

Security, Risk and Trust in E-wallet Payment Systems: Empirical Evidence from Indonesia

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ABSTRACT

The growth of e-commerce has created other technological innovations such as online payment initially developed by the banking industry, such as internet banking and mobile banking. However, e-wallet payment innovation has emerged as another online payment option provided by the non-banking sector. Unfortunately, the usage level of e-wallet payment in Indonesia is still considered relatively low compared to the country's internet or even mobile internet usage. This study investigated how perceived risk, trust, and security influence the behavioural intention of e-wallet payment using extended variables commonly used in extended TAM or UTAUT using postgraduate students in universities in Indonesia. The data analysis used Structural Equation Model (SEM) with IBM-AMOS. This study found that perceived trust played a vital role in influencing the behavioural intention of e-wallet payment usage. Perceived trust also acted as a mediator of perceived security in predicting behaviour. The implication of it hopefully will give a direction for e-wallet providers in providing the service to the users and lead more potential users to use it.

Keywords: E-Wallet, E-Payment, Adoption, Acceptance, TAM, UTAUT.

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INTRODUCTION

Information technology has changed how people do business (Turban, Pollard, & Wood, 2018). The innovation of the digital revolution in business is e-banking, e-commerce, e-business, e-cash, and also e-wallet payment system (Rainer & Prince, 2019). The e-wallet payment system initially was a card-based payment system, similar to the debit card and credit card issued by banking institutions. However, e-wallet payment systems can currently be card-based and application-based in users' smartphones that non-banking institutions can issue.

The level of adoption of the e-wallet payment system in Indonesia until February 2021 was 46% of Indonesia's population (self-computed based on statistics of the amount of outstanding e-money report by Indonesia Central Bank) (Indonesia Central Bureau of Statistics, 2021; www.bi.go.id, 2021). To date, the mobile internet users have been on 65% of the population. This research aimed to study the e-wallet level of adoption in Indonesia as it was considered low compared to mobile internet users or even the total population.

The percentage of e-wallet payment usage can be considered inefficient compared to total mobile internet users. Moreover, it is related to investment that providers and other stakeholders have already made. There were already 41 e-money providers in Indonesia, according to Indonesia Central Bank (www.bi.go.id, 2021)

For further consideration, the Covid-19 outbreak has changed all aspects of human life. This outbreak changed traditional transactions from traditional markets such as supermarkets, retail, to be online and digital transactions on the online marketplace. Moreover, the Indonesian government has encouraged non-cash payments for transactions (Communication Dept. Bank Indonesia, 2020). This phenomenon could be a momentum to increase the usage level of the e-wallet payment system in Indonesia.

Since the e-wallet payment system emerged, other than established predictors from TAM and UTAUT, it found few problems in their use from a user perspective such as trust, risk, and security (Dahlberg et al., 2015). From the initial view on prior research about e-payment, especially

e-wallet payment systems, there are few things that can be concluded as factors that hinder the use of these technologies. There are problems such as awareness, trust, and security that prevent users from using electronic payments like e-wallets (Stewart & Jürjens, 2018). Other researchers have also stated that the risk problem (perceived risk) that will arise becomes what also prevents using the technology (Muñoz-Leiva, Climent-Climent, & Liébana-Cabanillas, 2017; Pei, Wang, Fan, & Zhang, 2015; Ryu, 2018). Other concerns are the perceived trust of a user (Chang, Wong, Lee, & Jeong, 2016; Kumar, Adlakaha, & Mukherjee, 2018; Stewart & Jürjens, 2018).

Besides, the study regarding e-wallet adoption was still limited in Indonesia, especially the study that wants to see whether the extended factors can influence the intention to use and have a relationship with each other to predict the intention to use e-wallet payment. In detail, the research questions of this study were as follows:

1. Does perceived security, risk, and trust influence the intention to use e-wallet payment in Indonesia?
2. Do mediating effect relationships exist between those variables?

