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The Role of E-Money in Sustainable Smart City Development in Bogor City Area

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Abstract

The concept of society today has entered the era of society 5.0 where society will coexist with systems and technology in the industrial era 4.0, use technology and information systems is very important where today in this era the community is expected to help the development of smart cities. In this era, people always carry out activities with technology and digitalization, one of which is how to transact that transforms electronically with technology. Currently, e-money is considered to have its own role in the sustainability of community activities, especially in the city of Bogor, so that if the role of e-money can be utilized, a positive value can be generated for the sustainability of smart city development. To assess the success of the role of e-money, this research instrument was built using the DeLone and McLean methods in building a research model that aims to support the development of smart cities with aspects of indicators such as information quality, system quality, service quality, user satisfaction level, utilizing and net benefit. The research method used in this study is factor analysis to process the data collected from the questionnaire. The Alpha Cronbach value in this study has a value of 0.971 or 97.1%, which is can be summarize that the positive influence of electronic money (e-money) is very large to support the development of smart cities in Bogor City. This research is expected to preparation information related to the sustainable development of smart cities in Bogor City.

Keywords: *Bogor City; E-Money; Information; Smart City; Society 5.0*

1. Introduction

Digital transformation is a very important thing to apply in the development of society 5.0 today, where all things about digitalization cannot be avoided in everyday life. Bogor City is one of the cities in West Java Province that is the center of the Bogor Region because it is located in the middle of the Bogor Regency area. The area of Bogor City is 118.50 Km2 with a population of 1.04 million people in 2020 [1] which can be seen in Figure 1, the number of administrative areas

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consists of 6 districts and 68 urban villages. The development of information technology at this time is a challenge and a great opportunity for the City of Bogor in increasing productivity by supporting the development of a smart city, which can support communication and integration of the Bogor City government with the community. Therefore, to support the progress of the city of Bogor, this research purpose to establish the factors of the role of e-money in the development of smart cities in the city of Bogor, along with the development of the times that are transforming into the digital world. In this era, information and communication technology is an indicator image of the progress of a country and cities in the country. The use of information technology in government administration has experienced many developments Figure 1

Figure 1. Total Population of Bogor City.

Currently, it is the era of society 5.0, which is the era where society implements technology from industry 4.0 by considering humanities aspects, so that it can solve various social problems that occur and create a sustainability of new technologies along with increasing capabilities and technological developments [2]. So that currently information technology is not only used in the implementation of government administration, but also in providing public services to electronic based society [3]. The large number of users of information technology in all aspects of life ranging from the community environment to the government has encouraged several cities in Indonesia to implement the connectedness of the use of existing information technology, this is the integration of aspects of the city to support the continuity of urban life based on information technology or can be called a smart city [4]. The purpose of the 5.0 era society concept is the stage where society is centric when there are economic problems and existing solutions can be solved properly, so that people can take advantage of a quality system in supporting their daily activities and work [5]. While industry 4.0 is a concept of development of technology and its function, where this function is part of human life as a society 5.0 [6].

In this era, the role of e-money (electronic money) is one of the factors to support the successful implementation of smart cities in Indonesia, especially in the city of Bogor. E-money which is electronic money that can support online and digital payment systems, where the payment system is used to create more efficient transactions and in these transactions there are several flows and rules, institutions and mechanisms for transferring funds from 1 person to other parties to fulfill obligations in an economic activity. E-money which is a type of modern transaction service by utilizing technology that can improve performance and allow various activities to be carried out quickly, precisely and accurately which can increase productivity [7]. Where we know previously people in Indonesia generally make transactions and payments using physical rupiah currency and along with the development of information technology, the use of e-money can be used as a tool for online or electronic transactions in supporting needs or transactions during daily activities.

Almost all people in Indonesia currently have e-money, especially in the productive age range of 15 to 55 years. Bank Indonesia has also issued a regulation on electronic money numbered 20/6/PBI/2018 issued in order to support developments in the current digitalization era which is increasingly developing and varied in line with the development of technological innovation and increasing public needs in the use of electronic money [8] in the era of society 5.0. E-money does not replace the role of physical currencies, but the existence of a digital payment system can minimize inflation due to the large number of physical currencies circulating in the community, in addition to digital payments by utilizing e-money in transactions more efficiently in time and reducing excessive storage of physical currencies while people travel and other daily activities[9]. Service providers, trade and other transactions have now begun to transform online or digitize with e-money because it is considered more effective in transaction numbers so as to reduce fraud. E-money is part of an electronic system supported by the existence of an application on a gadget and website, which can form a public view of the government's steps in supporting the implementation of the system to help increase time efficiency in community activities by integrase e-money on transportation, toll payments and etc [10]. At this time, the smart city concept is a positive thing that aims to build cities in the future by implementing an integrated system, so as to overcome problems in people's lives related to negative environmental extremities. Therefore, the sustainability of smart cities will be embraced in urban development [11].

