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HOW DO MUSLIM SCHOLARS AND EXPERTS POSIT CRYPTOCURRENCIES IN SOCIAL MEDIA

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ABSTRACT

The advancement in technology since its inception has brought a lot of innovations in how several things are being done in communities. The current 4th industrial revolution in technology has not only affected the system of interactions but has also introduced a new model of financial exchange called cryptocurrency. The Muslim community has always assumed Sharia as the guide for all its activities, based on the depiction of the prophet, the companions, and, subsequently, the Muslim scholars and experts in society. There have been several speculations on the permissive and prohibitive issues related to cryptocurrency among the Muslim communities since its inception. Social media platforms have also become a medium through which Muslim scholars and experts communicate their views, advice, and justifications on contemporary issues to the community. Therefore, this research aims to identify some of the topic communities and analyse the sentiments of some well-known Muslim scholars and experts in Malaysia on topics related to cryptocurrency. To do this, commentaries made by these scholars and related experts on cryptocurrency were collected from their social media platforms from which they have a range of followers from more than a thousand to millions. Analysis was carried out using some text mining techniques. 126 commentaries were retrieved from the Facebook and Twitter accounts of the indicated scholars and experts, after which a Provalis QDA miner, WordStat, and LightSide content analysis software were applicable for the analysis. The results of the analysis revealed the thematic structure of the commentaries, in which topics like "Cryptographic Halal", "Authorities Official", "Blockchain System" and "Buy Goods" were mentioned in 100% of the cases, and topics like "Medium of Exchange Goods and Services", "Scholars Point of View" and "Legal Tender" were mentioned in 88.9% of the cases. The topic "Legal Tender" as used in the commentaries makes it clear that most of the scholars and experts in Malaysia today were in support of the argument that cryptocurrency can be used as a legal tender in Muslim communities. Similarly, the results of the sentiment model also show a strong percentage of accuracy in which most of the commentaries made were positive about the subject matter.

Keywords: *Topic Community, Sentiments, Muslim Scholars and Experts, Cryptocurrencies, Social Media Platforms, QDA miner, WordStat, LightSide*

1. INTRODUCTION

Cryptocurrency is a digital currency with encryption techniques. It is a currency that operates independently of any central bank. This type of currency was introduced back in 2008 as an alternative means of exchange, especially for online commercial activities [1]. It all started when a study titled Bitcoin – A Peer to Peer Electronic Cash System was posted to a mailing list discussion on cryptography by someone called Satoshi Nakamoto, whose identity remains anonymous [2]. The main objective of this monetary system, as stated in the study, was to facilitate peer-to-peer monetary transactions that operate independently of the central bank. Cryptocurrency is not physical; it has been introduced as a digital coin that can only transact over the virtual internet network [3]. Because this currency cannot be physically withdrawn, the owner can only transfer the funds to other parties who need the digital currency for fiat money because of anonymity [4]. Another controversial issue with cryptocurrency was price volatility, which has been used as an advantage for some people over others. This main reason has also made many Muslim communities, with their respective scholars, give different *fatwas* on the issue of permissive and prohibitive cryptocurrency.

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However, the question of cryptocurrency has been a hot topic in the community for a long time. Different groups of experts are still debating it.

It is a tradition in a Muslim community to act upon the Islamic laws and regulations (*Sharia*), which are diverse legal systems mostly derived from the Holy Quran and the traditions of the Prophet (peace and blessings of Allah be upon him), which are also based on the explanations and teachings of Muslim scholars [5], [6]. Islam has always promoted justice among the entire humanities, and therefore its teachings do not leave out the social and financial ethics of society. However, as life goes on, the human community continues to experience some dynamism in several aspects of life for which the canonical texts from the Holy Quran or traditions of the Prophet, peace and blessings of Allah be upon him, do not take a permissive or prohibitive position. So, to keep justice in the community, scholars are required to help come to a consensus on any new and fair rules [7].

Today, the methods by which people interact with each other in their communities and organisations have been radically transformed because of the proliferation of social media platforms like blogs, Facebook, Twitter, and other related online social networks. Many experts perceived social media as a strong set of tools that can be used to redefine the connection between leaders and followers [8]. As a result, contemporary Muslim schools and experts have also been experimenting with social media platforms to interact with their respective communities.

Therefore, this research aimed to identify some current topic communities and sentiments of some well-known Malaysian Muslim scholars and experts on cryptocurrency. To do this, 126 commentaries on cryptocurrencies were retrieved from the selected scholars' and experts' Facebook and Twitter social media pages. The commentaries retrieved contain text, videos, and picture formats, which were analysed to identify some current topic communities and their sentiments on issues related to cryptocurrency. Since the study has taken into consideration all scholars and experts in Malaysia that have a commentary on cryptocurrency on their social media pages, it also provides insight for the community on the overview topics of permissive and prohibitive issues that are related to the currency. The sequence of this research has been organised as follows: the second part after this introduction presents an extant literature review of published studies on Muslim scholars' and experts' perceptions of cryptocurrency. The third part talks about how the research was done and what textual data was used. In the next section, the results of the analysis are shown. In the last section, the conclusions and limits of the study are talked about.

2. LITERATURE REVIEW

Since its inception, several studies have been published on the permissive and prohibitive issues related to the use of cryptocurrency in the Muslim community. Similarly, many scholars have also given several public lectures on this topic. Even though some Muslim scholars have agreed that cryptocurrency is permissible according to Islamic law and the Muslim community can transact with it [9]. Such as in the report published by Blossom Finance, a fintech startup based in Indonesia, by their internal Sharia advisor (Mufti Muhammad Abu Bakr) and others like Mufti Faraz Adam, a United Kingdom-based Islamic Finance & FinTech advisor and the executive director of the global Shariah advisory firm Amanah Advisors, and Sheikh Ziyaad Mahomed, the Shariah Committee Chairman of HSBC Amanah Malaysia Bhd. [10]. Some of these scholars also stated that a Zakat could apply to the currency if kept or invested for a minimum period [11]. Similarly, some of the early Muslim scholars who made a public statement on cryptocurrency were the Mufti of Egypt, in the person of Shaykh Ahmad Shawqi, who stated that cryptocurrency is prohibited based on Islamic law and argued that most people only use the currency for illegal activities like money laundering and fraud. He further stated that the currency is also intangible and has no central authority that monitors its activities, like the central banks or government entities [12]. Shaykh Haitham, who is based in the United Kingdom, also agrees with the statement of the Mufti of Egypt that cryptocurrency is illegal based on the Islamic perspective, and he argues that the currency is not backed by any authority and cannot be used as a legal tender [13]. Furthermore, this section of the research has reviewed some current and empirical studies that have been published in the last five years on the permissive and prohibitive issues of cryptocurrency from the Islamic perspective or in the views of Muslim scholars and experts.

Among the earlier empirical studies that were conducted on this topic was that in which [14] developed and presented an information dissemination model for scholars on cryptocurrencies. The main purpose of their study

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was to review the existing information dissemination models, identify known factors influencing the information dissemination process, and propose an information dissemination model for scholars working on cryptocurrencies. The study was carried out through an exploration of some surveyed literature on the known epidemic models and their influencing factors on cryptocurrencies. Lastly, their results showed that the epidemic model can be used to describe how scholars spread information about cryptocurrencies. They also successfully presented a model for scholars who are interested in topics related to cryptocurrencies that are based on the well-known SIER epidemic model.

A study was also conducted [3] and titled "The Requirements of Cryptocurrency for Money: An Islamic View." The main objective of the study was to evaluate how suitable cryptocurrency is as money from an Islamic point of view. They started their study by identifying some of the characteristics of money from the sharia point of view, such as stability and the requirement that it be based on assets. The study employed an investigative method in which their data was gathered from well-known cryptocurrency institutions, and their findings later showed that cryptocurrency is volatile and, for that reason, has a limit on being called money because the value of most of the crypto they studied was based on speculation, which they claimed is prohibited in Islam. Finally, their study concluded that Muslims would be hesitant to use cryptocurrency as money or as a currency for transactions, raising the possibility that cryptocurrency may not have a promising future in Muslim communities. However, another study [15] claimed to provide a solution to the stated challenges. One of the goals of the study was to investigate the opinions of some Islamic and financial experts and Shariah scholars about Islamic cryptocurrencies, such as GOLDX, which was created by a Singapore-based financial technology company called HelloGold, and OneGram, which is already being used in some Arab and Islamic countries and led by the United Arab Emirates gold-based digital money. This study was qualitative, and interviews were conducted to explore some five selected Muslim scholars' views on the framework of these mentioned Islamic cryptocurrencies. The scholars were selected based on their knowledge and experience of both Islamic Shariah and cryptocurrency. The findings at the end of the study revealed that Islamic law is absent from the essential models for conventional cryptocurrency utilisation (such as bitcoin) as either a legitimate or illicit apparatus exchange device. Consequently, introducing new Islamic cryptocurrencies is to reconcile cryptocurrencies such as GOLDX and OneGram.

However, some researchers have also endorsed cryptocurrency with the sharia characteristics of money, among which is a study conducted on the Islamic approach toward purification of transactions with cryptocurrency [16]. The main objective of the study was to elaborate and clarify some of the negative perceptions of the Muslim community on the issue of cryptocurrency. Their study was qualitative, in which they selected and interviewed a sample of eight Islamic financial experts. At the end of their analysis, they concluded that the use of cryptocurrency can be legitimate in the Islamic context as a means of payment. Some other arguments they made are that cryptocurrency can facilitate a monetary transaction by eliminating the normal cost of international money transfers and that some Muslim communities are actively encouraging the use of the currency due to its ease of use and transparency. They also used some verses from the Holy Quran and the hadith of the Prophet to back up their claims. For example, they said that there were no sharia rules or principles from the Holy Quran, the hadith, or ijma that said what a community should use as a currency. They concluded that, from a Shariah point of view, cryptocurrencies are just as good as fiat currency and can be used in any transaction.

