

Crypto Digital Asset Phenomenon in Hadith Review with Anthro-Economic Social Approach

Aprilia^{1*}, Wahyudin Darmalaksana²

¹Hadith Science Department, Faculty of Usuluddin and Islamic Thought, UIN Raden Fatah Palembang, Indonesia

²Department of Hadith, Faculty of Usuluddin, UIN Sunan Gunung Djati Bandung, Indonesia

*Corresponding Author Email: apriliah@radenfatah.ac.id

ABSTRACT

This study aims to discuss the phenomenon of crypto digital assets in the review of hadith through an anthropo-economic social approach. This study uses a qualitative approach through descriptive-analytical methods. The results of the research and discussion show that cryptocurrency can be understood as a digital currency for virtual transactions or those based on an internet network in which there are differences of opinion among scholars. This study concludes that the use of crypto is prohibited based on the hadith about buying and selling that can lead to gharar and according to the views of scholars in Indonesia, this is related to the precautionary principle as far as cryptocurrency has not guaranteed security in the implementation of the socio-anthro-economic perspective of the Islamic community. This study recommends Islamic economic institutions such as Islamic financial services authorities and Islamic banking to conduct a more in-depth study of security guarantees in the use of digital crypto in Indonesia.

Keywords: crypto, digital assets, hadith

ABSTRAK

Penelitian ini bertujuan untuk membahas fenomena aset digital kripto dalam kajian hadits melalui pendekatan sosial antropo-ekonomi. Penelitian ini menggunakan pendekatan kualitatif melalui metode deskriptif-analitis. Hasil penelitian dan pembahasan menunjukkan bahwa cryptocurrency dapat dipahami sebagai mata uang digital untuk transaksi virtual atau yang berbasis jaringan internet yang di dalamnya terdapat perbedaan pendapat di kalangan ulama. Penelitian ini menyimpulkan bahwa penggunaan kripto diharamkan berdasarkan hadits tentang jual beli yang dapat menimbulkan gharar dan menurut pandangan para ulama di Indonesia, hal ini terkait dengan prinsip kehati-hatian selama kripto belum menjamin keamanan dalam bertransaksi. Implementasi perspektif sosio-antropo-ekonomi masyarakat Islam. Penelitian ini merekomendasikan lembaga ekonomi syariah seperti otoritas jasa keuangan syariah dan perbankan syariah untuk melakukan kajian yang lebih mendalam mengenai jaminan keamanan dalam penggunaan kripto digital di Indonesia.

Kata kunci: kripto, aset digital, hadits

INTRODUCTION

Crypto currency is the result of technological developments that are increasingly sophisticated and seem unstoppable. Cryptocurrencies are an alternative means of payment that makes up for the shortcomings of conventional currencies. However, behind the convenience and sophistication it offers, cryptocurrencies have various legal problems ranging from misuse to legality as a currency and medium of exchange. (Hanafi, 2018). In Indonesia itself, there are no special regulations or regulations related to Cryptocurrency as a legal means of payment. Because Bank Indonesia or the Central Bank of Indonesia refused with reasons related to the rise of economic crimes, especially embezzlement of funds, terrorism financing, money laundering and account hacking (Tungkiman, 2021). Basically Islam views money only

