information system acceptance. According to (Davis, 1993) the main purpose of TAM is providing a basis to search the influence of external factor on user's trust, attitude, and purpose. TAM considers 2 individual's belief, which are perceived usefulness (PU) and perceived easy of use (PEOU), are the main influences of computer acceptance behavior (Davis, 1993).

#### A. Research Framework

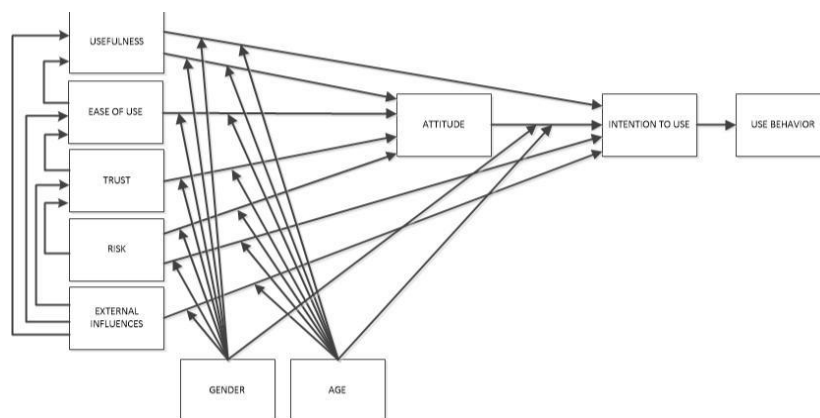


Figure 1. Research Model

The framework of this research was based on the relationship between variables with the explanation of the relationship as follows:

- The correlation between usefulness, ease of use, trust, risk, and external influences
- In mobile payment service, ease of use and external influences have positive influence on usefulness (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014). Trust and external influences have positive influence on ease of use (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014). Risk has negative influence on trust, while External Influences has positive influence on trust use (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014).
- The correlation between (usefulness, ease of use, trust, risk, and external influences) and (attitude and intention to use)
- Usefulness, ease of use, trust, and risk have positive influence on attitude (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014). Usefulness, attitude and external influences have positive influence on intention to use while risk has negative influence on intention to use (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014).
- The influence of moderating variables (age and gender)  
According to Venkatesh, Morris, Davis, & Davis (2003) variables age and gender play a moderating role on the adoption of new technology. Rhodes (1983) also states that variables age and gender play a moderating role on the relation between independent variable social influence and dependent variable behavioral intention in the context of the

adoption of new technology. The survey by Mars Indonesia and the background of the study show that different age ranges have different levels of adoption of e-money.

The result of Convergent Validity Test in Table 1 shows that outer loading value of all question items > 0,70 and Average Variance Extracted (AVE) values of all variables > 0,50, so it is concluded that all indicators and variables satisfied convergent validity test.

## B. Construct Reliability Test

Reliability tests performed to prove the accuracy, consistency, and accuracy of instruments to measure the construct. In PLS-SEM using SmartPLS software to measure the reliability can be done in two ways, by Cronbach's Alpha and Composite Reliability. The following table shows the results of testing the reliability of the construct:

Table 2. Construct Reliability

Variable	Cronbach Alpha	Composite Reliability
Usefulness	0,809	0,887
Ease of Use	0,872	0,907
Trust	0,840	0,887
Risk	0,742	0,853
External Influence	0,880	0,907
Attitude	0,799	0,870
Intention to Use	0,720	0,843
Use Behavior	1,000	1,000

Based on the result of reliability test, Table 2 shows that the values of Cronbach's Alpha and Composite Reliability of all variables > 0,70, so it's concluded that all construct indicators were reliable or met reliability test of Hypothesis Results Test

## C. Goodness of Fit Test

PLS path modeling also can identify global optimization criteria to determine the goodness of fit of the model like CB-SEM. According to PLS-SEM structure, every part of the model requires validations of measurement model, structural model and overall model. For PLS path modeling, there are three different fit indexes, which are communality index, redundancy index and Goodness of Fit (GoF) index (Ghozali, 2008). Because the recommended communality value = 0,50 (Fornel and Lareker 1981) and R Square Small value = 0,02, Medium = 0,13 dan Large = 0,26 (Cohen 1988 in Ghozali 2015), so Goodness of Fit small value = 0,10, medium value = 0,25 and big value = 0,36.

