The Implementation of E-money in Mobile Phone: A Case Study at PT Bank KEB Hana

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***Abstract*—Innovation in cashless payment instruments can lead to complications in the use of quantity targets in monetary control. The empirical study found that the presence of non-cash payment instruments using cards can replace the role of cash payment instruments in economist transactions in Indonesia. The growth of electronic money when viewed on a monthly basis is much faster than the growth of debit and credit card cards, a monthly increase of electronic money can reach 70% -100%, while debit and credit card cards only grow in the range of 20%. This study aims to analyze the design of e-money, as well as provide some development ideas that must be done related to the implementation of e-money.**

Keywords— strategic planning, e-money, electronic banking, business strategy, cashless payment, fintech, the blockchain

I. INTRODUCTION

Information technology systems have evolved. Economies in many places are in the midst of an e-commerce revolution. This revolution leads to new methods of transacting and making payments, thereby introducing new money (e- monies), so in the future, it is not impossible to replace the current currency. E-money is stored-value or prepaid payment in which a record of the funds to a consumer is stored upon the electronic device in the consumers. Research on e-money design has been done before, by Mohammad Salah with the main discussion of the research paper is "e-wallet" for Bangladesh, which changed the old traditional payment such as cash, coins, checks and Credit/Debit/ATM cards[1].

In the current era, people are reluctant to bring large sums of money because of security matter where you can get robbed or lost the cash. The payment card is one another possible option which can be used to used as cashless payment. Using cashless payment is a benefit for a society where a customer can pay their transactions by online or using Electronic Data Capture (EDC) machine as a mobile ATM machine.

II. USE OF E-MONEY IN INDONESIA

The initial purpose of using e-money for practicality, only one press transaction successfully done, other than that no need to bring cash if you want to buy something. Primarily e-money is not intended to replace the function of money in total. E-money cardholders should choose e-money cards as needed. This is because there are many e-money cards on the market and offer different payment facilities. Also, not all merchants can accept payment transactions via e-money. In other words, no e-money card can meet all the needs.

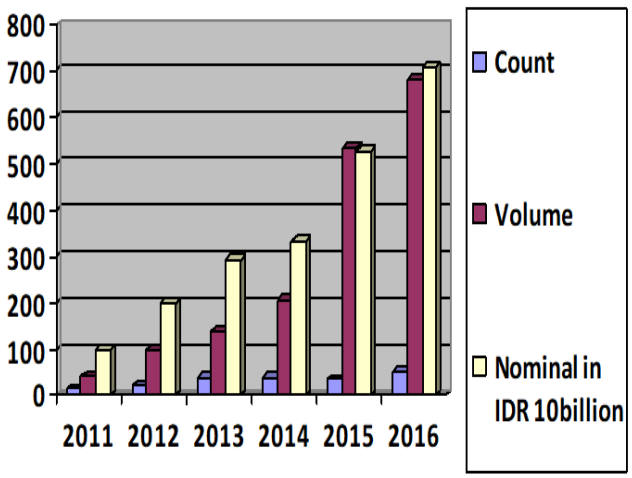

Fig. 1. e-money usage in Indonesia (Bank Indonesia, 2017)

E-Money is present in Indonesia since 2009. E-money is issued by banks and non-bank institutions for licensing from Bank Indonesia (Bank Indonesia, 2009). Bank Indonesia data as of December 2016 noted there were 20 e-money publishers, consisting of 9 banks and 11 non-bank institutions. According to statistical data from Bank Indonesia, the use of e-money, the total e-money in circulation had the highest increase in the period 2016. Although relatively still in the early stages of development, e-money has the potential to shift the role of cash. In its construction, the electronic payment system or can be called non-cash is strongly influenced by the progress of technological development and changes in people's lifestyles.