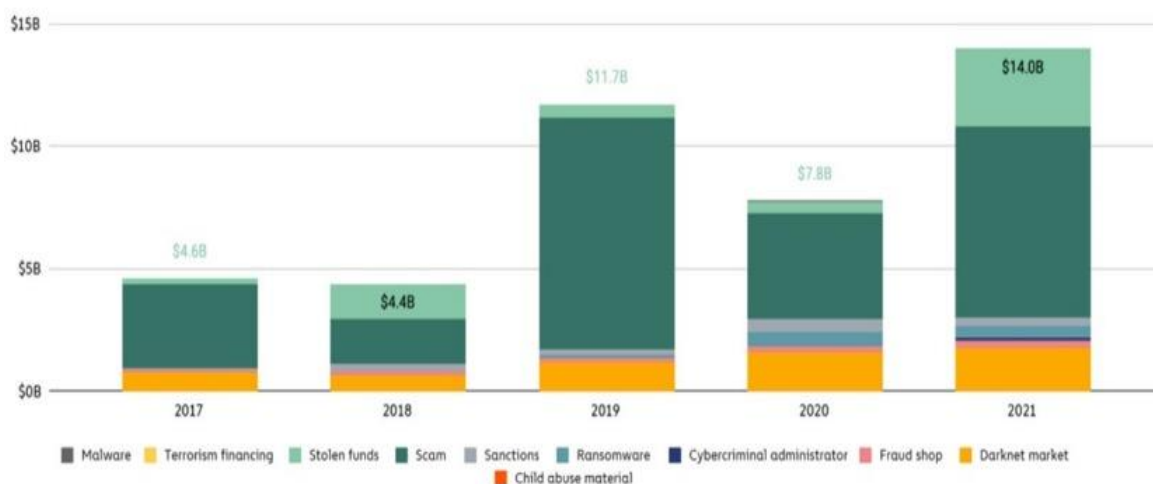
* Copyright (c) 2022 **Aprilia and Wahyudin Darmalaksana**

This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

Received: July 8, 2022; Revised: October 22, 2022; Accepted: October 31, 2022

as a medium of exchange, not as a commodity (Darmalaksana, 2022c). Therefore, the motive for the demand for money aims to meet the money demand for transactions, not for speculation. Islam also strongly encourages the use of money in exchange (Darmalaksana, 2022a), as in the hadith narrated by Ata bin Yasar, Abu Said and Abu Hurairah as well as Abu Said al-Khudri explained that apparently the Prophet did not approve of transactions using the barter system, for that it is recommended that you use money. It seems that he forbade this kind of exchange because there is an element of usury. The use of digital money can be reflected this time for cryptocurrencies and the fulfillment of the criteria as a currency or legal tender. The most famous type of cryptocurrency today is bitcoin. In general, scholars and sharia experts have two different opinions. *First, some scholars argue that cryptocurrency is haram, meaning that it is prohibited by sharia.* Second, another group is of the view that cryptocurrencies are in principle halal, meaning they are allowed (Kusuma, 2020). In line with the above explanation, the crime rate of cryptocurrency has increased every year as the data below:

Table 1. Total Cryptocurrency Value by Addresses, 2017-2021



Source: Chainalysis 2021

Table 1 shows that the share of crypto transaction volume related to malicious activity has never been lower, representing only 0.15% of transaction volume in 2021. During 2021, rug pulls became the crime of choice for crypto criminals, the scamming revenue rate rose 82% in 2021 to \$7.8 billion USD. The data shows that out of that \$7.8 billion USD, more than \$2.8 billion USD was the total generated from the criminal rug pull scheme on tokens created by the criminals. In November 2021, criminal investigations announced that they had seized more than \$3.5 billion USD of crypto in 2021 from non-tax investigations (Team, 2021).

The results of previous studies have been stated by several researchers related to the phenomenon of crypto digital assets. Among others Dyah Pramitha Widyarani, Ida Ayu Putu Widiati, Ni Made Puspasutari Ujianti (2022), "Kajian Yuridis Penggunaan Koin Kripto Sebagai Alat Pembayaran di Indonesia," Jurnal Prefensi Hukum. This study aims to determine the regulations regarding payment instruments in Indonesia and the legal consequences if crypto coins are used as payment instruments in Indonesia. This research is a normative legal research, namely research by examining through literature studies based on primary and secondary legal materials. The problem approach used is a statutory approach and a