This research has a conceptual framework as the basis for the research, where the results of this research are evaluation materials to support the development of smart cities in Bogor City in a sustainable development. The following is the conceptual framework of this research shown in Figure 2

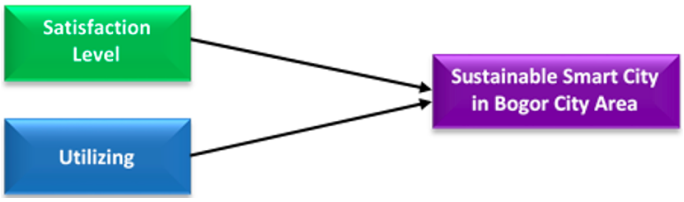

Figure 2. Research Findings Concept.

The basic concept of a smart city is to create a community or environment for an efficient, sustainable society. The concept of smart city includes services, the smart city sustainable is development to help the government policy makers, service providers, and government officials in terms of understanding and to get the more insights from the suggested smart solutions for development of smart cities, public policy formulation and planning [12]. So that the application of e-money is an advance to support the realization of a smart city in Bogor City in a sustainable development. The use of electronic money has begun to be widely used in many fields, especially in the field of education, transportation and transactions that can be used anywhere and anytime without using cash. Therefore, the use of electronic money has begun to be expanded because its effectiveness is high enough so that the public and users of electronic money can experience significant benefits [13]. Therefore, the purpose of this research is to obtain the results of the analysis of the role of the implementing of e-money or electronic money in the successful development of smart cities in the city of Bogor, so that important aspects of the use of e-money can be found in the daily life activities of society 5.0. Then the results of this research analysis can be used as evaluation material and find positive opportunities in the future in the success and development of smart cities in Bogor City.

2. Methods

This research uses quantitative methods where the data source used is primary data. Quantitative methods in this research were collected from data on e-money users through an online survey, after which the researcher conducted a descriptive analysis and inference in presenting the results of this research. Research methods are basically a scientific way to obtain data with a specific purpose and usefulness [14]. Data collection using data analysis research instruments is quantita-

tive or statistical with the aim of testing predetermined hypotheses. Based on this, there are four keywords that need to be considered, namely scientific method, data, purpose and usefulness [15].

2.1 Introduction to Model DeLone and McLean

This research was measured using the DeLone and McLean model to establish the level of influence of the use of electronic money in supporting the sustainable development of the Smart City of Bogor City. So that the output of this research will be used to evaluate the application of e-money in Bogor City in supporting the development of smart cities.

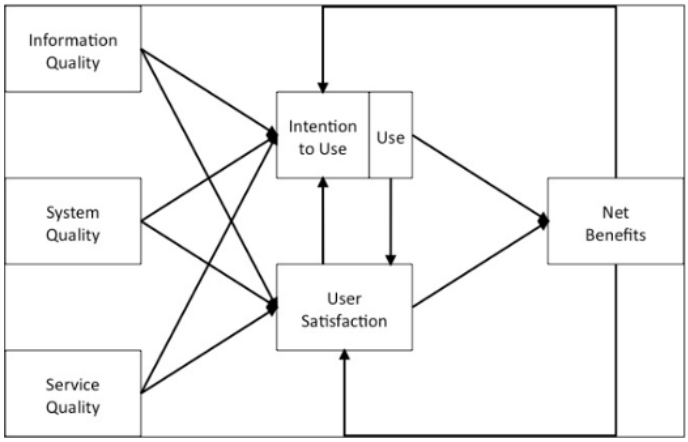

Figure 3. DeLone and McLean Models.

Based on Figure 3, it is a model of the relationship between information quality, system quality, service quality, intention to use, use, user satisfaction can affect net benefits. So that in measuring the success rate of the use of e-money, it is appropriate to use the DeLone and McLean model with the criteria of aspects related to the success of smart city development [16].

