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Analysis of e-wallet application adoption through the diffusion of innovation theory approach (study of e-wallet application users in Bengkulu city)

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ABSTRACT

This research aims to examine the influence of relative advantage, compatibility, complexity, triability, and observability on the decision to adopt e-wallet applications in Bengkulu City. The object of this research is the people of Bengkulu City who use the e-wallet application. A total of 261 data were collected using a survey with a purposive sampling technique. using non-probability techniques in purposive sampling as a sampling approach. To see the hypothesis results, SmartPLS 4 is used to manage the data. The test results show that relative advantage and compatibility have no effect on adoption decision, while complexity, trialability, and observability have a positive effect on adoption decision.

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1. INTRODUCTION

In a sale and purchase transaction, a legal tender is required as a substitute for the goods or services being traded. There are two legal means of payment in Indonesia, namely cash and non-cash payments. Cash payment instruments consist of coins and banknotes. While non-cash payment instruments themselves consist of checks, money orders, giro, credit cards, debit cards (ATM), and so on (Dewi, 2018). Most Indonesians still use cash payment instruments in the form of banknotes and coins in their daily transaction activities.

Banknotes and coins still have shortcomings when compared to non-cash payment instruments. Banknotes themselves have many weaknesses, including being easily damaged, especially those with small nominal values, because they are often used for daily transactions. Other weaknesses of banknotes are that they are easily shabby, scuffed, and prone to loss because of their thin shape. In addition, there are irresponsible people who deliberately falsify it. Metal money also has disadvantages, namely that the raw materials used to make metal money are non-renewable resources and have a small nominal currency and heavy weight, so that it becomes an obstacle when making transactions with a large nominal (Hadijah, 2017). Along with the development of technology and science, technology is also developing that is used to reduce the use of cash payments, namely technology in the financial sector (Fintech), which consists of

several features such as e-wallets, e-money, e-cash, smartcards, microtransactions, and so on.

In order to encourage innovation in the financial sector and maintain monetary stability in an efficient, smooth, safe, and reliable payment system, Bank Indonesia, as the payment system authority, has taken steps by issuing Bank Indonesia Regulation (PBI) and Member of the Board of Governors Regulation (PADG) regarding Financial Technology and Regulatory SandBox through PBI No. 19/12/PBI/2017 concerning the Implementation of Financial Technology, which contains rules regarding registration obligations for financial technology providers who carry out payment system activities. The above registration is exempt for providers who have obtained permission from Bank Indonesia and for financial technology providers under the authority of other authorities. Bank Indonesia also provides a means of supporting innovation and development of financial technology in the form of space to conduct trials of products, services, technology, and/or business models at Bank Indonesia through PADG No. 19/14/PADG/2017, which regulates the procedures and process of trials in the Regulatory Sandbox (Bank Indonesia, 2019).

An e-wallet is a non-cash payment instrument whose monetary value is stored electronically. With the existence of e-wallets as part of financial technology innovation, there has been a shift in the use of payment instruments from cash to e-wallets. This is evident from Bank Indonesia data, which records an increase in the number of transactions using e-wallets from year to year.

There are 38 e-wallet applications that have successfully registered and obtained an official license from Bank Indonesia. The granting of this license is a concrete proof of recognition by the country's financial authorities of the reliability, security, and conformity of the e-wallet operations with the regulations set by Bank Indonesia. As a result, e-wallet users can feel confident and secure in using these services, knowing that they are operating within a strict legal framework and are closely monitored by the relevant authorities.

A digital wallet app is an electronic application used for online transactions through a smartphone or other device that is similar to a debit or credit card. This service has two main components, namely software and information. The software itself plays a role in storing personal information and providing data security and encryption, while information is detailed data about users that includes user personal data such as name, address, payment method, transactions, user card information, and so on (Rosmayanti, 2019).

As a means of payment, people need to top up first or connect an account card with an e-wallet application. The e-wallet balance can be filled through various methods provided by e-wallet Top Up, including through banks that have collaborated with e-wallets and several agents that have partnered with e-wallets. In order to facilitate transactions, e-wallets also provide facilities that can provide direct access to debit cards, so that users can transact without topping up.