Hopefully, this study will provide a clear picture of the inhibitors that prevent users from adopting e-wallet payments from the user's perspective. This discovery will provide insights to stakeholders such as e-wallet vendors and the government. For vendors in providing good factors given in this study, and for the government in creating a good environment of e-wallet payment technology in terms of regulation, ease of granting certification, ease of requirements that vendors must meet, and so on.

This paper has eight sections comprising of the introduction, literature review, the development of hypothesis and research model, research methodology, data analysis, discussion, conclusion, limitation of the study, and suggestions for future research.

LITERATURE REVIEW

Mobile Payment/E-Payment

Along with the advancement of information technology, such as the internet, payment mechanisms grew from the innovation of credit cards and debit cards. After the internet innovation got into the banking system, new options were like internet banking, mobile banking, and e-money/e-wallet (Alt, Beck, & Smits, 2018). E-wallet payment can be used in many activities such as e-commerce/marketplace payment, utility payment, ride-hailing payment, and even payment at a physical retailer. E-wallet payment is application-based that can be used in smartphones (android or IOS). Users will link their bank account to their e-wallet application that is used for all mentioned transactions (Bagla & Sancheti, 2018; Malik, Suresh, & Sharma, 2019).

Study about Technology Adoption and Acceptance

Research about usage behaviour and its intention has been long before prominent theories like the Technology Acceptance Model (TAM) (Davis, 1989). TAM was developed based on the Theory of Reasoned Action (TRA) by (Ajzen & Fishbein, 1977). TRA stated that behavioural intention was predicted by attitude and subjective norms. In the TAM, attitude was expanded and explained by previous predictors, perceived ease of use and perceived usefulness.

However, the TAM received some criticism. In its early days. Even though the TAM had already extended into TAM2 and TAM3, it failed to explain the social context in adopting new technology. Therefore the TAM was believed to have limited ability to explain the behavioural intention of new technology (Shin, 2009). These critics later were improved in the Unified Theory of Acceptance and Use of Technology (UTAUT) that accommodates to include predictors such as social influence (Venkatesh et al., 2003). Other critics found out that the TAM did not pay attention to the trust and security concerns of the new technology (Shaw, 2014; Singh, Srivastava, & Sinha, 2017). Generally, new technology will always have a security and trust concern that prevents potential users from using it. Accordingly, this study examined those so-called extended variables

of the TAM and UTAUT, such as perceived trust, perceived security, and perceived risk.

Another theory that examines behavioural usage of new technology innovation besides TAM was the UTAUT (Venkatesh et al., 2003). It was considered an improvement from previous theories such as the TAM and extended TAM. UTAUT was claimed to enhance the predictive strength of the antecedent variables to the dependent variable (Malik et al., 2019; Martins, Oliveira, & Popovič, 2014). Few past studies have discussed the extended TAM and UTAUT with new predictors (Chawla & Joshi, 2019; Dahlberg et al., 2015; Shin, 2009). These extended variables will be expected to enhance the predictive strength of predictors to behavioural intention as dependent variables (Soodan & Rana, 2020).

Hypothesis Development and Research Model

In a systematic literature review which was done by (Dahlberg et al., 2015), it was found out that the top three of the extended variables used in behavioural adoption research were trust, risk, and security. The result is similar to research done by (Karsen et al., 2019). Trust, security, and risk are still a concern that can be explored in studying behavioural usage of technology (Dahlberg et al., 2015); accordingly this study examined the relationships of those three independent variables and the potential existence of mediation effect between them.

Perceived security

Past research has been discussing perceived security as an antecedent to behavioural intention. Perceived security is defined as how the users believe that online transactions will be secured (Chawla & Joshi, 2020). Users perceive that using online platforms for transaction payment will not risk losing their information credentials or even their financial losses (Liébana-Cabanillas, Marinkovic, Ramos de Luna, & Kalinic, 2018). Good perceived security will increase behavioural intention to use the new technology such as study in mobile payment (Oliveira, Thomas, Baptista, & Campos, 2016), Fintech (Stewart & Jürjens, 2018), and e-wallet (Nizam, Hwang, & Valaei, 2018). This study, following past research, will examine the relationship between perceived security and behavioural intention to adopt e-wallet payments. Therefore, the hypothesis was as follows:

H1: Perceived security has a significant positive influence on behavioural intention to adopt e-wallet payment.