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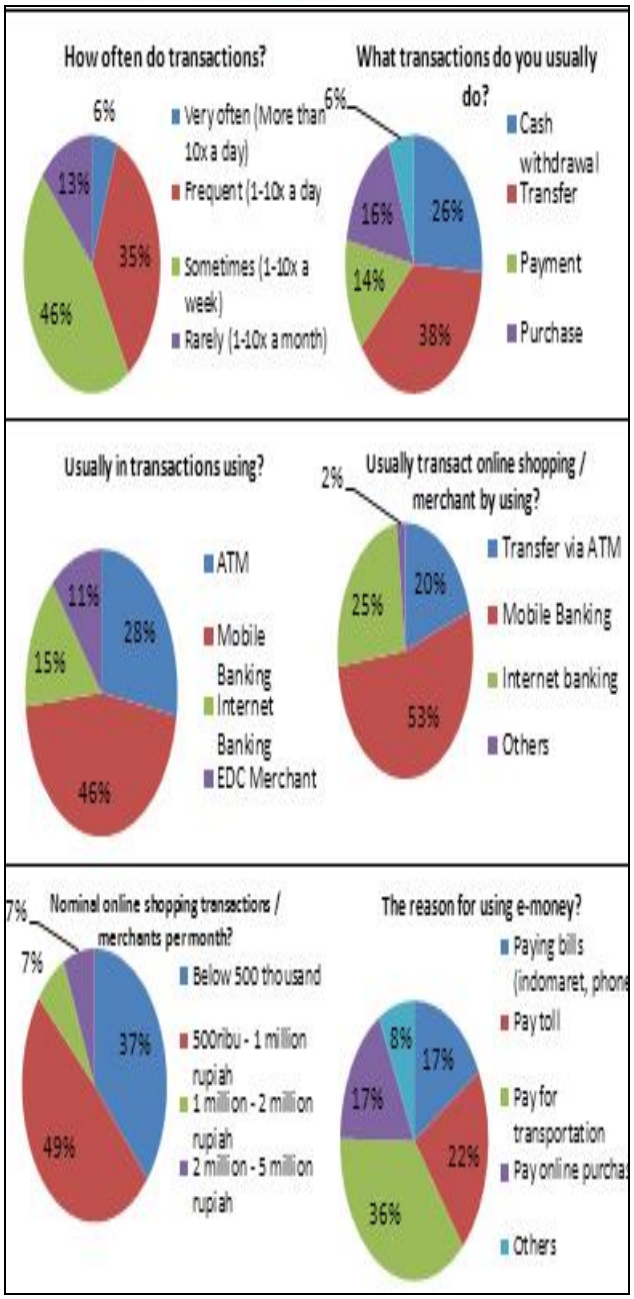

Fig. 2. survey result regarding e-money

Currently, the development of non-cash payment instruments is proliferating along with the development of payment system technology which in recent years has had a significant impact on the parties involved in the payment system. With the support of advanced technology, users and non-cash payment system providers are continually looking for more efficient and secure non-cash payment instruments.

Surveys about transactions commonly done by users show above, about 46% of user mostly making sales in mobile banking. Then, more than 38% of the transactions are often done is a transfer, and then 26% are cash withdraw. Most of the user (46%) use only occasionally use e-money, 1-10 times in a month. The analysis display that the highest number of purpose using e-money transactions was to pay transportation fare.

III. ISSUES KEB HANA E-MONEY

Analyze the external environment of a company's business is an analysis performed on external factors that play a role in the company's business activities.

Strengths are identified to know what are the powers of e-money to continue and sustain the business of the company. By understanding the force, the company will be able to maintain and even increase its strength as a capital to be able to compete with its competitors.

Identify the weakness aims to know what are the vulnerabilities that exist, so that can be improved for the better. Identify opportunities, both current, and prospects, then the organization can prepare to cover those weaknesses. Various efforts in realizing opportunities and maintain the smoothness of the organization's business will undoubtedly experience many threats. Identified threats can be sought so that organizations can minimize risks from e-money implementation at KEB Hana Bank.

A. Application Technology in E-Money

From the measurement results from Table 4:16 above can be concluded that after the measurement of performance through IT Balanced Scorecard done, it will be evaluated the effects of the average achievement obtained from the four current perspectives.

- Cardless withdrawal is a fund withdrawal transaction through ATM KEB Hana without using ATM card, by using QR code the money withdraw and the balance in KEB Hana e-Money will be deducted according to the withdrawal amount.
- PaybyQR is a technology that allows the use of mobile devices to be able to perform digital payment transactions or merchants by using QR code as payment media.

B. Application Security in E-Money

The best service for customers should be the bank's primary focus, but do not forget to pay attention to the security side, data security or customer privacy is a most critical factor.

