Future Electronics Payment System Model

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Abstract. This paper aims to know information about the differences of Future Electronics Payment System Model. We describe various systems of electronic payment services, security issues related to them and the future of the mobile payment mode and overview of e-money. Payment systems using e-money is a process of modernization of the payment system that is safe, convenient, and easy which has been developed in several countries in the world. Electronic Money is essentially cashless money. Its function is a non cash payment instrument to merchant not to the issuer of electronic money. The data used is secondary data form Bank of Indonesia Report in 2011-2017. This type of paper is comparative method. Data analysis used is non parametric of Analysis of Variance (ANOVA). The findings show that there are significant differences for each type of payment model. This is indicated that there are significant differences for each type of payment model and the payment system using e-money is predicted will grow up fo the future. Payment systems using e-money is a process of modernization of the payment system that is safe, convenient, and easy which has been developed in several countries in the world.

1. Introduction
As we all know, the development of information technology is now very fast. Entering the era of industrial revolution 4.0, the emphasis is on digital economy, artificial intelligence, big data and robotic, there has been a change in trade in the world, now all in digital form. The world’s financial system that exists today is the result of the development and evolution a few centuries ago. Technological development has an impact on all aspects of life including changes of the existing payment system. Cash payment instrument by using money has begun to shift to non-cash payment instruments. The development of the use of non-cash payments are not only separated from technological development but also supported the government's efforts towards Less Cash Society [1]. Non-cash payment instruments is considered to have a role in replacing money as a means of payment. We don’t realize that sooner or later we will soon need innovation in future payment system, especially mobile payment. Technological developments will change the way people make transaction. Transactions that are usually done manually/cash start to change into non-cash payments [2]. Of course with increasingly advanced technology, the future payment system requires payment instruments that are innovative, safe, efficient and easy to use by the community. The use of non-payment cash in Indonesian society is still relatively low compared to other countries Bank Indonesia has also launched the National Non-Cash Movement (GNNT) since August 14, 2014 in transactions [3]. Generally, the factors that influence the use of non-cash payment instruments are the existence of community need, availability of instruments that are safe, fast, and efficient, the number of
outlets/market players who receive the non cash payment instruments. Based on a survey conducted by the Indonesian Internet Service Providers Association (APJII) throughout 2016, 67.8% of Internet users in Indonesia conducted internet activities on a mobile or smartphone basis. This means that the amount of smartphone usage also indicates the level of use of mobile internet in Indonesia is increasing. No wonder this then impacts on other technological developments that are mobile as well. No exception in financial matters. There are so many choices for making financial transactions. Moreover, the current technological advances are so rapid, making financial transactions easier. Non-cash payment instruments discussed in this paper are credit cards, ATMs, debit cards and stored value card/prepaid cards such as e-money.

2. Future Electronic Payment System Model

Electronic payment systems (EPS) have attracted much attention from researchers and information system designers due to their vital role in modern electronic commerce [4]. Electronic payments are payments that utilize information and communication technologies such as Integrated Circuit (IC), cryptography and communication networks [5]. There are many developed and well-known electronic payments today include phone banking, internet banking, credit cards and debit cards/ATMs. All such electronic payments, except credit cards, are always directly related to the accounts of bank customers who use them. In this case, every payment instruction made by the customer, either through phone banking, internet banking, credit card or debit card/ATM, is always through an authorization process and will be charged directly into the customer's account.

E-payment systems, as a strategic information system, are considered one of the main components of economic development, particularly in developing countries, and they greatly help to reinforce the capabilities and provision of financial services [6]. With the advancement of technology and the need for practical and inexpensive payment instruments, electronic payment products have been developed in several countries known as Electronic Money (e-money), whose characteristics are different from the previously mentioned.