Perceived trust

From a social psychological point of view, trust is defined as the expectation and willingness of the trusting party to conduct a transaction (Roca, García, & de la Vega, 2009). It was believed that it is owned by consumers of certain characteristics of their providers/suppliers (Flavián & Guinalíu, 2006). In terms of e-wallet payment technology, trust can be defined as the consumers' level of belief in the reliability and validity of that technology (Damghanian, Zarei, & Siahsarani Kojuri, 2016).

It is believed that good (high) perceived trust would increase behavioural intention to adopt and use new technology. As it was discussed in past studies in internet banking (Aboobucker & Bao, 2018) and (M.K & Ramayah, 2017), fintech (Stewart & Jürjens, 2018), and e-wallet (Nguyen & Huynh, 2018) and (Madan & Yadav, 2016). Accordingly, this study hypothesized that higher perceived trust will increase behavioural intention to adopt e-wallet payment as follows:

H2: Perceived trust has a significant positive influence on behavioural intention to adopt e-wallet payment.

Perceived risk

The risk or perceived risk has long been discussed in technology adoption studies in the past (Abdul-Hamid, Shaikh, Boateng, & Hinson, 2019; G. Kim & Koo, 2016). The core of perceived risk definition lies in uncertainty. It can be defined as uncertainty beyond the control of the consumers using online transactions or online payments (Ong & Lin, 2015). The uncertainty can be the form of the outcome in the online environment (E. Slade, Williams, & Dwivdei, 2013). The outcome can be a negative or unintended result from online transactions (Van et al., 2020). It is believed that a higher perception of risk in doing online transactions will lead to lower intention to use new technology (Kesharwani & Bisht, 2012; D. J. Kim, Ferrin, & Rao, 2008). Similar to that, this study hypothesized as follows:

H3: Perceived risk has a significant negative influence on behavioural intention to adopt e-wallet payment.

Perceived trust as mediating variable

Perceived trust was believed to be influenced by perceived risk negatively. Higher perceived risk will lower consumer perceived trust and, accordingly, lower behavioural intention to adopt. It was consistent with past studies in internet banking (Ong & Lin, 2015), e-payment (Nguyen & Huynh, 2018), and mobile payment (Liébana-Cabanillas, Muñoz-Leiva, & Sánchez-Fernández, 2018). Therefore, perceived trust is believed to affect perceived risk and intention to adopt e-wallet payment indirectly. The hypotheses was as follows:

H4: Perceived risk has a significant negative influence on perceived trust.

H5: Perceived trust mediates the relationship between perceived risk on behavioural intention to adopt e-wallet payment.

In other previous studies, perceived trust was also believed to influence perceived security positively. Higher (good) perceived security would increase perceived trust, increasing intention to adopt e-wallet payments. It is similar to the previous study in mobile commerce (Al-Khalaf & Choe, 2020), e-payment system (C. Kim, Tao, Shin, & Kim, 2010), and m-wallet (Kumar et al., 2018). Therefore, perceived trust was believed to indirectly affect perceived security to independent variable intention to adopt e-wallet payment. The hypothesis was as follows:

H6: Perceived security has a significant positive influence on perceived trust.

H7: Perceived trust mediates the relationship between perceived security and behavioural intention to adopt e-wallet payment.

The dependent variable behavioural intention to adopt e-wallet payment

The issue of this current study was the low level of usage of e-wallet payment in Indonesia compared to the number of internet users, especially mobile internet users. So, the primary purpose of this study was about how to increase the e-wallet payment usage level. In this case, the dependent variable behavioural intention to adopt e-wallet payment will be the ultimate purpose. Over prior literature, behavioural intention has been determined

to have an ability to predict the actual usage and adoption of a new system (Alalwan, Dwivedi, & Rana, 2017).

RESEARCH METHODOLOGY

This part will discuss the instrumentation used in the research, sampling process, pilot testing, and data collection.