conceptual approach. The results of this study show concretely that crypto coins are illegal means of payment. The use of crypto coins as a means of payment in Indonesia is not in accordance with the law and is an act that is against the law so that it can have legal consequences. Crypto coins do not have a legal basis to be used as a means of payment in Indonesia (Kadek Dyah Pramitha Widyarani, Ida Ayu Putu Widiati, 2022). Addinanto H, (2018), "Determinan Penggunaan Mata Uang Kripto di Indonesia," Universitas Islam Indonesia. This study aims to identify the factors that influence the decision to use cryptocurrencies. The factors discussed are grouped into two categories, namely perceived benefits and perceived risks. This study uses a purposive sampling technique through PLS-SEM with a final sample of 140 respondents. The results show that all the variables of the benefits of using cryptocurrencies have a significant effect on the perceived benefits and on the risk variables of using cryptocurrencies (Addinanto, 2019). M. Najibur Rohman (2021), "Tinjauan Yuridis Normatif terhadap Regulasimata Uang Kripto (*Crypto Currency*) di Indonesia," Jurnal Ilmiah Ilmu Hukum. The purpose of this study is to explain the normative juridical aspects of cryptocurrency regulations or policies in Indonesia. This review is based on the law and a number of regulations to see the legality and form of regulation of cryptocurrencies. This study uses a normative legal research method with a normative juridical approach. The results of this study indicate that normatively there are differences in definitions that have an impact on the pattern of cryptocurrency regulation. Bank Indonesia views it as digital money so it is not legal as a means of payment, while the Ministry of Trade views it as a digital asset so that it can be traded on a futures exchange (Rohman, 2021).

Previous research has touched on payment instruments in Indonesia and the legal consequences if crypto coins are used as payment instruments in Indonesia. The difference between this study and previous research lies in the discussion space, because this study will focus on the phenomenon of crypto digital assets in a hadith review through an anthropo-economic social approach.

The framework of thinking needs to be structured as a logical flow that outlines the course of the research (Hindriari, 2018; Setiawati, 2011; Siringoringo, 2020). Cryptocurrencies are digital currencies that are independent of central government authority (Firdaus, 2020). Cryptos are advanced versions of digital, internet and electronic currencies emerging with the spread of trade under the control of central authorities around the world. Theoretically, cryptocurrencies have all the features of money acting as a medium of exchange (Yildirim, 2019). Some large online companies such as amazon.com, paypal.com, namecheap.com, and wordpress.com can make payments with Bitcoin (Azizah, 2020). Indonesia itself does not legalize payments via Bitcoin, but existing online sites are starting to look at payment methods using cryptocurrencies. Islam as a religion embraced by the majority of the Indonesian population needs to provide an answer to the issue of cryptocurrency payment systems. Meanwhile, the Prophet stated that the dinar and dirham (gold and silver) coins were not the only medium of exchange used in ancient times (Hadith narrated by Muslim). This study seeks to discuss cryptography in the review of hadith through a socio-anthro-economic approach (Ashari Arief, 2016).

The main problem of this research is that there is a phenomenon of crypto digital assets in the hadith review through an anthropo-economic social approach. Theoretically, this research is expected to have benefits as the development of Islamic treasures in understanding the reality of crypto digital assets. Practically, this research is expected to contribute to the regulation of the Islamic financial system in Islamic economic institutions, such as the Islamic financial services authority and Islamic banking.

RESEARCH METHOD

Research methodology as the science of research, teaches theoretically about the general principles of research methods, while the method as a scientific way of working in research is carried out starting

from determining the nature and character of research, formulating problems as the main target object of research (Qamar, 2017). This research method uses a qualitative type through library research, literature reviews from previous research (Darmalaksana, 2020). The purpose of research methods is divided into basic research or pure research and applied research or application research. Basic research is research that is intended for the benefit of scientific development without wanting to apply the results and simply to understand the problem. Applied research is research aimed at seeking information or extending the benefits of basic research findings to solving problems (Nana & Elin, 2018). This research applies descriptive-analytical qualitative method (Darmalaksana, 2022b), through a socio-anthro-economic approach. In this study, researchers do not need a place to research, but use literate research techniques with critical analysis.

RESULT AND DISCUSSION

Crypto Overview

Cryptography comes from Greek, consisting of two syllables, namely crypto and graphia. Crypto means hiding, while graphia means writing. Cryptography is a science that studies mathematical techniques related to information security aspects, such as data confidentiality, data validity, data integrity, and data authentication (Rozali Toyib, 2020). Cryptocurrency is a series of cryptographic codes that are formed in such a way that they can be stored on a computer device and can be transferred such as electronic mail and may be used as a means of payment in commercial transactions (Aditya Damar P Dimas, 2021). Today's payment transaction tools have experienced a lot of developments. By buying products over the internet, you can buy them without having to use paper currency.