2.1. Credit Cards

A credit card is essentially a line of credit that can be used to borrow money to make purchases, transfer balances and get cash advances, with the agreement that you will pay back the money borrowed, plus any interest you owe on it, at a later date. The most commonly used online payment mode so far was the use of credit cards. Initially, the security concerns hindered in the adoption of credit cards for making online payments but later with the provision of more secure features to protect every transaction made, customers developed trust on the use of credit cards. Applicability of credit cards is a strong factor that contributed to its wide use throughout the world. Credit card companies have established a wide network for their consumers ensuring a huge user base for a number of different transactions. However, it is considered a less-suitable method for small businesses and customers that need to make small payments due to high fees for credit cards [7].

One of the major advantages of credit cards is their easy to use functionality with making online transactions in no time and from anywhere. These cards are easy to obtain and use as customers don’t need to purchase any extra software or hardware to work with them. Cardholder authentication procedure is also simple, with the provision of a name, credit card number, and expiry date. For the security of consumers’ personal information, credit card companies have developed a number of complementary systems including MasterCard SecureCode and Verified by Visa [8]. These systems allow users to create a password and use it when they shop online through their credit cards.

2.2. Debit Cards

ATM cards or debit cards use a balance system. This is arguably a savings system. You have to fill/deposit in first, so that it can be used for cash withdrawals, transfers, payments, top up, etc. If the balance is empty, small, and insufficient for the transaction, then the card cannot be used. In contrast to credit cards, payments through debit cards are withdrawn directly from the personal account of the consumer instead of an intermediary account [9]. This makes it difficult for consumers to handle
payment disputes as there funds don't have an extra protection in a debit account. For debit payments, providing the account number is enough without the necessity of producing a physical card or card number. The use of debit cards is particularly high in most countries with a specific user base depending on the conditions and regulations attached to the issuance of credit cards. Since there are lower costs for using debit cards unlike credit cards. This method is suitable for micropayments. In addition, the overall security of debit card payments is found to be higher than that of credit card payments with extensive identification requirements demanded by the banks.

2.3. E-Money

The definition of e-money refers to the definition issued by the Bank for International Settlements (BIS) in one of its publications in October 1996. In this publication e-money is defined as "stored-value or prepaid products in a record of the funds or value available to a consumer stored electronic device in the consumer's possession "(stored-value or prepaid product where a certain amount of money is stored in an electronic media that someone has) [10]. The definition of e-money is more focused on a type of prepaid card that can be used for various payment purposes (multi purpose) not on a single prepaid card that can only be used for certain purposes such as telephone cards as applicable in Indonesia.

E-money which is meant here is also different from other card-based electronic payment instruments such as credit and debit cards. Credit and debit cards are not "prepaid products" but "access products". In general, the characteristic differences between "prepaid product" and "access product" are as follows: [11]

- **Prepaid product (e-money)**
  - The value of money has been recorded in e-money instruments or often referred to as stored value.
  - Funds registered in e-money are fully in the control of consumers
  - At the time of the transaction, the transfer of funds in the form of electronic value from e-money cards owned by consumers to the merchant terminal can be done off-line. In this case, verification is sufficient at the merchant level (point of sale), without having to be on-line to the computer issuer.

- **Access product (debit card and credit card)**
  - There is no record of funds on the card instrument
  - Funds are fully in the management of the bank, as long as there is no authorization from the customer to make payments
  - At the time of the transaction, the card instrument is used to access on-line to the issuer computer to obtain authorization to pay for the customer's account, both in the form of a savings account (debit card) and a loan account (credit card). After authorization by the issuer, the customer's account will then be debited immediately. Thus, payments using credit and debit cards require on-line communication to the computer issuer.

Furthermore, some countries today have begun to introduce electronic payment products known as Electronic Money (e-money) or can be called digital money. The difference between e-money and electronic payment instruments mentioned earlier is that every payment using e-money does not always require an authorization process and is not directly related to the customer's account in the bank. E-money as an electronic payment instrument has the potential to be developed in Indonesia so that it is expected to encourage the people of Indonesia towards a less cash society. In addition, the use of e-money will also encourage increased financial inclusion.