2.2 Research on information systems success model of DeLone and McLean.

This study has benchmarks from several previous researchers who used the DeLone and McLean model. Therefore, the comparisons and results issued in previous studies can be an evaluation material that can be studied for this study. The use of the DeLone and McLean model has been widely used by organizations in measuring success rates so that they can develop the organization [17]. Previous research has shown that DeLone and McLean's model is more popular to be able to perform analysis in empirical literature and in non-empirical literature as a research model.

The following are the results of research from previous researchers in evaluating and assessing the success of the system in the government, so that it can be a benchmark in this study, including:

1) First, research on the evaluation model of yachters information system implementation to increase organization performance. This study produced several factors that need to be improved in the yachters information system by applying 6 aspects of the DeLone and McLean model [18].
2) Second, research on trust in e-Government success in Singapore. The result of this study is an additional variable, namely trust in the government and trust in the application of technology, information systems and the web from the e-Government website in Singapore [19]. Then there is another variable that is used to support, namely user needs, this is considered necessary to know the level of trust in e-Government.
3) Third, research on the success of tax information systems in Greece. In this study, a combination of models between DeLone and McLean and Seddon Model has been carried out, which uses benchmarks of the quality of information, systems and services and is linked to the value of usability and satisfaction felt by users [20].

2.3 Data Gathering Method

The sampling technique that the researchers implemented in this case used a non-probability sampling method called convenience samples. The sample in this research was a resident or activist respondent in the Bogor City area with an age range of 15-55 years.

Online surveys are carried out online by spreading e-form links through the Whatsapp application and several social media such as (Instagram and Twitter). The data collected is data on respondents is characteristics, namely data on the use of respondents is e-money in their daily activities and for variable data adjusted to the framework of research and use of e-money.

In this research, there were 317 respondents consisting of Men and Women. Respondents involved in this survey on the use of e-money in Bogor City are people of productive age between 15-55 years. The gender and age range in the results of this research survey can be shown in Figures 4 and 5.

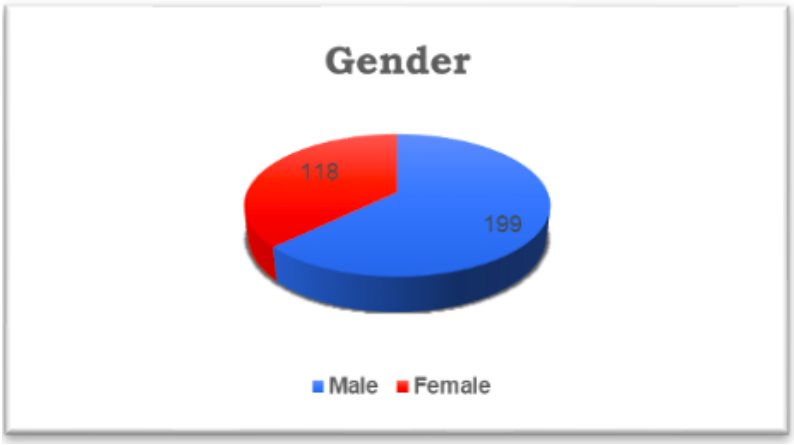

Figure 4. Respondent Gender.

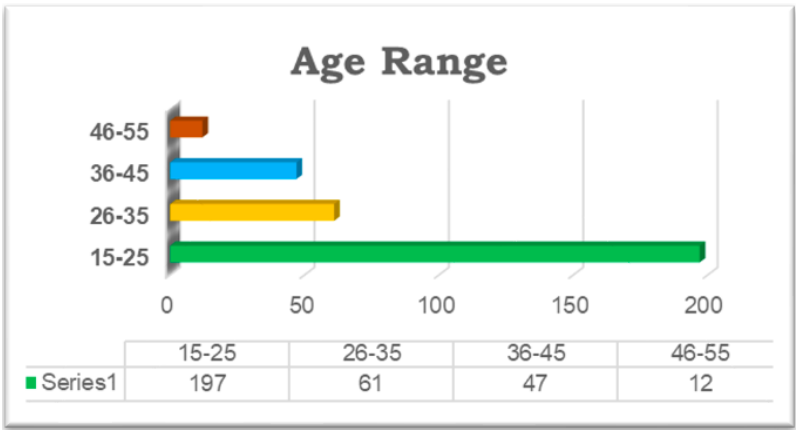

Figure 5. Age Range.