Table 3 shows that the Goodness of Fit value is 0,703. Based on rule of thumb of GoF > 0,36, it 's in the GoF Large category. Therefore, the GoF value of this research model is in the category of GoF Large.

Table 3. The Result of Goodness of Fit Test

Variable	R Square	Communality
Usefulness	0,633	0,724
Ease of Use	0,800	0,662
Trust	0,767	0,610
Risk		0,660
External Influence		0,581
Attitude	0,759	0,626
Intention to Use	0,726	0,641
Use Behaviour	0,625	1,000
Mean	0,718	0,688
GoF		0,703

## D. Hypothesis

Hypothesis test was performed using SmartPLS 3.0 and the result is shown in tables 4 and 5 below.

Table 4. The Result of H1 and H2 Hypothesis Test

Hypothesis	Independent Variable	Dependent Variable	Path Coefficient	T-Value
H1a	Ease of Use	Usefulness	0,476	8,087***
	External Influences		0,347	5,607***
H1b	External Influences	Ease of Use	0,424	10,934***
	Trust		0,504	13,050***
H1c	Risk	Trust	-0,330	7,568***
	External Influences		0,585	13,810***
H2a	Usefulness	Attitude	0,146	3,946***
	Ease of Use		0,332	6,161***
	Trust		0,346	6,660***
	Risk		-0,126	2,653***
H2b	Usefulness	Intention to Use	0,168	3,798***
	Attitude		0,281	5,109***
	Risk		-0,189	3,940***
	External Influences		0,291	5,015***

Table 5. The Result of H3 Hypothesis Test

Hypothesis	Independent Variable	Dependent Variable	Moderating Variable	
			Age	Gender
			T-Value	T-Value
H3a	Usefulness	Attitude	0,809	0,233
	Ease of Use		3,238*	0,071
	Trust		0,681	0,321
	Risk		2,083*	0,117
H3b	Usefulness	Intention to Use	0,171	0,687
	Attitude		0,252	1,053
	Risk		1,162	1,336*
	External Influences		1,368*	1,472*

Note : \*\*\*\*\* significant at confidence level 99,5%  
 \*\*\*\*\* significant at confidence level 99%  
 \*\*\* significant at confidence level 97,5%  
 \*\* significant at confidence level 95%  
 \* significant at confidence level 90%

## II. CONCLUSION AND SUGGESTION

This study was aimed to determine the adoption of Telkomsel e-money, which is T-Cash, and determine variables influencing the adoption. Based on the result of the discussion of empirical data and hypothesis test in the previous chapter, the following is concluded:

1. Based on descriptive analysis, it's determined that T-Cash users gave adequate / moderate assessment on variables Usefulness (64,55%), Ease of Use (64,13%), Trust (65,20%), Risk (55,97%), External Influences (65,79%), and Attitude (65,49%) and only variable Risk was below 60%.
2. Variables influencing e-money adoption in T-Cash users in Indonesia were investigated through variables influencing Intention to Use in Modified MPTAM model. Based on the result of hypothesis test, the variables influencing e-money adoption were Usefulness, Ease of Use, Trust, Risk, External Influences, and Attitude. The most influential variable on Attitude was variable Trust with path coefficient value of 0,346. Variable Risk was the

variable with the smallest influence on Attitude with path coefficient value of  $-0,126$ . The most influential variable on Intention to Use was variable External Influences with path coefficient value of  $0,291$ , only differing slightly from variable Attitude, which was on the second position with path coefficient value of  $0,281$ , and the least influential variable was Usefulness with path coefficient value of  $0,168$ .

