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Indonesia's Digital Financial and Economic Transformation Through Digitalize Redenomination

Silvia Puspa Kumaeroh[1], Muhammad Ayesha Arif Sandy[2], Muhammad Ikhwanurrohiim Septenta[3], Fina Dwi Utami[4], and Mutiara Tresna Parasetya[5]

[1,5] Department of Accounting, Universitas Diponegoro, Semarang

[2] Department of Statistics, Universitas Diponegoro, Semarang

[3] Departement of Law, Universitas Diponegoro, Semarang

[4] Departement of Economics, Universitas Diponegoro, Semarang

Email: silviapuspa26@gmail.com[1], sandy.ayesha019@gmail.com[2], septenta@gmail.com[3], finadwi2002@gmail.com[4], mutiara@lecturer.undip.ac.id[5]

Abstract: The financial sector plays an important role in the economy and continues to develop. Some central banks are actively exploring the initiation of digital currency that will become a legal tender [6]. This digital currency is known as the Central Bank Digital Currency (CBDC). Apart from the technological aspect, the CBDC must also be supported by the efficient value of the rupiah denomination. Therefore, it is necessary to simplify the number of digits in the rupiah denomination with a redenomination policy. The implementation of the two policies separately will take a long time in the formulation process. This research comes up with a new concept called "Digitalize Redenomination". This concept that has never existed in previous studies integrates both redenomination policy and CBDC at the same time. The research methods are both qualitative and quantitative. The qualitative method is done by analyzing literature study data and interviews with Bank Indonesia and economists. While the quantitative method is done by analyzing questionnaire data of the public. From this research, it is concluded that the current condition of the financial system in Indonesia has entered the era of digital transformation and at the same time, Indonesia also needs to simplify the rupiah denomination. The Digitalize Redenomination mechanism has the potential to be applied in Indonesia. However, the application of this concept cannot be implemented until the national economic condition is stable. After the economy is stable, the government can review this concept to be implemented in Indonesia.

1. Introduction

The financial sector plays an important role in the economy and will continue to develop according to the needs of the public. This is in line with today's conditions, which are undergoing rapid changes with the Industrial Revolution 4.0, marked by digital technology that is developing rapidly in all parts of the world, including in Indonesia. These changes affect various aspects of life and will cause disruption. As an archipelagic country that stretches from Sabang to Merauke and has a high population of productive age, Indonesia creates various effects and impacts of disturbance. In the western part of Indonesia, this influence is more significant and optimistic than in Indonesia's central and

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eastern regions. However, Indonesia still has to open itself to enter the digital era because it will affect the nation's future, including the transformation in the financial sector.

Carney (2016) states that innovation in the financial sector will change the central bank's foundation and bring a revolution to every user of financial services. This innovation in the financial sector has come to be known as Financial Technology (FinTech). FinTech has proliferated in developed countries and is also proliferated in developing countries, such as Indonesia. The existence of FinTech can bring more practical and secure financial transaction process. This financial transaction process includes the payment, borrowing money, transfers, or buying and selling shares.

The IMF (2017) reports that total global investment in FinTech companies increased from US$9 billion in 2010 to US$25 billion in 2016. The type of FinTech that is believed to be changing the future of the global financial industry is blockchain. The World Economic Forum recently explained that blockchain was one of the ten most innovative technologies in 2016. Blockchain is the basis for the development of the concept of digital currency. This new generation of electronic money, also called digital or virtual currency, raises important questions for central banks, financial systems and economies. Bordo and Levin (2017) explain that several central banks are actively exploring the initiation of digital currency by the central bank, which will become a legal tender and can be used by anyone. The digital currency is currently known as the Central Bank Digital Currency (CBDC).

The development of the digital economy through CBDC policy has potential to increase productivity and economic growth in the future. However, the achievement of national economic development, which is quite good at this time, has not been supported by the efficient value of rupiah denominations. Currently, the rupiah has too many digits. This condition has the potential to cause inefficiency in future economic transactions. Money with too many digits will drive complex calculations in economic transactions so that it has potential to cause errors and take longer. Implementing each policies, redenomination and CBDC, takes quite a long time. So in this research we want to integrate the two policies simultaneously because it will be more efficient and not require much higher costs if the implementation of these policies is carried out at different times. Of course, the integration of these policies is implemented when all the things needed have adequately been fulfilled. It is hoped that later financial transformation in Indonesia can be realized through the concept of "Digitalize Redenomination", which is an integration of the Central Bank Digital Currency policy with the Redenomination policy.