Cryptocurrency is one of the digital currency assets as a solution to today's online financial transaction needs. Crypto currency or cryptocurrency is a digital asset which is understood as digital currency. This currency is very different from the conventional version, which is used for virtual transactions via the internet. The use of cryptographic electronic money was initiated by an American cryptography expert David Chaum in 1983 which was later called e-cash. In 1995, he began implementing an early form of cryptographic electronic payments via Digicash with the support of user software to pull notes from banks and designate certain encrypted keys before they could be sent to recipients (Faidul Adzim, Ahmad Harakan, Muhammad Zia Ul Haq, 2021). Cryptocurrency is also a digital or virtual currency that uses cryptography as security. Cryptography provides a mechanism used to secure systems in digital currencies by encoding or encoding rules in the cryptocurrency system itself. Cryptocurrencies can also be called peer to peer electronic money systems that allow online payments to be sent directly from one party to another without going through a financial institution. Currently, the most popular currency in the cryptocurrency market is Bitcoin, which was created by Satoshi Nakamoto in 2009 (Purwati, 2019).

Bitcoin Crypto Digital Asset Phenomenon

Digital asset is an item or object contained in an electronic system that has a value that can be owned and controlled by a legal entity or individual. Digital assets are a form of development of the concept of assets which were initially only limited to the real world but developed into the cyber world. Digital assets are assets or objects whose ownership is recorded digitally which is controlled directly by the owner (Franco, 2015). In the digital world, the term cryptocurrency has emerged. In simple terms, cryptocurrency can be understood as a digital currency. Different from conventional currencies, cryptocurrencies can be used for virtual or internet-based transactions. To maintain its security,

cryptocurrencies will be protected by quite complex passwords. Furthermore, this digital currency is decentralized. That is, there is no party who acts as an intermediary in a transaction. Payments made using digital currency take place on a peer-to-peer basis from sender to recipient. Nevertheless, all transactions carried out are still recorded in the existing system on the cryptocurrency network. The registration is carried out by cryptocurrency miners and will receive a commission in the form of digital money used (Teguh Permana, 2019).

Since the beginning of the emergence of Bitcoin as one of the results of crypto technology, bitcoin has brought a concept where not only can be considered a digital currency or currency but Bitcoin users also use it for investment by turning it into a commodity. In order to support the development of this technology, the Indonesian government continues to deepen and study Bitcoin. In the end, the government through the Ministry of Trade issued a policy, namely the Regulation of the Minister of Trade of the Republic of Indonesia Number 99 of 2018 concerning the General Policy for the Implementation of Crypto Asset Trading which contains the determination of crypto assets as commodities that can be subject to contracts (Wijaya, 2019).

The use of Cryptocurrencies increased rapidly from 2016 to 2017 so that many parties made special observations about the emergence of this cryptocurrency. However, the currency that is most often described as virtual on the internet is actually real, or in other words, the currency exists. Conventional currencies have other centralized properties with digital currencies which have decentralized properties. Payments using digital currency occur directly from the sender to the recipient or commonly referred to as peer to peer. In Indonesia, the use of virtual currency can cause many and various crimes that can be detrimental on various sides. As a result, the emergence of digital or virtual currencies in society is not only viewed and used negatively, but can also be used as an investment commodity. With the increasing activity in the use of Cryptocurrencies in Indonesia, new challenges arise for the digital currency. The current obstacle to activity in the currency market is in terms of regulation. Several countries in the world have already regulated the activities of the legality of the means of exchange or payment instruments using digital currency or using them to create a digital currency of their own creation, but the attitude towards cryptocurrencies in Indonesia can be said to be unclear. Indonesia still does not have definite specific regulations regarding the use of virtual currencies or cryptocurrencies in society (Ida Ayu Samhita Chanda Thistanti, I Nyoman Gede Sugiarta, 2022).

