Development of digital currency technology

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Abstract. This research aims to produce digital technology through bitcoin platform. By using blockchain technology, people can use decentralized peer-to-peer transactions that can be used by users. The method that is used in this research are qualitative and quantitative methods, where the research data in the form of numbers and analysis using statistics. Sampling technique used simple random sampling and data processing tool in the form of questionnaire. From the research results obtained are digital technology and digital data can produce data in accordance based on user needs. Quantitative analysis techniques are also called statistical techniques and used to analyze data in the form of questionnaire numbers. The results of this research can be a recommendation for people who want to keep abreast of digital currency technology to be as digital assets.

1. Introduction

The increase in the number of computer users all over the world connected via internet network with increasing globalization of the world economy, the utilization of the technology of the world wide web when doing transaction. This raises the amount of money circulation in cyberspace without any geographical limitation. Also community needs for speed, convenience and security of transactions using digital currencies. The current trend of transactions the use of non-cash means of payment has become an urgent need for the community. The role of a teller at the bank have already started being replaced by machines such as ATMs and EDC. Indonesia Bank dividing the five types of non cash payment instruments namely cards, cheque, bilyet giro, debit notes and electronic money. Course of five kinds of payment instruments, electronic money be the option most needed at this time.

Cryptocurrency technology with use of payment systems as the technology still has several obstacles associated with the matter quite a long faced and unresolved for many years in the world of computer science that is Double spending problem and the Byzantine general problem. So this technology already is never discussed again. Through to the end in the year 2008 there is a programmer who confessed himself named Satoshi Nakamoto create a new digital currency with a named bitcoin. Of all the limitations this is emerging a new currency in digital form based on cryptography, which does not depend on a third party to manage the circulation of money. Bitcoin is one of several digital currency that first appeared in the year 2009, as digital currencies based on cryptography. Up to now, the use of the bitcoin as digital currencies are already widely used by the perpetrators of online businesses as a means of payment. A benefit of using bitcoin is one of which there is no limit or fixed rule in doing buy/sell transactions, in which the good seller or buyer, it would...
be very difficult to track his presence or are anonymous. Therefore, bitcoin usually many once used as means of payment in the transaction illegal trade, such as illegal drugs. One way to get a bitcoin through methods of mining.

Society needs to freedom in the conduct of financial transactions concerning payments without the constraints confronted by the payment system from their respective publishers. Of course the expectation of the community no longer need to mess around with compatibility problems of electronic money issuer. And besides the utilization technology of bitcoin is expected to help resolve the problems currently faced by bank Indonesia related to the manufacture of standard electronic money/digital money. the outline of the issues that will be examined include: (1) how technology to digital currency? (2) How digital currency circulation in Indonesia? (3) How technological developments of digital currency? As for the goals of this research are as follows: (1) to know the technological development cryptocurrency, (2) platform for the exploration of digital currencies in Indonesia, (3) Obtain data regarding means of payment virtual cyberspace.

2. The Related Of Work

Bitcoin utilizes a peer-to-peer network as its distribution medium by using advanced cryptographic protocols. First set up in 2008 by Satoshi Nakamoto, bitcoin software was created and started in 2009. A bitcoin value electronic coin is a sequence of a digital signature. A detailed discussion of how bitcoin works is beyond the scope of this paper. In the figure below can be seen the price movement of a block of transaction chain in one year.

![Figure 1. Average USD Market Price](image)

More cryptocurrencies exist today, with Bitcoin being the most prominent of them. Cryptocurrencies are generated by mining, as a fee for validating any transaction. The rate of generating hashes, which validate any transaction, has been increased by the use of specialized machine such as ASICs, running complex hashing algorithms like SHA-256, thereby leading to faster generation of Cryptocurrencies. With more people venturing into the world of virtual currency, generating hashes for this validation has become far more complex over the years, with miners having to invest huge sums of money on employing and maintaining multiple high performance ASICs [1].