There are set up various security processes to reduce the risk of unauthorized online access to a customer's records. To address the security issues, we build a mobile-enabled security framework in the payment system. This security framework includes the following components:

1. Encryption
   i. Exchange data from and to server
      Using HTTPS with encryption using RSA algorithm via SSL.
   ii. User ID and password
      Using encryption with 256 bit AES algorithm after MD5 hashing process.
   iii. User ID and password
      ATM debit card PIN.
   iv. User API key
      Key unique to each customer after registration use of PayByQR feature.

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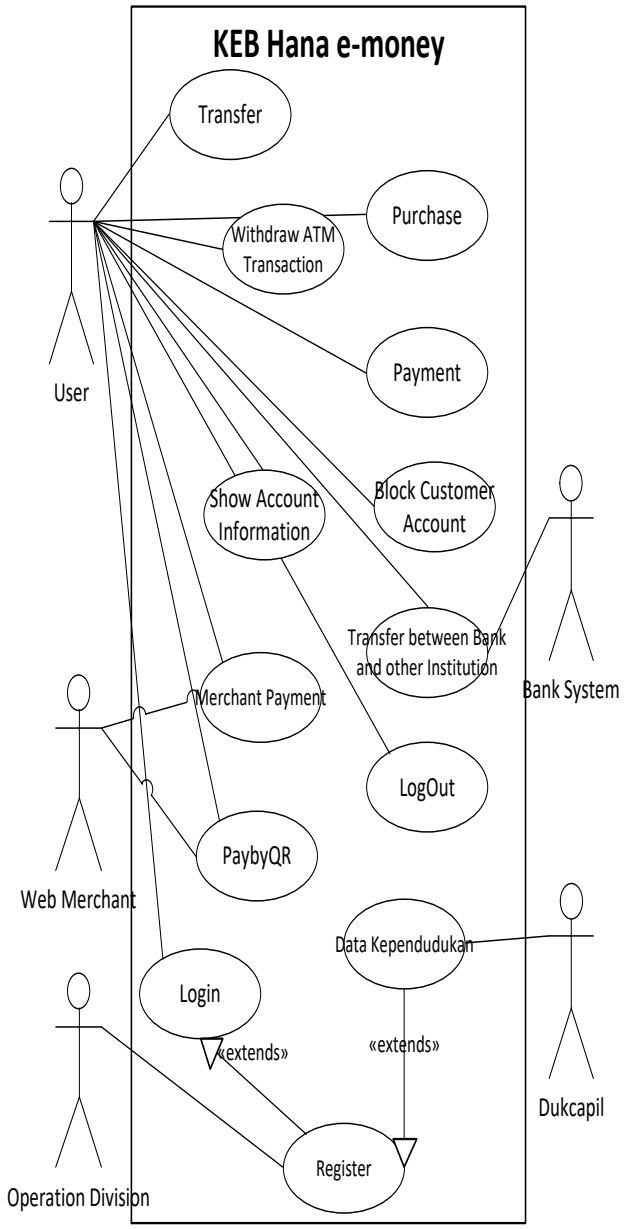

Fig. 3. proposed use case diagram KEB Hana e-money

2. Nonrepudiation
   Safeguards to ensure that transactions come from the right party.
3. Network security
   Data exchange of information through the network will be via HTTPS (HTTP Secure).
4. Security access
   Using the User ID is 7-20 digits alphanumeric and password that has been made by the previous customer during the registration process.
5. Control authorization in systems and database.
   If an indication of leakage is found to enable misuse of information, IT will take steps to close access to information from both inside and outside.
6. Maintenance and audit trails
   Each audit log trails from the Cardless Withdrawal and PayByQR functions stored in the database and server logs that are backed up daily along with other Hana e-Money KEB functions.
7. Fraud detection
8. Setting hardware and software parameters.
   The settings of the hardware parameters are adjusted with the system configuration as well as the security factor. Not only server hardware, but also from the side of switches, routers, and firewalls.
9. Due diligence oversight procedures to third parties
   Data center and network provider third party chosen from a provider that already has an excellent reputation and their client from a financial institution.