Crypto in Hadith Review with Anthro-Economic Social Approach

Crypto currency does not yet have clarity, Indonesia itself has not or even banned the use of this cryptocurrency as a legal means of payment transactions. So in this case, the use of cryptocurrencies as a currency and means of payment transactions is not allowed from a sharia point of view, this crypto currency also cannot be seen in its physical form, and there is no legal certainty of legality either in Indonesia itself or in global agreements. Therefore it can still be called pseudo and *gharar*, especially its use in investment and trading, which makes this crypto currency inseparable from price speculation which is very volatile and its use is only as a means of profit and loss, so it contains elements of *maysir* (Khairunnisa Harahap, Tuti Anggraini, 2022). So the Prophet also forbade transactions that contain elements of *gharar* and *maysir* in the hadith of the Prophet. narrated by Abu Hurairah :

نَهَى رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ- عَنْ بَيْعِ الْحَصَاةِ وَعَنْ بَيْعِ الْغَرَرِ

Meaning: "The Messenger of Allah, sallallaahu 'alaihi wa sallam, forbade the buying and selling of *al-hashah* and buying and selling of *gharar*" (HR. Muslim No. 1513).

The recommended currencies in Islamic economics are the dinar (Gold) and the dirham (Silver). The gold dinar is a 22 carat (91.70%) gold coin weighing 4.25 grams. While the silver dirham is a pure silver coin (99.95%) with a weight of 2,975 grams. This standard of dinar and dirham was determined by the Prophet Muhammad, in the year 1 Hijriyah, and then upheld by Caliph Umar ibn Khattab in 18 Hijriyah. At that time for the first time Caliph Umar ibn Khattab minted dirham coins. While the person who first scored Islamic gold dinars was Caliph Malik ibn Marwan in 70 Hijri, while still referring to the provisions of the Prophet and Umar ibn Khattab, namely in a weight ratio of 7/10 (7 dinars versus 10 dirhams) (Darmalaksana, 2022a).

Globally there are two opinions of jurists in terms of the nature of money with explanations, the first group argues "that money is a form that was created only limited to dinars (gold) and dirhams (silver) to be printed as currency. Because according to them God created gold and silver to be currencies that were used as a means of barter and a measure of value. In line with al-Ghazali's opinion about gold and silver, among the blessings of Allah SWT is creation, there is a trade that is prepared for it. Then the second group, agreed with the narration of Umar Radiyallahu anhu, which was previously mentioned. They think that money is a matter of terminology. So anything that is in human terms and can be accepted among them as a measure of value, is called money. From the research results of a contemporary researcher, he said that it was really strong to say that Umar Radiyallahu Anhu was determined to make money from skin because of the many dirham frauds. It's just that because he was worried about the extinction of the camel, he canceled the plan. It is also not narrated that someone refuted Umar bin Khattab on the grounds of the creation value of silver when he wanted to make a dirham from camel skin. In Islam the category of property has at least four elements including: 1) Possessing material substances that can be touched or touched; 2) Can be stored for a long time and does not change; 3) Has the principle of benefit and does not have benefits; and 4) Some people view them as assets such as gold, silver, cars, stocks, and others. This category is not owned by Cryptocurrencies even if the price is more than gold or silver (Azizah, 2020).

The Indonesian Ulema Council has different opinions, in this case there are many pros and cons of fellow Indonesian scholars regarding the legal status of bitcoin, but in the *ijtima ulama*, the 7th Indonesian Ulema Council Fatwa Commission which was held on 9-11 November 2021 discussed cryptocurrency law, which obtained three provisions including: 1) The use of cryptocurrency as a legal currency is unlawful, because it contains *gharar*, *dharar* and is contrary to Law number 7 of 2011 and Bank Indonesia Regulations; 2) Cryptocurrencies as digital commodities/assets are not legally traded because they contain *gharar*, *dharar*, *qimar* and do not meet the *sil'ah* requirements, namely, have a physical form, have value, know the exact amount, are proprietary and can be handed over to the buyer; and 3) Cryptocurrency as a commodity/asset that meets the requirements as *sil'ah* and has an underlying and has clear benefits that are legally valid for trading. So based on the *ijtima*, the use of cryptocurrency as a legal currency is haram, because it contains *gharar* and *dharar* (Burhanuddin, 2022).