And there are several types of jobs of respondents involved in this survey, where these types of jobs are professions that are heavily involved in the city of Bogor, such as Students, Teachers/Lecturers, Private Employees and TNI/POLRI. The majority of respondents from the survey results were Students and Private Employees. This shows that the number of e-money users in transacting or transporting is mostly carried out by both categories of work. To see the number of occupational professions, it can be shown in Figure 6.

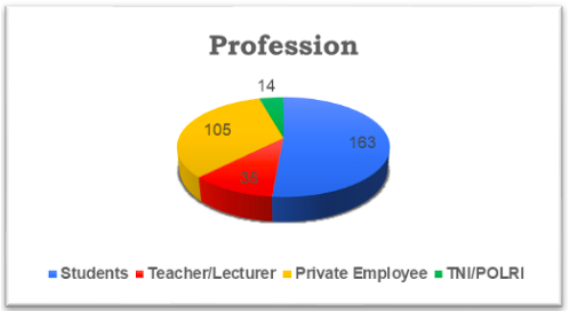

Figure 6. Profession.

Data collection was carried out for 1 month and researchers conducted interviews with several nearby respondents to support the analysis of survey results in order to get more in depth results in supporting the level of this research approach on the actual conditions in Bogor City.

2.4 Research Variables and Indicators

The accuracy of determining variables and indicators in this study is very important, where indicators are obtained based on references from journals, books and theories related to the application of the DeLone and McLean model. There are 2 research variables, each variable has 6 indicators which will be explained with the research instrument development matrix see Table 1.

Table 1. Research Variables and Indicators

Research Variables	**Indicators**
Satisfaction Levels	Information Quality System Quality Service Quality
Research Variables	Indicators
Satisfaction Levels	Information Quality System Quality Service Quality

2.5 Reliability Test (Cronbach's Alpha)

In this research, a reliability test was used as a tool to qualifying questionnaires which are variable indicators in this research. Through the data collection process using google form, it is necessary to conduct a reliability test to get value in this research. The data collected using the test Cronbach's Alpha reliability. In this research, testing was execute on 317 respondents Figure 7 and 8.

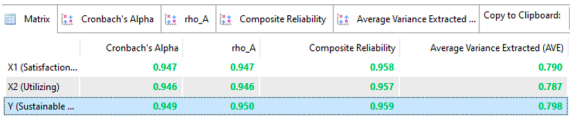

Figure 7. Construct Reliability and Validity.

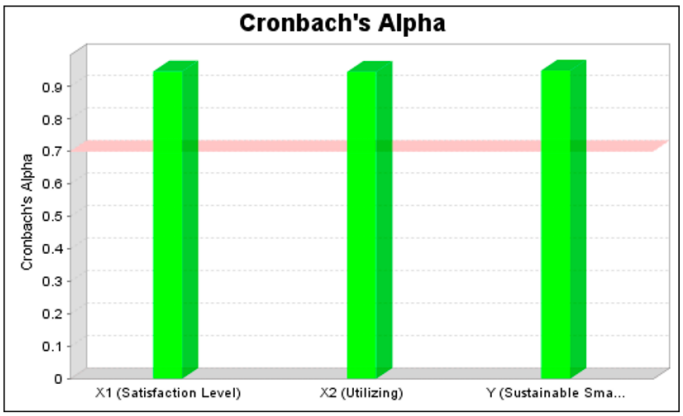

Figure 8. Cronbach's Alpha Sustainable Smart City in Bogor City Area.

2.6 **R Square (Coefficient of Determination)**

The R square test is a coefficient of determination test, which is can describes how far dependent data can be described by independent data. R square is GAP between 0 – 1 provided that the closer to the number 1, the better. If number r square is 0.50, it means that 50% of the distribution of the dependent variable can be explained by an independent variable [21]. The others 50% cannot be described by independent variables or can be described by variables another in outside of independent variables. If the value is close to 1, it means that the coefficient of determination is invariant for linear transformations of the distribution of independent variables, and an output have value to one results in a good prediction observe of the scale on that variable.