Another comprehensive study conducted on this topic was on the sharia compliancy of blockchain-based fintech [17]. It was titled "Are Cryptocurrencies ḥalāl? On the Sharia-Compliancy of Blockchain-Based Fintech". The main objective of the study was to respond to some of the most frequent concerns of Muslim scholars on the prohibition of cryptocurrencies, such as the issues of volatility and speculative nature of the currency, security issues, and most commonly, the claim that these currencies are not ḥalāl because they have no intrinsic value. The study tried to outline the different positions of Muslim scholars on the sharia-compliancy of cryptocurrencies, from which the author concluded that cryptocurrencies may be classified as commodities if their usufruct value is recognized. He also said that cryptocurrencies could be considered money and be used to pay if they are seen as goods with real value or if the real

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value isn't seen as a requirement as long as their nominal value is respected.

The conceptual research on the sharia-based cryptocurrency [18], described several ways to promote the use of digital currency in Muslim communities. They tried to support their arguments with different commentaries by Muslim scholars on why and how cryptocurrency could be implemented and used in Muslim communities. Among their arguments is that anything accepted by a community of people can be used as a medium of exchange and they quote that Umar bin Khattab RTA wanted to make money from the camel's skin but was afraid the camel would become extinct with time (Futuh al-Buldan, al-Baladziri) and concluded with the statement of Imam Malik that a currency does not have to be made of gold and silver. The authors ended their argument by saying that cryptocurrency can be used for all buying and selling in Muslim communities if there is no usury, and everyone agrees on what is going on.

Ayedh et al. (2020) investigated Malaysian Muslim investors' behaviour in the bitcoin cryptocurrency market. The main objective was to examine some of the factors that can influence the Malaysian Muslim community to invest in the bitcoin market. Their study was quantitative and used a questionnaire as the means of data collection from about 200 potential Muslim communities who have an interest in investing in cryptocurrency. Structural equation modelling, basic descriptive statistics, and one sample test were used for the data analysis. The conclusion showed that compatibility, awareness, and conditions that make it easy to invest have a big effect on how much Malaysian Muslim communities invest in the bitcoin market. They also suggested that the government make more people, especially older people, aware of the currency.

However, all the reviewed articles were only retrieved from the Scopus online database and included articles that were published within the last five years. The entire review of studies has indicated that most of the researchers have endorsed cryptocurrency and agreed it can be used as money in line with the Islamic laws of currency. While those opposed to the currency's use in the Muslim community [3], [15], they claim that cryptocurrency is volatile because the values are based on speculation, which they claim is prohibited in the Islamic context; it has no intrinsic value or physical form because it only exists in digital format; its supply is not determined by any central bank and is neither issued nor controlled by any company [19]. Unlike the cited literature, in which most of the researchers either support or refute the legality of cryptocurrency in Muslim society, this research, on the other hand, aggregates the two classes and examines their supporting evidence based on the majority. Most of the studies have also either employed survey, interview, or document review methods as their sources of evidence, while this research, on the other hand, has extracted all the available old and current commentaries of several scholars and experts on cryptocurrency from their social media home pages. Since the retrieved commentaries were made over a given period, which allowed the samples to either change their positions or give more emphasis to their choices as they gained more experience on the subject matter over time.

Table 1: Summary of the reviewed studies on the Muslim perceptions of cryptocurrency

S/N	Author(s)/date	Title	Summary of the publication
1	Husain, A. S., & Othman, R. (2018, March)	Information Dissemination Model for Scholars on Cryptocurrencies.	To look at the information dissemination models that are already out there, to find out what factors are known to affect the information dissemination process and propose an information dissemination model for scholars who study cryptocurrencies using the SIER epidemic model, which is a way to spread information.
2	Siswantoro, Handika, & Mita, (2020)	The requirements of cryptocurrency for money, an Islamic view	To evaluate how suitable cryptocurrency can be used as money from Islam's point of view, the authors have concluded that Muslims would be reluctant to use cryptocurrency as money and that it may not also have a promising future in Muslim countries.
3	Abdeldayem, M. M., Al Dulaimi, S. H., & Al Dulaimi, F. H. (2021).	A qualitative approach to evaluate the reconciliation of GOLDX and OneGram in Islamic Finance.	It is necessary to investigate the views of some Islamic and financial experts, as well as Shariah scholars, on the Islamic cryptocurrency, Goldx and OneGram. They concluded that Islamic law is absent from the essential models for conventional cryptocurrency and that it is better to reconcile with GOLDX and OneGram.
4	Saleh, A. H. A. I., Ibrahim, A. A., Noordin, M. F., & Mohadis, H. M. (2020).	Islamic Approach Toward Purification of Transaction with Cryptocurrency	To elaborate, some of the negative perceptions of the Muslim community towards cryptocurrency and their findings also indicate that the use of cryptocurrency can be legitimate in the Islamic context as any other payment method.
5	Kirchner, I. K. (2020).	Are Cryptocurrencies ḥalāl? On the Sharia-Compliancy of Blockchain-Based Fintech.	In response to some Muslim scholars who say that cryptocurrencies should be banned, the author tried to summarise the different views of Muslim scholars on whether cryptocurrencies are in line with sharia. From this, he concluded that cryptocurrencies could be considered commodities if their usufruct value is recognized.
6	Virgana, R. A. E., Saudi, M. H. M., & Sinaga, O. (2019).	Conceptual research: Sharia-based cryptocurrency	The authors tried to back up their arguments with comments from different scholars. They concluded that cryptocurrency can be used for all buying and selling in Muslim communities if usury is avoided and the people doing business have a basic agreement.
7	Ayedh, A., Echchabi, A., Battour, M., & Omar, M. (2020).	Malaysian Muslim investors' behaviour towards the blockchain-based Bitcoin cryptocurrency market	They concluded that compatibility, awareness, and enabling conditions all have a big effect on how much Malaysian Muslim communities invest in the bitcoin market. They suggested that the government make more people, especially the elderly, aware of the currency.

3. METHODOLOGY

Based on the objective of this research and its explanatory method, text analysis was applicable in examining the data collected. This has been a technique mostly used by researchers in extracting worthwhile information from human languages. In line with this research, 126 commentaries by some well-known Malaysian Muslim scholars and experts on cryptocurrency were retrieved from their Facebook and Twitter webpages as indicated in Table 2 below. After that, the Provalis QDA miner,

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WordStat, and LightSide content analysis software were applicable in the analysis, in which the current topic communities and the sentiments of scholars and experts on cryptocurrency were identified. This is all to learn more about how Muslims around the world think about the permissible and not-so-permissive issues with cryptocurrency.

Table 2: Categories of the data

Case No	Scholars/Experts	Type of commentaries	No of commentaries	Sources
1	Bank Negara Malaysia (BNM)	Text/videos/ images	14	Facebook
2	Dr Daud Bakar (Chairman of the Shariah Advisory Council, Central Bank of Malaysia)	Text/videos/ images	20	Facebook
3	Dr Mohammad Asmadi Naim (Prof. at Islamic Business School (IBS) Universiti Utara Malaysia, and Syariah Advisory Council, Securities Commission of Malaysia)	Text	11	Facebook
4	Dr Zaharuddin Abd Rahman (A member of Shariah Advisory Council of Securities Commission of Malaysia and a member of Islamic Finance Special Committee for Ministry of Finance Malaysia)	Text/images	15	Facebook
5	Dr Zulkifli Al-Bakri (The former Mufti of the 7th Federal Territory, Malaysia)	Text	2	Facebook
6	Farad	Text/images	25	Twitter
7	INCEIF (International Centre for Education in Islamic Finance)	Text/videos/ images	11	Facebook
8	Muamalat.my	Text	23	Facebook
9	Dr Kameel Mydin Meera (Dean, Institute of Islamic Banking & Finance, International Islamic University Malaysia.)	Videos	5	Facebook
Total			**126**	

From the 126 commentaries retrieved as indicated in the category table above, the commentaries were later combined from individual posts into a single case (dataset) based on the individual scholar or expert contribution. Since some of the commentaries were also retrieved in a language other than English and a format other than text, a web-based oTranscribe and the imTranslator were used in transcribing and translating the commentaries to text format and English respectfully before carrying out the analysis. The commentaries were put together and put into groups based on what different scholars and experts said. As the table shows, we now have 9 cases.

The basic text mining processes were carried out on the entire dataset as highlighted in the textbook "Text mining and analysis: practical methods, examples, and case studies using SAS" [20] to achieve the objectives of the research. The processes were followed as indicated in the figure below.

