

Research Article

Cryptocurrency and the Future of the World Currency

Aang Kunaifi^{1*}, Muhamad Wildan Fawa'id², Ani Faujiah³¹Program Studi Ekonomi Syariah, Fakultas Ekonomi dan Bisnis Islam, Institut Agama Islam Al-Khairat, Pamekasan, Indonesia²Program Studi Ekonomi Syariah, Fakultas Ekonomi dan Bisnis Islam, Institut Agama Islam Negeri Kediri, Kediri, Indonesia³Program Studi Ekonomi Syariah, STAI An Najah Indonesia Mandiri, Sidoarjo, Indonesia

ARTICLE INFO

ABSTRACT

Keywords

Cryptocurrency, Blockchain, World currency, Islamic civilization

***Correspondence**

angkunaifi@alkhairat.ac.id

Article History

Received 16 July 2021

Accepted 30 March 2022

Published online 1 April 2022

Cryptocurrencies and blockchain technology are increasingly loved, especially the COVID-19 pandemic sweeping the world. Some people choose to trade, invest, or mine using cryptocurrency because it is considered practical and able to generate fantastic profits. This article was written to analyze the prospects and implications of using cryptocurrency as a currency. To explore and describe the prospects and implications of cryptocurrency as a currency, a study was conducted with a literature review approach from secondary sources regarding the reasons for the prohibition of cryptocurrencies, the instability of crypto values, and without a clear underlaying of assets. Furthermore, the study in this article is expected to be able to explain the advantages and disadvantages of cryptocurrencies as well as alternative efforts in creating a stable and fair world currency

1. INTRODUCTION

In this digital industrial era, almost all lines of human life cannot be separated from the internet, including financial activities. All financial transaction data is recorded by the bank's computer in accordance with a programming language that is easy to read by customers and banks. The debits and credits must be written neatly and must be without errors. But apparently, this ancestral tradition that has been passed down from generation to generation has made some people feel uncomfortable with this technology. There are several reasons why this banking technology is considered to need a breakthrough. First, bank technology is very easy to break into by irresponsible people using the internet, fake telephones and skimming ATM cards. Second, inter-bank transactions are subject to a fee of up to 10,000 rupiah per transaction, which for some people is very burdensome. So there are various platforms that take this opportunity to provide easy transfers between banks without a penny, but it turns out that the banks are still very limited. Third, the aspect of the rupiah exchange rate is also based on the supply and demand activity of the United States dollar, this causes the rupiah currency to be corrected in value, especially inflation every year.

Answering this question Satoshi Nakamoto fought the global elite by creating bitcoin and blockchain technology in 2008. Blockchain itself is a technology used to transact bitcoin which at that time cost only 50.00 rupiah per coin in 2008, now it reaches 500,000,000.00 rupiah per coin. (Hikam, 2021) For cryptocurrencies, especially bitcoin, our country, which in this case is represented by the governor of Bank Indonesia Perry Wijayanto, has not yet accepted it as a legal tender, (idxchannel, 2021) however, the Commodity Futures Trading Regulatory Agency (BAPPETI) allows cryptocurrencies to be included in asset trading in Indonesia. This regulation was made to provide high confidence in the commodity futures trading sector (PBK) and create a favorable investment climate. There are at least 13 companies and 229 crypto assets getting legality from BAPPETI. (Liputan6.com, 2021) Although this decision from BAPPETI does not seem to be in line with the thoughts of KH. Cholil Nafis, Chairman of the Central MUI, said that cryptocurrency is not worthy of being called an investment, because it is closer to gharar (speculation) and there must be someone who benefits because they can profit while others feel disappointed because they always lose. Cryptocurrencies do not have clear underlying assets, so prices are unstable and very difficult to control and there is

no official guarantee of their existence. (idxchannel, 2021) Automatically if the object is haram, then all the means that support it are also considered haram.

Some of the previous research on blockchain technology as follows. Christian Esposito's research, entitled Blockchain-based authentication and authorization for smart city applications, says that blockchain is very suitable to be used as a smart city support technology because blockchain is capable of having a high level of security and can be integrated into a firmware platform. (Esposito, Ficco, & Gupta, 2021) David Berdik's research, A Survey on Blockchain for Information Systems Management and Security, the fact that blockchain structures and cloud and modern computing paradigms are critical in enabling the broad adaptation and development of blockchain technology for new entrants in a dynamic global market is unprecedented. previously. (Berdik, Otoum, Schmidt, Porter, & Jararweh, 2021) Nan Jing research, A blockchain-based code copyright management system, This paper proposes a blockchain-based code copyright management system. First, an Abstract Syntax Tree-based code originality verification model was built. The authenticity of the uploaded code is determined by its resemblance to the rest of the original code. Second, the Peer-to-Peer blockchain network is designed to store the copyright information of the original code. Nodes in the blockchain network can verify the authenticity of the code based on the code authenticity verification model. Then, through block construction and validation of block legitimacy and linking, a blockchain-based code copyright management structure is built. The whole process guarantees that copyright information is traceable and will not be tampered with. According to the experiment, the accuracy and processing time of the code originality verification model are proven to meet the code originality verification requirements. Experiments also show that the best storage type of copyright code information is code fingerprint which is a 256 bit hash value converted from the eigenvalues of the code. It performs better in response speed and storage efficiency. In addition, due to the uniqueness and irreversibility of the results of the SHA256 algorithm, the storage of code fingerprints results in a better level of storage security. (Jing, Liu, & Sugumaran, 2021)

From the various cases above, it can be concluded that blockchain has technological advantages that can technically be developed to create a transaction tool that meets the demands of globalization, as well as being a fair medium of exchange according to market mechanisms. A fair currency is really needed by the world community, because the current paper currency system tends to be a tool for superpower domination over developing countries. In practice, we see that the European-dominated superpowers with secular-capitalism ideology are very effective in controlling or colonizing Muslim countries through the main currency dollar. It's just that blockchain technology is still intended for cryptocurrencies. When countries refuse cryptocurrencies to enter into payments legally, this technology becomes useless. So there is an opportunity if a country's currency such as rupiah is converted into digital money or crypto money, it will have the opportunity to take advantage of blockchain technology as a new breakthrough in the monetary system. The goal is to maintain a fair exchange rate between currencies. So is cryptocurrency with its blockchain technology the only hope in fixing the world currency gap over the dominance of the dollar, pound sterling, or euro? How can developing countries, which are predominantly Muslim countries, be able to free themselves from the domination of the currency of the superpowers? This study will be discussed in this paper.

