

E-Wallet Usage Intention through Technology Acceptance Model and Technology Readiness in Indonesia



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ABSTRACT: Digital transformation plays an important role in affecting consumer behavior in society. One of the changes that have occurred in society can be seen in the way people buy and pay for products using e-wallets. This phenomenon is supported by the emergence of the COVID-19 pandemic which requires people to keep their distance from one another. These factors ultimately enhance the financial technology (fintech) revolution and present the habits of a cashless society.

This study aims to determine the factors that influence the intention and readiness of the Indonesian people to use E-wallets through the TAM theoretical model and psychological factors of technology readiness to investigate the determinants that influence customer intentions to use E-wallet payment system. Data collection was carried out using online survey method with a purposive sampling technique. The research sample total 270 respondents with the characteristics of all Indonesian people who know and understand the E-wallet payment system and are over 18 years old. Data analysis using SEM-PLS with the help of SmartPLS 3.2.9 software.

The results showed from eight hypotheses proposed, six hypotheses were accepted and two hypotheses were rejected. Technology readiness is proven to have a positive and significant effect on perceived ease of use and perceived usefulness, but does not directly influence the intention to use E-wallets. Perceived ease of use and perceived usefulness have a positive and significant effect on attitudes which ultimately affect the intention to use E-wallets. Technology readiness and trust are shown to have an insignificant effect on the intention to use E-wallets.

KEYWORDS: TAM, Technology Readiness, Trust, Intention to use, E-wallet, Cashless Society

I. INTRODUCTION

Digitalization makes a crucial role and brings numerous changes, varying from communication technology, trade industry, and banking to indirectly influencing consumer behavior in society (Cugno et al., 2021). This transformation has created a major revolution in electronic payments, shifting from cash payments to electronic payment or electronic wallet (*E-wallet*). *E-wallet* payments and bank transfers are preferred by many users due to their convenience, ease of use, and popularity compared to credit cards.

As time progresses and technological advancements, cash transactions are no longer considered practical due to several deficiency associated with the use of cash in transactions. Firstly, cash transactions are inefficient as buyers have to carry physical cash to purchase multiple desired items, and sellers often face difficulties in providing change. Another significant reason is the emergence of a new phenomenon in Indonesia over the past two years, where people become less panicked when realizing they don't have their wallets with them for payment transactions. Customers casually take out their mobile phones from their pockets and open online application platforms (Alfina, 2020). This phenomenon is referred to as the cashless society era, where people no longer need to use cash for purchasing transactions (Balakrishnan & Shuib 2021).

Another factor driving the significant behavioral change towards widespread adoption of cashless payments is the phenomenon of the COVID-19 pandemic that has affected the world in the past two years (Adiani et al., 2021). The change in people's behavior due to Covid-19, which subsequently triggered the emergence of the cashless society phenomenon, including a shift in preference from cash usage, has led to an increase in the use of *E-wallets* in several ASEAN countries, including Indonesia. According to the World Economic Forum (WEF) report cited in Ahdiat (2022), the most popular digital financial service in ASEAN is non-cash or online payments, accounting for 46% of the total. The findings of the WEF research align with the IPSOS survey results for Southeast Asia in September 2020, which revealed a 44% increase in the frequency of non-

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cash/cashless payment usage among the Indonesian population during the Covid-19 pandemic (Javier, 2021). In 2022, based on the insights from a survey conducted by Insight Asia titled "Consistency that leads: 2023 E-wallet industry outlook" as cited in Dhanesworo (2022) *E-wallets* emerged as the top choice of payment method among the Indonesian population, followed by cash, bank transfers, QRIS, debit cards, pay-later options, and lastly, virtual accounts (VA).

The various surveys also explain that the majority of digital wallet usage in Indonesia is highest for online shopping, while purchasing mobile credit and money transfers occupy the second and third positions, respectively. The benefits perceived by the public from using *E-wallet* payment services for the most popular transactions, such as electricity and water bills, school fees, mobile credit and internet data top-ups, movie tickets, online shopping, etc., are significant (Haque et al., 2020). The public can utilize *E-wallets* to conduct transactions across multiple channels, including consumer-to-consumer, consumer-to-business, consumer-to-machine, and consumer-to-online transactions (W.-J. Lee, 2019).