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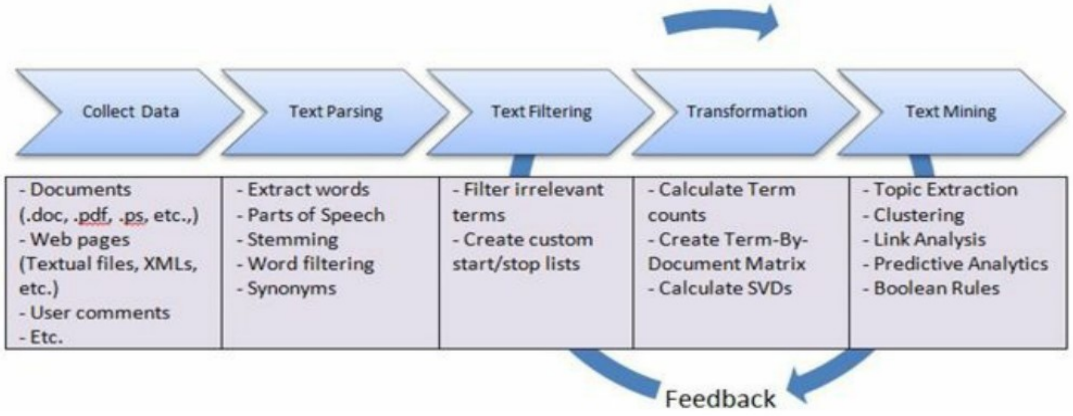

Figure 1: Text Mining Process Flow by Chakraborty et al., (2014) [20]

The process here also began with the data collection. The applicable data was collected in different formats (text, video, and images) from the social media web pages. After that, the text parsing was carried out, which also involves formatting, cleaning, extraction, and creating a dictionary of words from the documents using NLP. The frequently used keywords by the scholars and experts were extracted from the commentaries, after which other irrelevant terms were now removed. The data transformation stage is now carried out to give the filtered text a structured view before the final stage of text mining, in which the topics and other related and relevant content are extracted. Sentiment analysis was also carried out using the Lightside computer application to identify the mood and feelings expressed in the commentaries. Finally, to avoid selection or classification bias among scholars and experts, as well as any other related social issues from the retrieved commentaries and the meanings attached to the words and phrases used in concluding the research, the potential threats to internal validity must be identified and countered. Different threats can apply to single-group and multi-group studies [21]. After that, a further review of studies conducted on the adoption, awareness, and perceptions of Malaysians on the subject matter was conducted, and the findings were correlated to counter the threats.

4. RESULTS AND FINDINGS

For the text parsing, the text analysis software WordStat was used, with which the word frequency analysis was first carried out. This allowed us to quickly get a glance at the most common keywords in the entire dataset (cases). This will be useful in further identifying most of the themes and important topics in cryptocurrency. The results are shown below both in a word cloud graphical format and a statistical table format for more precise frequency results.

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Figure 2: Word frequency (word cloud)

The word cloud shows the 200 words that are used the most, and the size of each word is based on how often it is used in the whole dataset (cases).

According to the statistical frequency table, only words that have a frequency of 50 or above were included in the commentaries, and only the first 50 most frequently used keywords were retrieved using the keyword extraction approach. It was apparent from the table that the most-used word by the scholars and experts on cryptocurrency was "CURRENCY" with a frequency of 838. Other relevant and related keywords in the commentaries are "SHARIA" with a frequency of 208, ISLAMIC with a frequency of 114, HADITH with a frequency of 94, GOVERNMENT with a frequency of 76, SCHOLARS with a frequency of 70, SOCIETY with a frequency of 67, LEGAL with a frequency of 62, and ILLEGAL with a frequency of 53.

Table 3: The 50 most frequently used keywords from the commentaries

S/N		FREQUENCY	% SHOWN	% PROCESSED	% TOTAL	NO. CASES	% CASES	TF • IDF
1	CURRENCY	838	7.69%	3.07%	1.20%	8	88.89%	42.9
2	BITCOIN	605	5.55%	2.21%	0.87%	9	100.00%	0.0
3	MONEY	341	3.13%	1.25%	0.49%	8	88.89%	17.4
4	DIGITAL	314	2.88%	1.15%	0.45%	8	88.89%	16.1
5	SYSTEM	292	2.68%	1.07%	0.42%	6	66.67%	51.4
6	BLOCKCHAIN	243	2.23%	0.89%	0.35%	9	100.00%	0.0
7	SHARIA	208	1.91%	0.76%	0.30%	7	77.78%	22.7
8	GOLD	190	1.74%	0.70%	0.27%	7	77.78%	20.7
9	ISSUE	182	1.67%	0.67%	0.26%	7	77.78%	19.9
10	TERMS	171	1.57%	0.63%	0.24%	6	66.67%	30.1
11	BUY	170	1.56%	0.62%	0.24%	6	66.67%	29.9
12	PEOPLE	158	1.45%	0.58%	0.23%	7	77.78%	17.2
13	TECHNOLOGY	153	1.40%	0.56%	0.22%	9	100.00%	0.0
14	EXCHANGE	149	1.37%	0.55%	0.21%	8	88.89%	7.6

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15	LAW	143	1.31%	0.52%	0.20%	6	66.67%	25.2
16	CRYPTOCURRENCY	132	1.21%	0.48%	0.19%	9	100.00%	0.0
17	CRYPTO	126	1.16%	0.46%	0.18%	8	88.89%	6.4
18	MAKE	122	1.12%	0.45%	0.17%	6	66.67%	21.5
19	BASED	121	1.11%	0.44%	0.17%	8	88.89%	6.2
20	ISLAMIC	114	1.05%	0.42%	0.16%	8	88.89%	5.8
21	TIME	110	1.01%	0.40%	0.16%	6	66.67%	19.4
22	POST	103	0.95%	0.38%	0.15%	9	100.00%	0.0
23	WORLD	100	0.92%	0.37%	0.14%	7	77.78%	10.9
24	BANK	98	0.90%	0.36%	0.14%	6	66.67%	17.3
25	MALAYSIA	97	0.89%	0.35%	0.14%	8	88.89%	5.0
26	COUNTRY	95	0.87%	0.35%	0.14%	7	77.78%	10.4
27	RISK	95	0.87%	0.35%	0.14%	7	77.78%	10.4
28	HADITH	94	0.86%	0.34%	0.13%	4	44.44%	33.1
29	SHARIAH	94	0.86%	0.34%	0.13%	6	66.67%	16.6
30	COMPLIANT	93	0.85%	0.34%	0.13%	7	77.78%	10.2
31	INVESTMENT	91	0.83%	0.33%	0.13%	7	77.78%	9.9
32	ASSETS	85	0.78%	0.31%	0.12%	6	66.67%	15.0
33	ISSUES	85	0.78%	0.31%	0.12%	7	77.78%	9.3
34	NEW	85	0.78%	0.31%	0.12%	8	88.89%	4.3
35	RINGGIT	82	0.75%	0.30%	0.12%	4	44.44%	28.9
36	CRYPTOGRAPHY	76	0.70%	0.28%	0.11%	3	33.33%	36.3
37	GOVERNMENT	76	0.70%	0.28%	0.11%	7	77.78%	8.3
38	THING	75	0.69%	0.27%	0.11%	6	66.67%	13.2
39	VIEW	75	0.69%	0.27%	0.11%	6	66.67%	13.2
40	SILVER	74	0.68%	0.27%	0.11%	5	55.56%	18.9
41	CHANGE	71	0.65%	0.26%	0.10%	7	77.78%	7.7
42	FINANCIAL	71	0.65%	0.26%	0.10%	7	77.78%	7.7
43	SCHOLARS	70	0.64%	0.26%	0.10%	6	66.67%	12.3
44	TRANSACTION	70	0.64%	0.26%	0.10%	6	66.67%	12.3
45	SOCIETY	67	0.61%	0.25%	0.10%	5	55.56%	17.1
46	ASSET	66	0.61%	0.24%	0.09%	8	88.89%	3.4
47	CONTROL	66	0.61%	0.24%	0.09%	6	66.67%	11.6
48	LOOK	65	0.60%	0.24%	0.09%	7	77.78%	7.1
49	LEGAL	62	0.57%	0.23%	0.09%	8	88.89%	3.2
50	ILLEGAL	53	0.49%	0.19%	0.08%	4	44.44%	18.7

4.1 Topic Extraction

The topic analysis is a means to organise and understand a large collection of text datasets, either by assigning tags or categories according to each text's topic or theme (MonkeyLearn, n.d.). The topic extraction here uses Natural Language Processing (NLP) to break down our gathered commentaries into patterns and to reveal the semantic structures of the commentaries. Figure 2 below presents the topic map extracted from the entire commentaries.

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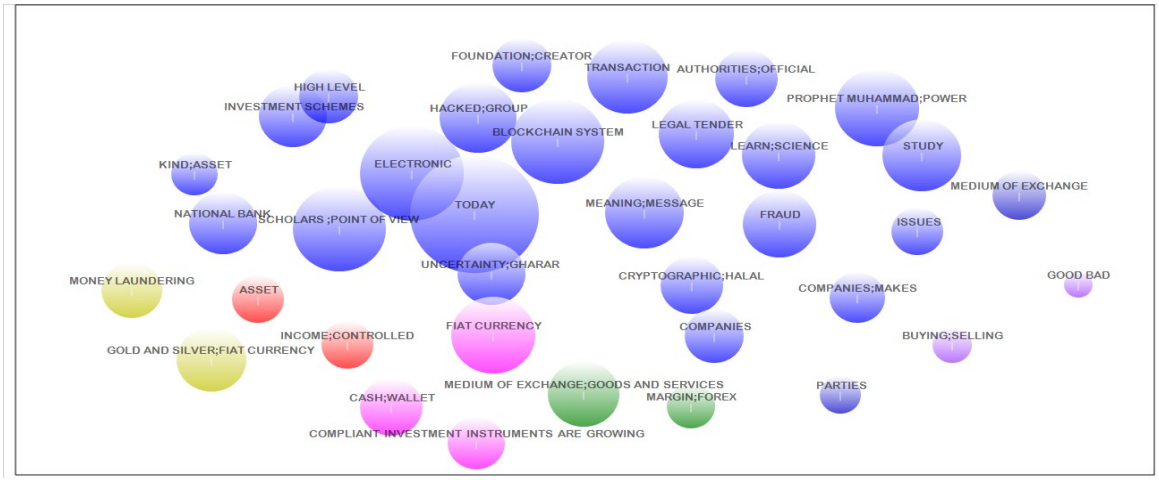

Figure 3: Topic mapping from the commentaries

Due to the mining and cluster analysis of the extracted topics, as shown in Figure 3, Overall, 50 topics are extracted from the entire commentaries, which were grouped into 5, and the size of the circle representing each of the topics is proportional to the frequency and the number of cases in which it is presented in the commentaries. When the topics are taken out of the comments, Table 3 shows the coherence (NPMI), eigenvalues, frequencies, number of cases, and percentage of cases for each topic and its keywords.