2. RESEARCH METHODS

This article was written based on the study of literature and historical data, as well as the latest empirical data. Furthermore, it is compared with describing the values in the Qur'an and Hadith as a source of Islamic law. Data collection and analysis was carried out qualitatively with a study approach. The data is obtained from secondary sources obtained through books, articles, scientific journals, and news about the pros and cons of cryptocurrencies as an interpretation of the advantages and disadvantages of cryptocurrencies. Furthermore, it is compared with the historical facts of currency in Islam which for almost 1,400 years have used dinars and dirhams (full bodied money) as currency. Next, it is analyzed with verse texts, hadiths, and opinions of credible scholars relating to the application of currency in the history of Islamic civilization. This approach is commonly applied in various contextualization studies of fiscal and monetary systems. (Kunaifi, 2021), as well as the field of macroeconomics as an applicable concept of welfare (Kunaifi, Rahman, & Dwiaryanti, 2021). To strengthen this, the mechanism for using technology in currency management is also studied, so that an ideal currency system can be initiated and formulated that is fair, and in accordance with Islamic law (Azizah & Irfan, 2020).

3. RESULTS AND DISCUSSIONS

3.1. A Brief History of World Currencies

The emergence of money for the first time in the world there is no consensus from economists to estimate how the money is used. In primitive societies the term money had not yet been invented, but as an embryo for an urgent need, humans gradually implemented a barter system whose development later emerged the term money as a substitute for the barter system. The development of this money then became a medium of exchange until now. This happens because barter exchange has many problems compared to money. This activity can be observed that barter exchange can take place if the assessment of the goods to be exchanged by each owner is in accordance with both the type of goods and the desired value. If one person does not want and does not need the goods to be exchanged, then the barter process cannot occur. Before the idea of using money in general by the community, people have used many metal objects as a medium of exchange. Again, because it was heavy and found it difficult to carry a metal currency, people began to think about making a metal currency that was more practical. (Alamad, 2019)

This is the forerunner of the existence of coins. Likewise with the forerunner of paper money, in ancient times the traders who kept gold (dinar) in the bank received a letter of deposit of gold from the bank. Gradually the proof of gold deposit was used as a means of payment. In brief, the development of world currencies can be described as follows.

3.1.1. Currency in whole of Islamic Civilization

In Islamic history, trade was the basis of the economy in the Arabian peninsula before Islam came. The currency used at that time was the Roman dinar and the Persian dirham. (Fayyad, 1958) This is understandable because the Romans and Persians were trading partners of the Arabs. In addition, the geographical location of the Arab region, especially the Hejaz. So that it gives a distinct advantage for the area to be traversed by trade routes between Persia and Rome, Rome to India and its colonies such as Sham (Syria), Ethiopia and Yemen. The value of one dinar at that time was equal to ten dirhams. (Al-Kattani, t.t.) After Islam came, the dinar and dirham currencies were still used as a transaction tool at the time of the Prophet. Even at this time it has been determined that the dinar and dirham are legal tender. According to Kadim as-Sadr in his writings "Money and Monetary Policy in Early Islamic Period" which was later collected by Baqir and Hasan in the Essay book. Explaining that the dinar and dirham coins have a fixed gold and silver content so that the stability of the exchange rate is stable. This happened not only during the time of the Apostles, but even further into the Umayyad dynasty. However, during the Umayyad and Abbasid times, the weight of the dinar and dirham changed as well as in Persia. (Mirakhor & Al-Hasani, 1989) In the next period the content of dinar (gold) and dirham (silver) underwent changes in other areas of Islamic rule. So it can be concluded that the dinar and dirham, although originally from Rome and Persia, Islam was the one who then incised the implementation of the two currencies for a very long period of centuries until the Ottoman Dynasty in 1924. Standardization of dinar and dirham money at that time was based on hadith Rasulullah saw, "The scales are the scales of the residents of Mecca, and the dose is the dose of the people of Medina" (HR. Abu Daud). At the time of the caliph Umar bin Khattab, namely in 642 AD, along with the printing of the first dirhams in the caliphate, the standard of the weight relationship between gold and silver was standardized to 7 dinars equal to 10 dirhams. While the weight of 1 dinar is equal to or equal to the weight of 72 medium-sized grains of wheat which are cut off at both ends. To see the historical heritage of Islamic currency, it can be seen that there are four collections of currency relics, one of which is the currency printed during the Caliph Ali Ra., while the other three are silver coins that were printed in Damascus and Mervi around the year 60-70 H. (Karim, 2002)

At the time of Caliph Umar and Uthman Ra. currency has also been printed following the Persian dirham style with changes to the inscription on the currency. At the beginning of the reign of Umar Ra. never arose the thought of printing money from leather. The idea was canceled because it was not approved by the other friends.

The currency of the Islamic caliphate has a special feature that was printed at the time of Caliph Ali ra. Unfortunately, its circulation was very limited due to the political conditions at that time. Persian style currency was also printed in the Mua'wiyah era with pictures and swords imprinted, the Governor of Iraq, during Zaid's reign, printed money with the name of the caliph on it. As a result, the mode used by Mu'awiyah and Ziad was in the form of embedding the image and name of the head of government on the currency. These relics may still be preserved to this day, including in Indonesia in making money with the inclusion of images and heads of government. Although the currency circulating at that time was not round like coins today, it was only during ibn Zubair's time that round currency was printed but its circulation was only limited to the Hijaz region. A unique breakthrough was like the governor of Kufa who printed money in a combination of Persian and Roman. In the year 72-74 H -- Bishri bin Marwan

-- printed currency called atawiyya. Until this time the caliph's currency circulated with the Roman dinar and Persian dirham and a little Yemeni himyarite. It was only during the time of Abdul Malik (76 H) that printing houses could be organized under government control, namely the establishment of printing houses in Dar A'jarb, Suq Ahwaz, Sus, Jay, Manadar. Maysan, Ray and Abarqubadh.(Alamad, 2019)

3.1.2. Currencies in 20th Century

Dirhams and dinars have a fixed value because of that there is no problem in exchanging money, if the dinar is used as a unit of value then the value of the dirham is the multiplication of the dirham; and if we assume the dinar as a monetary unit its value is ten times the dirham. Even so, the dirham was more commonly used than the dinar because of the political aspect, namely that almost all areas of the Persian empire whose currency was dirham could be controlled by Islamic armies. While not all areas of the Roman Empire that had the dinar currency could be controlled by Islam, it became natural that the dirham was more common in the Arab trading world at that time. So that the dinar and dirham become world currencies that are not limited by place and time until the golden age of Islam.