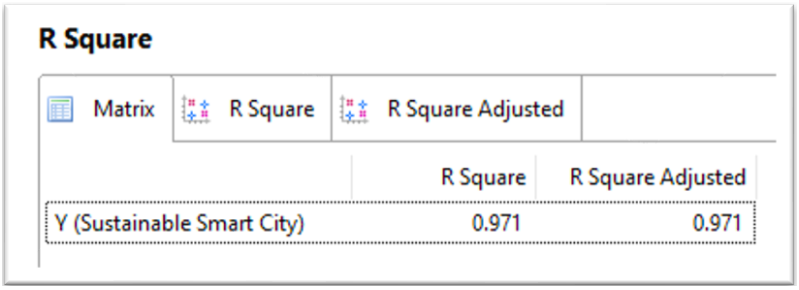

Figure 9. Coefficient of Determination.

From the results of figure 9, the data processing carried out by researchers, an R2 (R Square) value of 0.971 or 97.1% was produced, which can be interpreted as having a significant effect on the development of the smart city of Bogor City.

3. Result and Discussion

For the result in this research based on the analysis of data, that has been processed and tested, it can be concluded that the role of e-money has a positive and significant effect on the development of smart cities in Bogor City in a sustainable manner in the current era of society 5.0. The value of R Square or coefficient of determination in this research produced a value of 0.971 where this value shows that the ability of free variables, namely satisfaction level and utilizing of bound variables, namely sustainable smart city, is 97.1% where the residual value is 2.9% which is influenced by other factors outside this research which are not included in the regression model in this research. The results of this research are expected to be a source of information and evaluation of several parties related to the development of smart cities in Bogor City.

3.1 Types of E-Money Transactions

Researchers made several pictures of transaction flows using e-money to support community activities in daily activities as shown in Figure 10, Figure 11, Figure 12 and Figure 13. It is hoped that this simulation image can show how to use e-money according to their respective functions.

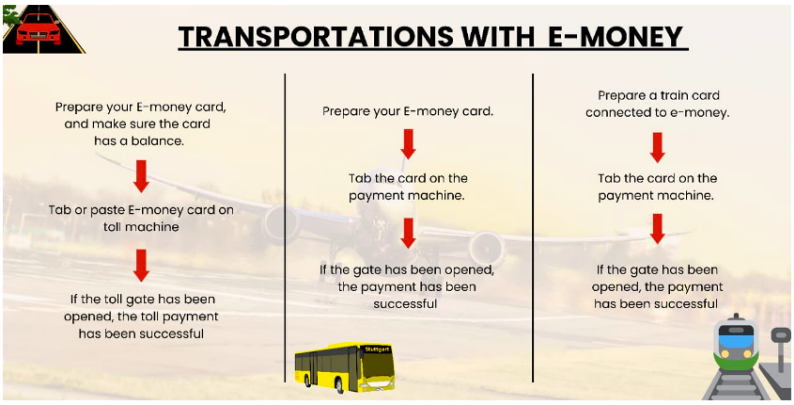

Figure 10. Transportation with E-Money.

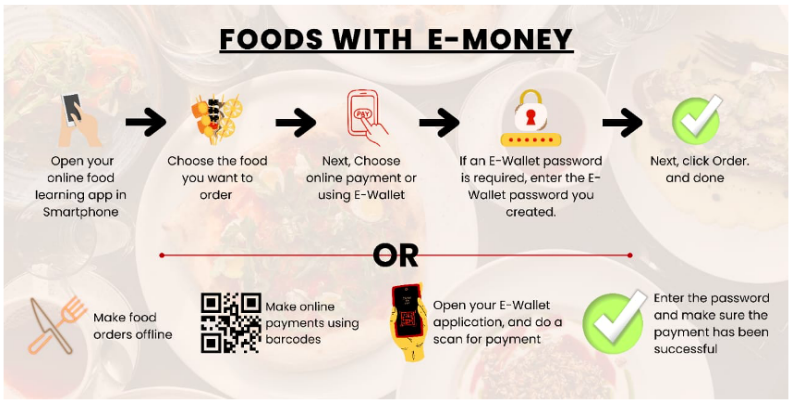

Figure 11. Food & Beverage with E-Money

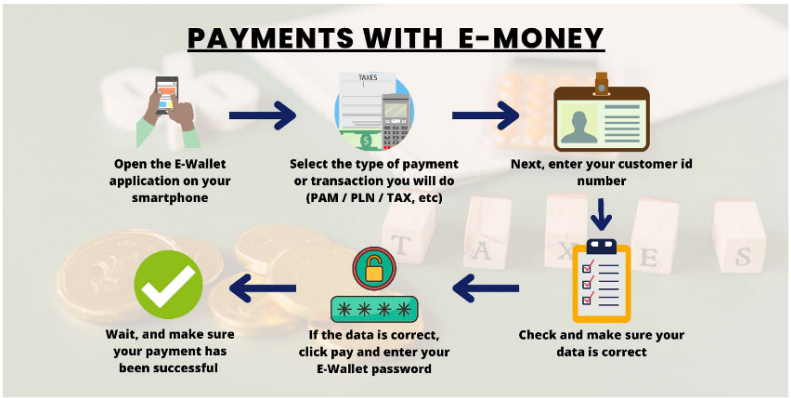

Figure 12. Payments with E-Money

Figure 13. Shopping with E-Money.