Table 4: Topic extraction table

NO	TOPIC	KEYWORDS	COHERENCE (NPMI)	EIGENVALUE	FREQ	CASES	% CASES
1	**FIAT CURRENCY**	SATOSHI; CORRUPTION; ANSWER; FRIENDS; MAN; MILLION; SCHEME; ARGUMENTS; FATWA; DISCUSSION; UNIT; ILLEGAL; QUESTIONS; HUMAN; FIELD; FIAT; OPEN; COMMENT; REAL; SALE; SHARIA; TOMORROW; VIEW; LANGUAGE; INVEST; UNDERLYING; SELLING; LAW; PAY; CALLED; MAIN; FIAT CURRENCY	0.576	32.10	366	7	77.78%
2	**ELECTRONIC**	ELECTRONIC; MUSLIM; MONETARY; TALKING; ALLAH; ECONOMY; USURY; PROBLEM; PAPER; CHARACTERISTICS; AFTER; IMPORTANT; YEARS; GLOBAL; JAPAN; WORD; ISLAM; INTRODUCE; TRADE; ADDRESS; CREATE; SMALL; LONG; NUMBER; STRONG; CRYPTOCURRENCIES; CREATED; RINGGIT; ZAKAT; OPINION; GOLD; ISSUED; MILLION; CALL; INTEREST; CRYPTOCURRENCY; PAYMENT; DINAR; RECORD; MEANS; ISLAMIC; FINANCIAL; SELL; ISSUE; SCHOLAR; BANKING; BOOK; SYSTEM; ISLAMIC LAW;	0.483	8.39	675	9	100.00%

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4	**PROPHET MUHAMMAD POWER**	POWER; HEARD; PROPHET; HADITH; STRENGTH; THEORY; MUHAMMAD; DISTRIBUTED; LEDGER; CONTEXT; STATE; BLOCK; CHAIN; CONSIDERED; BOOKS; STRONG; PERSON; RECORD; HISTORY; NUMBER; DATA; DIFFICULT; TERMS; DAY; CORRECT; AMOUNT; ADDRESS; IMPORTANT; PROPHET MUHAMMAD; BLOCKCHAIN SYSTEM;	0.593	6.01	395	7	77.78%
5	**MARGIN FOREX**	MARGIN; FOREX; SPOT; CLEAR; ASKED; PROFIT; SMALL; KIND; PURPOSE; MALAYSIAN; PROBLEM; SHAPED; WATER; AMOUNT; BUSINESS; SELL; SALE; TIMES; PURCHASE; ALLOWED;	0.550	5.74	141	7	77.78%
6	**CRYPTOGRAPHIC HALAL**	CRYPTOGRAPHIC; HALAL; EARLY; COST; FATWAS; SALE; PURCHASE; MILLION; TYPES; INVEST; CURRENT; MALAYSIAN; LANGUAGE; THEORY; ILLEGAL; PART; FIELD; AFTER; CONTEXT; BUSINESS; SCHOLAR; STOCK; RESEARCH; RINGGIT; CONCEPT; HIGH; BOOK; UNDERSTAND; PROPHET; PRICE;	0.524	4.88	234	9	100.00%
7	**LEGAL TENDER**	TENDER; LEGAL; ACCEPT; CORRECT; COUNTRIES; VALID; CONSIDERED; LONGER; LADIES; FREE; CURRENCIES; SUPPLY; INVOLVE; PARTY; IMPORTANT; YESTERDAY; GOODS; FACT; COUNTRY; COMMUNITY; HAPPEN; POWER; ISSUE; JAPAN; DISCUSSION; LEGAL TENDER; FIAT CURRENCY;	0.611	4.23	297	8	88.89%
8	**COMMISSION**	COMMISSION; ADVISORY; COUNCIL; SECURITIES; DECISION; ASSETS; SHARIAH; DIGITAL; MALAYSIA; TRADING; ISSUED; INVESTMENT; DIGITAL ASSETS; DIGITAL CURRENCY; SECURITIES COMMISSION MALAYSIA; SHARIAH ADVISORY COUNCIL; TRADING OF DIGITAL ASSETS; COMMISSION ISSUED A SHARIAH DECISION; DISCUSSIONS AND DECISIONS; PERLIS FATWA COUNCIL; SHARIAH DECISION ON THE INVESTMENT; SHARIAH PERSPECTIVE;	0.517	3.87	379	8	88.89%

9	**MEANING MESSAGE**	MEANING; MESSAGE; CODE; INFORMATION; SCIENCE; GOOD; UNDERSTOOD; THEORY; UNDERSTAND; STUDY; MAKES; COMMUNITY; END; FIELD; BASIS; SCHOLAR; CRYPTOGRAPHY; BASED; READ; TERMS; HUMAN; CONTROL; DATA; AMOUNT; PARTY; YESTERDAY; TIMES; TRANSFER; PEOPLE; BLOCKCHAIN SYSTEM;	0.489	3.79	348	8	88.89%
10	**BLOCKCHAIN SYSTEM**	WHITE; TRANSPARENT; DATA; CHAIN; INTERNET; SMALL; SATOSHI; ZAKAT; INTERESTING; PAPER; STATEMENT; LANGUAGE; FINANCE; RECORD; SUPPLY; FACT; HUMAN; MIND; READ; EARLY; CHANGE; BLOCKCHAIN; GOODS; TECHNOLOGY; SOCIETY; THEORY; MARKET; TRUST; ISSUES; FRAUD; SYSTEM; FINANCIAL; COMPANY; BLOCKCHAIN SYSTEM;	0.607	3.76	505	9	100.00%
11	**INCOME CONTROLLED**	INCOME; CONTROLLED; TAX; CORRUPTION; BAD; CRYPTOGRAPHIC; CONDITIONS; FREE; GOVERNMENT; ARGUMENT; POLICY; STRENGTH; FORM; CONTROL; MATTER; ACCEPT; CONTEXT; TOMORROW; REAL; CREATOR;	0.553	3.72	161	7	77.78%
12	**STUDY**	SESSION; TAALA; MORNING; MEET; COMMENT; SHARE; KNOWLEDGE; TOMORROW; CONTINUE; RELATED; QUESTIONS; STRENGTH; HALAL; READ; SHAPED; QUESTION; FOUNDATION; PEEL; WORD; STUDY; LANGUAGE; HARAM; ISLAMIC; RESEARCH; MIND; IMAM; ANSWER; TERMS; NOTE;	0.668	3.46	350	8	88.89%
13	**GOLD AND SILVER FIAT CURRENCY**	DIRHAM; DINAR; GOLD; FIAT; SILVER; BACKED; COST; PROFIT; FRIENDS; COIN; PAPER; MONEY; GOVERNMENT; GOLD AND SILVER; FIAT CURRENCY; BASED ON GOLD; DINAR AND DIRHAM;	0.511	3.35	274	7	77.78%
14	**CASH WALLET**	CASH; WALLET; SUBJECT; USURY; MALAYSIAN; SPOT; RINGGIT; PAY; BUY; FOREX; ETHER; HADITH; LAW; MM; TOKEN; LONGER; COIN; COMMODITY; MALAYSIAN RINGGIT;	0.527	3.29	231	7	77.78%
15	**BUY GOODS**	VIDEO; NOTE; INVOLVE; BANKS; POST; FREE; ITEMS; ETHER; TIMES; AUTHORITIES; CORRECT; BUY GOODS;	0.394	3.16	73	9	100.00%

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16	**COMPANIES**	BIG; EARLIER; LONGER; VALID; COUNTRIES; SHAPED; MENTIONED; STATES; SUPPLY; IMAM; MEANS; ASKED; THING; RISK; ECONOMIC; PEEL; NATURE; BOOK; HUMAN; HIGH; COMPANIES; MENTIONED EARLIER;	0.561	3.05	200	7	77.78%
17	**LEARN SCIENCE**	LEARN; SCIENCE; THEORY; STABLE; PURPOSE; KNOWLEDGE; MALAYSIAN; UNDERSTAND; DIFFICULT; ALLOWED; RINGGIT; RISK; TERMS; NATURE; ISSUE; SHARIA; WORLD TODAY;	0.483	2.95	308	8	88.89%
18	**TRANSACTION**	KEY; MINING; COMPUTER; INFORMATION; LEDGER; DISTRIBUTED; CODE; CREATE; BLOCK; ACCOUNT; MESSAGE; ALLOWED; CORRECT; INTERESTING; CRYPTOGRAPHY; PERSON; MAN; PAY; CALLED; PROBLEM; DIFFICULT; TRANSACTION; NORMAL; TEN; BLOCKCHAIN; ACCORDING; PURPOSE; BLOCKCHAIN SYSTEM; BLOCKCHAIN TECHNOLOGY;	0.528	2.79	341	7	77.78%
19	**USTAZ**	USTAZ; EARLIER; DR; BUY; YEAH; CONTINUE;	0.253	2.73	106	6	66.67%
20	**PROCESS LONGER**	PROCESS; LONGER; ETHEREUM; HAPPEN; BLOCK; CHAIN; INVOLVE; FUTURE;	0.450	2.70	54	6	66.67%
21	**FOUNDATION CREATOR**	FOUNDATION; CREATOR; STRONG; BASIS; TEN; LEVEL; ISSUES; FINANCIAL; THOUSAND; POLICY; SESSION; ARGUMENTS; ETHEREUM; DISCUSSED; ISSUED; PUBLIC; GENTLEMEN AND GENTLEMEN;	0.506	2.61	182	8	88.89%
22	**MEDIUM OF EXCHANGE GOODS AND SERVICES**	SERVICES; TOOL; GOODS; EXCHANGE; PURCHASE; FREE; BUY; MAIN; SALE; SHAPED; HUMAN; MALAYSIAN; HISTORY; COMMUNITY; MAN; BUYING; BOOK; TIMES; MEDIUM; ARGUMENTS; UNIT; MEDIUM OF EXCHANGE; GOODS AND SERVICES; CURRENCY EXCHANGE;	0.570	2.55	304	8	88.89%
23	**GOLD AND SILVER BACKED**	BACKED; DOLLAR; GLOBAL; GOLD; ITEMS; REAL; SILVER; STRONG; NUMBER; ELECTRONIC; ISLAM; THINGS; GOLD AND SILVER; BASED ON GOLD; PROPHET MUHAMMAD; BACKED BY RIBAWI ITEMS;	0.484	2.50	227	7	77.78%