In other words, gold and silver currencies are still declared fixed. For this reason, there are many thoughts from Muslim figures in the world, both through the Islamic Development Bank (IDB) – which was established on April 23, 1975 – and Indonesian Muslim scholars through Bank Muamalat Indonesia (BMI) such as Cecep Maskanul Hakim and others. declared that the gold dinar will be used as world currency again? (Perwataatmadja & Antonio, 1992)

The dinar is a currency with the same physical value and intrinsic value, as it is based on gold. In Indonesia, the dinar is not yet popular. Dinars have been produced and circulated in Indonesia since 2001. The use of gold dinar coins by the Indonesian people is still very limited, both in terms of function and quantity of use.(Redaksi, 2004) Based on the standards of the World Islamic Trade Organization (WITO), the value is equivalent to 4.25 grams of 22 carat gold, with a diameter of 23 mm. The form of the dinar around the world is different. In Indonesia too, the form is different, depending on the institution that issued it. The dinar issued by Baitulmaal Muamalat (B-Dinar) has a picture of the Aqsa Mosque, Baitulmaal inscription, a light above the Aqsa Mosque, and gears. While the inside is written two sentences of the creed. The shape is not very significant, basically all institutions clearly have the right to issue dinars as long as they meet the WITO standards, which are 4.25 grams, 2 carats, 23 mm in diameter. Moreover, if the government has the political will to make the dinar a currency, its form must be used the same way throughout Indonesia after going through WITO as its accreditation agency. The applicability of a currency for further development (post-dinar and dirham) can be observed that it is limited by place and time and does not apply at all times, for example, the Rupiah is only accepted in the territory of Indonesia, the Rupee is only accepted in the territory of India -- and many other currencies -- as a tool valid payment, and not valid in other regions.

3.1.3. Fiat Money

The end of the classical gold standard system, or better known as the classical gold standard, was followed by the end of a substitute system similar to it, namely the Bretton Woods system in early 1971, marking a new era of the international monetary system under the floating exchange rate system. However, in reality the system is dollar-dominated. Duncan in his book *The Dollars Crisis*, prefers to call it the standard dollar. The nickname is because the dollar is used as the main reserve currency (the core reserve currency) in the international world to replace gold, which became the world's main reserve when the Bretton Woods system or the classical gold standard system was implemented.(Hamidi, 2007) Furthermore, Duncan argues, that one of the hallmarks of the gold standard system is the presence of an automatic adjustment mechanism that other systems such as the dollar standard do not have.

The dissolution of the Bretton Woods system by America was motivated by the war between America and Vietnam, resulting in America printing dollars to increase its fiscal spending, including to finance the war. Thus, it will have an impact on the budget deficit that is getting bigger while the ratio between the supply of dollars and its gold reserves continues to decline. During that period, America's gold stock fell from 20 billion dollars to only 9 billion dollars and America then experienced a gold reserve deficit. Taqiyuddin an-Nabhani argues that politically the steps taken by America to stop linking the dollar with gold are driven by America's desire to position the dollar as an international monetary standard so that it dominates the international monetary market. Therefore, the gold standard was then considered no longer usable in the world. The Bretton Woods monetary standard then crumbled and exchange rates continued to fluctuate. This is where various difficulties arise in the mobility of goods, money and people.(an-Nabhani, 2012) Since then the world currency has become unstable. The currencies of the US and the rest of the world continue to be volatile. Fluctuations in exchange rates are difficult to predict and sometimes even go to extremes. Not to mention that inflation continues to soar due to currency printing getting out of control. This is a very disturbing situation for economists. These are some of the consequences of fiat currency.

3.1.4. *E-Money and Digital Money*

Electronic money is a price value stored in a money register, the recording media can be in the form of application media or chips. The recorded price and use value are in accordance with the nominal value deposited with the application manager and chip issuer. (Rizki, 2020) By owning the chip or application, the owner or application holder can use it to make less cash payments. Various advantages of electronic money whose use is encouraged by Bank Indonesia are; guarantees payment accuracy up to 1 digit, is faster and more practical, safe in storage, and saves money production costs. (Rusdiyanto, 2017)

In terms of function, electronic money is divided into two, namely; single-purpose and multi-purpose. Single purpose is the single function of electronic money for certain payments, such as e-toll (only for payment of toll road use services), e-parks, and so on. Meanwhile, multi-purpose allows the money stored in the user's chop or application to be used to pay for all transactions that we make, both for payment for services and for purchasing goods. Of course, the multi-purpose function also has limited transaction objects, according to the number of merchants (third parties who collaborate with e-money issuers).

Apart from the various shortcomings of the existence of electronic money, both in terms of supporting facilities and infrastructure that do not cover the entire retail trade; the level of security in the use of e-money; the cost of purchasing a starter pack and e-money top-up fee; there is no regulation that guarantees protection and legal certainty regarding e-money, (Suharni, 2018) but the public interest is very high. This is evidenced by the increasing number of transactions using electronic money, even at the end of 2018 it had reached 42 percent of all transactions. In addition, technology which in principle is to facilitate human work becomes a necessity that is difficult to avoid.

As for digital money as the development and expansion of electronic money, it is formed from the existence of digital money providers who are also often called digital currencies or virtual money and crypto currencies. All three are new trends and their development has influenced payments and the transformation of the monetary system. In its existence as a currency that is used as a combination of two elements, namely a tradable asset and an exchange mechanism that allows payments and settlements through the use of certain applications. Although digital money has become the main focus of scientific research around the world in recent years, in particular there is no unified system for estimating the risks of digital money circulation at various levels of the economy. Scientifically and tools to manage this risk have not yet developed, thus creating obstacles for government agencies in regulating the circulation of digital money. (Larina & Akimov, 2020)

3.2. *The Risks and Problems of Each Currencies*

Each type of currency must have advantages and disadvantages in its use. So to give a comprehensive conclusion, an apple to apple approach must be taken. Here are some of those analyses:

3.2.1. *The Problems on Fiat Money*

In world monetary history, it was found that the use of paper currencies that were not backed by commodities such as gold caused a number of very serious problems in the economy. Among these problems are:

First, paper currency causes high inflation. At the beginning of the 9th century, China circulated paper money as well as being the first country to use paper money to replace copper, which at that time experienced a shortage. China has produced paper currency which is not backed by gold or other commodities at all. However, instead of fixing its economy, in 1051 China actually slumped and experienced very high inflation due to the continuous production of paper money.