In this research, several flows have been explained that have been made by researchers in utilizing e-money which can be seen in figures 10, 11, 12 and 13. Where the use of e-money in the current digital era is very intense or often used to support community activities, especially in the city of Bogor. So that the role of e-money has a positive influence on the sustainable development of the smart city of Bogor City. The value of Cronbach's Alpha in this study has a value of 97.1% which has been described in Figure 9 with this value, so it can be concluded that the positive influence of e-money is very large to support the development of smart cities in Bogor City.

3.2 Research Model

In this research obtained a population of all e-money users involved in the use of the system. E-money users are active people in Bogor City, where the e-money is used for daily activities such as, payment for public transportation, purchases and payment of basic necessities, shopping, e-toll payments, etc. where e-money is used by users in digital or online transactions. From the results of the relationship between indicators and variables, this research can be concluded with research methods as in Figure 14.

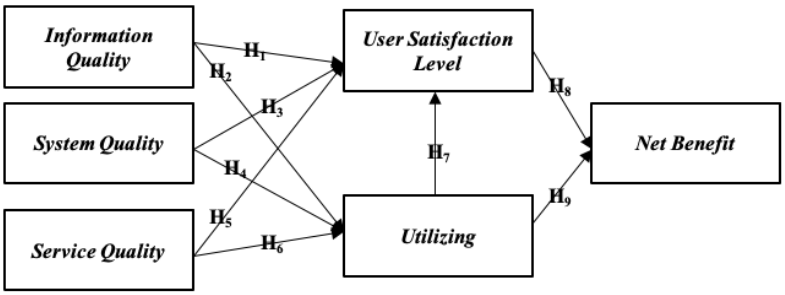

Figure 14. Research Model

3.3 Hypothesis

Based on the methodology of research Figure 14, in this research methodology it can be concluded that net benefit is influenced by utilizing and user satisfaction levels. Where utilizing can affect the user satisfaction level. Utilizing is influenced by information quality, system quality and service quality. Likewise, the same user satisfaction is influenced by information quality, system quality and service quality. Furthermore, the reliability test,

Table 2. Hypothesis

H1	Information Quality has a positive effect on User Satisfaction Level.
H2	Information Quality has a positive effect on Utilizing.
H3	System Quality has a positive effect on User Satisfaction Level.
H4	System Quality has a positive effect on Utilizing.
H5	Service Quality has a positive effect on User Satisfaction Level.
H6	Service Quality has a positive effect on Utilizing.
H7	Utilizing has a positive effect on User Satisfaction.
H8	User Satisfaction Level has a positive effect on Net Benefit.
H9	Utilizing has a positive effect on Net Benefit.

where this test refers to the consistency of relationships in a series of measurements with Aplha Cronbach's method, the reliability of each question item will be measured. An alpha value (coefficient of determination) of 0.6 is an acceptable value, but a strong common value to use is an alpha value ≥ 0.7 [22]. In this study, the alpha value from the reliability test calculation results was 0.971 or 97.1%, which is a strong value.

3.4 Analysis or Relationship between Variables

H1: Information Quality has a positive effect on User Satisfaction Level. The relationship between information quality and user satisfaction is stated to be very strong. Where e-money users in Bogor City have intense activities with the use of e-money against these activities, e-money is considered very supportive of community activities in transactions and other types of payments.

H2: Information Quality has a positive effect on Utilizing. The relationship between information quality and utilizing is stated to be very strong. Based on the fact found that e-money has quality information that supports users, where the balance value on e-money must always be sufficient from the value of payments or transactions.

H3: System Quality has a positive effect on User Satisfaction Level. In this research, the relationship between system quality and user satisfaction is very strong. This is based on the system of e-money is a system that is validly connected according to personal data and the balance of each user. The fact of finding that so far the quality of e-money still has a good value in supporting daily activities.