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24	**HIGH LEVEL**	LEVEL; HIGH; USD; PRICE; COMPARED; INTERNATIONAL; CRYPTOCURRENCIES; BITCOIN; SECURITY; HIGH LEVEL;	0.338	2.41	201	7	77.78%
25	**BUYING SELLING**	BUYING; SELLING; HAPPEN; SELL; REAL; INCOME; BACKED; GOOD; PLACE; INTRODUCE; ELECTRONIC; TRUST; END; OPEN; COMPANY;	0.491	2.37	91	7	77.78%
26	**ISSUES**	PART; CONTINUE; SERIES; TRADED; PLATFORM; CLEAR; MAIN; FRIENDS; ISSUES; COMMON; CORRECT; CONSIDERED; SHARE; INTERESTING; NUMBER; ILLEGAL; USURY; TRADE; CURRENCIES; MORNING; NEGARA;	0.450	2.32	161	8	88.89%
27	**PROHIBITED SPECULATION**	PROHIBITED; SPECULATION; HARM; PERMISSIBLE; TRADE; HARAM; OPINION; MEANS; SECURITY; INTEREST; UNCERTAINTY;	0.281	2.26	67	7	77.78%
28	**COMPLIANT INVESTMENTS ARE GROWING**	COMPLIANT; SHARIAH; CONDITIONS; ETHER; STOCK; TOKEN; COIN; COMMODITY; CONCEPT; SHARIA; COMPLIANT INVESTMENT INSTRUMENTS ARE GROWING; UNDERSTOOD BY MALAYSIANS;	0.420	2.23	200	7	77.78%
29	**KIND ASSET**	KIND; ASSET; TAX; MEANS; CRYPTOCURRENCY; QUESTION; BASED; INTRODUCE; FACT; CURRENCY BASED;	0.413	2.20	116	8	88.89%
30	**MEDIUM OF EXCHANGE**	STORE; UNIT; MEDIUM; AMOUNT; BOOKS; FUTURE; TIME; MENTIONED; TEN; IMPORTANT; PROPHET; MUHAMMAD; MEDIUM OF EXCHANGE; PROPHET MUHAMMAD; UNIT OF MEASUREMENT;	0.488	2.18	144	6	66.67%
31	**HACKED GROUP**	HACKED; GROUP; SERIES; NUMBER; NOTE; WORD; CREATED; SECURITY; TRANSFER; TRANSACTION; CRYPTOGRAPHY; CODE; ADDRESS; LANGUAGE; DISCUSSED; CHANGE; BLOCKCHAIN; ISSUED; INVOLVED; UNDERLYING; PEOPLE; YESTERDAY; SYSTEM; BLOCKCHAIN SYSTEM;	0.535	2.16	347	9	100.00%
32	**SCHOLARS POINT OF VIEW**	VIEW; POINT; SCHOLARS; VIEWS; FRIENDS; ETHER; EXISTING; ANSWER; SYSTEM; CURRENCY; DIGITAL CURRENCY; POINT OF VIEW; ISLAMIC SCHOLARS;	0.421	2.11	374	8	88.89%

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33	**PARTIES**	ABLE; PARTIES; HARAM; TRANSFER; MATTER; MIND; TIME; CONTRACT; NOTE; TRUST; HALAL; RELATED;	0.436	2.06	93	7	77.78%
34	**STOCKS AND CRYPTO**	CRYPTO; STOCKS; INVESTMENTS; STOCK; TYPES; ASSETS; SECURITIES; BASIS; STOCKS AND CRYPTO; CRYPTO INVESTMENTS; ANALYSIS FOR STOCKS AND CRYPTO; BASIS OF STOCKS AND CRYPTO; CRYPTO BETTER THAN STOCKS; STOCK ZAKAT AND CRYPTO ZAKAT; STOCKS AND CRYPTO DIGITAL ASSETS; STOCKS AND CRYPTO INVESTMENTS; STOCKS AND CRYPTO LICENSED; STOCKS BETTER OR VICE VERSA;	0.319	2.03	171	8	88.89%
35	**SARF CONTRACT**	SARF; CONTRACT; AL; SUBJECT; PARTIES;	0.395	2.02	64	6	66.67%
36	**TODAY**	TODAY; TERMS; WORLD; QUESTIONS; SHARIA; ASKED; TRUST; RECORD; CONTEXT; TECHNOLOGY; LAW; FUTURE; CORRUPTION; PEOPLE; ISSUES; DIGITAL; BOOKS; TIME; SOCIETY; END; INTERNET; CONTROL; CURRENCY; BLOCKCHAIN; LADIES; LEARN; TOMORROW; DIGITAL CURRENCY; SHARIA LAW;	0.570	1.95	383	9	100.00%
37	**AUTHORITIES OFFICIAL**	AUTHORITIES; OFFICIAL; RESEARCH; STATE; ETHER; STATES; NATIONAL; WRONG; SCIENCE; UNDERSTOOD; YEARS; COUNTRY; READ; DAY; MALAYSIAN; PERSON; INVOLVED; QUESTIONS; CRYPTOGRAPHY; SCHOLAR; VIEWS; FRIENDS; BIT; ISSUED;	0.474	1.92	199	9	100.00%
38	**INVESTMENT SCHEMES**	SCHEMES; INVESTMENT; COIN; ICO; SOCIETY; INVEST; SECURITY; ACCORDING; BITCOIN; CRYPTOCURRENCIES; INVESTMENT SCHEMES; ACCORDING TO STATISTICS; CONTRADICT WITH SYARA; DECEIVED BY FAKE INVESTMENT SCHEMES; SOCIETY ARE DECEIVED BY FAKE; BITCOIN INVESTMENT;	0.248	1.90	251	8	88.89%
39	**NATIONAL BANK**	ACCOUNT; NATIONAL; BANKS; BANK; INVOLVE; SECURITY; PAY; PURPOSE; ILLEGAL; DR; JAPAN; SYSTEM; ETHER; DOLLAR; COUNTRY; MAKES; HAA; COST; MALAYSIA; NATIONAL BANK;	0.436	1.89	276	8	88.89%
40	**OPINION GLOBAL**	OPINION; GLOBAL; YEAH; CONTRACT; POLICY; PAPER MONEY;	0.362	1.86	30	6	66.67%

41	**COMPANIES MAKES**	COMPANIES; MAKES; RELATED; EARLY; ETHER; PARTY; ETHEREUM; WHITE; BUSINESS; THING; COMPANY; GENERAL; WRONG; PLATFORM; MAKE; PAPER; TALKING; THOUSAND; ISSUED;	0.578	1.85	187	9	100.00%
42	**MONEY LAUNDERING**	LAUNDERING; ACTIVITIES; MONEY; HALAL; BUSINESS; ILLEGAL; FINANCIAL; MONEY LAUNDERING;	0.356	1.83	223	8	88.89%
43	**FRAUD**	FRAUD; PRICE; TIMES; TEN; BIT; CHANGE; RESEARCH; PARTY; SCAM; BOOKS; DAY; MORNING; FIELD; BOOK; MENTIONED; BUY; TOMORROW; INFORMATION; IMPORTANT; AMOUNT; CORRECT; NORMAL; SELL; BLOCK; SERIES; ADDRESS; DIFFICULT;	0.498	1.78	297	7	77.78%
44	**PAST REGULATED**	PAST; REGULATED; CALL; BANKS; GOVERNMENT; SELLING; NORMAL; CONCEPT; MARKET;	0.473	1.77	66	7	77.78%
45	**GOOD BAD**	BAD; COMMON; WORD; JAPAN; WATER; GOOD; HAPPEN;	0.525	1.75	46	6	66.67%
46	**ISLAMIC BANKING FINANCE**	BANKING; FINANCE; ISLAMIC; TECHNOLOGY; CALLED; ISLAMIC BANKING; ISLAMIC BANKING AND FINANCE;	0.445	1.75	109	7	77.78%
47	**GENERALLY ACCEPTED**	GENERALLY; ACCEPTED; PAYMENT; COMMODITY; COMMON; COMPARED; TOOL; GENERALLY ACCEPTED;	0.431	1.73	79	6	66.67%
48	**BANK NEGARA MALAYSIA**	NEGARA; MALAYSIA; BANK; BNM; OFFICIAL; STATEMENT; FINTECH; BANK NEGARA MALAYSIA;	0.313	1.72	125	8	88.89%
49	**ASSET**	YESTERDAY; UNDERLYING; FORM; PROFIT; CONTROL; PROBLEM; CRYPTOGRAPHY; COMPANY; MAN; MENTIONED; FUTURE; JAPAN; ECONOMY; DISCUSSED; HAPPEN; MUHAMMAD; ASSET; WRONG;	0.497	1.66	161	7	77.78%
50	**UNCERTAINTY GHARAR**	UNCERTAINTY; GHARAR; ARGUMENT; UNDERLYING; PHYSICAL; POLICY; HISTORY; YEARS; WRONG; LANGUAGE; DEMAND; BASIS; RISK; TRADE; ISLAM; ARGUMENTS; SILVER; ASSET; CONTEXT; BIG; REAL; HIGH; SCHOLARS; READ; GOLD AND SILVER;	0.540	1.63	256	8	88.89%