Besides being able to be used for transactions at merchants, e-wallet balances can also be used for other payment transactions, such as PLN payments, PDAM payments, prepaid and postpaid credit purchases, BPJS Health, Telkom, Indihome Internet Providers, Cable TV, TIX ID payments, Digital Vouchers, Installments, Insurance, Zakat, Parking, LAZADA, and Online Game Vouchers. With the various services offered, users are expected to switch and utilize e-wallets as a legal non-cash payment instrument.

The theory of innovation adoption (Rogers 1983) can be considered one of the earliest theories that can be used to explore the factors that lead to the adoption of new innovations or technologies. The characteristics of the theory include:

Relative Advantage, where innovation can provide more benefits when compared to previous innovations. Compatibility, innovation can be accepted if they are considered in

accordance with existing values, experiences, and needs. Complexity, innovations that are introduced if they are easier to use are more likely to be accepted by the community. Trialability, whether people can try an innovation first or must be bound to use it. Observability, the easier it is for someone to see the results of an innovation, the more the innovation will be accepted by the community.

Al-Jabri and Sohail (2012) conducted a study to determine the factors that influence the adoption process of a new innovation in the form of mobile banking. Al-Jabri and Sohail (2012) used the innovation diffusion theory approach to determine these factors. In their research, the characteristics of this innovation diffusion theory include relative advantage, complexity, compatibility, triability, observability, and perceived risk as independent variables. For the dependent variable, they use mobile banking adoption. and using satisfaction as a tool to measure mobile banking adoption. The sample used was made up of students from three universities in Saudi Arabia. The research sample was selected using the convenience sampling technique.

The research conducted by Al Jabri and Sohail (2012) is the basis for conducting research. The difference between this research and previous research is that the independent variables used are relative advantage, complexity, compatibility, triability, and observability as part of the innovation diffusion theory. In addition, Al-Jabri and Sohail also added perceived risk as another independent variable, which is related to the risks arising from the security of using mobile banking innovations. Risks that arise can be from human error, such as forgetting passwords or losing cellphones with data about bank accounts. Meanwhile, satisfaction is used as a tool to measure the dependent variable, namely mobile banking adoption, in determining whether someone will adopt this innovation or not. The research data obtained in the study were processed and analyzed using application tools in the form of SPSS 16v.

This study measures the acceptance of the use of technology in the adoption of e-wallet applications using the diffusion of innovation theory approach with its five characteristics. To analyze the adoption of e-wallet applications through the diffusion of innovation theory approach, with a focus on e-wallet users in Bengkulu City. This study aims to examine the effect of e-wallet innovation characteristics, such as relative advantage, compatibility, complexity, triability, and observability, on e-wallet usage intentions.

In addition, this study also aims to examine the effect of risk perception on e-wallet usage intention and the effect of e-wallet usage intention on e-wallet usage decisions. This research is expected to provide input for e-wallet application developers on improving the application. In addition, this research is also expected to contribute to the development of innovation diffusion theory in the context of e-wallet use. Relationship between Relative Advantage and E-wallet Application Adoption Decision.

The practical implications expected from this research are that the findings of this research can be used as a basis for the development and adoption of e-wallet applications in Indonesia and can also provide insight and support for the development and adoption of e-wallet applications in Indonesia, as well as helping the Indonesian people experience the benefits from e-wallet technology.

The benefits of research in the academic and scientific fields are very important for researchers to understand, because the benefits of research are defined as the contribution of the research carried out. Overall, the benefits of e-wallet adoption research using the diffusion of innovation theory approach are expected to contribute to the development and adoption of e-wallet applications in Indonesia, as well as help increase public understanding and awareness of e-wallet technology.