Despite the numerous benefits derived from using E-wallets as a new payment system, according to Khoa (2020) most people still have concerns about changing their previous behaviors and adopting new products or services. Additionally, there are several weaknesses that *E-wallet* users may face. For instance, funds deposited into the account cannot be withdrawn or may require a minimum balance. The availability of *E-wallet* payment facilities is still limited, as not all restaurants or merchants actively provide this option. There are also administrative fees for topping up the wallet balance (Ibnu, 2021). Furthermore, there is a potential risk of cybercrimes, as seen in cases involving OVO and DANA users, where unauthorized activities in the account led to a decrease in the balance without the account owner's knowledge (Play Store, 2022).

The mentioned weaknesses and issues highlight that E-wallets, as a new payment method, still have limitations and require further development. Therefore, researchers find it necessary to understand the clear reasons behind the rapid growth of E-wallet usage in Indonesia, a developing country with a diverse population of different ethnicities and age groups.

One way to predict an individual's attitude towards accepting and using technology is by using the Technology Acceptance Model (TAM). This model explains and predicts how users accept and use technology. TAM is a model designed to illustrate how users comprehend and implement information systems (Davis et al., 1989). Furthermore, to further understand individual adoption behavior of new technology, Lin et al., (2007) proposed the Technology Readiness and Acceptance Model (TRAM) by incorporating Technology Readiness (TR) into TAM. Combining TR and TAM can provide a deeper understanding of the psychological processes involved in the adoption behavior of a technology. According to the research by Chawla & Joshi (2020) the likelihood of individuals accepting new technology should consider not only the components of TAM but also individual personality traits (that is, Technology Readiness).

Based on the afore mentioned explanation, the author use the TAM model into relevant conceptual theories to provide a more holistic theoretical background in demonstrating the customers' sustained intention towards digital platforms, particularly within the *E-wallet* system (Lee et al., 2016; Zhou et al., 2018). The theory is the integration between TAM and TR to determine the influence of individuals using technology in the field of *E-wallet* or digital wallets. Therefore, it can be concluded that the focus of this research is to understand the behavioral intention of individuals to adopt E-wallet technology by using the *Technology Readiness* (TR) and TAM model, with the additional variables of Trust (TRU) and Attitude (ATT) as factors influencing the intention (INT).

II. THEORETICAL FRAMEWORK

The Technology Acceptance Model (TAM) is considered to be the most robust and influential model in the study of innovation acceptance behavior (Davis et al 1989; Pavlou, 2003), addressing the issue of how users accept and use technology. The TAM model consists of two cognitive elements: perceived ease of use (PEOU) and perceived usefulness (PU) when using the technology. Together, these dominant elements determine the attitude towards technology usage, which can influence the behavioral intention to use and, consequently, actual technology adoption (Davis, 1989; Tahar et al., 2020; Venkatesh dan Davis, 2000).

Furthermore, PEOU is defined as "the extent to which an individual believes that using a particular system will be free from physical and mental effort" (Davis, 1989). Specifically, PEOU is considered as the level to which users perceive the use of an information technology system to be easy to learn. On the other hand, PU is "the extent to which an individual believes that using a particular technology system will enhance their job performance" (Davis, 1989). *Perceived usefulness* focuses on how much the technology can improve user performance.

In addition to the TAM model, TR, which is the combination of positive and negative technology-related beliefs, determines an individual's inclination to interact with new technology to achieve personal or professional goals (Parasuraman dan Colby, 2001). The study by Lin et al., (2007) proposed that an individual's interaction with new technology simultaneously influences differences in beliefs, perceptions, emotions, and motivations. Technology Readiness also serves as an empirically

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proven factor that influences an individual's perception of perceived ease of use (PEOU) and perceived usefulness (PU), which in turn affect the acceptance and adoption of new technology (Chen & Lin, 2018; Chiu & Cho, 2021; Lin et al., 2007; Sinha et al., 2019). Furthermore, this study includes trust (TRU) and attitude (ATT) as variables that also influence intention. Trust (TRU) is defined as the situation in which one party has confidence in the reliability and integrity of the exchange partner (Morgan dan Hunt, 1994). On the other hand, the attitude variable is defined as an individual's comprehensive belief and evaluation when receiving or encountering information related to a specific behavior. Another definition states that attitude is the disposition to respond positively or negatively towards an object, person, institution, or event (Ajzen, 2005).