The Topics extraction was intended to uncover some hidden themes from the scholars' and experts' commentaries on cryptocurrency using the combination of natural language processing and statistical analysis. The main statistical procedure used for the extraction is factor analysis, in which only words with a loading of 0.20 and higher are retrieved, and topic modelling was applicable. Some of the related topics that were extracted are "Fiat Currency", "Cryptographic Halal", "Legal

Tender", "Blockchain System", "Gold and Silver Fiat Currency", "Medium of Exchange Goods and Services", "Buying and Selling", "Prohibited Speculation", "Medium of Exchange", "Scholars Point of View", "National Bank", "Money Laundering", "Islamic Banking Finance", "Generally Accepted", "Bank Negara Malaysia", and "Uncertainty Gharar". From the results, it was also indicated that the topic with the largest eigenvalue is "FIAT CURRENCY" with a value of 32.10, and some important related keywords like "corruption," "scheme," "arguments," "fatwa," "discussion," "illegal," "sharia," "view," "invest," "selling," and "law." These keywords were retrieved from 7 of the cases with a total frequency of 366, and some of the instances in which these keywords have been used in the commentaries are presented in Table 4 below. However, the topic "ELECTRONIC" got the highest number of frequencies with related keywords like Muslim; Monetary; Allah; Economy; Usury; Problem; Paper; Characteristics; Global; Japan; Islam; Trade; Address; Cryptocurrencies; Ringgit; Zakat; Gold; Issued; Million; Interest; Payment; Dinar; Record; Islamic; Financial; Sell; Issue; Scholar; Banking; Book; System and Islamic Law. Similarly, the topic has appaired in all the 9 cases with a 100% case and an 8.39 eigenvalue.

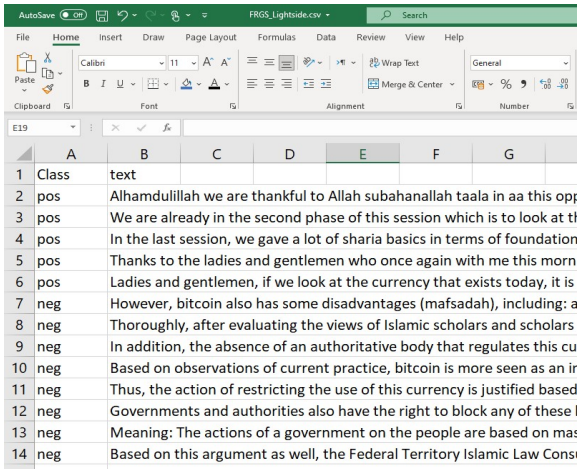
Table 5: The Keyword in Context

No.	**Keywords**	**Keyword in Contexts**	**Cases No.**
1.	FIAT CURRENCY	Bitcoin is also **called** virtual currency according to the IMF. Functionally almost like paper money is known as **fiat** currency.	Case No. 5
2.	CORRUPTION	My articulation in own my understanding cryptocurrencies are much more equipped than **fiat** money to fight **corruption** and we must prove that this is the case in the future. Because of the transparency, the technology can track the owner of the coin and the owner of the transaction all the way…	Case No. 5
3.	SCHEME	When participating in a bitcoin or crypto **scheme**, through a quick-rich **scheme** organized by middlemen or mediation companies that promise fixed or lucrative profits. This is haram from the point of **view** of **sharia** as well as local **law**…	Case No. 5
4.	ARGUMENTS	The first group argues that Bitcoin is **sharia**-compliant based on certain **arguments**. The second group argues that Bitcoin is not **sharia** compliant. While the third group, which is the most numerous, is still researching and studying the **law** for this new transaction instrument.	Case No. 6
5.	FATWA	3 types of scholars globally have issued a **fatwa** on or opinion on cryptocurrency. you have one group that says it's permissible since the recognition of currency in **sharia** is about istilah with simply means social concurrence…	Case No. 8
6.	DISCUSSION	…so, the issue in the **sharia discussion** of many **sharia** papers I read they say this is invalid because bitcoin does not have a clear system of who created the system…	Case No. 2
7.	ILLEGAL	**…fiat** currency is still used to do **illegal** money laundering so when there is money laundering through ordinary currency this does not mean that ordinary currency does not have **sharia**-compliant **law,** he is a currency is a tool of exchange he can use to buy and sell but he can also give opportunities to those who have bad intentions…	Case No. 2
8.	SHARIA	…in my opinion, later, I tell you that even if the ringgit is not **sharia**-compliant money it is not, but once society has accepted this as money then the rule of al-*sarf* usury all will apply must be applied to it because you using as money already right. so, if you were strict with most **sharia** scholars on this one, they will say generally the scholar will allow anything used by people as money…	Case No. 3
9.	VIEW	it's good, so from the point of **view** of Islam, Islam sees now,	Case No. 5

		first, bitcoin is what it is, so scholars have different opinions, some say it is an asset or digital asset, and some say it is a currency.	
10.	INVEST	For me, if we use economic glasses and social justice, investing in bitcoin doesn't do any good to humanity. **Invest** in bitcoin 100% currency speculation. In terms of **law,** there are many things to discuss but from an economic point of **view,** it is detrimental to the ummah…	Case No. 9
11.	SELLING	I mention in the fourth argument that bitcoin is clearer than other currencies. This is because it has a technology that can identify who is buying who is **selling** how much it is at what time it is so that's why everything is online in **real**-time.	Case No. 2
12.	LAW	Bitcoin is only required in countries that do not prohibit bitcoin transactions. If the **law** of the country prohibits it, then it is also prohibited from the point of **view** of **sharia**.	Case No. 6

4.2 Sentiment Analysis

The sentiment analysis here was used to probe the moods and feelings of the related scholars and experts on the related topics of cryptocurrency in the Muslim community. This analysis will help in understanding many of the scholars' and experts' perceptions of the currency. The process begins with data preparation, in which the data is formatted and organised into a CSV file format accepted by the application (lightside). So, the texts were broken up into small chunks of meaningful sentences, each of which was then assigned to a different class of tag (neg/pos), as shown in figure 2 below.



	A	B
1	Class	text
2	pos	Alhamdulillah we are thankful to Allah subahanallah taala in aa this opp
3	pos	We are already in the second phase of this session which is to look at th
4	pos	In the last session, we gave a lot of sharia basics in terms of foundation
5	pos	Thanks to the ladies and gentlemen who once again with me this morn
6	pos	Ladies and gentlemen, if we look at the currency that exists today, it is
7	neg	However, bitcoin also has some disadvantages (mafsadah), including: a
8	neg	Thoroughly, after evaluating the views of Islamic scholars and scholars
9	neg	In addition, the absence of an authoritative body that regulates this cu
10	neg	Based on observations of current practice, bitcoin is more seen as an ir
11	neg	Thus, the action of restricting the use of this currency is justified based
12	neg	Governments and authorities also have the right to block any of these t
13	neg	Meaning: The actions of a government on the people are based on mas
14	neg	Based on this argument as well, the Federal Territory Islamic Law Consu

Figure 4. Sample CSV file showing some of the classifications of the dataset

After breaking down the entire commentaries as in Figure 4 above, a total of 1,737 instances were realized, after which any sentence from the post that supports the implantation of cryptocurrency was tagged as positive (pos). While all other commentaries that were against the implementation of the cryptocurrency were tagged with "negative" (neg). For example, any sentence that includes a negative statement like the following is classed as negative (neg):

prohibited	lack of control	violates
disadvantages	eliminate	illegal
absence of	no accurate data	wrongly traded
restricting	no control,	the risk
block	money laundering	scammer's

After extracting the basic features from the dataset and having the feature table that displayed the basic statistics (correlation and kappa), a model that can replicate our human labels was trained from the build models tab in the application. There is a figure below that shows how reliable the model is. It shows the model evaluation metrics and the model confusion metrics. The accuracy and kappa reports are the same as in Figure 5 below.

Based on the results of the analysis as displayed in the model, the accuracy is 0.8492 and the kappa is 0.4357. To know if we have a high level of agreement in our predicted classification model, an often-heard rule of thumb for the kappa statistic is 70 to indicate good reliability [22]. However, Cohen suggested that kappa statistics be interpreted as follows:

Values ≤ 0	no agreement
0.01-0.20	as none to slight
0.21-0.40	as fair
0.41-0.60	as moderate
0.61-0.80	as substantial
0.81-1.00	as almost perfect agreement

In a nutshell, looking at the above results of analysis, the commentaries make it clear that most of the scholars and experts in Malaysia have endorsed the argument that cryptocurrency can be used as a legal tender in the Muslim community. But to further confirm the findings and avoid any form of bias, a further review of general studies conducted on the adoption, awareness, and perceptions of Malaysians on the subject matter was conducted, and the findings were correlated to counter the likely threats to the findings. Although several studies have been conducted on the adoption, awareness, and perceptions of cryptocurrency in Malaysia, some of them with clear and direct results are presented in Table 5 below.

