

Cryptocurrency: A Sentiment Analysis from Twitter Data

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Islam regulates everything perfectly, even the smallest things are regulated in Islam. With the development of technology, quantity and innovation of financial and economic products, it is necessary to study products that are in accordance with Islamic law. There are several studies that examine cryptocurrency in the view of Islamic law and have even reached the stage of proposing a cryptocurrency model that is in accordance with sharia. The purpose of this study is to analyze the sentiment generated from the opinions of users of the Twitter social media application regarding cryptocurrency. The data analyzed consisted of 18,304 using the keyword cryptocurrency. The method used is a qualitative approach with descriptive statistics from the study of cryptocurrency-themed literature. The results showed that neutral sentiment was the most frequent result with a percentage of 91%, followed by negative sentiment of 6.1%, and positive sentiment of 2.9%. The diversity of sentiment results is due to the pros and cons of cryptocurrency.

Keywords: Cryptocurrency; Sentiment; Twitter; Big Data

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1.1.

INTRODUCTION

Since the industrial revolution around 1760 - 1840 humans have continued to develop technology rapidly. Noted, the industrial world has entered Industry 5.0 which relies on automation in the industry. Technological developments are useful for various fields such as telecommunications, transportation, pharmaceuticals, education, and economics. These developments make it easier for humans to carry out their daily lives, improve the welfare of society, and advance human civilization.

Among the fields that have been aided by technological developments are finance and economics. We can see how the banking industry, trade between countries, and financial technology have grown rapidly along with the development of technology. Technology also contributes to facilitating transactions between people. Among the technology products that facilitate transactions are e-money, e-wallet, cryptocurrency, and CBDC (Central Bank Digital Currency).

Among the applications of technology in the ease of transactions is the existence of Cryptocurrency. Cryptocurrency is predicted to be the currency of the future. As of January 2021, there are more than 4,000 cryptocurrencies. Major cryptocurrencies include Bitcoin (\$BTC), Ethereum (\$ETH), and Litecoin (\$LTC).

Research on cryptocurrencies and central bank digital currencies (CBDCs) has been widely conducted in Indonesia. [Ismanto et al. \(2019\)](#) found that the application of blockchain technology has the potential to boost e-commerce and address e-commerce issues, although there is still uncertainty regarding regulation in many countries including Indonesia as there are risks in the use of blockchain and cryptocurrencies such as money laundering and black markets. [Widjaja \(2021\)](#) revealed that, instead of building its own Central Bank Digital Currency, Indonesia's central bank could play a role in monitoring cryptocurrencies.

Islam regulates everything perfectly, even the smallest things are regulated in Islam. With the development of technology, quantity and innovation of financial and economic products, it is necessary to study products that are in accordance with Islamic law.

There are several studies that examine cryptocurrency in the view of Islamic law and have even reached the stage of proposing a cryptocurrency model that is in accordance with sharia. [Ruslianor Maika et al. \(2019\)](#) designed dinar and dirham digital currencies. [Virgana et al. \(2019\)](#) conducted Conceptual Research that proposed Sharia-based Cryptocurrency.

This study aims to analyze the sentiment generated from user opinions regarding cryptocurrency. The data analyzed consists of tweets from Twitter application users in January 2022. The data will be processed and analyzed using the python programming language using the Vader Sentiment Analysis library to determine the sentiment value related to cryptocurrency.

LITERATURE REVIEW

Cryptocurrencies, such as bitcoin, are peer-to-peer money secured by cryptography, making counterfeiting and double-spending practically impossible. It is based on electronic accounting entries. Since cryptocurrency is a virtual coin, it has no physical form. Bitcoin was the first cryptocurrency and was introduced in 2009 by Satoshi Nakamoto. This kind of money is created electronically by a method called mining and can be used as a medium of exchange. Cryptocurrency, labeled "the currency of the future," is expected to have three advantages over all other forms of money, including gold: it will create a unified financial system through decentralization of standards, it will be much scarcer than gold, and it will be able to control inflationary trends caused by fiat currencies ([Abubakar et al., 2019](#)).