H4: System Quality has a positive effect on Utilizing. Based on the relationship between system quality and utilizing in this case has a strong value, where the quality of the system can be useful and useful for the process of transactions, payments and purchases. However, e-money is still considered not entirely applicable to some transactions, so the people of Bogor city must always provide cash in making transactions, for example, such as in canteens at universities, schools, workplaces and some transportation facilities in Bogor City.

H5: Service Quality has a positive effect on User Satisfaction Level. The relationship between service quality and user satisfaction level is very strong, but in the case of e-money, the effect of service quality on user satisfaction is not too strong. Because some users feel that transacting using e-money is something that is applied due to several regulations from the government, where the people of Bogor City or people from outside Bogor City who work and do activities in Bogor City must have e-money as a means of payment transactions in supporting activities.

H6: Service Quality has a positive effect on Utilizing. Based on the relationship between service quality and utilizing in this case, it has a strong value, but some users still have

limitations on the use of e-money, because the bank that is the provider of e-money is the same bank with the same bank registration. It is hoped that e-money users can top up each bank in an integrated.

H7: Utilizing has a positive effect on User Satisfaction Level. The relationship between utilizing and user satisfaction levels is very strong, because e-money users are the first factor in the satisfaction assessment in this case. So that the impact of user satisfaction is the need and use of e-money that is in accordance with the needs of the people of Bogor City which is a benchmark for satisfaction in this case.

H8: User Satisfaction Level has a positive effect on Net Benefit. The relationship between user satisfaction level and net benefit is very strong, because the level of satisfaction from e-money users can have a good impact on the development of smart cities in Bogor City, with the increasing number of e-money users who can support digitalization transformation in the current era.

H9: Utilizing has a positive effect on Net Benefit. The relationship between utilizing and net benefit is very strong, because e-money users are a factor that is considered to be able to support the sustainable development of smart cities in Bogor City.

Table 3. Hypothesis Testing Results

Relationship	**H**	**Influence**	**Remark**
Information Quality has a positive effect on User Satisfaction Level	H1	Positive	Accepted
Information Quality has a positive effect on Utilizing	H2	Positive	Accepted
System Quality has a positive effect on User Satisfaction Level	H3	Positive	Accepted
System Quality has a positive effect on Utilizing	H4	Positive	Accepted
Service Quality has a positive effect on User Satisfaction Level	H5	Positive	Accepted
Service Quality has a positive effect on Utilizing	H6	Positive	Accepted
Utilizing has a positive effect on User Satisfaction	H7	Positive	Accepted
User Satisfaction Level has a positive effect on Net Benefit	H8	Positive	Accepted
Utilizing has a positive effect on Net Benefit	H9	Positive	Accepted

Based on the results of the evaluation in assessing the role of e-money in the sustainable development of the smart city of Bogor City, according to the point of view of e-money users, it shows that the application of e-money can support the development of smart cities in Bogor City, so that e-money can be developed and integrated into various transactions and systems of Bogor city government to take advantage of the role of e-money in society 5.0 in the current industrial era 4.0

4. Conclusion

Based on the results of the analysis that has been carried out on the role of e-money on the development of smart cities on an ongoing basis, using a factor analysis involving 317 respondents, it can be concluded that e-money has an influential role in the development of smart cities in Bogor City by utilizing the function of e-money in transacting, transporting, paying and purchasing daily needs (Food, Beverages, Equipment, etc. online) of the people of Bogor City. E-money has a positive relationship in the development of smart cities in Bogor City because in terms of information quality, system quality and service quality that have been implemented in Bogor City are categorized as having supported the implementation of the e-money use system. The

Net Benefit obtained based on the value of the user satisfaction level and utilizing is very strong, therefore e-money users in Bogor City are active people whose daily activities use e-money. Some suggestions that can be given from the results of this research, the first hheoretical Suggestions: Further research can use the variable needs of the people of Bogor city in using the system for activities, so that the development of the model will look even better if it is in accordance with the needs of the community in activities in the industrial era 4.0 and society 5.0 at this time. Then the measurement of success in supporting the development of smart cities can be correlated with the level of security of e-money users and integrated systems in supporting the continuous development of smart cities. Second, practical Suggestions: The level of Information Quality, System Quality and Service Quality must be improved again to support the development of smart cities in Bogor City, with integrated systems. The use of e-money can be developed based on user needs in supporting activities.

5. Acknowledgement

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