The e-money policy that has been carried out in Indonesia is the determination of all toll payments required to use e-money which has been in effect since 31 October 2017. Telecommunication and banking companies have also issued e-money services and products. Almost all major banks in Indonesia currently have e-money services, such as Mandiri e-money, BRI Brizzi, BNI Tapcash, BCA Flazz, and there are T-cash products from telecommunications companies, Telkomsel [12]. In fact,
their steps were also followed by startups in the field of financial technology (fintech), which had a smaller scale, but the movement was very agile like Tokopedia with Tokocash, there is Bukalapak's and Gopay's Bukadompet owned by Gojek.

Of course this requires the community to get used to using e-money as one of the daily payment transactions because e-money is one model of a future payment system that has many benefits. The use of e-money will provide advantages compared to using cash and other non-cash payment instruments. For example, it is faster and more convenient than using cash, especially small-value transactions, because the customer does not need to spend the right money or receive change. In addition to the use of e-money there is no refund error when making a transaction. Another advantage of e-money is that the time needed to complete a transaction is much shorter than a transaction with a debit card, credit card or ATM. Because, using e-money does not require online authorization, signature or entering a PIN code. With off-line transactions costs can be reduced.

3. Methods
The data used is secondary data form Bank of Indonesia Report in 2011-2017. This type of paper is comparative method. Data analysis used is non parametric of Analysis of Variance (ANOVA). This paper uses comparative method. Data analysis used is non parametric ANOVA (Analysis of Variance). The data retrieval technique used is study of literature (which is done by reading books), observation (which is done by taking secondary data and then analyzing the data), conclusion (which is taken after the analysis process is carried out). When viewed from the results, there are significant differences for each type of payment model. And it is clear that e-money growth is also quite significant. Even though e-money itself was recently introduced in Indonesia.

4. Results and Discussion
4.1. Result

The Amount of Electronic Money Circulating in Indonesia show in Table 1 as follows:

| Period | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   | 2017   |
|--------|--------|--------|--------|--------|--------|--------|--------|
| Amount of INSTR | 14,299,726 | 21,869,946 | 36,225,373 | 35,738,233 | 34,314,795 | 51,204,580 | 90,003,848 |

Sources : Bank Indonesia (2018).

The Amount of Payment Instrument Using a Card show that in Table 2:

| Period       | 2011     | 2012     | 2013     | 2014     | 2015     | 2016     | 2017     |
|--------------|----------|----------|----------|----------|----------|----------|----------|
| Credit Card  | 14,785,382 | 14,817,168 | 15,091,684 | 16,043,347 | 16,863,842 | 17,406,327 | 17,244,127 |
| ATM Card     | 3,623,992  | 4,533,187  | 6,292,164  | 7,189,917  | 7,330,388  | 8,361,351  | 8,815,007  |
| ATM Card + Debet | 59,761,318 | 73,219,365 | 83,170,125 | 98,638,287 | 112,948,818 | 127,786,999 | 155,663,442 |

Sources : Bank Indonesia (2018).
4.1.1. Kruskal Test – Wallis Test

\[ H = \frac{12n(n+1)}{\sum R_i^2/n_i + \sum R_j^2/n_j + \ldots + \sum R_k^2/n_k} - 3(n+1) \]  

(1)

4.1.2. Hypothesis
Ho = The four variables do not differ significantly
Hi = The four variables are different significantly

4.1.3. Decision Making
Based on Count Statistic
Based on count statistic < table statistic, Ho is accepted
Based on count statistic > table statistic, Ho is rejected