Problems Formulation: (1) How is the current development of digital economic and financial transformation in Indonesia? (2) How is the "Digitalize Redenomination" mechanism can be implemented for Indonesia? (3) What are the impacts of the transformation of the national economy and finances through the concept of “Digitalize Redenomination”?

Research Objectives (1) To find out the current development of digital economic and financial transformation in Indonesia. (2) To know the mechanism of "Digitalize Redenomination" in Indonesia. (3) To find out the impact of the transformation of the national economy and finance through the concept of "Digitalize Redenomination".

Int. J. Sci. Appl. Sci.: Conf. Ser., Vol. 5 No. 1 (2021) doi: 10.20961/ijsascs.v5i1.62077

2. Method

This study used a qualitative and quantitative approach. The qualitative approach was carried out using two methods, namely interviews and literature review. In comparison, the quantitative approach is obtained through a survey by distributing questionnaires to respondents. A qualitative approach was used to obtain primary data by interviewing the informants. The interviewees were the Central Bank Indonesia (BI) Payment System Policy Department and economic experts. BI was used as a resource to obtain up-to-date information on CBDC policy issues and the Rupiah Redenomination policy in Indonesia and get feedback regarding the idea of integrating CBDC into Rupiah Redenomination (Digitalize Redenomination). Economic experts are chosen as the interviewee to get feedback and suggestions related to the mechanism of research results. This study produces secondary data taken from several national and international journal libraries with the keywords: financial transformation, CBDC, and redenomination. Journals are obtained from credible sources such as Sinta, Scopus, Science Direct, and others.

In addition, this study also uses a quantitative approach through a questionnaire survey in google form that is distributed to the general public to find out how much knowledge the general public has regarding redenomination, CBDC, and the impact of implementing the integration those policies. Before being distributed, the questionnaire was reviewed and then distributed to several respondents for testing. The questionnaire data was then tested for its validity and reliability. The validity of the questionnaire was tested with the Pearson Correlation test in SPSS, while the reliability was tested with the Cronbach Alpha test in SPSS. After all the question items proved valid and reliable, the questionnaires were distributed to the general public randomly (random sampling). Categorical (ordinal) data from the distribution of the questionnaires were interpreted and analyzed descriptively. Then the data is visualized into a graph.

3. Results and Discussions

3.1. The Current Development of Digital Economic Transformation

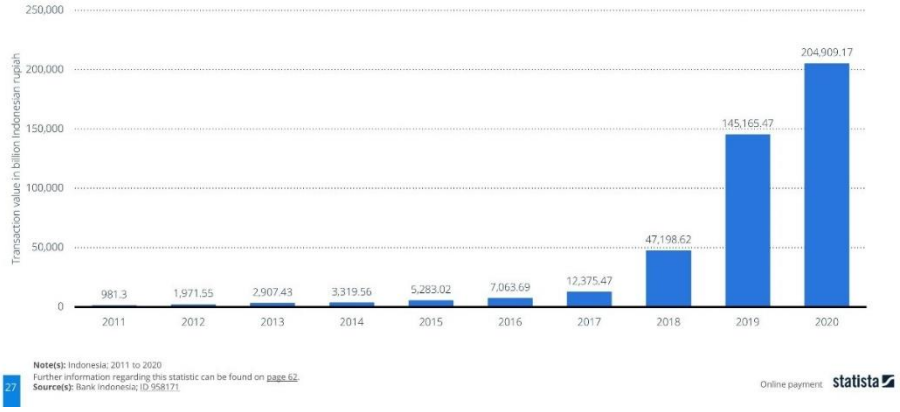
The existence of technology has entered into various lines of life, including economic activities in society. New innovations develop massively and are continuously introduced to the public. One of these innovations is the digitalization of the payment system. It is undeniable that the average business actor has digitized his business to gain a broader market share. While the times are growing, consumers also want it to be easier to get the goods/services they needed. With the internet, it can connect the transacting parties, so that regional boundaries can be exceeded.