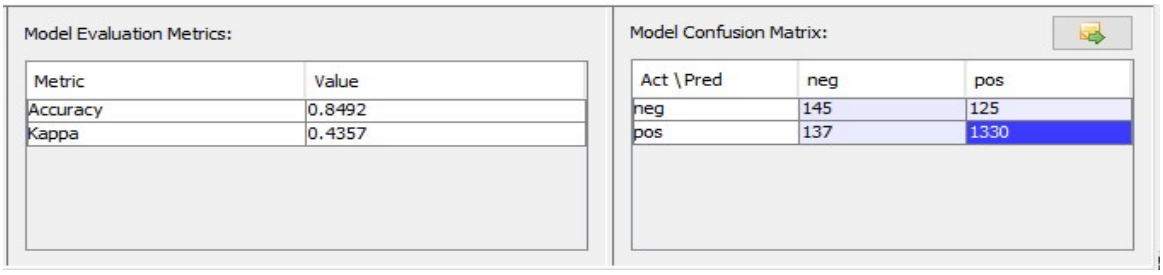


Figure 5 Model Presentation

Table 6 Studies on adoption, awareness, and perceptions of cryptocurrency in Malaysia

S/N	Studies	Methods and samples	Findings
1.	Yeong, Y. C., Kalid, K. S., Savita, K. S., Ahmad, M. N., & Zaffar, M. (2022). Sustainable cryptocurrency adoption assessment among IT enthusiasts and cryptocurrency social communities. *Sustainable Energy Technologies and Assessments*, *52*, 102085.	The survey data came from Malaysians with cryptocurrency knowledge, and the model was estimated using the partial least square structural equation modelling (PLS-SEM) method.	The findings revealed that Malaysians have a high intention to adopt cryptocurrency, and the factors of performance expectancy, social influence, facilitating condition, and price value were discovered to have a significant influence on an individual's adoption behaviour.
2.	Iftikhar, W., Vistro, D. M., & Mahmood, Z. (2021). Blockchain Technology Adoption by Malaysian Higher Education Institutes: A Perspective of Integrated Tam Model and Toe Framework. In *3rd International Conference on Integrated Intelligent Computing Communication & Security (ICIIC 2021)* (pp. 606-617). Atlantis Press.	A questionnaire survey was used to collect data for the research from five Malaysian higher education institutes.	The findings of the statistical analysis revealed that perceived usefulness, competitive pressure, and top management support have a significant and positive influence on Malaysian higher education institutes' intention to adopt Blockchain technology.
3.	Ku-Mahamud, K. R., Omar, M., Bakar, N. A. A., & Muraina, I. D. (2019). Awareness, trust, and adoption of blockchain technology and cryptocurrency among blockchain communities in Malaysia. *International Journal on Advanced Science, Engineering & Information Technology*, *9*(4), 1217-1222.	The questionnaire was sent to 304 people in Malaysian blockchain communities to find out how much they knew about, used, and trusted applications of blockchain technology.	Most of the respondents are confident and trust that blockchain technology can offer a stable and secure platform, which has a positive impact on the application of the technology. Empirical results also tell us a lot about how the blockchain technology industry is growing in the country.
4.	Ooi, S. K., Ooi, C. A., Yeap, J. A.,	Self-report	The findings of the importance-

	& Goh, T. H. (2021). Embracing Bitcoin: users' perceived security and trust. *Quality & Quantity*, *55*(4), 1219-1237.	questionnaires distributed to a sample of 109 Bitcoin users, after which Structural Equation Modelling was used for the analysis.	performance map analysis (IPMA) in the study indicated that perceived security, perceived trust, and technical protection are the areas of focus for increasing Bitcoin use.
5.	Yeong, Y. C., Kalid, K. S., & Sugathan, S. K. (2019). Cryptocurrency adoption in Malaysia: Does age, income, and education level matter? *International Journal of Innovative Technology and Exploring Engineering*, *8*(11), 2179-2184.	The sample is made up of 176 Malaysian individuals who are equipped with cryptocurrency knowledge. The research data was gathered using an online survey questionnaire.	The results revealed that the role of age, education, and income level are not significant in influencing an individual's behaviour towards cryptocurrency adoption.
6.	*Ajouz, M., Abdullah, A., & Kassim, S. (2020). Acceptance of Sharīʿah-compliant precious metal-backed cryptocurrency as an alternative currency: An empirical validation of adoption of innovation theory. Thunderbird International Business Review, 62(2), 171-181.*	Using a questionnaire, the study gathered data from the economically active residents of the Klang Valley in Malaysia. The data analysis was carried out using partial least squares structural equation modelling.	The findings revealed that six out of the eight constructs used in the study to influence the adoption of the precious metal-backed cryptocurrency were statistically significant. Also, more than 60% of the people who answered the survey said they would be willing to use the cryptocurrency backed by precious metals in their future transactions.
7.	Ter Ji-Xi, J., Salamzadeh, Y., & Teoh, A. P. (2021). Behavioural intention to use cryptocurrency in Malaysia: an empirical study. *The Bottom Line*.	A non-probability sample of 290 cryptocurrency users in Malaysia was chosen and asked to fill out an online survey.	The results show that three of the five proposed factors (performance expectancy, effort expectancy, and facilitating condition) are significant predictors of BI's adoption of cryptocurrency as a medium of transaction.
8.	Ayedh, A., Echchabi, A., Battour, M., & Omar, M. (2020). Malaysian Muslim investors' behaviour towards the blockchain-based Bitcoin cryptocurrency market. *Journal of Islamic Marketing*.	A survey questionnaire was distributed to 200 Muslim respondents in Malaysia. Subsequently, SEM, descriptive statistics, and one sample test were applicable for the analysis.	The findings showed that compatibility, awareness, and facilitating conditions have a significant impact on Malaysian Muslim communities' investment in the Bitcoin market.
9.	Ku-Mahamud, K. R., Abu Bakar, N. A., & Omar, M. (2018). Blockchain, cryptocurrency and Fintech market growth in Malaysia. *Journal of Advance Research in Dynamical & Control Systems*, *10*(14 SI), 2074-2082.	A quantitative design was used to survey 304 blockchain users and industry players in Malaysia.	The results revealed that privacy is the most significant barrier to the adoption of blockchain technology and the cryptocurrency ecosystem. There are also problems with the law, cost, security, and stability, and it can be hard to switch to new technology.
10.	Sukumaran, S., Bee, T. S., &	The research uses a	The findings indicate

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	Wasiuzzaman, S. (2023). Adoption of Cryptocurrency Investment: Malaysian Context. In *International Conference on Business and Technology* (pp. 1155-1165). Springer, Cham.	quantitative approach, and 304 Malaysian retail investors were sampled. The collected data was then analysed using Smart PLS.	compatibility, trialability, ease of use (complexity), observability, and perceived value influence the intention to invest in cryptocurrency among Malaysian retail investors.
11.	Chen, X., Miraz, M. H., Gazi, M. A. I., Rahaman, M. A., Habib, M. M., & Hossain, A. I. (2022). Factors affecting cryptocurrency adoption in digital business transactions: The mediating role of customer satisfaction. *Technology in Society*, *70*, 102059.	Two hundred and ninety-five people in Malaysia who use cryptocurrency answered the survey questions.	The results showed that social influence, price value, traceability, and attitude all had an effect on adoption (the dependent variable) in Malaysia's digital market by way of customer satisfaction.
12.	Sukumaran, S., Bee, T. S., & Wasiuzzaman, S. (2022). Cryptocurrency as an Investment: The Malaysian Context. *Risks*, *10*(4), 86.	Data was gathered using purposive sampling from 211 respondents in various cities in Malaysia. The data was now analysed using Smart PLS Structural Equation Modelling.	The findings indicated that perceived value has a significant influence on cryptocurrency adoption among the respondents. Meanwhile, Malaysian investors didn't use cryptocurrency much because of how risky they thought it was.
13.	Veerasingam, N., & Teoh, A. P. (2022). Modelling cryptocurrency investment decision: evidence from Islamic emerging market. *Journal of Islamic Marketing*, (ahead-of-print).	Data were collected from 200 individuals aged 18 and over, and the hypotheses were tested using the partial least squares–structural equation modelling technique.	The findings revealed that an investor's attitude toward risk and perceived behavioural control have a significant positive effect on their decision to invest in cryptocurrency.
14.	Gafar, A., Abenoh, N. A. B., & Ahmed, E. M. (2021). Generations Y and X Perception Towards Bitcoin in Malaysia. *Journal of Information & Knowledge Management*, *20*(01), 2150007.	The research was conducted based on both primary data from the questionnaire and related secondary data.	The findings revealed that the value of Bitcoin and the expanding network of operations are considered significant factors in the perception and use of Bitcoin, while the security of Bitcoin has the opposite status. This shows that Bitcoin does have high potential, and it may change the current monetary system, as it is classically known.
15.	Al-Amri, R., Al-Shami, S., Abualrejal, H. M. E., Al-Sharafi, M. A., & Alormuza, T. K. Y. (2021, November). Role of shariah compliance on cryptocurrency acceptance among Malaysians: an empirical study. In *2021 International Conference on Intelligent Technology, System and Service for Internet of Everything (ITSS-IoE)* (pp. 1-6). IEEE.	A sample of 496 respondents was used for the study.	The hypothesis testing revealed that performance expectancy, effort expectancy, social influence, and Shariah compliance all affect behavioural intention to adopt cryptocurrency from a Shariah perspective in Malaysia.

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It can be concluded from the above table that the level of cryptocurrency acceptance by Malaysians has also significantly increased. These are all due to several factors that are mentioned by the researchers in the cited studies, such as perceived value, price value, social influence, facilitating conditions awareness, and so on when compared to some of the reasons why some are not interested, such as security, privacy, legality, cost, and stability.