Relative advantage is the advantage possessed by an innovation, whether an innovation offered is better than before. The higher the advantage received by the adopter, the faster the innovation will be adopted (Rogers, 1983). AlJabri and Sohail

(2012) conducted research related to the adoption of mobile banking by students 2017 in Saudi Arabia, and the results showed that relative advantage has a positive effect on the adoption of mobile banking. Nor et al. (2010) also conducted research on the adoption of internet banking using the diffusion of innovation theory with final-year and postgraduate students from four universities in Malaysia. The conclusion obtained after conducting research is that relative advantage has a positive effect on the adoption of this new technology. H1: Relative advantage has a positive effect on the decision to adopt the E-Wallet application.

Relationship between Compatibility and E-wallet Application Adoption Decisions Compatibility is the level of compatibility of a new innovation with existing values, past experiences, and needs in society. If the innovation has similarities and compatibility with the values or norms that prospective users adhere to, then it will be faster to adopt, and vice versa; if it is not appropriate, then it will be difficult to adopt (Rogers, 1983). Based on the results of research by Nor et al. (2010), it is concluded that compatibility has a significant influence on the adoption of internet banking. Research conducted by Al-Jabri and Sohail (2012) also shows that compatibility has an influence on the adoption of mobile banking. The same thing is also obtained from Tristiyanti's research (2017), showing that compatibility also affects the adoption of mobile banking. Based on the results obtained above, the following hypothesis can be formulated: H2: Compatibility has a positive effect on the decision to adopt the E-Wallet application. Relationship between Complexity and E-wallet Application Adoption Decisions

Complexity is the level of complexity of an innovation that will determine its adoption rate (Rogers, 1983). Complexity has a negative relationship when adopting new innovations; the lower the level of complexity, the faster the innovation will be adopted. Conversely, the more complicated the innovation, the more difficult it will be to adopt (Bauer et al. 2005). Desmayanti (2012) conducted a study to determine what factors affect the intensity of taxpayers use of e-filling innovations in Semarang City. The conclusion of the study is that complexity has a negative effect on the intensity of e-filling. Likewise, research conducted by Wulandari et al. (2017) also shows that complexity has a negative effect on the intention to use Mocash LPG BRI. Based on the results of previous research, the researchers can formulate the following hypothesis: H3: Complexity has a negative effect on the decision to adopt the E-Wallet application.

Relationship between Triability and E-wallet Application Adoption Decision Triability is an innovation that can be tried first or bound to be used (Rogers, 1983). According to research conducted by Nor et al. (2010), triability has a positive effect on attitudes towards using mobile banking technology. The same results were also obtained from research conducted by Tristiyanti (2017),. Triability has a positive influence on mobile banking adoption. Different results were obtained from research conducted by Al-Jabri and Sohail (2012),. In this study, trialability had a negative effect on mobile banking adoption. Based on the different results in previous studies, the researchers conducted research by examining the effect of triability on the decision to adopt the E-Wallet application. Thus, researchers can formulate the following hypothesis results: H4: triability has a positive effect on the decision to adopt the E-Wallet application.

Relationship between Observability and E-wallet Application Adoption Decisions Observability is an assessment where the results of using an innovation can be seen by others. The easier it is for someone to see the results of an innovation, the more likely it is to be quickly adopted by potential users (Rogers, 1983). Tristiyanti (2017) also conducted research with the aim of knowing the effect of observability, or the ability to be seen, on the adoption of BCA mobile banking. The research was conducted by distributing questionnaires to respondents, namely BCA bank customers in Surabaya. The result of this study is that observability has a positive effect on the adoption of BCA mobile banking. Likewise, research conducted by Al-Jabri and Sohail (2012) states that observability, or the ability to be observed, has a positive effect on the adoption of mobile

banking. Different results were obtained from research conducted by Krismawan (2013),. The study aims to identify factors that influence a person's acceptance of and use of smartphone technology innovations. Based on this research, it is concluded that observability has a negative effect on attitudes toward and use of smartphones. Based on the results of previous research, there are differences in the results of previous research. Therefore, researchers conducted research by examining the effect of observability on the decision to adopt the E-Wallet application. Thus, researchers can formulate the following hypothesis results: H5: observability has a positive effect on the decision to adopt the e-wallet application.