Behavior Intention, as defined, is the measure of an individual's intention strength to engage in a specific behavior and has consistently been found to predict the actual usage of a technology (Amoroso & Magnier-Watanabe, 2012). Fishbein & Ajzen (2011) further add that intention to use E-wallets is a measure of the intensity of an individual's intention to purchase a product. Ultimately, intention to use represents the strength of an individual's willingness to engage in a specific behavior (Ajzen, 1991) and serves as a strong signal of how individuals will behave in the future (McKnight et al., 2002).

Based on the theoretical explanation above, this research will propose the following hypotheses:

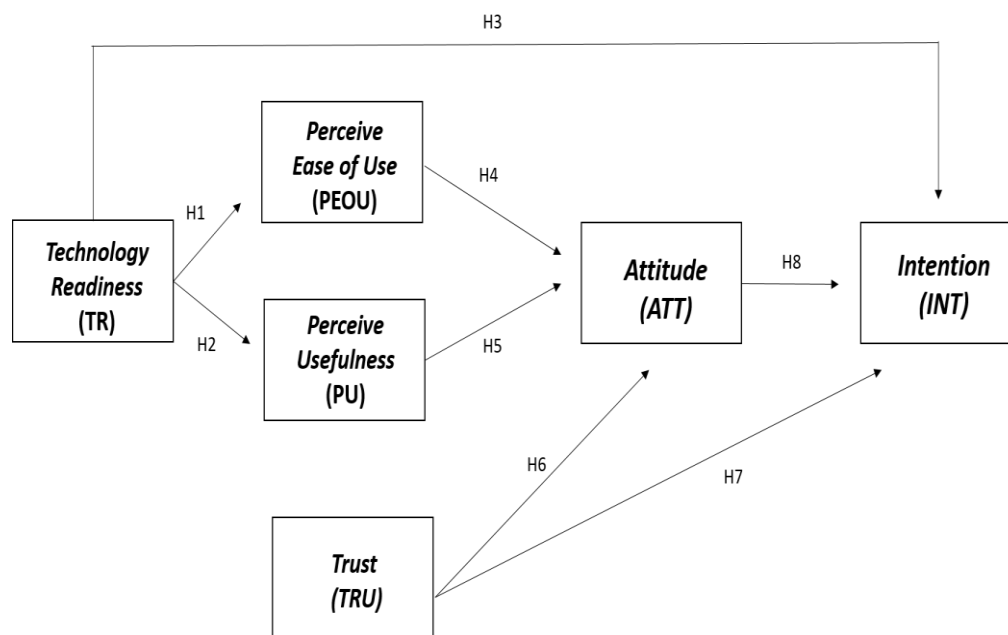


Figure I Theoretical Framework

H1: Technology Readiness (TR) affects perceived ease of use (PEOU).

H2: Technology Readiness (TR) affects perceived usefulness (PU).

H3: Technology Readiness (TR) affects intention (INT).

H4: Perceived ease of use (PEOU) affects attitude (ATT) towards using E-wallets.

H5: Perceived usefulness (PU) affects attitude (ATT) towards using E-wallets.

H6: Trust (TRU) affects consumer attitude (ATT) towards using E-wallets.

H7: Trust (TRU) affects intention (INT) to use E-wallets.

H8: Attitude (ATT) affects intention (INT) to use E-wallets.

III. METHODOLOGY

A. Population and Sample

Sample Selection Method Using Purposive Sampling Technique with a sample size in this study based on the calculation formula (Hair et al., 2014) which is the number of indicator variables used in the questionnaire, assuming n variables \times (5-10), resulted in a total of 270 individuals. Respondents will be proportionally divided based on the population size of each region in Indonesia. Based on the proportionate sample calculation, the total sample size for each region in Indonesia that can represent the population in the study is as follows: 218 samples for Western Indonesia, 43 samples for Central Indonesia, and 9 samples for Eastern Indonesia. Then, the samples will be randomly selected from each cluster of regions in Indonesia. This sampling method

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is conducted to ensure that the samples reflect the characteristics of the Indonesian population in each region and represent the overall population of this study.