Cryptocurrency is a type of digital or virtual currency that uses cryptography for security and operates on decentralized networks, typically based on blockchain technology. Unlike traditional currencies issued by governments and central banks, cryptocurrencies are not controlled by any single entity, making them immune to government manipulation or interference. Cryptocurrencies can be used for various purposes, including online purchases, investments, remittances, and as a means of transferring value across borders. However, their volatile nature and regulatory uncertainties have led to debates about their suitability as a medium of exchange and store of value. Nonetheless, they have attracted significant interest from investors, technologists, and entrepreneurs, leading to ongoing developments in the cryptocurrency space. Bitcoin was the first cryptocurrency and remains the most well-known and widely used. Since the launch of Bitcoin, thousands of other cryptocurrencies, often referred to as altcoins, have been created, each with its own unique features and use cases.

Cryptocurrencies were created to enable peer-to-peer transactions that are not regulated by a central bank. Cryptocurrencies are usually governed by a system that determines how many coins can be created,

how they are created, and how the integrity of the ledger is maintained. These protocols are meant to match the current fiat money system that is regulated by central banks. A specialty of bitcoin is confidentiality, as there is no central bank to regulate the functions or transactions involving bitcoin. All transactions are recorded in a system called "blockchain" and verified by "nodes". (Jain, 2019).

Blockchain transactions are the only way to prove cryptocurrency ownership. A blockchain is a publicly available decentralized ledger (or electronic ledger). Bitcoin owners, for example, want to buy goods from merchants who accept cryptocurrency as payment. Instead of having a bank organize the remittance, the transfer is handled through a public ledger system. Usually, cryptocurrency blockchains are organized in such a way that changing their operating protocols is difficult or even impossible.

Scholars and researchers differ on the law of cryptocurrencies in the Islamic view. Siswantoro et al., (2020) examined the requirements of cryptocurrency as money in the view of Islam showing that cryptocurrency is highly volatile and does not qualify as "money" because it is restricted and used for speculation, which is prohibited in Islam. Misbah (2001) discusses money, virtual currency, and Bitcoin. He also discussed the law of Bitcoin in Islamic Sharia by mentioning two opinions about the law of Bitcoin, namely the opinion that allows and the opinion that prohibits accompanied by arguments for each opinion. Rabbani et al. (2020) discussed FinTech, Blockchain and Islamic Finance. This study also mentions two views related to the law of cryptocurrencies, namely the opinion that allows and the opinion that prohibits with each argument.

Abu Bakar et al. (2019) said that Bitcoin will create a unified financial system through decentralization of standards, it will be much rarer than gold, and will be able to control inflationary trends caused by fiat currencies. He also said players in the Islamic finance industry should be proactive rather than reactive in developing technical notes, standards, and operational guidelines to participate in the inevitable migration to cryptocurrencies.

Cryptocurrency cannot be used as a means of payment in Indonesia as stated in Bank Indonesia Press Release No. 20/4/Dkom. This is as stated in Law No. 7 of 2011 concerning Currency which states that currency is money issued by the Unitary State of the Republic of Indonesia and every transaction that has a payment purpose, or other obligations that must be

fulfilled with money, or other financial transactions carried out in the Territory of the Unitary State of the Republic of Indonesia must use Rupiah.

METHOD

The data used in this study are the tweets of Twitter users. Tweets are messages posted by Twitter users. Tweets can consist of letters, photos, and videos. For sentiment analysis we use tweets consisting of words. Data collection is done by scraping method using Snsrape. Snsrape is a package in the Python programming language that extracts Tweets from the Twitter application without having to use the Twitter API. The data used amounted to 18,304 using the keyword cryptocurrency.