IV. DESIGN OF E-MONEY

Data Subject / Business Function	Transaction Type	Transaction	Disburseme	Statement	Account	Customer
The agent of selling goods and services to the user of KEB Hana e-money.	Web Merchant	R				
The actor of the company's business activities.	R	User KEB Hana e-money				
Facilitate all incoming transactions and process the transaction.	R	R	R	Bank System		
Provide IT infrastructure and software required by the business.	R	R	R		R	
To support the business operational activities of KEB Hana e-money related companies.	R	R	R	R	Operational	
Provide residence data information triggered by identity card.						Dukcapil

Fig. 4. Grouping entity/activity matrix KEB Hana e-money

E-money runs on a smartphone or any other devices which can do money transaction such as money transferring, making payments, etc. E-Wallet or E-Money can be set up first timely by storing our information, then the other categories transactions can be added. This paper proposes an e-money application that gives authorization to users to saving and control their money, in one central place that runs on a smartphone. The primary function of this e-money application to replace cash transaction and cash service that divided into cash withdrawal, transfer, bill payments and account balancing. E-money offers the characteristics of physical money as it is used in the same manner. Therefore, electronic cash must be secure and highly challenging to

forge. Figure 3 shows the use case diagram of the process in KEB Hana e-money.

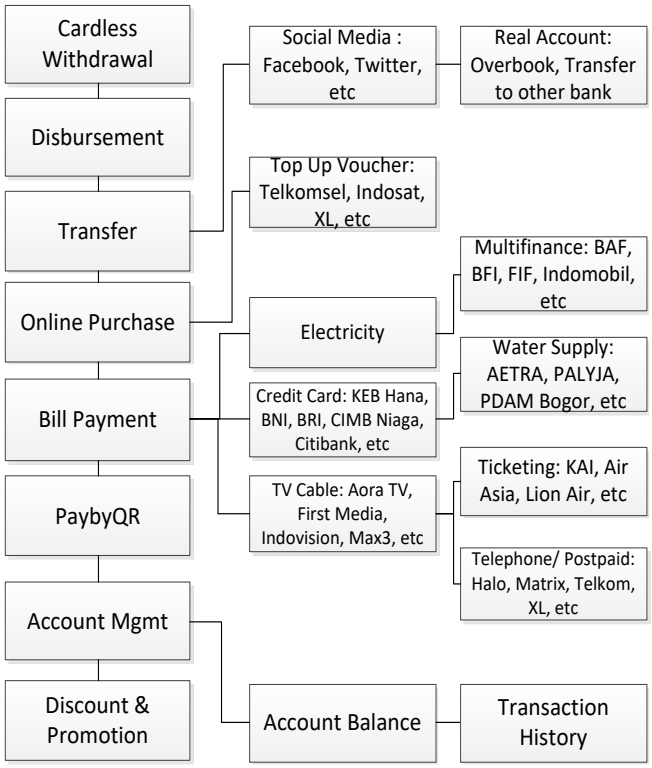

Fig. 5. User Menu applied in KEB Hana e-Money

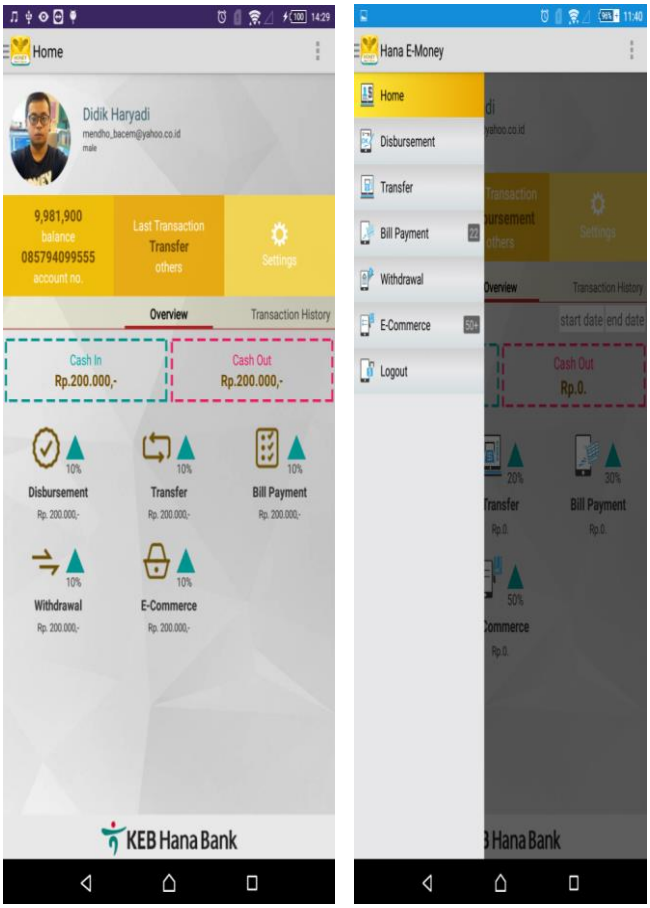

Fig. 6. User Interface (UI) KEB Hana e-money Prototypes

To mapping the function to the related data subject related to the primary business process in KEB Hana Bank, it will be grouped to show the function area in which the purpose and discipline of the related data in the function cycle. The area of business functions consisting of functional regions, business functions, business processes running in the company, data, and information, and applications.