Second, the legitimacy of paper currency is very fragile because it is not based on valuable commodities such as gold and silver. It is only supported by laws made by the government of a country. If the political and economic conditions of the country are unstable, the level of confidence in its currency will also decrease. The owners of money will switch to other currencies or commodities that have real value, so that paper currency becomes worthless.

Third, paper money has become the easiest source of government income through quantitative easing mechanisms. The cost of production is very low compared to the nominal value it contains, making it easier for the Central Bank to print paper money. The money is then circulated to the people to be accepted as a medium of exchange. By exchanging the money for goods and services produced by its people, the government can enjoy the sweat of its people easily. In other words, paper currency has become a means of extorting the state against its people. People then become victims of high inflation. (Iqbal, 2010)

Fourth, the use of paper currency creates injustice in economic activity. For example, the cost of producing a 100 dollar note is 20 cents, so the benefit (seignorage) of the exchange rate is 99.80 dollars. In other words, every time the US prints a 100 dollar bill, it will make a profit of 99.80 dollars. The Federal Reserve, the US central bank, has

enjoyed enormous seignorage by issuing dollars since it became the most dominant international reserve currency. The dollar has a strong purchasing power outside the US, so the US can freely take advantage of this opportunity to continue to print dollars.(Harwood, 2013)

Fifth, paper currency has pushed an economic bubble that can lead to an economic boom. The danger of fragility of the dollar as the most powerful paper currency at this time has also been warned by Samuelson as written in The Washington Post (17/11/004). According to him, in 2004 alone, private investors had bought up US stocks and bonds. Overall foreign investors have held 13 percent of the total US stocks, 24 percent of corporate bonds and 43 percent of US government securities (treasury securities). This asset ownership structure is very dangerous. The reason, now the world has received more dollars than he wanted. If there is a crucial momentum at any time these stocks and bonds will be released by their owners and a global recession that I say will occur. People are busy selling dollars and switching to other strong currencies such as the Euro and Yen and the value of the dollar is sure to drop significantly. The fall in the dollar means the value of stocks and bonds held by foreign investors will also fall. They compete to sell the assets they have. That's when the stock markets will drop sharply and the US dollar will lose its value. This danger is even more threatening when the world has been flooded with dollars. In the money markets alone, there are US dollar bubbles amounting to 80 trillion US dollars per year. This amount is 20 times more than the value of world trade, which amounts to about 4 trillion US dollars per year. This means that the bubble can buy everything that is traded 20 times its normal value.

3.2.2. Risks and Problems on E-Money Even Digital Money

Some of the problems and risks in digital money systems are (Larina & Akimov, 2020); First, in the management system aspect, high power is needed that is able to back up smooth transactions and minimize disruptions. So that this condition will deny the existence of partial management and lead to a more centralized pattern of state involvement. It is this factor which, in principle, is undesirable in capitalism, because it is considered to interfere with the freedom of transactions and monetary policy which should be liberal and independent by the central bank. If it is not backed up by state power, it will pose a big risk of material loss, considering that authentic evidence is only in the form of an application or the chip has no physical value.

Second, market risk and investment risk in the form of difficult to predict the digital movement of currency values because they depend on various factors: advertising, political and financial news, technical trends, and the dynamics of the law of demand and supply that become the price value of a commodity including digital money.

Third, the instability of the financial and banking systems in the form of technical dependence with a very dense population and transactions at the same time. It requires constant maintenance and technology updates, as well as cost repair and system integrity. All digital currencies are based on distributed ledger technology which has many advantages, but at the same time it is not perfect, and that should be considered. Digital money is also easy to crash in a short time as happened in August 2020 a major vulnerability in the bitcoin protocol was seen, which engineered users to create an unlimited number of bitcoins.

Fourth, the loss of state sovereignty in the context of a borderless digital money mechanism. The state is hard on volatility and anonymity which in turn triggers tax evasion, money laundering, financing of terrorism and, as a result. Private digital currencies are not controlled by the state, assets and can be used for public purposes and can also be used to undermine state sovereignty.(Ridwan, 2019)

Fifth, the risk of deflation caused by an imbalance in the supply of digital money (could be caused by a poor management system). The number of managements and the limited number of supporting facilities are obstacles to the production of digital money. On the other hand, the number of goods and services can grow rapidly. So there is a gap that results in deflation.

3.3. Cryptocurrency and Blockchain

3.3.1. Cryptocurrency, what is it?

The word cryptocurrency literally means currency with a secret code. Why is it called a secret? because based on its history, cryptography was a technology of the German army during the second world war, to send messages. But now cryptography is transformed into cryptocurrency, namely digital money whose messages or transactions are no longer secret because it can be seen by many people, but only the password is secret.

In contrast to conventional currencies which are centralized and controlled by the government, cryptocurrencies are decentralized. Everyone can build their network and get a fee for every transaction, which is why this activity is called mining. Transactions occur between people with computer intermediaries (peer to peer), and all transaction activities are recorded properly by blockchain technology.(Noorsanti, Yulianton, & Hadiono, 2018)

One of the advantages of cryptography is that digital currency is difficult to counterfeit, not only that cryptography is able to secure financial transactions, monitor financial use and verify them. The founder of Stockgrow, Achie Mahfudloh, said that cryptocurrencies have at least four functions, namely transactions, mining, investment, and trading. As a means of transaction, crypto currency has the same exchange rate as other conventional currencies to buy goods and services. Bitcoin (BTC) is the most popular crypto currency. The total value of Bitcoin has reached over \$1 trillion.(Firdaus, 2020)

Since the 1990s, cryptocurrency development has been carried out, but it has only been around the last 10 years that cryptocurrency has been known to the public, especially during the COVID-19 pandemic. The introduction was also very funny, namely the transaction made by Lazlo hanyecz who decided to buy 2 pizzas by transferring 10,000 bitcoins. In today's cryptocurrency market there are more than 1,000 types of cryptocurrencies but the ones that are often used are Ethereum, Ripple, Monero, Litecoin, Dogecoin and of course Bitcoin.(Hamin, 2020)

3.3.2. Cryptocurrency Advantages and Disadvantages

Like a system, it will definitely not be separated from the positive and negative sides. The following is an explanation of the advantages and disadvantages of cryptocurrencies.(Purwati, 2019) The advantages include; has the potential to become a commodity of high economic value in the future, transactions take place quickly, are safe from physical damage and are easy, avoidable and cannot be counterfeited, safer than paper money or ordinary electronic money because they transact without showing their real identity.