The method used is a qualitative approach with descriptive statistics from Twitter application user tweet data related to cryptocurrency. This research uses sentiment analysis to find out public sentiment about a theme. Opinion mining (OM) or sentiment analysis (SA) is a new and active research field that aims to automatically evaluate large amounts of unstructured text including views, feelings, judgments, and attitudes about targets such as products and services (Brahmi, et al, 2019). To classify tweets, a Python library called Textblob is used. Textblob is a text processing package for Python 2 and 3. Textblob offers an API for performing natural language processing (NLP) activities including part-of-speech tagging, noun phrase extraction, sentiment analysis, classification, and translation, among others. Examples of studies using sentiment analysis can be seen in Maulida (2022), Riani & Rusydiana (2023), and Hakim et al., (2022).

RESULT AND DISCUSSION

Sentiment Analysis

This research tries to analyze the sentiment of Twitter application users' tweets that discuss cryptocurrency. This research was conducted using the Python programming language library, Textblob. Textblob as a tool for processing data to be classified into 3 groups, namely: positive, neutral, and negative. Classification is obtained by measuring the polarity of each tweet. Tweets are given a polarity value between -1 and 1. If a tweet has a polarity of more than 0 to 1, it will be classified as positive. Tweets with polarity less than 0 to -1 are classified as negative. Finally, tweets with a polarity value of 0 are classified as neutral. The results of sentiment analysis on the bitcoin theme can be seen in the following diagram.

Sentiment Polarity on Tweets Data

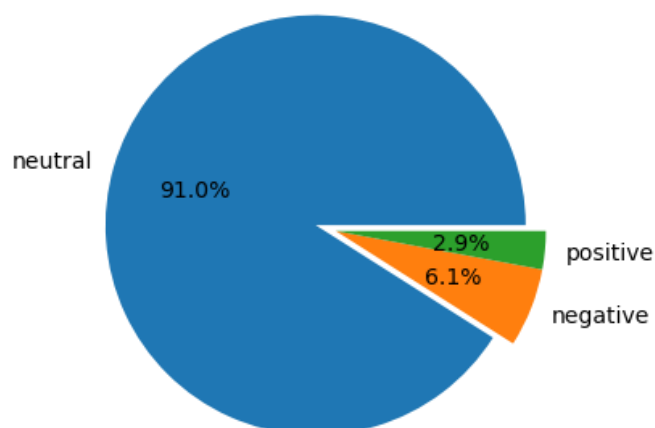


Figure 1. Sentiment Polarity

From the diagram above, neutral tweets related to cryptocurrency in January 2022 are the most with a percentage of 91%. Meanwhile, negative tweets related to cryptocurrency have a percentage of 6.1% of the total data. Positive tweets have the smallest percentage with 2.9% of the total data.

FINDINGS

The following table summarizes the issues contained in the tweets that have been. Based on data from 99 bitcoin articles in 2022, the following results are obtained. The results of this study found sentiment levels in cryptocurrency-related tweets. The results show that neutral sentiment is the most sentiment with a percentage of 91%. The classification results also showed a negative sentiment of 6.1%. This is due to the debate about the effect of cryptocurrency on the climate. Cryptocurrency is also alleged to be a place for the rich to escape taxes. Another issue is the high volatility of cryptocurrency. Research by [Siswanto et](#)

[al. \(2020\)](#) shows that cryptocurrency is highly volatile and does not qualify as "money" because it is restricted and used for speculation, which is prohibited in Islam.

In recent years, blockchain technology and cryptocurrencies such as Bitcoin, Litecoin, and Ethereum are gaining a lot of interest ([Zulhuda & Sayuti, 2017](#)). Blockchain (BC), the technology that underpins the cryptocurrency system, is widely considered essential in building the backbone to provide better security and privacy for various applications, including the Internet of Things (IoT) ecosystem. A new transaction must be validated by all participants in the relevant Blockchain ecosystem before it can be added to an existing chain ([Amsyar et al., 2020](#)). Participants in such validation and verification processes must use certain algorithms. What is considered "valid" by the relevant Blockchain ecosystem varies from one ecosystem to the next. A block is a collection of transactions that have been validated and verified and thus approved.