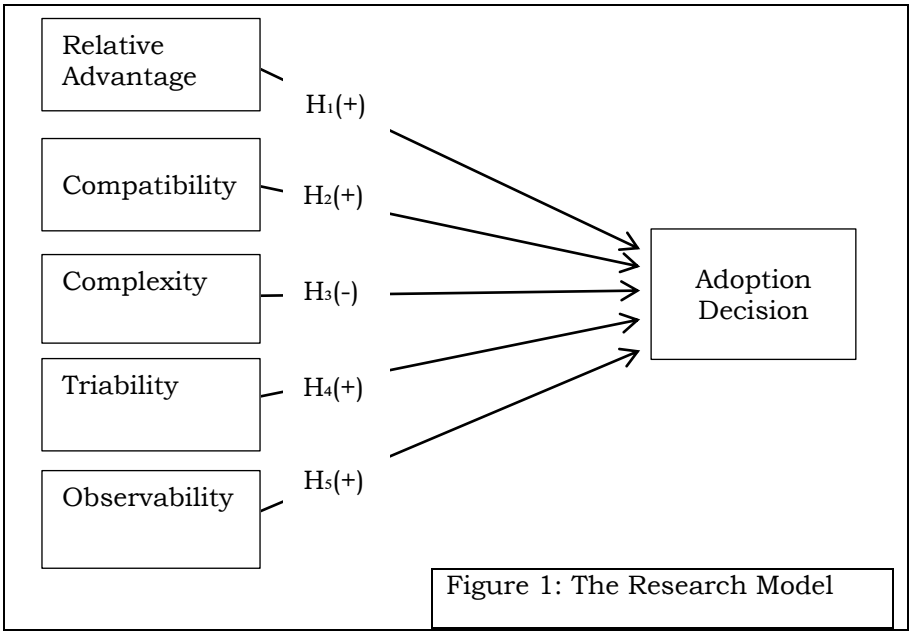

Figure 1: The Research Model

2. RESEARCH METHOD

2.1 Population and Sample

Population is a combination of many factors with different characteristics in the form of a set of specifications for marketing research purposes (Churchii et al. 2015). This research is quantitative, while the study used in this research is a descriptive study. The population used in this study were the people of Bengkulu City who used the e-wallet application. The technique used in this research is purposive sampling. According to Notoatmojdo (2010), purposive sampling: sampling based on certain considerations, such as the nature of the population or its characteristics, which are already known in advance. the results of 261 samples that will be used in the study.

2.1 Types of Data and Their Sources

The data used in this study are primary data collected using a questionnaire as a research instrument. The research questionnaire was distributed online using Google Forms tools.

2.2 Data Analysis Method

The data analysis method is a method used to process research results to obtain a conclusion. In this study, the analysis was used to determine the effect of relative advantage, compatibility, complexity, triability, and observability on e-wallet application

adoption decisions. And in processing data using the SmartPls 4 application to find out the analysis of a relationship between variables.

3. RESULTS AND DISCUSSIONS

3.1 Overview of Respondent Characteristics

The characteristics of the data search are gender, age, latest education, occupation, salary, how long they have been using el-wallelt, and the el-wallelt application they use. (a)Of the 261 respondents, 157 men (60.2%) and 104 women (39.8%) have participated in the survey. Based on their findings, the respondents are people from the city of Bengkulu. (b)It's known that out of 261 respondents, 10 respondents (3.8%) are between the ages of 36 and 40, 26 respondents (10%), are between the ages of 31 and 35, 31 respondents (11.9%), are between the ages of 26 and 30, 187 respondents (71.6%) are between the ages of 21 and 25, and 7 respondents (2.7%) are younger than 20 years old. (c)Of the 261 respondents, it's known that 0 (0%) have completed elementary school and junior high school, 193 (73.9%) have completed senior high school, 14 (5.4%) have completed D3, 52 (19.9%) have a bachelor's degree, and 2 (0.8%) have earned a master's degree. (d)Of the 261 respondents, I t's known that 179 (68.7%) have jobs as students, 15 (5.7%) have jobs as civil servants, 22 (8.4%) have jobs as private employees, and 45 (17.2%) have jobs as businessmen. (e)Of the 261 respondents, it's known that 181 (69.3%) have a salary under 3 million, 67 (25.7%) have a salary of 3 million to 5 million, 12 (4.6%) have a salary of 5 million to 10 million, and 1 (0.4%) have a salary more than 10 million.