Indonesia is in the fourth position as the country that has the largest digital transaction in the Asia Pacific, as well as being the largest in the ASEAN region. It indicates that Indonesia is heading towards digitizing payment instruments.

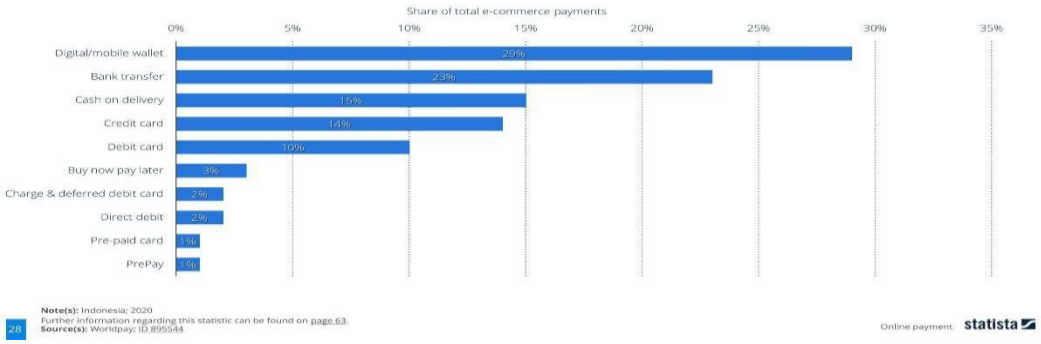
In addition, it is strengthened by electronic transactions, which from year to year show a significant increase, especially in 2017-2020. Moreover, the pandemic forces people to limit physical contact, and the alternative is to make buying and selling transactions through online stores. The tendency of people to complete transactions using virtual

Int. J. Sci. Appl. Sci.: Conf. Ser., Vol. 5 No. 1 (2021) doi: 10.20961/ijsascs.v5i1.62077

methods indicates that digital transaction activities are predicted to continue to develop positively following the development of e-commerce in Indonesia.



Graph 2: Aggregate value of e-money transactions in Indonesia from 2011 to 2020 in billion Indonesian Rupiah [13]



Graph 3: Distribution of e-commerce payment methods in Indonesia in 2020 [14]

Several digital economic trends, such as trading transactions, have a positive impact on Indonesia. The Ministry of Industry targets implementing the 'Making Indonesia 4.0' policy, which is expected to increase real economic growth by 1-2% per year. However, this digital transformation has also led to transactions, such as cryptocurrencies, which the Indonesian government has not legally recognized as a medium of excange. The skyrocketing price of crypto assets makes the public pay special attention to these assets. Last May, it was recorded that the market valuation of cryptocurrency almost reached USD 1,8 Billion or around 25 Trillion Rupiah (Statista, 2021). This figure has resulted in many people starting to learn and invest using crypto assets.

Seeing this opportunity, Bordo and Levin (2017) explained that several central banks are actively exploring digital initiatives that will become legal tenders and can be used by anyone. Unlike the private digital currency, the value of the central bank digital currency will be set in nominal terms. Bank Indonesia (BI), as the central bank, realizes that cryptocurrencies are very vulnerable to crimes such as money laundering, terrorism, buying and selling drugs, and other illegal activities. Therefore, to reduce the risk of using cryptocurrency, Bank Indonesia is currently starting to review a Central Bank Digital Currency (CBDC). CBDC is a means of digital storage of a value (money) and a method of exchange issued by a central bank.

Int. J. Sci. Appl. Sci.: Conf. Ser., Vol. 5 No. 1 (2021) doi: 10.20961/ijsascs.v5i1.62077

According to data from Mastercard, Indonesia is currently entering the digital transformation quadrant, Breakout, which means that although it is now relatively low in development. But in near future, Indonesia will evolve rapidly and have the potential to become a country with a robust digital economy. In response to this, Indonesia is focusing on developing the digital economy, starting from startups digital, e-commerce, fintech, services (on-demand service), to logistics [1]. In addition, Indonesian government has made various preparations in facing the current digital transformation, such as infrastructure provision, human resource development, and policies related to the Industrial Revolution 4.0 [1].