Research with the title mining system analysis on bitcoin. Where Bitcoin is widely used as a digital currency and has been widely used by hundreds and even thousands of merchants around the world online, as a recognized currency. The bitcoin system itself is based on cryptocurrency, regardless of government regulations and decentralization. The technology used is based on peer-to-peer networking and cryptography to maintain the integrity of its data. Although the use of bitcoin is still not widely known, from year to year it has experienced a fairly high increase in users. In research
studies on how to get bitcoin through one method, namely mining. With the increasingly widespread use of bitcoin as a digital exchange tool, it is enough to attract the attention of many online businesses to start using this digital money as an alternative to their payments. Besides that, now many are competing to get bitcoin by mining. With the increasing number of people doing this mining, it will certainly increase the difficulty level of the bitcoin network. So the amount of time needed to get bitcoin will increase as the difficulty network increases. The determination discussed in this paper is still not perfect, given the complex nature of the workings of this bitcoin technology [2].

Utilization of Cryptocurrency as Application of Rupiah Currency into Digital Forms Using Bitcoin Technology. Payment using electronic money that is integrated with all providers both banks and non-banks will make a lot of convenience for the community. Electronic money that uses chip-based and server-based types still requires the role of third parties to overcome compatibility issues between electronic reading terminals (EDC) in order to exchange customer information related to the account debit process. The purpose of this study is to study the use of cryptocurrency technology by using bitcoin technology to build an integrated electronic money payment system. Qualitative research methods are used in research, through narrative analysis and explanation based on sources collected from various publication media. With the establishment of an integrated system between providers, both banks and non-banks, it is possible for the community and the seller to only have one type of payment instrument that can be used in all places. Cryptocurrency technology using bitcoin makes it possible to build an integrated system that is able to exchange data in a limited peer-to-peer network between service providers [3].

Cryptocurrency, a form of digital currency that has open and decentralized system and uses cryptography to enhance security and control the creation of new units, is touted to be the next step from conventional monetary transactions. Many Cryptocurrencies exist today, with Bitcoin being the most prominent of them. Cryptocurrencies are generated by mining, as a fee for validating any transaction. The rate of generating hashes, which validate any transaction, has been increased by the use of specialized machine such as ASICs, running complex hashing algorithms like SHA-256 [4], thereby leading to faster generation of Cryptocurrencies. With more people venturing into the world of virtual currency, generating hashes for this validation has become far more complex over the years, with miners having to invest huge sums of money on employing and maintaining multiple high performance ASICs. This paper throws light on the nuances of Cryptocurrency mining process, the issues of traditional mining machines and the implication of incorporating cloud technology to current mining infrastructure.

3. Research Method
This research was carried out to analyse a marketplace digital currency that is bitcoin.co.id. Data capture will be done on some of the range of transactions that occur in the marketplace. Be it development of user transactions or the sum of the currencies listed. The method used in conducting research, through the following stages:
a. Literature study, to get data about the basic understanding of bitcoin as a digital currency, use, and bitcoin transactions.
b. Exploration of devices from the bitcoin.co.id platform, this stage is carried out by testing the application features needed in analysing the development of digital currency technology in bitcoin.

This research was conducted in several stages of research as shown in the picture below:

![Figure 3. Stages of research](image)

In General, qualitative research in doing data analysis using model a lot of analysis that was conceived by Miles and Huberman that is often referred to as interactive data analysis methods [5]. They revealed that activity in the analysis of qualitative data is done interactively and lasted continuously until it has been completed, so the data is already saturated. Activity in the analysis of qualitative data, there are three stages, namely the reduction of data, display data, and the conclusion or verification.