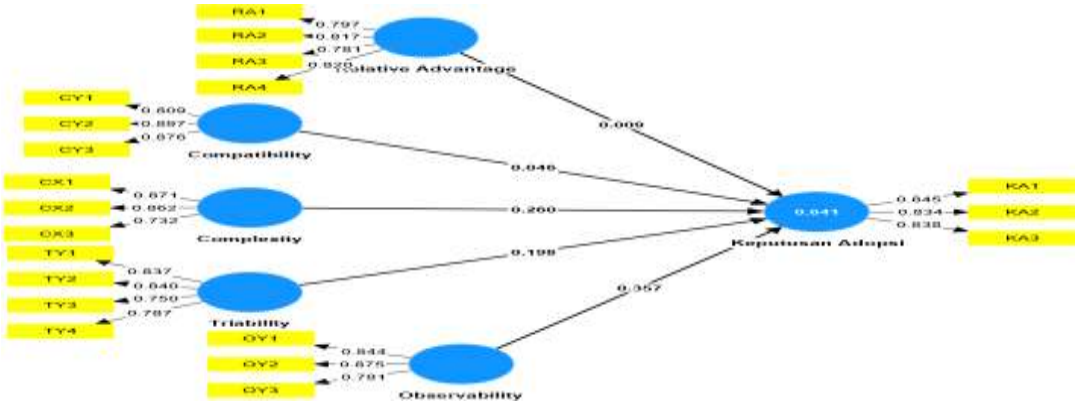

Figure 2. Pls Algorithm Analysis Results

3.2 Evaluation Measurement Model of

The measurement model in this study consists of a reflective measurement model where the variables relative advantage, compatibility, complexity, trialability, and observability are measured, as variables x and y respectively. According to Hair et al. (2012), Evaluation of the reflective measurement model consists of a loading factor> 0.70, composite reliability>0.70 , "Cronbach's alpha" and average variance extracted (AVE> 0.50), and evaluation of discriminant validity, namely the Fornell-Larcker criterion.

Table 2. Outer Loading, Composite Reliability And Average Variance Extracted

Variable	Measurement Items	Outer loading	Conbachs alpha	Composite reliability	AVE
Relative Avantage	RA1	0.797	0.819	0.880	0.647
	RA2	0.817			

	RA3	0.781			
	RA4	0.820			
Compatibility	CY1	0.809	0.825	0.896	0.742
	CY2	0.897			
	CY3	0.876			
Complexity	CX1	0.871	0.760	0.863	0.679
	CX2	0.862			
	CX3	0.732			
Triability	TY1	0.837	0.817	0.880	0.647
	TY2	0.840			
	TY3	0.750			
	TY4	0.787			
Observability	OY1	0.844	0.781	0.873	0.696
	OY2	0.875			
	OY3	0.781			
Adoption Decision	KA1	0.845	0.789	0.877	0.704
	KA2	0.834			
	KA3	0.838			

The information is as follows: In the Relative Advantage (RA) variable measured in four items, it can be measured validly with its outer loading between 0.781 and 0.820, which means that in the four items it can be measured validly which reflects the measurement of Relative Advantage. The level of reliability of the variable is acceptable, as shown by Cronbach's alpha (0.819) and composite reliability (0.880) above 0.70,. It can be said that the internal consistency of the variable is fulfilled and can be shown as a reliable variable, and in convergent validity, this variable can also meet good requirements, with its AVE value of 0.647>0.50 as a whole and the variation of the measurement items contained in this variable reaching 64.7%.