Disadvantages of cryptocurrencies include; legality has not been universally recognized as evidenced by the existence of several countries that prohibit it even though some allow its existence. High volatility, so the value can be very volatile and potentially unstable, so it can suddenly go high and it can go down just because of someone's influential statement. Through a fair mechanism, crypto money will be difficult to predict in value, so many people choose mining rather than trading. This is different from banknotes which are more predictable and can even be designed. A little mistake such as forgetting a password will have an impact on losing the digital money, because all data is only recorded on electronic systems and applications.

3.3.3. Blockchain System and Technology

The technology used by cryptocurrencies is called Blockchain. This technology literally means chain group. The name is in accordance with the technical workings of blockchain, which uses a computer network to create blocks that are connected to each other with the aim of executing transactions. Blockchain is a chain of sequential blocks that are assembled and distributed together. Each block consists of a ledger and three elements, namely the data, hash and hash of the previous block.(Di Pierro, 2017) The type of data used depends on the purpose for which the blockchain is built, as most likely this technology is not only about cryptocurrencies but various lines of life. Like for example in crypto transactions, the details of all transactions are entered in the block data, such as the number of coins, who is the sender and who is the recipient. While the Hash task is to identify the block and all of its contents in a unique code. Hash also serves to secure the blockchain chain while carrying a trace of information.(Nofer, 2017)

Although it is considered a modern technology that is on the rise today, in fact Scott since 1990 has sparked the idea of blockchain and wrote it in his journal entitled Journal of Cryptography: How to Time-Stamp a Digital Document.(Haber & Stometta, 1990) Blockchain technology is very applicable in the financial world, for example in cash books, which so far only know banking, can now be accessed by all blockchain users, anytime and anywhere. Even if this model will threaten the banking function. Blockchain technology is so indulgent in the entire transaction process. Transactions are more secure and transparent so as to minimize errors and misuse of data that is currently rife, such as buying and selling data, bribes and corruption. According to McKinsey, telecommunications, property, media, medical, and agricultural companies can also take advantage of Blockchain technology to facilitate their work, not only cryptocurrencies.

When a transaction is recorded on the blockchain, the information cannot be changed forever. Blockchain starts working when a block accepts a new transaction. The decentralized nature of blockchain makes this technology does not require a bank for data validation. Amazingly, all transactions are shared among all participants in the blockchain network so that everyone is watching. All information is entered into a block in the form of a hash that has a unique code. This one block can store any transactions, such as investments and transactions.(Wilianto & Kurniawan, 2018)

Blockchain technology has a very transparent and secure system. Blockchain technology is proven to be secure and transparent. The reason is, when the transaction takes place, public access can be seen by all parties without the need to login. However, the confidentiality of user information and data is guaranteed.(Kosasi, 2020) The blockchain database can only be added but not reduced. Each set has its own unique key. When one chain loses and forgets the

password, it must be abandoned and switch to a new chain. For now, the blockchain system is difficult for hackers to penetrate, because actually there is no safest system on this earth. But blockchain can also be used to track asset audit trails, so data abuse can be minimized. The presence of blockchain makes brokers able to change professions into selling rigs for mining, or rig repair services, even services for opening forgotten accounts. How not, this technology does not require intermediary fees. All recording and verification activities are directed and fixed. Rig sales for mining, or rig repair services, even services for opening forgotten accounts. How not, this technology does not require intermediary fees. All recording and verification activities are directed and fixed.

It should be noted that apart from investing and trading, mining activities are very wasteful of electricity, and require capital that is not cheap. Making GPUs (Graphic Processing Units) a rarity and their prices going up many times over. The GPUs needed for cryptocurrency mining are high-end GPUs, such as the Nvidia GeForce RTX 3090, RTX 3080, RTX 3060 and RTX 3070 as well as the AMD Radeon RX 6900 XT. While low-end GPUs such as AMD Radeon RX 5700 and RX 5600, this GPU should not be affected, but because it is rare, miners are forced to use this GPU. ("GPU Rp 5 Jutaan Kini Dijual Rp 11 Juta Gara-gara Bitcoin," t.t.) CPU (Central Processing Unit/prosesor) like a group of intelligent people, who can decide on their own commands on the computer. While the GPU is like a laborer who works like a horse, running tirelessly with satisfying work results. The cryptocurrency mining process is an iterative task, the GPU is in charge of performing arithmetic and logical calculations continuously. The more sophisticated the GPU, the faster the calculation process will be. More tasks are completed, and more money is generated. That's why high-end GPUs are being hunted more by virtual miners.

Benjamin Jones argues that mining activity consumes more electricity than a country's electricity supply. Of the 21 million bitcoins in circulation, 18.5 million are mined every day. The electricity used reaches tens of terawatts every year. An alternative financial company in Cambridge predicts electricity consumption for mining will reach more than 115 terawatt hours. Digicomist reports that not only is mining wasteful of electricity, but cryptocurrency transactions also consume a lot of electricity more than daily online activities. The carbon produced is equivalent to 680 thousand transactions using an atm card, and the time spent is the same as 51,120 hours watching YouTube. Perhaps it is for this reason that bitcoin mining is mostly done in China. ("Penambangan Bitcoin Boros Listrik, Begini Menurut Ahli," 2021) Perhaps because the largest solar power plant is in China with a capacity of 1,500 megawatts. (Mediatama, 2019)

3.4. *The Future of World Currency*

The monetary system is part of the management of economic resources in the world, this system will affect various human activities in meeting their needs. One of the instruments in this system is currency, which has a vital function as a medium of exchange and a means of measuring the value of goods and services. The world, through state institutions, is obliged to ensure the availability of money so that the distribution of resources in society runs smoothly. (Chapra, 2000) The currency system is a strategic component in people's lives. So that the whole world really needs a just monetary system, not an oppressive and deceptive system. (Gray, 2011) Therefore, it is important to examine the process of developing the international monetary system, to design international monetary stability from injustices in the form of inflation, exchange rate gaps, and interest rates. (Kamasa, 2012)

Coins (gold and silver) are comprehensively the best choice in the world of currency. As full bodied money, gold and silver not only have appropriate intrinsic and extrinsic values, but also provide guarantees for their owners to feel safe from being damaged, destroyed, or lost. Even though gold sinks into a salty ocean, for example, it remains in its original form and does not change. (Meera, 2004) Another advantage of gold currency is that it is easy to divide (divisibility), high value (luxury good), accepted by the whole world community (universally), and rare (scarcity). (Weatherford, 2005) The system of paper money that is printed without backing up gold and silver has created a wealth gap for countries in the world. This shows that the dollar paper currency as the main currency has failed to create monetary stability in the world. Even though it is supported by domination and political instruments, during the COVID-19 pandemic, its value tends to weaken. (Alamsyah & Juliana, 2021) The emergence of the euro in 1999 was a reaction to the distrust of the dollar as a currency.