Infrastructure. Since 2014, Indonesian government has provided support for infrastructure for digital development, which includes increasing the electrification ratio and building the Palapa Ring project for internet network quality. To accelerate the growth of electricity infrastructure in Indonesia, the government approved the 2018-2027 Electricity Supply Business Plan (RUPTL) with a target of reaching 56 GW of power plants spread throughout Indonesia. The network is expected to make internet access more widespread and the costs incurred are lower.

Human Resources (HR). According to BPS data (2020), Indonesia's population currently reaches 271 million people. Interestingly, from the total population, Indonesia is dominated by young people of productive age. It indicates a demographic bonus in Indonesia that can be appropriately utilised in the face of the Industrial Revolution 4.0 era by improving quality.

The Government’s Roles. The government has issued various policies that encourage the development of digital transformation in Indonesia. In 2018, the government officially launched a road map called 'Making Indonesia 4.0, ' which was implemented into potential digital transformations in five main driving technologies, namely artificial intelligence, human-machine interfaces, robotics, sensors, and the internet of things. Financial services authorities also encourage digital transformation by issuing several regulations, such as POJK 77/POJK.01/2016 concerning information technology-based lending and borrowing services and PBI No. 19/12/PBI/2017 regarding the implementation of financial technology. Contributions also come from SOEs and the private sector in preparing human resources in the digital era with the presence of NGOs or digital-based HR educational and training institutions, such as Digital Valley and the Digital Innovation Lounge (DILo) owned by Telkom, Binar Academy, Apple Developer Academy, and other digital developer academies.

3.2. Application of the “Digitalize Redenomination” Concept in Indonesia

Digitalize Redenomination has the potential to be applied in Indonesia. Bank Indonesia has been conducting studies on CBDC since 2017. With these studies, BI is trying to formulate the right technology and systems for CBDCs in Indonesia. So far, the type of CBDC that is most likely to be used soon is Wholesale CBDC which only can be used to solve large value transactions [2]. In addition, the Covid-19 pandemic has initiated the public to reduce the use of cash. In the past year, the use of electronic money has become more massive, so that people should also be able to get used to using digital money.

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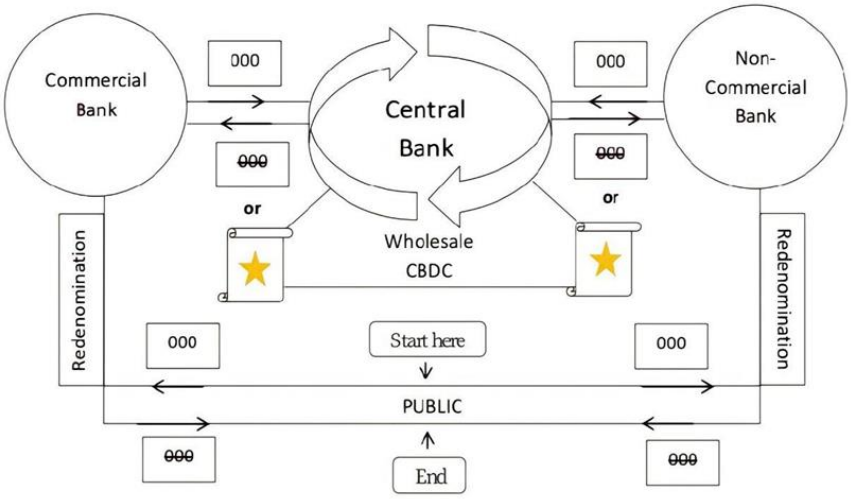


Figure 1: Model of Digitalize Redenomination

One of the redenomination stage involves dual price tagging where two types of currency are applied, namely the old rupiah and the new rupiah paper money. Government implemented this policy to get people used to the new rupiah and gradually withdraw the old paper money from circulation. Public will pay financial services with old paper money. Then, the old paper money circulating between financial institutions and the central bank. Bank Indonesia as central bank will converted it into a new paper money or CBDC that is tailored to the needs of financial institutions.