In the Compatibility variable (CY) measured in three items, it can be measured validly with its outer loading between 0.809 and 0.897, which means that in these three items it can be measured validly, which reflects the measurement of Compatibility. The level of reliability of the variable is acceptable, as shown by Cronbach's alpha (0.825) and composite reliability (0.896) above 0.70,. It can be said that the internal consistency of the variable is fulfilled and can be shown as a reliable variable, and in convergent validity, this variable can also meet good requirements, with its AVE value of 0.742> 0.50 as a whole and the variation of the measurement items contained in this variable reaching 74.2%.

The Complexity variable (CX) measured in three items can be measured validly with an outer loading between 0.732 and 0.871 which means that the three items can be measured validly, which reflects the measurement of complexity. The level of reliability of the variable is acceptable, as shown by Cronbach's alpha (0.760) and composite reliability (0.863) above 0.70,. It can be said that the internal consistency of the variable is fulfilled and can be shown as a reliable variable, and in convergent validity, this variable can also meet good requirements, with its AVE value of 0.679>0.50 as a whole and the variation of the measurement items contained in this variable reaching 67.9%.

In the Triability variable (TY) measured in four items, it can be measured validly with its outer loading between 0.750 and 0.840, which means that in the four items it can be measured validly, which reflects the measurement of Triability. The level of reliability of the variable is acceptable, as shown by Cronbach's alpha (0.817) and composite reliability (0.880) above 0.70,. It can be said that the internal consistency of the variable is fulfilled and can be shown as a reliable variable, and in convergent validity, this variable can also meet good requirements, with its AVE value of 0.647>0.50 as a whole and the variation of the measurement items contained in this variable reaching 64.7%.

In the Observability variable (OY) measured in 3 items, it can be measured validly, with its outer loading between 0.781 and 0.875, which means that in these three items it can be measured validly, which reflects the measurement of Observability. The level of reliability of the variable is acceptable, as shown by Cronbach's alpha (0.781) and composite reliability (0.873) above 0.70,. It can be said that the internal consistency of the variable is fulfilled and can be shown as a reliable variable, and in convergent validity, this variable can also meet good requirements, with its AVE value of 0.696>0.50 as a whole and the variation of the measurement items contained in this variable reaching 69.6%.

In the Adoption Decision variable (KA) measured in three items, it can be measured validly with its outer loading between 0.834 and 0.845, which means that the three items can be measured validly, which reflects the measurement of Observability. The level of reliability of the variable is acceptable, as shown by Cronbach's alpha (0.789) and composite reliability (0.877) above 0.70,. It can be said that the internal consistency of the variable is fulfilled and can be shown as a reliable variable, and in convergent validity, this variable can also meet good requirements, with its AVE value of 0.704> 0.50 overall and the variation of the measurement items contained in this variable reaching 70.4%.

Table 3. Discriminant Validity Test Results Using AVE Square Root Seen in Fornell Larcker Criterion Test Results

	Compatibility	Complexity	Adoption Decision	Observability	Relative Advantage	Trialability
Compatibility	0.862					
Complexity	0.763	0.824				
Adoption Decision	0.678	0.743	0.839			
Observability	0.758	0.790	0.754	0.834		
Relative Advantage	0.596	0.625	0.533	0.583	0.804	
Triability	0.799	0.812	0.724	0.765	0.637	0.804

The test results explain that the AVE value on the research variables has a value above 0.50. Furthermore, when viewed from the AVE square root value of each contract consisting of the AVE roots of the Compatibility, Complexity, Triability, Observability, Relative Advantage, and Adoption Decision contracts, the value is greater than the correlation value between the contract and other contracts in the model, so that these results have good discriminant validity (Hair et al. 2012).

3.3 Structural Model Evaluation

Test the hypothesis between variables by looking at the t-statistic or p-value. If the calculated t-statistic is greater than 1.96 (t-table) or the p-value of the test results is less than 0.05, there is a significant influence between variables. In addition, it is necessary to communicate the results along with the 95% confidence interval for the estimated path coefficient parameters and the f-squared value, which is the effect of variables directly on the construct level with the criteria (low f-squared 0.02, medium 0.15, and high 0.35), according to Hair et al. (2012).