Gold and silver currencies (dinar and dirham) are currencies that are able to bring business blessings and a fair system in the distribution of economic resources (Iqbal, 2010). Legally and in fact, the country's currency system must be resilient to inflation and provide a guarantee of genuine trust in the public. Because the existence and function of money in Islam is to ensure smooth transactions and increase the productivity of the real sector as a medium of exchange, not as a commodity to be traded commercially (Kunaifi, 2021). Apart from historically and empirically this currency is proven and tested for its reliability, it also has a strong theological value. Mentioned in the Qur'an Surah Ali Imron verse 75:

وَمِنْ أَهْلِ الْكِتَابِ مَنْ إِنْ تَأْمَنْهُ بِقِنْطَارٍ يُؤَدِّهِ إِلَيْكَ وَمِنْهُمْ مَنْ إِنْ تَأْمَنْهُ بِدِينَارٍ لَا يُؤَدِّهِ إِلَيْكَ إِلَّا مَا دُمْتَ عَلَيْهِ قَائِمًا
ذَلِكَ بِأَنَّهُمْ قَالُوا لَيْسَ عَلَيْنَا فِي الْأُمِّيِّينَ سَبِيلٌ وَيَقُولُونَ عَلَى اللَّهِ الْكَذِبَ وَهُمْ يَعْلَمُونَ

Among the People of the Book there is a person who if you entrust him with a lot of wealth, he will return it to you; and among them is someone who, if you entrust him with a dinar, will not return it to you unless you always ask for it. That is because they say: "There is no sin for us against the unbelievers. They speak lies against Allah, even though they know".

Thus there is no reason to ignore the application of the dinar and dirham currency system as a suitable currency for the world. Moreover, technically, the actual supply of gold and silver in the world must be sufficient and sufficient for human needs until the Day of Judgment. Political-economic issues became the alibi for rejection of gold currency by Western countries. Seeing the condition of the largest gold reserves in Islamic countries, it has the potential that the Islamic region that once controlled world civilization with an area of two-thirds of the world will become the richest region. So that with its political power the West (America and Europe) has always prevented the application of gold and silver currency.

The problem that must be resolved now is, how is the integration of the dinar and dirham currency systems in the development of digital technology in the form of cryptocurrency? Technology is a tool to facilitate human work, in the Islamic treasures the law is equated with the law of objects (madah) that is permissible. So, as long as it is not created from a certain concept or ideology, it can be created and used. This is as fiqh rules:

أَلَّاصِلٌ فِي الْأَشْيَاءِ الْإِبَاحَةُ مَا لَمْ يَرِدْ دَلِيلُ التَّحْرِيمِ

The law of origin of objects (goods) is permissible as long as there is no evidence that forbids it. (Khalil, 2014)

Meanwhile, how to use technology is a category of actions, the origin of which is legally bound by sharia, meaning that it must be explored first whether it is allowed or not.

الْأَصْلُ فِي الْأَفْعَالِ التَّقِيدُ بِالْأَحْكَامِ الشَّرْعِيَّةِ

The law of origin of human actions is bound by sharia law.

This shows that in Islam humans have the freedom to be creative in creating products that are useful for meeting human needs, except for products that are clearly forbidden by sharia, both in terms of the physical object and the manufacturing process (Kunaifi, 2016). So that in terms of the creation and use of blockchain technology in order to regulate the management and transactions using crypto money systems, it can be utilized. Remain within the framework or context of changing the form of gold or silver currency which is converted into cryptocurrency before being transacted. But the money production system itself still uses a currency that is fully backed by gold and silver.

Table 1. Currency system comparison table

Character	E-money	Cryptocurrency
Definition	Electronic or digitally money	A combination of two different syllables, namely cryptography (crypto password) and currency (currency). So, cryptocurrency is a cryptographic cipher based currency
Legality	Legal for all countries/nations	Just a number of nations in legal, some others illegal
Technology	Computer networking/ internet	Blockchain
Purposive	Exchange	Exchange, investment, mining
Sharia compliance	Halal by the right contract	Haram both as currency and as a commodity. One of the reasons is because this type of currency does not have a physical form that can be handed over to the buyer and ultimately creates uncertainty in transactions
System	There is physical currency that is used as collateral. The physical money is the official currency of a country and is placed and stored by the owner of the e-money in the bank where the e-money is issued.	There are 2 types of cryptocurrencies, including unsecured cryptocurrencies, and asset-backed cryptography. Cryptocurrencies that are not guaranteed assets, for example, are Bitcoin. Asset-backed cryptocurrencies, for example, are a subset of Ethereum, and generally Tether.
	Centralized on banking system	Tether is a cryptocurrency backed by US dollar (USD) assets, with the physical dollar currency set up by its own Issuing Platform. Meanwhile, Ethereum's assets are in the form of digital physical a work of art provided by the miners themselves. Decentralized (only between users no third parties)

Character	E-money	Cryptocurrency
Exchange rate	Controlled	Uncontrolled, very sensitive
Product	E-toll, e-wallet, e-payment, GoPay, OVO, DANA, etc	Bitcoin, Litecoin, Dogecoin, Feathercoin, etc.

Table 1 shows that the characteristics of cryptocurrencies are very different from digital money or electronic money. This is because its main function is not only as a medium of exchange for transactions carried out in economic activities. The function of money in a currency system is not a commodity, so it is not commercialized, because otherwise it would be a gambling transaction. In summary, the existence of crypto is a phenomenon that is impossible to develop in the Islamic monetary system because its function is not appropriate, and factually does not provide benefits for the people. The real challenge is how to replace the hegemony of the monetary system built by the ideology of capitalism. It takes general awareness of Muslims in particular to have complete awareness to make changes from the adoption of the capitalist system to the Islamic system. Allah SWT says:

لَهُ مُعَقِّبَاتٌ مِّن يَدَيْهِ وَمِنْ خَلْفِهِ يَحْفَظُونَهُ مِنْ أَمْرِ اللَّهِ إِنَّ اللَّهَ لَا يُغَيِّرُ مَا بِقَوْمٍ حَتَّى يُغَيِّرُوا مَا بِأَنفُسِهِمْ
وَإِذَا أَرَادَ اللَّهُ بِقَوْمٍ سُوءًا فَلَا مَرَدَّ لَهُ وَمَا لَهُمْ مِّن دُونِهِ مِن وَالٍ

"For humans there are angels who always follow him in turn, in front and behind him, they guard him by Allah's command. Verily, Allah does not change the condition of a people until they change what is in themselves. And if Allah wills evil for a people, then no one can refuse it; and there is no protector for them but Him."