5. CONCLUSIONS

In general, the Muslim community is relatively divided into three groups, based on the issues related to the permissive and prohibitive nature of cryptocurrency. We have those who say it is permissible and can be used as a medium of exchange because of its certain futures, such as a unit of account, medium of exchange, and store of value, and it is widely and commonly accepted globally [15]. We have the second group who said it is prohibitive because most of the cryptocurrencies have no intrinsic value, have no physical form of existence (they only exist in a digital form), their supply is not determined by any central bank or government, and they are neither issued nor controlled by any company or government body. The third group was classified by the Malaysian Minister of Religious Affairs (Datuk Dr Zulkifli Mohamad al-Bakri) as tawaqquf, which means those still yet to conclude on the issue. Their reason was to give more time to study and find as many insights as possible into the use of the currency. Their final decision will be issued after they are completely satisfied with the information they have obtained.

This research aimed to identify some topic communities and the sentiments of some well-known Malaysian Muslim scholars and experts on cryptocurrency. Specifically, this study has focused on some selected scholars and experts on cryptocurrency in Malaysia because of the country's legal qualification as an Islamic state (Kai Mah, 2011). The commentaries of these scholars and experts on related cryptocurrency topics were extracted from their social media webpages in different formats (text, videos, and images). The transcription and translation were carried out using a special computer online program. A total of approximately 126 commentaries were retrieved from a total group of 9 scholars and experts. This research adopted a text mining technique to evaluate the collected dataset, consisting of nine cases after sorting, filtering, and refining processes. Within the scope of the study, 1,767 sentences with a total of 111,342 words were used for the evaluation.

The results of the research have revealed that the most frequently repeated words in the commentaries made by these scholars and experts on the use of cryptocurrency in the Muslim community were currency, Sharia, Islamic, Hadith, government, scholars, society, and legal. All these words have a frequency of over 60 and have at least appeared in 6 of the cases. Therefore, even this limited number of signs indicated that most of the commentaries were intended to enlighten the community on the acceptance of the currency from the Islamic perspective. However, to further reveal the thematic structure of the commentaries and to reveal a clearer insight into the big picture, topic extraction was performed. In which topics like "Cryptographic Halal", "Authorities official", "Blockchain System" and "Buy Goods" were mentioned in 100% of the cases, and other related topics like "Medium of Exchange Goods and Services", "Scholars' Point of View" and "Legal Tender" were mentioned in 88.9% of the cases. However, this analysis offered insight into the frequent use of a term as an intended decision. However, the topic "Legal Tender" as used in the commentaries makes it clear that most of the scholars and experts in Malaysia have endorsed the argument that cryptocurrency can be used as a legal tender in a Muslim community. To further verify these findings, previous studies conducted on cryptocurrency adoption, awareness, and acceptance in Malaysian content were reviewed, and most of the results indicated that the Malaysian attitude towards cryptocurrency is more positive. Another related benefit associated with this research was that the data used was retrieved from the social media platforms, and even though the users can add and categorize their topics on the platforms to improve the direction and searching of content in groups. Most of the retrieved commentaries were not yet categorized by the commenter and this research tries to collect and categorized the commentaries with the applicable IT tools for related topic extractions. Studies like this would subsequently motivate Muslim schoolers and experts to monitor their information and comments on social media sites and platforms. This would also allow them to have access to instant contemporary issues that need the attention of the experts in the Muslim community, which can also be easily solved over social media platforms.

Another important part of the findings was the sentiment analysis, with which the moods and feelings of the scholars and experts on the topic were viewed. When it comes to the acceptance of cryptocurrency in the Muslim community, most scholars and experts think it's a good thing.

5.1 Limitations

Although this research was carried out to understand the opinions of the Muslim community on cryptocurrency as the currency keeps gaining global acceptance day by day, some limitations are also applicable to the research. Among them is the fact that the data is limited to that of scholars and experts residing in Malaysia only, and the collected data refers only to the data published on Facebook and Twitter accounts. For more research, the location could be expanded to the whole world, and other related media platforms that scholars and experts use a lot could be added.

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REFERENCES:

[1] J. Zhang *et al.*, "A Hybrid Model for Central Bank Digital Currency Based on Blockchain," *IEEE Access*, vol. 9, pp. 53589–53601, 2021.

[2] B. Marr, "A Short History Of Bitcoin And Crypto Currency Everyone Should Read," *Forbes*, p. 1, 2017, Accessed: Sep. 07, 2020. [Online]. Available: https://www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#21e27ab43f27.

[3] D. Siswantoro, R. Handika, and A. F. Mita, "The requirements of cryptocurrency for money, an Islamic view," *Heliyon*, vol. 6, no. 1, p. e03235, 2020, doi: 10.1016/j.heliyon.2020.e03235.

[4] M. Y. bin Zul Kepli and S. Zulhuda, "Cryptocurrencies and Anti-money Laundering Laws: The Need for an Integrated Approach," in *Emerging Issues in Islamic Finance Law and Practice in Malaysia*, Emerald Publishing Limited, 2019.

[5] S. O. Manullang, "Understanding of Modern Society Perception on Sociology of Islamic Law in Indonesia," *Int. J. Humanit. Lit. Arts*, vol. 3, no. 1, pp. 85–92, 2020.

[6] L. Salaymeh, "Islamic Law," in *International Encyclopedia of the Social & Behavioral Sciences: Second Edition*, Elsevier Inc., 2015, pp. 746–753.

[7] H. Laludin, "Al-Maslahah (public interest) with special reference to Al-Imam Al-Ghazali," *J. Syariah*, vol. 14, no. 2, pp. 103–120, 2019.

[8] S. Picazo-Vela, I. Gutiérrez-Martínez, and L. F. Luna-Reyes, "Understanding risks, benefits, and strategic alternatives of social media applications in the public sector," *Gov. Inf. Q.*, vol. 29, no. 4, pp. 504–511, 2012.

[9] M. M. Abu-Bakar, "Shariah Analysis of Bitcoin, Cryptocurrency, and Blockchain," *Bloss. Labs*, vol. 1, p. 21, 2017, [Online]. Available: https://blossomfinance.com/bitcoin-working-paper.

[10] I. Khan, "Scholars Who Say Cryptocurrency is Haram and Those who say its Halal - IslamicFinanceGuru," 2020. https://www.islamicfinanceguru.com/investment/scholars-who-say-cryptocurrency-is-haram-and-those-who-say-its-halal/ (accessed Oct. 08, 2021).

[11] S. Hussain, "What is Cryptocurrency - is it halal?," *Qardus*, Aug. 04, 2021. https://www.qardus.com/news/what-is-cryptocurrency-and-is-it-halal (accessed Oct. 08, 2021).

[12] ETHNews, "Grand Mufti of Egypt Issues Fatwā Against Cryptocurrency," *Bitnewsbot*, 2018. https://bitnewsbot.com/grand-mufti-of-egypt-issues-fatwa-against-cryptocurrency/.

[13] 5Pillars, "VIDEO: Dr Haitham al-Haddad declares Bitcoin and all cryptocurrency haram | 5Pillars," 2018. https://5pillarsuk.com/2018/01/27/video-dr-haitham-al-haddad-declares-bitcoin-and-all-cryptocurrency-haram/ (accessed Jun. 23, 2022).

[14] A. S. Husain and R. Othman, "Information Dissemination Model for Scholars on Cryptocurrencies," in *Proceedings - 2018 4th International Conference on Information Retrieval and Knowledge Management: Diving into Data Sciences, CAMP 2018*, 2018, pp. 66–71, doi: 10.1109/INFRKM.2018.8464764.

[15] M. M. Abdeldayem, S. H. Al Dulaimi, and F. H. Al Dulaimi, "A qualitative approach to evaluate the reconciliation of GOLDX and OneGram in Islamic finance," *Zb. Rad. Ekon. Fak. au Rijeci*, vol. 39, no. 1, pp. 113–134, 2021, doi: 10.18045/zbefri.2021.1.113.

[16] A. I. S. Al-hussaini, A. Abubakar Ibrahim, M. Fauzan Noordin, and H. Mohd Mohadis, "Islamic approach toward purification of transaction with cryptocurrency," *J. Theor. Appl. Inf. Technol.*, vol. 98, no. 6, pp. 1050–1067, 2020.

[17] I. K. F. Kirchner, "Are cryptocurrencies halāl? On the sharia-compliancy of blockchain-based fintech," *Islam. Law Soc.*, vol. 28, no. 1–2, pp. 76–112, 2021, doi: 10.1163/15685195-BJA10005.

[18] R. A. E. Virginia, M. H. M. Saudi, and O. Sinaga, "Conceptual research: Sharia-based cryptocurrency," *J. Adv. Res. Dyn. Control Syst.*, vol. 11, no. 3 Special, pp. 138–143, 2019.

[19] M. Abubakar, M. K. Hassan, and M. A. Haruna, "Cryptocurrency tide and Islamic finance development: Any issue?," in *Disruptive Innovation in Business and Finance in the Digital World*, vol. 20, J. J. Choi and B. Ozkan, Eds. Emerald Publishing Limited, 2019, pp. 189–200.

[20] G. Chakraborty, M. Pagolu, and S. Garla, *Text mining and analysis: practical methods, examples, and case studies using SAS*. 2014.

[21] B. Pritha, "Internal Validity in Research: Definition, Threats, Examples," *Scribbr*, 2020. https://www.scribbr.com/methodology/internal-validity/ (accessed Aug. 17, 2022).

[22] A. Schnell, "What is Kappa and How Does It Measure Inter-rater Reliability?," *The Analysis Factor*, 2020. https://www.theanalysisfactor.com/kappa-measures-inter-rater-reliability/.