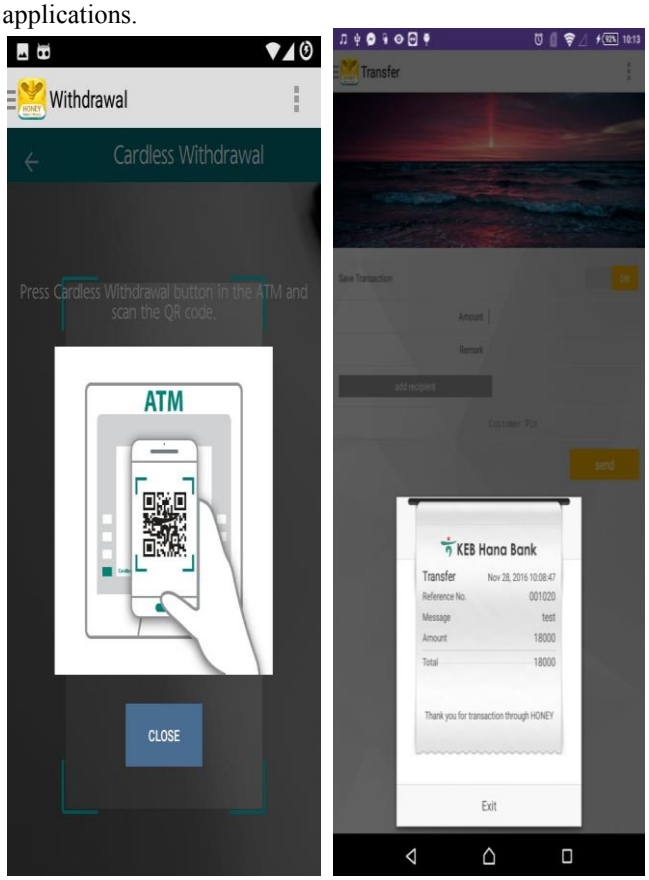

Fig. 7. User Interface (UI) KEB Hana e-money Prototypes

KEB Hana e-money facilities offered many features and capabilities in common with other financial institutions have, but have some specific application and the standard features are shown in figure 5.

In this proposed E-wallet system, banking customer can do online transactional such as display account balance, recent transactions, download PDF format bank statement, display discount, cashback and promotion and any other banking transactions. Moreover, bank customers can do their banking transactions by online such as:

- funds transfers between the customer's linked accounts
- paying third parties, including voucher purchase, bill payments (e.g., above menu)
- register utility billers and make bill payments
- money withdrawal in ATM
- e-commerce payment using PaybyQR
- pay a merchant for goods and services using PaybyQR

Financial institution administration e-commerce websites

- management of multiple users having varying levels of authority
- register personal financial password for a support transaction

Figure six and seven show displays the layout of the Android application demonstrating the main screen of the e-money, the screenshot of checking the balance menu and the purchase details and mobile phone-based checking of recharge details.

V. CONCLUSION

E-wallet as Electronic payment System for KEB Hana Bank, which changed the traditional payment that contains notes, Credit/Debit/ATM cards to cashless payment. The proposed e-money highlights the details regarding the design of e-money applications, and it also strives to increase theoretical of previous literature by adding features that have not existed in previous research such as payments via QR code and withdrawal in ATM.

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