The following are the criteria for the sample in this research:

1. Users and non-users who are knowledgeable about and understand the method of payment using E-wallets.
2. Minimum age of 18 years.

B. Measurement

This study used a questionnaire items that has been adapted from previous research. The TR variable was adapted from Sinha et al., (2019) and consists of three questionnaire items. The PEOU variable was adapted from Chawla & Joshi (2019) and consists of five questionnaire items. The PU variable was adapted from Chawla & Joshi (2019) and consists of six questionnaire items. The ATT variable was adapted from Flavian et al., (2020) and consists of four questionnaire items. The TRU variable was adapted from Srivastava et al., (2010) and consists of five questionnaire items and The INT variable was adapted from Venkatesh et al., (2003) and consists of four questionnaire. All quells

Tionnairel items were measured on a 5-point Likert scale with 1 being strongly disagree and 5 being strongly agree.

C. Data Analysis

The method used for data analysis and hypothesis testing in this research is Structural Equation Model - Partial Least Squares (SEM-PLS). The analysis using SEM-PLS typically consists of two sub-models: the measurement model (outer model) and the structural model (inner model) (Hair et al., 2018). The outer model describes the relationships between latent variables and indicator variables, the inner model describes the relationships between latent variables, and finally, there is the hypothesis testing model.

IV. RESULTS AND DISCUSSION

A. Results

The process of collecting questionnaire data was conducted in March 2023, with a total of 280 respondents gathered. However, out of the total 280 respondents, only 96.5% or 270 respondents met the research criteria, and their data could be used for data processing.

Based on the analysis of the characteristics of research respondents, the majority of them belong to the Generation Z (18-25 years old) and millennial (26-35 years old) population. Among all the e-wallets available in Indonesia, GoPay remains the top choice for Indonesian society, followed by the newcomer ShopeePay in second place. Further explanations can be found in Table 1 and Table 2.

Table 1: Respondents' Age

Age	Total	Percentage
18-25 Year	180	67
26-35 Year	76	28
36-45 Year	7	3
> 45 Year	7	3
Total	270	100

Source: Data Analysis (2023)

Table 2: Most Frequently Used

<i>E-wallet</i>	Frequency (In units)	Percentage (In percent)
Go-Pay	235	27,9
Shopeepay	216	25,7
OVO	172	20,4
Dana	168	20,0
Link Aja	41	4,9
others (Sakuku, Touch n Go)	8	1,0
Flip	2	0,2
Total	842	100

E-wallets

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Source: Data Analysis (2023)

Table 3 items validity and reliability

Variable	Indicator	Item	Factor Loading	AVE	Cronbach's Alpha
Technology Readiness	TR1	I can usually figure out new high-tech products and services without help from others	0,774	0,625	0,704
	TR2	Technology makes me more efficient in my occupation	0,843		
	TR3	The human touch is very important when doing business with a company	0,752		
Perceived Ease of Use	PEOU1	I believe step by step navigation e-wallet apps are easy to understand	0,847	0,641	0,859
	PEOU2	I believe learning to use e-wallet is easy	0,859		
	PEOU3	I like the fact that payments done through e-wallet require minimum effort	0,704		
	PEOU4	I believe it is easy to transfer money through e-wallet as minimum steps are required	0,805		
	PEOU5	Overall I think e-wallet is very easy to use	0,779		
Perceived Usefulness	PU1	I think using e-wallet would enable me to accomplish transactions more quickly	0,813	0,668	0,899
	PU2	I believe e-wallet would be useful for conducting online transactions	0,859		
	PU3	I believe using e-wallet would improve my efficiency of online transactions	0,888		
	PU4	I think using e-wallet would make it easier for me to make online payments	0,837		
	PU5	I believe e-wallet improves the quality of online transaction	0,790		
	PU6	Overall, I think using an e-wallet would improve my performance	0,704		
Attitude	ATT1	I like the idea of using mobile payment	0,861	0,779	0,905
	ATT2	Using mobile payment is a pleasant experience	0,891		
	ATT3	Using mobile payment is a good idea	0,907		
	ATT4	Using mobile payment is a wise idea	0,872		
Trust	TRU1	I feel safe providing personal privacy information over the mobile payment app I use.	0,871	0,756	0,920
	TRU2	I am not worried to use this mobile payment app as I know my transactions will be secured.	0,881		
	TRU3	I am not worried to use this mobile payment app as I know my transactions will be safe.	0,877		
	TRU4	I am not worried to send my sensitive information across the mobile payment app	0,880		
	TRU5	I am not worried to use the mobile payment app will not divulge any of my information to the third party.	0,838		
Intention	INT1	I would like to do transactions using e-wallet in the near future	0,845	0,736	0,881