3. Variables which moderated independent variables (Attitude and Intention to Use) on the adoption of Telkomsel e-money, i.e. T-Cash in Indonesia, were tested by multigroup analysis. The result of the hypothesis test is as follows:

- a. Independent Variable Attitude:

Variables influencing Attitude were Usefulness, Ease of Use, Trust, and Risk. Moderating variable Age moderated variable Ease of Use, in which the impact was greater on old age group. Moderating variable Age also moderated variable Risk, in which the impact was greater on young age group. Variable Age couldn't moderate variables Usefulness and Trust. Moderating variable Gender couldn't moderate variables (Usefulness, Ease of Use, Trust and Risk) influencing Attitude

- b. Independent Variable Intention to Use

Variables influencing Intention to Use were Usefulness, Attitude, Risk, and External Influences. Moderating variable Age moderated variable External Influences, in which the impact was greater on young age group. Variable Age couldn't moderate variables Usefulness, Attitude and Risk. Moderating variable Gender moderated variable Risk, in which the impact was greater on male gender group. Variable Gender also moderated variable External Influences, in which the impact was greater on male gender group. Variable Gender couldn't moderate variables Usefulness and Attitude, which influenced Intention to Use

4. The model in this study was Modified MPTAM model, which has R-squares values of  $0,633$  for Usefulness,  $0,800$  for Ease of Use,  $0,767$  for Trust,  $0,759$  for Attitude,  $0,726$  for Intention of Use and  $0,625$  for Use Behavior and Goodness of Fit of  $0,703$ . The values and GoF are in strong or substantial model category. Therefore, Modified MPTAM model could predict Telkomsel users' Attitude and intention to Use on T-Cash through variables Usefulness, Ease of Use, Trust, Risk, External Influences, and Attitude.

Today, there are two types of e-money circulated in Indonesia based on money storage media: (1) e-money which uses server as the money storage media; and (2) E-money which uses chip planted in card as the money storage media. This study used T-Cash as the research object, where the money storage media is server, so the following suggestions are only suitable for e-money which uses server as the money storage media.

This study used T-Cash which uses server as the money storage media, but there is another e-money type which uses chip planted in card as the money storage media. So, beside moderating variables Age and Gender, moderating variable money storage media may be added.

E-money providers often promote their products using discounts for purchase of certain goods and services to increase the usage of e-money, so it may be used as an additional variable in future studies.

E-money can't immediately be used, there should be several facilitating conditions, such as: availability of merchants who support payment by e-money, availability of system for loading e-money, availability of e-money instruments. Transaction process using can be obstructed or inapplicable if one of the above can't be fulfilled. So variable Facilitating Condition can be considered for additional variable in future studies.