Table 1. Sentiment Reasons

Positive	Negative
1. An alternative to traditional currencies. 2. It allows for financial transactions, purchases, transfers, with others. 3. Although cryptocurrencies are characterized by poor liquidity, low convenience, high volatility, and high risk, they promise long-term growth.	1. A means to avoid taxes that will lead to the collapse of the country. 2. The issue of cryptocurrency's effect on the climate. Cryptocurrency mining requires a huge amount of energy. Such emissions have major consequences. 3. High volatility. 4. There is still the potential for scams.

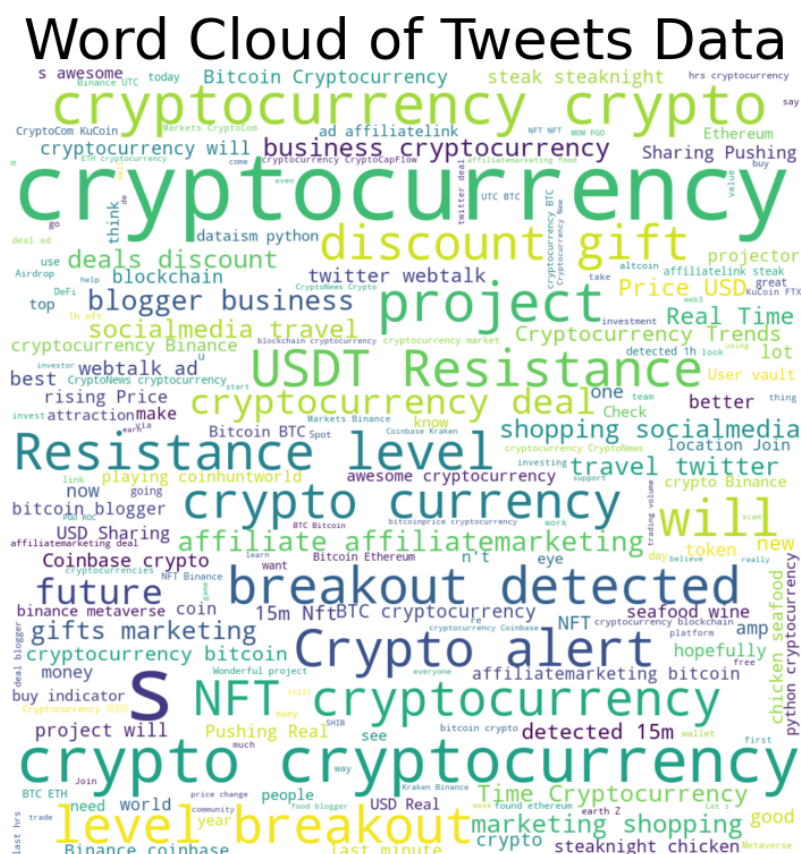


Figure 2. Wordcloud analysis

Users can exchange value digitally without the involvement of a third party when they use cryptocurrencies (Yussof & Al-Harthi, 2020). Cryptocurrencies are based on the principle of breaking encryption techniques to generate a limited number of unique hashes. Users can exchange hashes as if they were dealing with real currency, thanks to a network of computers authenticating the transactions. (Li & Wang, 2017). There will only be a limited number of bitcoins created, preventing oversupply and guaranteeing their uniqueness.

The data shows that neutral sentiment is the most common, accounting for 91% of the total. The growing importance of blockchain technology and cryptocurrencies has consequences in various academic fields. Bitcoin is attracting more study attention, including talks on technological aspects, security and legal challenges in cryptocurrency systems, and analytics on the data contained in the blockchain. (Amsyar et al., 2020).