Empirically historically only the Islamic system is capable of creating justice for mankind. Moreover, with the future of the return of the glory of Islam through the presence of an Islamic caliphate government system, it will be a stimulus to continue to strive for a fair system, especially in the monetary system. As explained in the hadith of the Prophet Muhammad: ("Memaknai Hadis Kembalinya Khilafah – Al-Wa'ie," 2021)

تَكُونُ النَّبُوَّةُ فِيكُمْ مَا شَاءَ اللَّهُ أَنْ تَكُونَ • ثُمَّ يَرْفَعَهَا اللَّهُ إِذَا شَاءَ أَنْ يَرْفَعَهَا • ثُمَّ تَكُونُ خِلَافَةً عَلَىٰ مِنْهَا جِئْتُمُوهَا
فَتَكُونُ مَا شَاءَ اللَّهُ أَنْ تَكُونَ • ثُمَّ يَرْفَعَهَا اللَّهُ إِذَا شَاءَ أَنْ يَرْفَعَهَا • ثُمَّ تَكُونُ مُلْكًا عَاصًا فَيَكُونُ مَا شَاءَ اللَّهُ أَنْ
يَكُونَ • ثُمَّ يَرْفَعَهَا إِذَا شَاءَ اللَّهُ أَنْ يَرْفَعَهَا • ثُمَّ تَكُونُ مُلْكًا جَبَرِيَّةً فَتَكُونُ مَا شَاءَ اللَّهُ أَنْ تَكُونَ • ثُمَّ يَرْفَعَهَا اللَّهُ إِذَا
شَاءَ أَنْ يَرْفَعَهَا • ثُمَّ تَكُونُ خِلَافَةً عَلَىٰ مِنْهَا جِئْتُمُوهَا

"In your midst is the age of prophethood. He exists and by Allah's permission will continue to exist. Then Allah will lift up that age if He wills to raise it. Then there will be a Khilafah following the prophetic manhaj. He exists and by Allah's permission will continue to exist. Then Allah will lift up that age if He wills to raise it. Then there will be unjust power. He also exists and by Allah's permission will continue to exist. Then Allah will lift up that age if He wills to raise it. Then there will be a miserable dictatorship. He also exists and by the permission of Allah will continue to exist. Then there will be another Khilafah following the prophetic manhaj." (HR Ahmad, Abu Dawud ath-Thayalisi dan al-Bazzar).

4. CONCLUSION

The concept of currency is the use of objects as a medium of exchange and a means of measuring value. In its function as a traded commodity, it must meet the rules of exchange for usury goods (sharf). Based on the data and description above, to formulate a fair future for currency in the world, it is first necessary to examine the best currency system, namely currency that can provide justice for mankind. The currency must be stable, free from inflation, free from a high exchange rate gap, free from usury. Thus, historical facts and studies show that the gold currency system is the best choice. As for crypto money, it can be used as a form of asset storage technology for its owners to be easily spent or exchanged. To realize this, enormous resources are needed, related to gold and silver exploration, energy to support crypto technology, as well as guarantees from a powerful government. implement the Islamic system. Through the power of the superpowers who back up the currency, the unfair dominance of the dollar and other paper currencies will be easily replaced.