Based on Probability
If the probability > 0.05, Ho is accepted
If the probability < 0.05, Ho is rejected

| Table 3. Kruskal-Wallis Test. |
|-----------------------------|
| Ranksa                      |
| Payments                    | N  | Mean Rank |
|------------------------------|----|-----------|
| E Money                      | 7  | 17.43     |
| Credit Card                  | 7  | 12.00     |
| The Amount of users          |    |           |
| ATM Card                     | 7  | 4.00      |
| ATM Card + Debit             | 7  | 24.57     |
| Total                        | 28 |           |

Sources: SPSS Result (2018).

| Table 4. Test Statistics. |
|---------------------------|
| Test Statisticsa,b        |
| Amout Use                 |
| Chi-Square                | 23.432 |
| df                        | 3      |
| Asymp. Sig.               | .000   |
| a. Kruskal Wallis Test    |
| b. Grouping Variable: Payments |

Sources: SPSS Result (2018).

Based on the Table 3 and Table 4 the result show that there are significant differences for each type of payment model.

4.2. Discussion
E-money is slowly introduced in Indonesia. E-money in Indonesia was introduced in 2007, while in Hong Kong was introduced in 1997 and Singapore in 2000. Because of this, e-money is unknown compared to credit card and ATM/debit card. In fact, e-money is also less well known compared to other banking products such as mobile banking, SMS banking, phone banking, and internet banking.
In order to support the success of the National Movement of Non-Cash (GNNT), it is important to give more intensive socialization about that. One thing to do is to add number of merchants that can receive e-money. The benefits of using non-cash instruments is very big because this will increase the efficiency in the transaction as well as ease in daily activities, especially if supported by the security of transactions and individual data and the number of merchants that accept the use of these cards.

As an electronic payment instrument, the use of e-money in various countries has proven to provide benefits as an alternative means of non-cash payment, especially for micro and retail transactions. However, as with other non-cash instruments, e-money also has various risks and potential implications for monetary policy [13]. so to maintain public trust, e-money development needs to pay attention to security features to protect the integrity, authenticity and confidentiality of the system used. Security measures that need to be implemented include prevention, detection and limitation of losses due to abuse (containment). In the implementation of e-money there are several institutions that hold roles such as issuers, operators, clearing and acquirer operators [15]. The existence and role of each of these institutions is very dependent on the e-money business model developed. In this case the institution that plays the most important role is the issuer [16]. Therefore, regulation of e-money is one aspect that needs special attention by the central bank as the payment system authority and monetary authority. Basically, there is nothing difficult to do if we want to learn and become a more advanced nation. Through collaboration between Bank Indonesia, central and regional governments, payment system industry players and the entire community, hopefully the non-cash payment system is increasingly utilized by the community in its economic activities so that we will become more advanced countries and can always prioritize smarter programs and fun for the people of Indonesia. Bank of Indonesia, as the payment system service authority and monetary authority. Basically, there is nothing difficult to do if we want to learn and become a more advanced nation. Through collaboration between Bank Indonesia, central and regional governments, payment system industry players and the entire community, hopefully the non-cash payment system is increasingly utilized by the community in its economic activities so that we will become more advanced countries and can always prioritize smarter programs and fun for the people of Indonesia. Bank of Indonesia must examine whether the use of e-money also has the potential to increase the velocity of money which can complicate the calculation of monetary aggregate as a target or indicator of monetary policy.

Another important issue of using e-money that is of concern to the central bank is about seignorage. Seignorage is a profit obtained by the central bank from the difference between the nominal value of paper money issued and the cost of producing money. If the use of e-money as a substitute for cash is expanding, it is estimated that it will have an impact on decreasing central bank revenue from seignorage posts on the central bank's balance sheet. Another issue that is noteworthy is the security problem and the efficient use of e-money. In essence, Bank of Indonesia will set a rule that the use of e-money must meet safety and efficiency standards.

5. Conclusion
The result show that there are significant differences for each type of payment model, and the payment system using e-money is predicted will grow up fo the future. Payment systems using e-money is a process of modernization of the payment system that is safe, convenient, and easy which has been developed in several countries in the world.

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