Gharar in Bitcoin transactions is caused by several things including Bitcoin was born by someone who is not known by the pseudonym Satoshi Nakamoto. Satoshi name was included in the Bitcoin Whitepaper by revealing a bit about himself leaving the project in late 2010 and publishing the first Bitcoin specification and proof of concept in 2009. The real inventor of Bitcoin is still unknown. This element is associated with the element of uncertainty (*gharar*) (Burhanuddin, 2022). In the case of digital coins, they can be matched with currency even though they have different characteristics and forms, where money is referred to as "*al-nuqd huwa kullu wasitli at-tabadul yulqa qabulan aman mahmakana zalika al-wasitwa*

ala ayyi halyakun" which means money here, namely everything that becomes a medium of exchange and is generally accepted, regardless of form and under whatever conditions the medium is (Muarif, 2021). Nevertheless, crypto in the view of the Prophet's hadith is a subject that is still prohibited based on the anthropo-economic social approach for the Indonesian context.

CONCLUSION

Cryptocurrency can be understood as a digital currency for virtual transactions based on an internet network that is distinguished from conventional currencies. To maintain its security, cryptocurrencies will be protected by quite complex passwords. In the use of crypto in Indonesia, there are differences of opinion among scholars. Meanwhile, the hadith prohibits buying and selling that can lead to gharar, including cryptocurrency transactions which do not necessarily guarantee the safety of economic actors which in turn harms the economy of the ummah. This research is expected to be able to contribute to enriching the treasures of Islamic scholarship related to the phenomenon of crypto digital assets in the hadith review. As for practically, this research hopes to be one of the informants in the application of the crypto digital asset phenomenon in the hadith review through an anthropo-economic social approach. This research has limitations in analyzing, so it opens up space for further researchers to conduct more critical studies through field research. This study recommends Islamic economic institutions to conduct studies related to security in the use of crypto for the economic life of the people in Indonesia.

REFERENCES

- Addinanto, H. (2019). *Determinan Penggunaan Mata Uang Kripto di Indonesia*. Universitas Islam Indonesia.
- Aditya Damar P Dimas, M. N. (2021). *Analisis Legalitas Bitcoin sebagai Virtualcurrency dalam Perspektif Hukum Positif dan Hukum Islam*. Universitas Muhammadiyah Surakarta.
- Ashari Arief, R. S. (2016). *Implementasi Algoritma Kriptografi RSA-CRT pada Aplikasi Instant Messaging*. Universitas Diponegoro.
- Azizah, A. S. N. (2020). Fenomena Cryptocurrency dalam Perspektif Hukum Islam. *Shautuna*, 1(1).
- Burhanuddin, S. F. (2022). Transaksi Cryptocurrency: Bagaimana Pandangan Hukum Ekonomi Islam memandang? *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan*, 4(7).
- Darmalaksana, W. (2020). Metode Penelitian Kualitatif Studi Pustaka dan Studi Lapangan. *Pre-Print Digital Library UIN Sunan Gunung Djati Bandung*. <http://digilib.uinsgd.ac.id/32855/>
- Darmalaksana, W. (2022a). *Filsafat dan Politik Hukum Islam Perbankan Syariah*. Sentra Publikasi Indonesia.
- Darmalaksana, W. (2022b). *Panduan Penulisan Skripsi dan Tugas Akhir*. Fakultas Ushuluddin UIN Sunan Gunung Djati Bandung.
- Darmalaksana, W. (2022c). The need for social theology to strengthen the social functions of Islamic banking in Indonesia. *HTS Teologiese Studies/Theological Studies*, 78(1), 1–13.
- Faidul Adzim, Ahmad Harakan, Muhammad Zia Ul Haq, A. S. (2021). Pendampingan Proses Penambangan Mata Uang Digital untuk Pemuda di Kota Makassar. *Jurnal Ilmu Pengetahuan*, 1(3).
- Firdaus, M. R. (2020). *Penggunaan Cryptocurrency di Indonesia*. UIN Sunan Gunung Djati Bandung.
- Franco, P. (2015). *Understanding Bitcoin: Cryptography, Engineering, and Economics*. TJ International Ltd, Great Britain.
- Hanafi, G. (2018). *Prospek Kebijakan Kriminalisasi Penggunaan Mata Uang Kripto*. Universitas Islam Indonesia.