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Variable	Indicator	Item	Factor Loading	AVE	Cronbach's Alpha
	INT2	It is very likely that I will use my smartphone to pay at the point-of-sale	0,860		
	INT3	I will frequently use e-wallet in future	0,872		
	INT4	I intend to recommend others to use e-wallet	0,856		

Source: Data Analysis (2023)

Based on the results of the measurement analysis in table 3 it can be seen that all the items measurement of variables have factor loading $>0,7$, AVE $> 0,5$ and cronbach's alpha $> 0,7$. Thus, all the items have met the validity and reliability criteria from (Hair et al., 2014, 2019).

Coefficient of Determination (R^2)

Table 4. Coefficient of Determination (R^2)

	<i>R Square (R^2)</i>	<i>R Square Adjusted</i>
PEOU	0,433	0,431
PU	0,277	0,274
ATT	0,575	0,570
INT	0,621	0,616

Source: Data Analysis (2023)

Hypothesis testing was conducted based on the results of the Inner Model (structural model) testing, which includes R-square values, path coefficients, and t-statistics. According to the table above, the Intention variable has an R^2 value of 0.616. This indicates that the technology readiness, perceived ease of use, perceived usefulness, trust, and attitude variables can explain 61.6% of the variance in the Intention variable, while the remaining 38.4% is explained by other variables not included in the study.

Path Coefficients

To determine whether a hypothesis can be accepted or rejected, the significance level between constructs, t-statistics, and p-values is considered. Hypothesis testing in this study was conducted using SmartPLS (Partial Least Squares) 3.2.9 software. The values can be observed from the bootstrap results. The rule of thumb used in this research for hypothesis testing:

- If the t-statistic value $> 1,96$, H_0 not supported and H_1 supported (significance level of p-value 0.05 (5%))
- If the t-statistic value $< 1,96$, H_0 supported and H_1 not supported (significance level of p-value 0.05 (5%))
- The value of path coefficient is positive, meaning that the influence between variables is positive.
- If the value of path coefficient is negative, meaning that the influence between variables is negative.

The values of hypothesis testing for this study are shown in the table 5 below:

Table 5. Hypothesis Testing Results

Direct Influence	Hypotheses	Original Sample	T Statistics	P Values	T Table	Explanation:
TR -> PEOU	H1	0,658	12,593	0,000	1,96	Supported
TR -> PU	H2	0,526	5,732	0,000	1,96	Supported
TR -> INT	H3	0,082	1,842	0,076	1,96	Not supported
PEOU-> ATT	H4	0,291	3,396	0,000	1,96	Supported
PU -> ATT	H5	0,300	3,799	0,000	1,96	Supported
TRU -> ATT	H6	0,326	6,725	0,000	1,96	Supported
TRU -> INT	H7	0,092	1,784	0,079	1,96	Not supported
ATT -> INT	H8	0,691	12,912	0,000	1,96	Supported

Source: Data Analysis (2023)

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Table 5 shows that out of the eight hypotheses proposed, six test results have t-statistic values greater than the critical t-value (t-table), indicating that the hypotheses are supported. On the other hand, the remaining two hypotheses have t-statistic values smaller than the critical t-value, indicating that the hypotheses are not supported, at a significance level of 5% (1.96). The two variables that have been found to have insignificant influence on intention are technology readiness and trust.