Table 5. Hypothesis Testing

Hypothesis	Part Coefficientre spondent	P-value	95% Path Coefficient Confidence Interval		F Square
			Lower Limit	Upper Limit	
H1. Relative Advantage -> Adoption Decision	0.009	0.873	-0.111	0.109	0.000

H2. Compatibility -> Adoption Decision	0.046	0.524	-0.091	0.201	0.002
H3. Complexity -> Adoption Decision	0.260	0.009	0.068	0.451	0.048
H4. Triability -> Adoption Decision	0.198	0.010	0.051	0.352	0.027
H5. Observability -> Adoption Decision	0.357	0.000	0.201	0.476	0.109

Based on the results of hypothesis testing above, the following results are obtained:

Hypothesis 1 is rejected, has a direct negative effect of relative advantage on adoption decision with a part coefficient (0.009) and significant p-value (0.873), meaning that any increase in relative advantage will be insignificant in adoption decision. At the 95% confidence level, the effect of relative advantage on adoption decision lies between -0.111 and 0.109. The existence of relative advantage in increasing adoption decisions has a low level of influence at the structural level (f square = 0.000).

Hypothesis 2 is rejected, having a direct negative effect of compatibility on adoption decisions with part coefficient (0.046) and a significant p-value (0.524), meaning that any increase in compatibility will have an insignificant effect on adoption decision. At the 95% confidence level, the effect of compatibility on adoption decision lies between -0.091 and 0.201. The presence of Compatibility in increasing adoption decisions has a low level of influence at the structural level (f square = 0.002).

Hypothesis 3 is accepted; there is a direct positive effect of complexity on adoption decisions with a part coefficient of 0.260 and a significant p-value (0.009), meaning that every increase in complexity will increase the adoption decision insignificantly by 0.009. At the 95% confidence level, the influence of complexity in increasing the adoption decision lies between 0.068 and 0.451. The presence of complexity in increasing the adoption decision has a high level of influence at the structural level (f square = 0.048).

Hypothesis 4 is accepted; there is a direct positive effect of trialability on the adoption decision with a part coefficient of 0.198 and a significant p-value (0.010), meaning that every increase in trialability will increase the adoption decision insignificantly by 0.010, at a confidence level of 95%, the effect of triability in increasing the adoption decision lies between 0.051 and 0.352. The existence of trialability in increasing the adoption decision has a moderate level of influence at the structural level (f square = 0.027).

Hypothesis 5 is accepted; there is a direct positive effect of observability on adoption decision with a part coefficient of 0.357 and p-value (0.000), meaning that every increase in observability will increase the adoption decision insignificantly by 0.000, at a confidence level of 95%, the effect of observability in improving adoption decision lies between 0.201 and 0.476. The existence of obsevability in improving adoption decision has a high level of influence at the structural level (f square = 0.190).

4. CONCLUSION

This study aims to determine the relationship between relative advantage, compatibility, complexity, triability, and observability variables on the adoption of e-wallet applications in Bengkulu city. Based on the results of data processing, it can be concluded that relative advantage and compatibility have no effect on the decision to adopt e-wallet applications, while the variables complexity, triability, and observability affect the decision to adopt e-wallet applications.

In addition, this research also contributes to the development of innovation diffusion theory in the context of electronic money usage. By understanding how diffusion of innovations works in the context of this study, we can develop a more accurate and illustrative research model for future research in the field of adoption and diffusion of innovations

The contribution of research to science is to provide new contributions in the field of knowledge and science and the contribution of research to science in research on e-wallet adoption through the diffusion of innovation theory approach can help the development and adoption of e-wallet applications in Indonesia, as well as increase understanding and adoption of e-wallet technology in Indonesia.

These suggestions would include clearly identifying the object of research, identifying the characteristics of the diffusion of innovations to be tested, using survey methods to collect data, analyzing the data using appropriate statistical techniques, and discussing the results of the research by relating the findings to the theory of diffusion of innovations and providing practical implications for e-wallet app developers. In conducting research, be sure to pay attention to research ethics and pay attention to the security and privacy aspects of respondents' data.

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