Instrumentation

This study used a questionnaire. The questionnaire comprised two parts: demographic information and the second was related to questions on constructs (PS, PR, PT, and BI). The composition of the number of questions of each construct and their references is shown in **Table 1**.

Table 1: Summary of Construct Development

Variable/Construct	Component/Questions	Reference
Perceived Security (PS)	PS1, PS2, PS3, PS4, PS5	(Kumar et al., 2018), (Lim, Kim, Hur, & Park, 2018), (Flavián & Guinalíu, 2006)
Perceived Trust (PT)	PT1, PT2, PT3, PT4, PT5, PT6	(Gefen, Karahanna, & Straub, 2003), (Alalwan et al., 2017)
Perceived Risk (PR)	PR1, PR2, PR3, PR4, PR5, PR6	(Ryu, 2018), (D. J. Kim et al., 2008)
Behavioural Intention (BI)	IA1, IA2, IA3, IA4	(Venkatesh et al., 2003), (Venkatesh, Thong, & Xu, 2012)

(source: developed for this study)

Before it was distributed to respondents, the questionnaire went through a pre-testing phase (Sekaran & Bougie, 2016). Once pre-testing and content validity were approved, the questionnaire was ready for pilot testing. Cut off value for Cronbach's alpha was 0.7 (Hair Jr, Black, Babin, & Anderson, 2018). Cronbach alpha result for all the constructs was above 0.7 (PS=0.927, PT=0.896, PR= 0.832 and BI=0.952). Therefore, there was no problem with the internal consistency of each question for each variable.

Sampling

In total, for the year 2020, there were 122 state-owned universities in Indonesia. The respondents were from Master and PhD students from the top 5 universities in Indonesia based on the 2020 QS World Ranking. The universities involved were Universitas Indonesia, Gajah Mada University, Bandung Institute of Technology (ITB), Bogor Agriculture University (IPB) and Airlangga University. Master's and doctoral students were chosen as the population because they are expected to be up to date on new technical innovations such as the e-wallet payment system and have a sufficient income to use this type of technology. Sampling was determined using stratified random sampling and based on Krejcie & Morgan, (1970), the sample size should be 470 respondents. In each university, they had mutually exclusive subpopulations, groups, strata, and student segments. From the high level (University) to the low level (Degree Level), the number of each group were determined (Master or PhD students). They all met the stratified random sampling requirement, as the efficient sampling size indicates that the sample size is drawn according to the share of each group in the whole population (Cooper & Schindler, 2014). Through an online questionnaire, the responses obtained were 550. After all data cleaning from incomplete responses, including blank responses, only 470 responses were ready for data analysis.

Data Analysis

Structural Equation Modeling (SEM) was used for hypothesis testing and data analysis. This study used IBM AMOS 24 as a tool for data analysis. This study was considered CB-SEM with a normal distribution of data assumption.

SEM procedures were conducted using a two-step approach (Anderson & Gerbing, 1988). This SEM data analysis comprised of measurement model fit (confirmatory factor analysis) and structural model fit.

Demographic Profile of Respondents

The frequency of distribution of respondents in this study is shown in **Table 2**.

Table 2: Frequency Distribution of Respondents

Variables	Items	Frequency (n=470)	Percent (%)
Age	≤ 30	244	51.9
	31-40	137	29.1
	41-50	79	16.8
	51-60	9	1.9
	> 60	1	.2
Gender	Male	186	39.6
	Female	284	60.4
Level of study	Master	320	68.1
	Doctoral (PhD)	150	31.9
Income/month	≤ Rp 10.000.000	307	65.3
	Rp 10.000.001 – Rp 20.000.000	98	20.9
	Rp 20.000.001 – Rp 30.000.000	32	6.8
	Rp 30.000.001 – Rp 40.000.000	7	1.5
	Rp 40.000.001 – Rp 50.000.000	9	1.9
	≥ Rp 50.000.000	17	3.6

(source: developed for this study)

Confirmatory Factor Analysis (CFA)

The first step of SEM’s two-step procedures (Anderson & Gerbing, 1988) is confirmatory factor analysis (CFA) or measurement model fit. The objective of CFA is to measure the validity of the measurement model and the interrelationship between constructs and their indicators/items (Hair Jr et al., 2018). In CFA, the first important thing is unidimensionality. The next one is that the model has to pass good measurement model fit, reliability, and validity.