Data reduction is the process of thinking that requires sensitive intelligence, discretion, and depth of insight. For researchers who are still new, in doing data reduction can discuss with friends or other people who are seen quite mastered the problems examined. Through that discussion, insight researchers will be developed, so that it can reduce data that has a value of findings and development of theory. After the data is reduced, then the next step is to present the data. In quantitative research, the presentation of data can be done using tables, graphs, pictogram, and so on. Through the presentation of the data, then the data are organized and arranged in the pattern of the relationship, so it will be easier to understand.

In this study and based on the data that the author obtained where the number of users of bitcoin Indonesia consists of 1 million users, so the method I use is simple random sampling method. Various reasons for using this method include:

a. Limitations of research time, costs, and human resources, make researchers must examine some of the elements of the research;
b. The population of bitcoin users is so large that in practice it is impossible to examine all elements

The sampling technique in this study uses the formula from Taro Yamane as follows:

\[
 n = \frac{N}{N.d^2 + 1}
\]
Note:
\[ n = \text{number of sample} \]
\[ N = \text{number of Population} \]
\[ d^2 = \text{number of precision} \]

Based on the formula above, the sample used in this study amounted to 100 people rounding with the following calculations:

\[ N = 1,164,940 \]
\[ d = 10\% \]
then the number of samples (n) is calculated:

\[ n = \frac{1.164,940}{0.1^2 + 1} = \frac{1.164,940}{0.01 + 1} = 1.164,940 = 99.99 \]

From the calculations carried out in accordance with the Taro Yamane formula, a sample of 99.99 was rounded up to 100 people from a population of 1,164,940 people with bitcoin users and a precision level set at 10%. The following is a list of statements stated in the questionnaire distributed.

1) Digital Technology Development Variables
   a. Digital technology is easy to use for information
   b. Digital technology is able to provide information
   c. Digital technology can affect habits
   d. Digital technology can make a difference
   e. Digital technology can produce information as needed
   f. Digital technology can be used as a promotional medium
   g. Digital technology can be related to the level of productivity
   h. Digital technology can change a person's personality

2) Digital Currency Technology Variables
   a. Blockchain technology is the biggest discovery after the internet
   b. Blockchain technology can send data without going through a server
   c. Digital currency technology can be used as an asset
   d. Digital currency technology can transfer money between countries very quickly and transparently
   e. Digital currency technology allows one user to send money to another user without the help of a third party
   f. Digital currency technology can be used as a payment instrument
   g. Digital currency technology can be used as investment and trading

In this study used Likert measurement scale. The Likert scale is used to measure attitudes, opinions and perceptions of a person or group about social events or upsets. By using a Likert scale, the variables to be measured are translated into dimensions, the dimensions are translated into sub-variables and then the sub-variables are translated into indicators that can be measured. Data Analysis Methods used in this research are quantitative analysis methods / techniques. Quantitative analysis techniques are also called statistical techniques and are used to analyze data in the form of numbers, both the measurement results and the results of transforming qualitative data into quantitative data [6].

4. Result and Discussion
Random sample withdrawal (simple random sampling) where the author spreads 100 questionnaires and the respondent is a member of the bitcoin platform aged 17 years and over. Profile of respondents based on gender can be seen in table 1 as follows:
Table 1. Profile Respondent

| Gender | Frequency | Percentage (%) |
|--------|-----------|----------------|
| Male   | 80        | 80 %           |
| Female | 20        | 20 %           |
| Total  | 100       | 100.00         |

Based on the data above, it can be explained that the respondent's data is dominated by men as many as 80 people or as much as 80% while women amount to 20 people or as much as 20%. Based on age, where the respondents included in this study were people aged 17 years and over. Profile of respondents based on age can be seen in table 2 as follows:

Table 2. Profile Respondent Base on Age

| Age        | Frequency | Percentage (%) |
|------------|-----------|----------------|
| 17th – 20th | 20        | 20 %           |
| 20th – 30th | 60        | 60 %           |
| Above 30th  | 20        | 20 %           |
| Total      | 100       | 100.00         |

Based on the data above, it can be explained that respondents are dominated by people aged 17 years - 20 years, as many as 20 people or as much as 20%, while respondents with ages 20 years - 30 years amounted to 60 people or as many as 60% while respondents with age 30 years and over amounted to 20 people or as many as 20%.