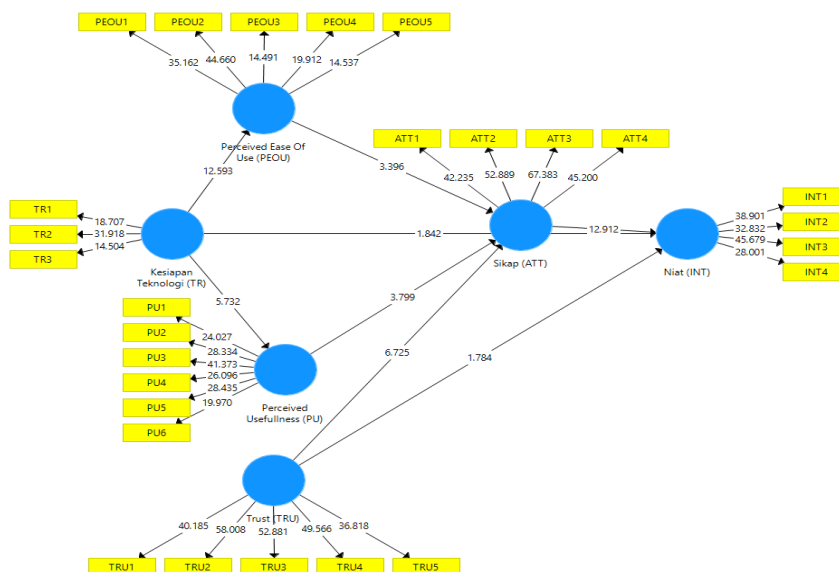


Figure II. Bootstrapping Test Results

Source: Data Analysis (2023)

B. Discussion

This study aims to investigate the influence of technology readiness on intention to use *E-wallets* through the Technology Acceptance Model (TAM) framework, including perceived ease of use and perceived usefulness, trust, and attitude, in the era of non-cash transactions in Indonesia. The results of this study indicate that six hypotheses were supported, while two hypotheses were not supported. The variable that directly influences intention is attitude. Additionally, perceived ease of use, perceived usefulness, and trust also have an indirect influence on intention through attitude. These findings are consistent with several previous research studies (Chawla & Joshi, 2020; de Luna et al., 2018; Flavian et al., 2020).

Based on the hypothesis testing process, the findings suggest that the technology readiness of Indonesian society has a positive and significant influence on the Technology Acceptance Model (TAM), specifically perceived ease of use and perceived usefulness when using *E-wallets*. An individual who is technologically ready or has technology readiness tends to easily accept technology, perceive ease in adaptation, and maximize the benefits from the technology. These findings are in line with a study conducted by Lin et al. (2007), which stated that the interaction between individuals and new technology simultaneously influences differences in beliefs, perceptions, feelings, and motivations.

In addition, perceived ease of use and perceived usefulness have a positive and significant influence on the attitude towards using *E-wallets*. These findings align with previous research that suggests perceived ease of use and perceived usefulness as two key factors determining the acceptance of new technology (Belanche et al., 2019; Davis, 1989; Franco et al., 2007). Both perceived ease of use and perceived usefulness are important and reliable predictors of users' attitudes and intentions towards new technology (Liebana-Cabanillas et al., 2018) and have been proven to have a significant influence (Chen & Lin, 2018; Flavian et al., 2020).

The attitude variable has been found to have a positive and significant influence on the intention to use technology. This is consistent with previous research findings from (Chawla & Joshi, 2019b; Flavian et al., 2020). The findings suggest that a positive attitude towards using *E-wallet* applications contributes positively to one's intention to download and use the application.

Furthermore, individuals' trust in the application and service providers has a positive and significant influence on the attitude towards using *E-wallets*. Previous findings in the context of mobile wallets have reported similar results (Madan & Yadav, 2016; Shaw, 2014; Shin, 2009). Trust emerges as an important factor in determining users' attitudes and intentions to adopt similar technologies (Belanche et al., 2012; Gu et al., 2009; Suh & Han, 2002).