REFERENCES

- Alamad, S. (2019). *Financial and Accounting Principles in Islamic Finance*. Birmingham. UK: Springer.
- Alamsyah, I. F., & Juliana, J. (2021). Transition to A True Currency: Impact of COVID-19 on The World Currency System. *Jurnal Kajian Peradaban Islam*, 4(2), 42–47. <https://doi.org/10.47076/jkpis.v4i2.65>
- Al-Kattani, A. H. (t.t.). *The Sistem of Propethic Development Goverment Calld The Administrative Procedure* (Vol. 2). Beirut: Dar Ihya At-thuras al 'Arabi.
- an-Nabhani, T. (2012). *Sistem Ekonomi Islam* (Terjemahan dari Nizhamul Islam). Jakarta: HTI Press.
- Azizah, A. S. N., & Irfan, I. (2020). Fenomena Cryptocurrency dalam Perspektif Hukum Islam. *Shautuna: Jurnal Ilmiah Mahasiswa Perbandingan Mazhab dan Hukum*, 1(1). Retrieved from <http://journal.uin-alauddin.ac.id/index.php/shautuna/article/view/12424>
- Berdik, D., Otoum, S., Schmidt, N., Porter, D., & Jararweh, Y. (2021). A Survey on Blockchain for Information Systems Management and Security. *Information Processing & Management*, 58(1), 102397. <https://doi.org/10.1016/j.ipm.2020.102397>
- Chapra, U. (2000). *Sistem Moneter Islam, "terj". Ikhwan Abidin, Towards a just monetary system*. Jakarta: Gema Insani.
- Di Pierro, M. (2017). What Is the Blockchain. *Computing in Science & Engineering*, 19(5), 92–95.
- Esposito, C., Ficco, M., & Gupta, B. B. (2021). Blockchain-based authentication and authorization for smart city applications. *Information Processing & Management*, 58(2), 102468. <https://doi.org/10.1016/j.ipm.2020.102468>
- Fayyad, A. A. (1958). *History of Islam*. Tehran: Enteshart Daneshgah Tehran.
- Firdaus, M. R. (2020). *Penggunaan Cryptocurrency Di Indonesia*.
- GPU Rp 5 Jutaan Kini Dijual Rp 11 Juta Gara-gara Bitcoin. (t.t.). Retrieved 16 Juli 2021, from <https://tekno.kompas.com/read/2018/01/25/10332217/gpu-rp-5-jutaan-kini-dijual-rp-11-juta-gara-gara-bitcoin>
- Gray, J. D. (2011). *Art of Deception Mereka Menipu Dunia*. Jakarta: Sinergi Publishing.
- Haber, S., & Stometta, W. S. (1990). *How to Time-Stamp a Digital Document*. 437–455. UK: Springer.
- Hamidi, M. L. (2007). *Gold Dinar; Sistem Moneter yang Stabil dan Berkeadilan*. Jakarta: Senayan AbadiPublishing.
- Hamin, D. I. (2020). Crypto Currensi dan Pandangan Legalitas Menurut Islam: Sebuah Literature Review. *JAMBURA: Jurnal Ilmiah Manajemen Dan Bisnis*, 3(2), 127–139.
- Harwood, J. (2013). *The Collapse of Global Capitalism: What can we learn from the Global Financial Crisis*. Ppt dipresentasikan pada Jakarta International Conference of Muslim Intelctual, Jakarta.
- Hikam, H. A. A. (2021). Begini Sejarah Panjang Lahirnya Bitcoin, Sudah Tahu? Retrieved 14 Juli 2021, from Detikfinance website: <https://finance.detik.com/fintech/d-5474690/begini-sejarah-panjang-lahirnya-bitcoin-sudah-tahu>
- idxchannel. (2021). Menilik Bitcoin Haram atau Halal, Ini 11 Catatan MUI. Retrieved 14 Juli 2021, from <https://www.idxchannel.com/> website: <https://www.idxchannel.com/economics/menilik-bitcoin-haram-atau-halal-ini-11-catatan-mui>
- idxchannel. (2021). Rupiah Alat Pembayaran Sah! Bukan Bitcoin, Dinar Apalagi Dirham. Retrieved 14 Juli 2021, from <https://www.idxchannel.com/> website: <https://www.idxchannel.com/economics/rupiah-alat-pembayaran-sah-bukan-bitcoin-dinar-apalagi-dirham>
- Iqbal, M. (2010). *Dinar Nomics*. Jakarta: Sinergi Publishing.
- Jing, N., Liu, Q., & Sugumaran, V. (2021). A blockchain-based code copyright management system. *Information Processing & Management*, 58(3), 102518. <https://doi.org/10.1016/j.ipm.2021.102518>
- Kamasa, F. (2012). *The Age of Deception Riba Dalam Globalisasi Ekonomi, Politik Global, dan Indonesia*. Jakarta: Gema Insani.
- Karim, A. (2002). *Ekonomi Islam; Suatu Kajian Kontemporer*. Jakarta: Gema Insani Press.
- Khalil, A. bin. (2014). *Ushul Fiqih Kajian Ushul Fiqih Mudah dan Praktis*. Depok: Pustaka Thariqul Izzah.
- Kosasi, S. (2020). Karakteristik Blockchain Teknologi Dalam Pengembangan Edukasi. *ADI Bisnis Digital Interdisiplin Jurnal*, 1(1), 87–94.
- Kunaifi, A. (2016). *Manajemen Pemasaran Syari'ah Pendekatan Human Spirit: Konsep, Etika, Strategi dan Implementasi*. Yogyakarta: Maghza Pustaka.
- Kunaifi, A. (2021). Quantitative Easing In Overcoming the Crisis: Criticism ofQeinthe Monetary System Of Capitalism. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, 12(3), 3703–3714. <https://doi.org/10.17762/turcomat.v12i3.1653>
- Kunaifi, A., Rahman, F., & Dwiaryanti, R. (2021). The Philosophy and Authentication of Welfare Equalization in the Islamic Economy. *Jurnal Kajian Peradaban Islam*, 4(2), 54–62. <https://doi.org/10.47076/jkpis.v4i2.67>
- Larina, O. I., & Akimov, O. M. (2020). Digital Money at the Present Stage: Key Risks and Development Direction. *Finance: Theory and Practice*, 24(4), 18–30. <https://doi.org/10.26794/2587-5671-2020-24-4-18-30>
- Liputan6.com. (2021). 13 Perusahaan dan 229 Aset Kripto Terdaftar di Bappebti. Retrieved 14 Juli 2021, from Liputan6.com website: <https://www.liputan6.com/tekno/read/4488774/13-perusahaan-dan-229-aset-kripto-terdaftar-di-bappebti>
- Mediatama, G. (2019). Bangun ladang panel surya raksasa, ini efek mengerikan yang bakal China alami. Retrieved 16 Juli 2021, from Kontan.co.id website: <https://internasional.kontan.co.id/news/bangun-ladang-panel-surya-raksasa-ini-efek-mengerikan-yang-bakal-china-alami>
- Meera, A. K. M. (2004). *The theft of Nations Returning to Gold*. Malaysia: PelandukPublications.

- Memaknai Hadis Kembalinya Khilafah – Al-Wa'ie. (2021). Retrieved 16 Juli 2021, from <https://al-waie.id/afkar/memaknai-hadis-kembalinya-khilafah/>
- Mirakhor, A., & Al-Hasani, B. (1989). *Essay on Iqtisâd Islamic Approach to Economic Problems*. USA: NUR.
- Nofer, M. (2017). Blockchain. *Business & Information Systems Engineering*, 59(3), 183–187.
- Noorsanti, R. C., Yulianton, H., & Hadiono, K. (2018). Blockchain-Teknologi Mata Uang Kripto (Crypto Currency). *Sendi U*.
- Penambangan Bitcoin Boros Listrik, Begini Menurut Ahli. (2021). Retrieved 16 Juli 2021, from VOI - Waktunya Merevolusi Pemberitaan website: <https://voi.id/teknologi/36317/penambangan-bitcoin-boros-listrik-begini-menurut-%20ahli>
- Perwataatmadja, K., & Antonio, M. S. (1992). *Apa Dan Bagaimana Bank Islam*. Yogyakarta: Dana Bakti Wakaf.
- Purwati, J. (2019). *Likuiditas Dan Efisiensi Pasar Pada Mata Uang Kripto*.
- Redaksi, T. (2004). Dinar Aman, Menguntungkan, Bebas Riba. *Alia Jakarta*.
- Ridwan, R. Z. (2019). The Utilization of Cryptocurrencies by the Terrorist Group as an Alternative Way of Hawala for Illicit Purposes. *Jurnal Sentris*, 2(2), 88–101. <https://doi.org/10.26593/sentris.v2i2.4183.88-101>
- Rizki, N. F. (2020). Analisis Kesesuaian Syariah Electronic Money pada Bank Penerbit Uang Elektronik di Indonesia. An-Nisbah: Jurnal Ekonomi Syariah. *An-Nisbah, IAIN Tulungagung*, 7(1), 212–249.
- Rusdiyanto, A. (2017). *Tinjauan Prinsip Syariah Terhadap Produk E-money Bank Syariah Mandiri* (Skripsi).
- Suharni, S. (2018). Uang Elektronik (E-Money) ditinjau dari Perspektif Hukum dan Perubahan Sosial. *Spektrum Hukum*, 15(1), 15. <https://doi.org/10.35973/sh.v15i1.1108>
- Weatherford, J. (2005). *Sejarah Uang*. Yogyakarta: Bentang Pustaka.
- Wilianto, W., & Kurniawan, A. (2018). Sejarah, Cara Kerja Dan Manfaat Internet of Things. *Matrix: Jurnal Manajemen Teknologi Dan Informatika*, 8(2), 36–41.