## References

- [1] Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice Hall.
- [2] Amalia, E. I. (2016, Februari 3). *Teknologi: Game*. Retrieved from metrotvnews.com web site: <http://teknologi.metrotvnews.com/>
- [3] Arvidsson, N. (2014). Consumer attitudes on mobile payment services – results from a proof of concept test. *International Journal of Bank Marketing* .
- [4] Bank Indonesia. (2016, March 16). *Publikasi: Sistem Pembayaran*. Retrieved from Bank Indonesia Official Web Site: <http://www.bi.go.id>
- [5] Cooper, D. R., & Schindler, P. S. (2011). *Metode Riset Bisnis, Terjemahan*. Jakarta, Indonesia: PT. Media Global Edukasi.
- [6] Davis, F. D. (1993). User Acceptance of Information Technology System Characteristics, User Perceptions and Behavioral Impacts. *International Journal of Man-Machine Studies* .
- [7] EY. (2014). *Mobile Money - The Next Wave of Growth*. Optimizing operator approaches in a fast - changing landscape.
- [8] Ghozali, I. (2008). *Structural equation modeling metode alternatif dengan partial least square (PLS)*. Semarang, Indonesia: Semarang BP Undip.
- [9] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis, 7th Edition*. Global: Pearson.
- [10] Indrawati. (2015). *Metode Penelitian Manajemen dan Bisnis: Konvergensi Teknologi Komunikasi dan Informasi*. Bandung, Indonesia: Refika Aditama.
- [11] Jonker, J., & Pennink, B. (2010). *The Essence of Research Methodology*. Amsterdam, Netherland: Springer.
- [12] Khoirunnisa. (2016, February 4). *News: Telco*. Retrieved from seluler.id web site: <http://seluler.id>
- [13] Kotler, P., & Keller, K. L. (2016). *Marketing Management 15th Global Edition*. Global: Pearson Education Limited.
- [14] Liebana-Cabanillas, F. J., Sanchez-Fernandez, J., & Munoz-Leiva, F. (2014). Role of Gender Acceptance of Mobile Payment. *Industrial Management & Data Systems* .
- [15] Lind, D., Marchal, W., & Wathen, S. (2011). *Statistical Techniques in Business and Economics 15th Edition*. Global: McGraw-Hill/Irwin.
- [16] Lukman, E. (2015, Desember 25). *E-Money di Indonesia Punya Masa Depan Cerah*. Retrieved from Tech In Asia Indonesia Web Site: <https://id.techinasia.com/>
- [17] Ozkan, S., Bindusara, G., & Hackney, R. (2010). Facilitating the adoption of e-payment systems: theoretical constructs and empirical analysis. *Journal of Enterprise Information Management* .
- [18] PT Telekomunikasi Indonesia, Tbk. (2015). *Laporan Tahunan 2014*. Bandung: PT Telekomunikasi Indonesia, Tbk.
- [19] PT Telekomunikasi Indonesia, Tbk. (2015, August 3). *Media: Siara Pers*. Retrieved from PT Telekomunikasi Indonesia, Tbk Web Site: <http://www.telkom.co.id/>
- [20] PT Telekomunikasi Seluler Indonesia, Tbk. (2016). *T-Cash: About T-Cash*. Retrieved from T-Cash Web Site: <https://digitalpayment.telkomsel.com/>
- [21] Riduwan, & Kuncoro, E. A. (2008). *Cara menggunakan dan memaknai analisis jalur (path analysis)*. Bandung, Indonesia: Alfabeta.
- [22] Rogers, E. M. (1983). *Diffusion of Innovations*. New York, NY: The Free Press.
- [23] Sandy, K. F. (2015, February 23). *Ekbis: Sektor Riil*. Retrieved from sindonews.com web site: <http://ekbis.sindonews.com>
- [24] Sekaran, U., & Bougie, R. (2013). *Research Method for Business, A Skill-Bildding-Approach (Sixth Edition)* . West Sussex, UK: John Wiley & Sons Ltd.
- [25] Singapore Post. (2014). *Indonesia's eCommerce Landscape 2014: Insights into One of Asia Pacific's Fastest Growing Markets*.
- [26] Sukestiyarno, & Pramesta, P. (2014). *Statistika dasar*. Yogyakarta, Indonesia: Andi.
- [27] Teoh, W. M.-Y., Chong, S. C., Lin, B., & Chua, J. W. (2013). Factors affecting consumers' perception of electronic payment: an empirical analysis. *Internet Research*.
- [28] Thakur, R., & Srivastava, M. (2014). Adoption readiness, personal innovativeness, perceived risk and usage intention across customer groups for mobile payment services in India. *Internet Research*.
- [29] Thakur, R., & Srivastava, M. (2013). Customer usage intention of mobile commerce in India: an empirical study. *Journal of Indian Business Research*.
- [30] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quaterly* .

- [31] Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending The Unified Theory. *MIS Quarterly*.
- [32] Wang, W.-T., & Li, H.-M. (2012). Factors influencing mobile services adoption: a brand-equity perspective. *Internet Research* .
- [33] Williams, F., & Monge, P. R. (2001). *Reasoning With Statistics: How To Read Quantitative Research*, 5th Edition. London, UK: Harcourt College Publishers.
- [34] Wiyono, G. (2011). *Merancang penelitian bisnis dengan alat analisis SPSS 17.0 & SmartPLS 3.0*. Yogyakarta, Indonesia: UPP STIM YKPN.
- [35] Yamin, S., & Kurniawan, H. (2009). *Structural Equation Modeling Belajar lebih mudah teknik analisis data kuesioner dengan Lisrel-PLS*. Jakarta, Indonesia: Jakarta Salemba Infotek.
- [36] Yang, Y., Liu, Y., Li, H., & Yu, B. (2015). Understanding perceived risks in mobile payment acceptance. *Industrial Management & Data Systems*.
- [37] Zikmund, W. G., & Babin, B. J. (2010). *Exploring Marketing Research*, 10th Edition. Global: Cengage Learning.
- [38] Zumar, D. (2014, April 25). Categories: Consumer Behavior, Finance. Retrieved from Mars Indonesia Newsletter web site: <http://newsletter.marsindonesia.com>