Unidimensionality

Table 3: Summary of Model Fit of Confirmatory Factor Analysis (CFA)

GOF Test	Initial Value	Modified Value	Threshold	Sources
CMIN/DF (χ^2/DF)	4.526	3.402	≤ 5	(Wheaton, Muthen, Alwin, & Summers, 1977)
GFI	0.843	0.901	≥ 0.90	(Marsh & Grayson, 1995)
RMSEA	0.087	.072	≤ 0.08	(Browne & Cudeck, 1993)
TLI	0.918	0.955	≥ 0.9	(Bentler & Bonett, 1980)
CFI	0.928	.962	≥ 0.9	(Hu & Bentler, 1999)
NFI	0.910	.948	≥ 0.9	(Schermelleh-Engel, Moosbrugger, & Müller, 2003)

The cut-off value of good factor loading is 0.7 (Hair Jr et al., 2018). We had to remove low factor loading items one by one up until the model reached a good model fit. It was found out that there were three items with a value of under 0.7: PR3 (0.521), PT5 (0.638), and PR1 (0.67). The initial measurement model fit can be seen in **Table 3**. After removing all three low factor loading items, the result of the measurement model was still not good enough for GFI (0.843). It required conducting modification indices which can be done with the condition that error correlation can only be done in a similar construct (Byrne, 2013). Modification indices were conducted to correlate error between PS1 and PS2, the final model fit after CFA are shown in **Table 3**. Another goal in unidimensionality is to prevent the issue in construct reliability and validity (convergent and discriminant validity).

Construct reliability

Besides Cronbach Alpha, another reliability testing is using construct reliability (CR); the threshold value for CR is 0.7, similar to Cronbach Alpha. The value of Cronbach alpha and construct reliability (CR) is shown in Table 6. All Cronbach alpha values for perceived security (0.958), perceived trust (0.918), perceived risk (0.863), and behavioral intention (0.935) were above 0.7. and it was similar to the value of CR of all constructs. They were already above 0.7 as a cut-off point, perceived security (0.956), perceived trust (0.930), perceived risk (0.861), and behavioral intention (0.942).

Construct validity

Construct validity consists of convergent validity and discriminant validity. In CB-SEM, convergent validity was measured using average

variance extracted (AVE), the threshold value of AVE is ≥ 0.5 . another construct validity is discriminant validity which all items in a similar construct measure only that particular construct and difference from other constructs in a model (Hair Jr et al., 2018). It ascertains that all squared roots of AVE of a construct have a higher value compared to correlation to other constructs (Fornell & Larcker, 1981). The value of AVE for all constructs where perceived security (0.814), perceived trust (0.729), perceived risk (0.610), and behavioural intention (0.802) were above 0.5 as a cut-off point.

Discriminant validity testing can be seen in **Table 4**, which showed that the squared root value of AVE of all constructs was higher than the correlation value of a particular construct to other constructs. It was concluded that the measurement model had passed the discriminant validity test. Ultimately, CFA had a good model fit index and passed reliability and validity testing. Therefore, we proceeded to the structural equation model.

Table 4: Discriminant Validity

	Perceived Security	Perceived Trust	Perceived Risk	Behavioral Intention
Perceived Security	0.902			
Perceived Trust	0.845	0.854		
Perceived Risk	-0.286	-0.283	0.781	
Behavioral Intention	0.460	0.529	-0.156	0.896

(source: developed for this study)

Structural Model

The second phase of the two steps of SEM (Anderson & Gerbing, 1988) is a structural model’s hypothesis testing. The main path to be analysed was behavioural intention to adopt e-wallet as a dependent variable, The last path to be analysed was whether there is a mediation effect of perceived trust as a mediator.