Until now, people still need paper money to accommodate transaction activities in the market, especially in retail transaction activities. In addition to retail transactions, the public uses old paper money to use financial services, either through commercial banks or non-bank institutions. Automatically, old rupiah paper money circulates to the central bank through these two types of entities. When banks and other financial institutions obtain old rupiah paper money from the public, the money will go to the central bank. It will be sorted out which paper money is still feasible and which must be withdrawn from circulation. As the central bank, Bank Indonesia, will only print new currency according to the quantity of rupiah that withdrawn from circulation.

Then what about electronic money? Will it use the old denomination or follow the post-redenomination nominal? Not only used paper money, public can also use electronic money to complete retail transactions. In contrast to paper money which imposes two prices on purchases, the electronic money will only use one denomination, namely the new denomination after the redenomination. In other words, electronic money will only use simple digits.

Based on the potential and risk analysis, Wholesale CBDC is a type of CBDC that has the potential to be implemented in Indonesia in the near future. Most likely, this type of wholesale CBDC runs on a blockchain network. This type of CBDC is exclusive, means that the network is only used in a limited scope for banks or parties determined by Bank Indonesia. So that it does not involve the public. That is to say that public does not use

CBDC to complete daily transactions because it is used only on a wholesale transaction scale. People continue to use rupiah new paper money as a substitute for the old one.

However, Digitalize Redenomination cannot be implemented in the near future. The Indonesian government is currently focusing on dealing with the Covid-19 pandemic. The redenomination policy alone has not become a priority for the National Legislation Program (Prolegnas). According to Berry A. Harahap, the redenomination policy bill is being worked on by Bank Indonesia and the Ministry of Finance to be included in the 2022 National Legislation Program.

On the other hand, every coin transaction in the blockchain requires a computational process with high specifications and large amounts of power. For example, each transaction of one bitcoin requires 1704.78 kWh of electricity, the equivalent of two months of electricity usage in the United States [3]. Each Transaction bitcoin also requires an average transaction fee of 2,129 USD [4]. So that the application of CBDC with a blockchain or Distributed Ledger Technology (DLT) is not yet possible to apply for retail transactions because more affordable energy has not been found.

A common thread can be drawn that the two discourses, both redenomination and CBDC discourse, cannot be realized in the near future because there are other aspects that require more attention and must be prioritized by the Indonesian government. However, if the various factors previously mentioned have been resolved, it is possible that Digitalize Redenomination can be reviewed and implemented during that period.

3.3. The Impact of Digitalize Redenomination

Financial transformation through Digitalize Redenomination with the wholesale CBDC will have a significant impact on the financial system in Indonesia. Wholesale CBDC has the potential to increase efficiency in settlements for transactions related to securities, derivatives and cross-border transactions. This type of CBDC can be another alternative to BI-RTGS. BI-RTGS volume data for 2020-2021 shows that the nominal and frequency the transactions has increased [5]. However, the BI-RTGS system is limited to operating hours starting at 06.30 - 19.00 WIB. The application of transaction fees is single credit differentiated based on the morning, afternoon and evening periods. While CBDCs wholesale use blockchain or Distributed Ledger Technology (DLT), the settlement process can be accessed 24/7 or at any time and can be done peer-to-peer to provide efficiency in operational time [2]. High-Value Payment System (HVPS) payment transactions, above one hundred million Rupiah and urgent, will increase due to increasingly sophisticated CBDC features and designs.

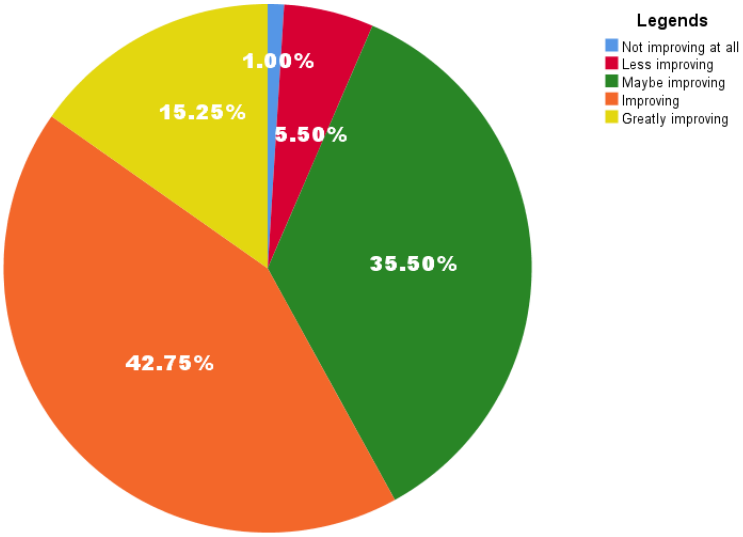
Due to technology limitations and the high operational costs of DLT technology, the public should use the new redenominated paper money for retail transactions. The redenomination of rupiah provides efficiency in the accounting recording process because it reduces the risk of recording errors and saves time. In addition, people's economic activities will be much easier. People no longer need to carry large amounts of money to carry out retail transactions.