The process of testing the validity of this research questionnaire uses SPSS IBM Statistics 22 software. To find out whether a research question is valid or not, a comparison must be made between r count and r table values. If the value of r count is greater than r table, the questionnaire can be said to be valid. Known number of respondents 100, with r table value of 0.1946.

Table 3. Digital Technology Development Validity Test

| Statement | r-table | r-count | Information |
|-----------|---------|---------|-------------|
| X1        | 0.1946  | 0.434   | Valid       |
| X2        | 0.1946  | 0.634   | Valid       |
| X3        | 0.1946  | 0.799   | Valid       |
| X4        | 0.1946  | 0.563   | Valid       |
| X5        | 0.1946  | 0.835   | Valid       |
| X6        | 0.1946  | 0.526   | Valid       |
| X7        | 0.1946  | 0.440   | Valid       |
| X8        | 0.1946  | 0.518   | Valid       |

The data in the table above is the result of IBM Statistics 22 SPSS output. From the data it can be seen that the calculated r value is greater than r table. Then it can be concluded that all statements about Digital Technology Development are valid.

The process of testing the validity of this research questionnaires using IBM SPSS Statistics software 22. To know her or not a valid question that research then to do a comparison between the value of r and r count table. When count r count greater than r table then the now can be said to be valid. Note the number of respondents 100, with a value of r 0.1946 table.
**Table 4. The Validity Of A Digital Currency Test**

| Statement | r-table | r-count | Information |
|-----------|---------|---------|-------------|
| Y1        | 0.1946  | 0.572   | Valid       |
| Y2        | 0.1946  | 0.805   | Valid       |
| Y3        | 0.1946  | 0.778   | Valid       |
| Y4        | 0.1946  | 0.756   | Valid       |
| Y5        | 0.1946  | 0.698   | Valid       |
| Y6        | 0.1946  | 0.592   | Valid       |
| Y7        | 0.1946  | 0.598   | Valid       |

The data in the table above is the result of IBM SPSS Statistics output 22. From these data it can be seen that the value r count greater than r tables. Then the conclusion can be drawn that the entire statement about technology digital currencies are valid. Reliability test is a picture of a reliable person who is a person who has consistent, stable and reliable behavior. Reliability test in each questionnaire statement is needed as a reference for the consistency of each statement item. If to measure validity requires r count & r table values, reliability is measured by the r table & Cronbach Alpha values. Reliability test can be done using SPSS IBM Statistics 22 software, where a question can be said to be reliable if the Cronbach Alpha condition is \( \geq 0.70 \).

**Table 5. Reliability Test**

| Variable | Cronbach's Alpha | N of Items |
|----------|------------------|------------|
| X        | .760             | 8          |
| Y        | .798             | 7          |

Reliability test data in the table above was obtained using SPSS IBM Statistics 20. Software It can be seen that all the results of the reliability test meet the Cronbach Alpha condition \( \geq 0.70 \). Based on the Cronbach Alpha reliability measurement table, the value is included in the category of very high and very significant or reliable. It can be stated that the research instrument is suitable for use.

### 5. Conclusion

The development of digital currency technology makes people look to learn this technology along with the times due to several conclusions including:

a. Digital technology produces information as needed with the highest calculated r value of 0.835.
b. The development of digital currency technology has been able to send transaction data without going through a server, this statement is very dominating with the highest calculated r value of 0.805.
c. Based on the above conditions, it can be said that the community can follow the development of digital currency technology through information obtained through the development of digital technology.

The results of this study can be a recommendation for people who want to keep abreast of digital currency technology to be used as digital assets. For further research it is expected to be able to have an overview of the buying and selling of digital currencies or used as a means of payment.

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