Since cryptocurrency is a virtual coin, it has no physical form. Blockchain transactions are the only way to prove ownership of cryptocurrencies. A blockchain is a decentralized ledger that is open to the public (or an electronic ledger) (DeVries, 2016). Bitcoin owners,

for example, want to buy goods from merchants who accept cryptocurrency as payment. Instead of having a bank organize the remittance, the transfer is handled through the public ledger system. When a company prepares to offer a new product and needs funds to develop it, a new coin is often launched. The corporation establishes its own virtual currency and uses the initial coin offering to issue additional coins or tokens.

Cryptocurrencies are typically governed by systems that determine how many coins can be created, how they are created, and how the integrity of the ledger is maintained. These protocols are meant to be equivalent to the government regulations and laws that underpin fiat money, and their strength will affect the trustworthiness of digital currencies and, as a result, supply and demand. When a cryptocurrency is released into circulation, there are various ways to obtain it. It can be bought on exchanges, some people receive it because their companies allow them to accept digital money, and some retailers accept cryptocurrencies as payment for their goods and services, and the people, or organizations, that maintain the blockchains for cryptocurrencies are usually rewarded with cryptocurrencies. (Wątorrek et al., 2021).

Furthermore, the negative sentiment results show as much as 6.1%. The use of cryptocurrencies as a medium of exchange is an interesting topic. This is because the financial structure of cryptocurrencies relies on cryptography. Cryptocurrency value calculations also depend on algorithms in the blockchain system. Bakar et al., (2017) found three characteristics that disqualify bitcoin from being classified as money. It is characterized by the following characteristics: (a) no intrinsic value, (b) anonymous holder, and (c) instability. Meera (2018) raised a similar point, arguing that money in an "Islamic" perspective must be backed by assets. Consequently, cryptocurrencies do not fulfill this criterion. He proposed that bitcoin should be backed by genuine assets to comply with Islamic beliefs. According to Nurhisam (2017), bitcoin is not allowed as money because it is not regulated by the government and its risks and drawbacks outweigh its benefits. So it is concerned about the legitimization of government money spending as well as uncontrollable difficulties in the future.

In addition, there is no consumer protection as cryptocurrency is a decentralized money system that relies exclusively on the system and its users. According to Siswanto et al, (2020), consumer protection in cryptocurrencies is weak due to the lack of regulation. Users and creators are completely anonymous, and this kind of currency can be used for criminal activities such as money laundering. Due to the lack of government oversight in cryptocurrencies, this may have an impact on the economy in the future (Mnif & Jarboui, 2021). It is impossible to track the circulation of cryptocurrencies throughout the economy. As a result, governments or regulatory bodies may lose control of the economy, especially if cryptocurrencies become the main currency.

Finally, the positive sentiment showed a percentage of 2.9%. This is due to the high growth of cryptocurrency despite its poor liquidity, low convenience, high volatility, and high risk. Cryptocurrency is becoming an alternative to traditional currencies to make financial transactions, purchases, transfers with people. Abu Bakar et al., (2019) said that Bitcoin will create a unified financial system through standard decentralization, it will be much rarer than gold, and will be able to control inflationary trends caused by fiat currencies

CONCLUSION

This study aims to analyze the sentiment of Twitter application users towards cryptocurrency. Based on the results of sentiment analysis, the assessment of cryptocurrency originating from Twitter shows a neutral sentiment result of 91%, then 6.1% shows negative sentiment, and 2.9% shows positive results. This shows a wide range of sentiments generated from tweets related to cryptocurrency with the dominance of neutral sentiment, followed by negative sentiment, and finally positive sentiment. Several issues related to taxes, high levels of volatility, speculation and digital security issues (scams) are important considerations regarding this cryptocurrency topic. The benefits of this research are as literacy and consideration materials related to cryptocurrency. The limitation of this research is that the data taken is only tweets during January 2022 which amounted to 18,304. The resulting results are very dynamic and can change as the economy, technology, and other variables develop.

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