The first thing to examine was the model fit of a structural model. All of these fit index values were within their threshold value. Therefore, we proceeded to the path analysis stage. The summary of the hypothesis analysis is shown in **Table 5**.

Table 5: Summary of Hypothesis Result (source: developed for this study)

Hypothesis	Path	Std β	CR	P-Value	Result
H1	PS \rightarrow BI	0.045	0.516	0.606	Not supported
H2	PT \rightarrow BI	0.489	5.530	***	Supported
H3	PR \rightarrow BI	-0.005	-0.099	0.921	Not supported
H4	PR \rightarrow PT	-0.045	-1.427	0.154	Not supported
H6	PS \rightarrow PT	0.832	21.385	***	Supported

Notes: *** P < 0.001

As shown in Table 5, it can be concluded that only H2 and H6 were supported. Other predictors for behavioural intention failed to influence it as a dependent variable. They were perceived security and perceived risk; therefore, H1 and H2 were not supported. The last path analysis was that perceived risk did not significantly predict perceived trust, so H4 was not supported. However, perceived trust was significantly predicted by perceived security, and therefore H6 was supported.

Mediation Effect Analysis

Table 6: Path Analysis of Constructs in Mediating Effect

Hypothesis	Path	Indirect	(Std β , P-Value)	Result
H5	PR \rightarrow PT \rightarrow BI	PR \rightarrow PT	(-0.045, 0.154)	Not supported
		PT \rightarrow BI	(0.489, ***)	Supported
H7	PS \rightarrow PT \rightarrow BI	PS \rightarrow PT	(0.832, ***)	Supported
		PT \rightarrow BI	(0.489, ***)	Supported

As shown in **Table 6**, mediation occurred only between perceived security to Behavioral Intention through perceived trust because all of the direct effect paths were significant (PS \rightarrow PT and PT \rightarrow BI). In addition, this path was full mediation since the direct path (PS \rightarrow BI) was not significant. While for the other path (PR \rightarrow BI), mediation did not occur since PR \rightarrow PT was not significant. Therefore, only in one path did the mediation effect occur from two mediating paths. It was perceived security to behavioural intention relationship.

DISCUSSION

Perceived trust was the only variable that was a statistically significant predictor in influencing behavioural intention; based on the hypothesis

result, a change in the level of trust perception can increase the level of behavioural intention to adopt e-wallet. It was similar to prior studies in e-wallet/mobile payment (Islam, Saif-Ur-Rehman, Abid, & Ahmer, 2020; Kumar et al., 2018). Plus, the finding regarding perceived trust that has the strongest effect on behavioural intention was also consistent with prior studies in mobile wallets (Madan & Yadav, 2016). It followed other studies that mentioned that perceived risk and trust were the most important things for users in deciding to use online transactions (Mou, Shin, & Cohen, 2017). It happened for perceived trust but not for perceived risk in this study.

However, behavioural intention failed to be influenced by perceived security and perceived risk in the hypothesis testing. For perceived security, it was consistent with prior studies in online banking (Damghanian et al., 2016), mobile wallets (Chawla & Joshi, 2019). Next, perceived risk analysis was consistent with prior studies in the mobile wallet (Singh, Sinha, & Liébana-Cabanillas, 2020) and online payment system (Rouibah, Lowry, & Hwang, 2016). The cause of the result could be due to the respective path was the direct effect path of total mediation effect.

Perceived trust, as the dependent variable, was significantly negatively influenced by perceived security and was similar to prior studies on mobile wallet (Kumar et al., 2018) and online banking (Damghanian et al., 2016). However, it did not happen for perceived risk that was not supported in predicting perceived trust. It contradicted prior studies in mobile payment (Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014) and online banking (Damghanian et al., 2016).

Perceived trust as mediating variable was significant in mediating the relationship of perceived security to behavioural intention. Initially, the relationship from perceived security to behavioural intention was not significant in direct effect. It was consistent with prior studies in internet banking (Ong & Lin, 2015) and mobile wallets (Kumar et al., 2018). However, the mediation effect of trust could not occur in the relationship between perceived risk to behavioural intention. It contradicted prior studies in mobile payment (Sun, Zhang, Liao, & Chang, 2020) and mobile banking (Van et al., 2020), where trust was mediating perceived risk to behavioural intention.