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However, despite the explanation above, another finding in this research is that the direct influence of technology readiness on the intention to use E-wallets is found to be not significant. Just because someone is psychologically ready to accept new technology does not automatically mean they have the intention to use it; they need to be aware of and experience other factors such as ease of use, benefits, security, and other variables during the use of the technology. These findings are consistent with the research by Kuo et al. (2013), which states that individual differences, specifically psychological characteristics in this case, technology readiness, are mediated by cognitive dimensions, namely perceived ease of use and perceived usefulness, in predicting society's acceptance of new technology (Agarwal and Prasad, 1999). The findings of this study are also in line with research on mobile payment in India, which explains that the relationship between technology readiness and intention becomes insignificant in the absence of adoption readiness variables (Sinha et al., 2019).

Based on the descriptive analysis, the most widely used and popular *E-wallet* applications according to the respondents, in descending order, are GoPay, ShopeePay, and OVO. Until now, many people choose to use e-wallets because some of the existing e-wallets have been integrated with online transportation applications and large e-commerce in Indonesia. Like gopay with gojek and tokopedia, shopeepay with shopee and OVO with Grab. The existence of this integration increases the use of the three e-wallets as a means of payment, as well as the emergence of various attractive features that provide more benefits such as online shopping cashback, paylater systems, cash loans, etc. What's more, how to become an e-wallet user is not difficult and requires detailed requirements. This certainly provides benefits and makes it easier for users and non-users who intend to use e-wallets. The following explanation is in line with e-wallet users, who are mostly millennials and generation Z, who currently prioritize convenience, speed and benefits. Furthermore, it can be said that millennials and Generation Z, who fall within the age group of 18-35 years and are considered part of the productive age, tend to be more connected and open to new technologies, including using E-wallets for payment systems. These findings are also consistent with the studies conducted by Adiani et al., (2021) dan A. Malik et al., (2019) where the majority of millennial and Generation Z respondents use E-wallets for various reasons such as ease of use, benefits, rewards, etc.

V. CONCLUSION, SUGGESTION AND LIMITATION

The World Payment Report Yang et al., (2021) found that *E-wallet* or electronic wallet payments are the most popular form of *fintech* service in Indonesia. E-wallets simplify the buying and selling transactions through the use of smartphone applications, enabling individuals to quickly complete online purchases. In the future, E-wallets are believed to continue to evolve into convenient and secure payment solutions for consumers, with the support of technologies that connect smartphones with physical devices such as NFC (Near Field Communication), sound waves, and QR codes. This research is expected to contribute to the understanding of consumer behavior, particularly in the context of E-wallet services, and provide information for decision-makers, whether policymakers, government entities, or E-wallet providers to ultimately help encourage the public to continue using E-wallets.

This research employs the theoretical model of TAM and the psychological factor of technology readiness to investigate the determinants influencing customers' intention (INT) to use E-wallet payment systems. Based on the hypothesis testing results table, it can be concluded that technology readiness (TR) does not directly influence INT but rather exerts its influence through the technology acceptance model, specifically perceived ease of use (PEOU) and perceived usefulness (PU), which subsequently influence individual attitudes and ultimately lead to INT to use E-wallets. On the other hand, the TRU variable does not have a significant influence on INT. User trust will have an impact through the individual attitude variable towards using *E-wallets*.

There are several suggestion and limitations in this study, suggestion for company: (1) easier to use and usefulness is one of the reason for using e-wallet We recommend that E-Wallet service providers continue to update and innovate their system so that E-Wallet applications become easier to use and improve features so that the benefits increase for the user. Apart from that, the company should collaborated more with various companies from othe industry and merchants so that help increase user productivity; (2) The majority of users have concerns regarding their privacy and personal data. e-wallet service providers must improve the security of big data systems with encryption techniques and strengthen internal regulations to prevent customer data leakage.

Direction for future research including: (1) This study only examines the intention to use E-Wallets, so there may be differences between users' intentions to download and use *E-Wallet* applications and their actual usage behavior, therefore, future research is suggested to use a technology acceptance model such as UTAUT to see direct adoption to the level of loyalty or continuity of use of the E-Wallet application. (2) There are many other important consumer-related factors such as relative advantage, perceived cost, perceived enjoyment, personal innovation, perceived credibility, etc., that could also be examined to better understand users' attitudes and intentions to adopt *E-Wallets*.

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