RTGS

System BI-RTGS by Category of Transacting Party Table

Period	Conventional Bank		Sharia Bank		Sharia Business Unit	
	Nominal (Billion Rp)	Frequency (Unit)	Nominal (Billion Rp)	Frequency (Unit)	Nominal (Billion Rp)	Frequency (Unit)
Juli 2021	10,122,491.29	698,969	367,049.13	26,965	283,486.15	8,644
Juni 2021	10,147,675.94	751,836	400,521.67	28,583	237,590.41	9,059
Mei 2021	8,030,299.75	642,696	370,024.18	24,659	215,941.13	7,878
April 2021	8,970,085.41	758,281	322,539.51	31,101	233,269.94	9,332
Maret 2021	9,580,902.59	769,768	350,289.18	30,895	218,720.64	9,536
Februari 2021	7,841,383.33	639,873	279,268.46	24,619	149,530.61	7,427
Januari 2021	8,604,284.87	683,960	297,631.71	25,315	166,646.35	8,069
Desember 2020	9,312,081.63	827,340	445,826.02	31,896	242,408.05	9,064
November 2020	8,861,846.27	780,003	420,827.13	29,814	271,305.28	9,150
Oktober 2020	8,252,084.76	659,066	390,697.85	25,674	264,801.41	8,008

Figure 2: System BI-RTGS by category of transacting party-table[5]



Graph 4: Respondents' opinions regarding the correlation between digitalize redenomination and economic efficiency

Based on the graph of the survey results above, it is interpreted that the majority of the public are look that Digitalize Redenomination can improve the efficiency of Indonesia's national economy. The integration of the CBDC into the rupiah redenomination policy can shorten the implementation time of those policies, so that economic efficiency is achieved. In addition, the concept of Digitalize Redenomination can provide an alternative mechanism regarding the implementation of the two policies which the government is still studying.

4. Conclusions

Based on research, it can be concluded that conditions in the world are currently undergoing rapid changes with the Industrial Revolution 4.0, marked by digital technology developing rapidly in the world. All over the world, including Indonesia. The

existence of these technological developments has an impact on the financial sector with the emergence of private currency that the government has not recognized. In response to this, Bank Indonesia, as its obligation in the monetary sector, responded to these developments by reviewing digital currency policies legally and receiving direct accountability from the government through the central bank, known as CBDC. In addition, in Indonesia itself, there is the issue of implementing the redenomination policy. However, this policy can be carried out when economic conditions are stable, inflation can be maintained, and socialization to the public has been carried out massively. In practice, the implementation of the policy takes a very long time and is gradual. Likewise, the implementation of CBDC policies also takes a long time and must pay attention to the technological needs, the condition of the vast territory of Indonesia and has not been able to spread evenly for internet network problems.

Therefore, it can be concluded that the mechanism of Digitalize Redenomination that may be applied in Indonesia is to use a system of indirect CBDC in the form of wholesale. The mechanism is applied at the redenomination transition stage, where there is an old rupiah and a new rupiah. The new rupiah represents currency and CBDC that have been redenominated. CBDC wholesale This is used for large transactions between commercial banks and the central bank. Meanwhile, to convert old rupiah to new rupiah to the public, Bank Indonesia through commercial bank intermediaries in the distribution. Gradually, the old rupiah will be withdrawn by the central bank and replaced with new rupiah after redenomination so that the mechanism Digitalize Redenomination can be achieved and implemented.

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