Practical and Theoretical Implication

From the hypothesis analysis result, perceived trust is considered a vital role for users in adopting the e-wallet payment system in Indonesia and it was supported by prior studies (E. L. Slade, Dwivedi, Piercy, & Williams, 2015). Without mediation, perceived trust and security were two predictors that explained the usage of e-wallets. Perceived trust and perceived risk have been considered as the main factors in the behavioural intention of adopting new technology (Mou et al., 2017). Nevertheless, not for perceived risk in this study.

As a result, all stakeholders in e-wallet payment, particularly vendors and regulators, must work to increase the trustworthiness of consumers and potential consumers in adopting e-wallet payment, because higher perceived trust from consumers leads to higher intention to adopt it. In using online transactions, users in Indonesia were more concerned with trustworthiness than with other factors.

However, trust is the implication, not the cause. Prior studies have mentioned a number of factors to predict consumer trust. The provider has to minimize the uncertainty in using e-wallet payment. Prior research discussed that perceived risk plays a vital role in increasing perceived trust. Lower perceived risk will increase consumer perceived trust. However, it did not happen in this study. All of the perceived risk relationships were not significant either to behavioural intention or perceived trust. It can happen for two reasons, the risk of doing online transactions, especially using an e-wallet, was not risky or at minimum risk at all, or the consumer did not become aware of the risk of using the technology. Therefore, education and awareness programs are still something that providers have to do to indirectly increase the trustworthiness of using the e-wallet, about the security of the application, and they have to explain the risks of using it.

In terms of perceived security, when no mediation path, perceived security was indeed significantly influencing the behavioural intention. However, when it comes to the final path, perceived security influences behavioural intention through perceived trust. Higher perceived security from the consumer on e-wallet technology can increase behavioural intention level in using the technology. Therefore, e-wallet providers have to ascertain

the security of the technology, It makes sense when security is considered important because security problems will give a risk of threat and prevent users from adopting the technology (Ong & Lin, 2015).

Ultimately, the main vital predictor in the behavioural intention of e-wallet payment was perceived trust, as supported by many prior studies mentioned before. However, to build trustworthiness, it will need an antecedent such as good technological security that will lower risk and increase trustworthiness itself.

CONCLUSION

It can be concluded that from those three-antecedent factors of the behavioural intention of e-wallet payment in Indonesia, perceived trust has the largest effect in predicting behavioural intention. The next factor that was significant was perceived security, with or without a mediating variable. Even perceived trust was the only significant predictor; however, e-wallet providers have to explore how to increase that trustworthiness from consumers. Trust from the consumer will increase if they are confident in doing online transactions, especially using e-wallet payments.

Mediation was found to occur in the relationship between perceived security to behavioural intention through perceived trust. It will support the previous conclusion that good or higher perceived security will enhance perceived trust from the consumer in intention to use e-wallet payment in Indonesia. While the perceived risk relationship was not significant enough to predict either perceived trust or behavioural intention, possibility caused by the education and awareness of the risks of using e-wallets. Alternatively, they just paid more attention to the security of the system that can build the trust of using it.

LIMITATION AND FUTURE RESEARCH

The research was done quantitatively through the cross-sectional method. Therefore, it captured the conditions only when respondents fill in all the questions in the questionnaire, and the result cannot be generalized all the

time. Secondly, the sample were masters and PhD students in the top 5 universities in Indonesia based on the QS world ranking. Therefore, from these two facts, the result can only be represented by those students. Future research should be done on common e-wallet payment users either in big downtown cities or uptown rural cities and users from various backgrounds that may generate different results compared to this study.

Future research can be extended to the inclusion of other extended variables such as privacy and convenience. Independent variables in this study can be further explored, which is believed can be the component or facet of perceived risk, perceived security, and perceived trust. Future research can be expanded to take other stakeholders as the unit of analysis, such as a merchant that use e-wallet as their payment option.

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