- Hindriari, R. (2018). Pengaruh Motivasi terhadap Produktivitas Kerja Karyawan Pada PT Usaha Teknik Indonesia. *Jurnal Madani: Ilmu Pengetahuan, Teknologi Dan Humaniora*, 1(1), 235–252. <https://doi.org/10.33753/madaniv1i1.12>
- Ida Ayu Samhita Chanda Thistanti, I Nyoman Gede Sugiarta, I. W. A. (2022). Kajian Yuridis mengenai Legalitas Cryptocurrency di Indonesia. *Jurnal Prefensi Hukum*, 3(1).
- Kadek Dyah Pramitha Widyarani, Ida Ayu Putu Widiati, N. M. P. U. (2022). Kajian Yuridis Penggunaan Koin Kripto sebagai Alat Pembayaran di Indonesia. *Jurnal Prefensi Hukum*, 3(2), 300–305.
- Khairunnisa Harahap, Tuti Anggraini, A. A. (2022). Cryptocurrency dalam Perspektif Syariah: Sebagai Mata Uang atau Aset Komoditas. *Jurnal Niagawan*, 11(1).
- Kusuma, T. (2020). Cryptocurrency dalam Perdagangan Berjangka Komoditi di Indonesia Perspektif Hukum Islam. *Tsaqafa*, 16(1). <https://doi.org/http://dx.doi.org/10.21111/tsaqafah.v16i1.3663>
- Muarif, M. S. (2021). Studi Kritik Analisis Teks dan Konteks Hukum Koin Digital sebagai Alat Pembayaran. *Jurnal Al-Minhaj Ilmu Syariah*, 2(2).
- Nana, D., & Elin, H. (2018). Memilih Metode Penelitian yang Tepat: Bagi Penelitian Bidang Ilmu Manajemen. *Jurnal Ilmu Manajemen*, 5(1), 288.
- Purwati, J. (2019). *Likuiditas dan Efisiensi Pasar pada Mata Uang Kripto*. Universitas Islam Indonesia.
- Qamar, N. (2017). *Metode Penelitian Hukum*. Penerbit SIGn.
- Rohman, M. N. (2021). Tinjauan Yuridis Normatif terhadap Regulasimata Uang Kripto (Crypto Currency) di Indonesia. *Jurnal Ilmiah Ilmu Hukum*, 11(2).
- Rozali Toyib, Y. D. (2020). Pengamanan Data Teks dengan Menggunakan Algoritma Zero-Knowledge Proof. *Jurnal Media Ifotama*, 16(1).
- Setiawati, U. (2011). *Tinjauan Pustaka: Pengutipan yang Baik*. Universitas Komputer Indonesia.
- Siringoringo, R. (2020). Analisis dan Implementasi Algoritma Rijndael (AES) dan Kriptografi RSA pada Pengamanan File. *Kakifikom*, 2(1).
- Team, C. (2021). *The Biggest Threat to Trust in Cryptocurrency: Rug Pulls Put 2021 Cryptocurrency Scam Revenue Close to All-time Highs*. Chainalysis.Com.
- Teguh Permana, A. P. (2019). Fenomena Uang Digital. *Jurnal Ekonomi Pembangunan*, 19(2).
- Tungkiman, D. R. (2021). Arti Penting Mata Uang Cryptocurrency sebagai Alat Pembayaran yang Sah menurut Prefektif Hukum Indonesia di Era Revolusi Industri 4.0. *Al-Yasini: Jurnal Keislaman, Sosial, Hukum Dan Pendidikan*, 6(2).
- Wijaya, F. N. A. (2019). Bitcoin Sebagai Digital Aset pada Transaksi Elektronik di Indonesia (Studi Pada PT. Indodax Nasional Indonesia). *Jurnal Hukum Bisnis Bonum Commune*, 2(2).
- Yildirim, M. (2019). Eknologi Blockchain, Cryptocurrency dan Cryptocurrency Negara Pendekatan ke Koin. *Ekonomi*, 10(20).