Research Article

Text Analytics on Regulation of Cryptocurrency

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Abstract.

This paper presented the views of Malaysians regarding their perception of cryptocurrency. Data were collected through interviews with 59 existing and potential users of cryptocurrency. Text analytics through keyword extraction and content analysis on the responses from the survey were then performed. Keywords on the question related to the regulation of cryptocurrency included "Government should", "Should regulate", and "Money laundering". Keywords such as "Government should", "Should issue", and "Regulatory regime" appeared for the question related to whether the government should develop a cryptocurrency regulatory regime. On issuing their own cryptocurrency, 49% of the respondents supported it, while 42% were against such a move. 88% of the respondents felt that the government should not ban cryptocurrency transactions. For the question related to suggestions to overcome issues associated with cryptocurrency, keywords such as "financial system", "privacy seriously", and "enhance financial" were reported. This paper adds to the body of knowledge on cryptocurrency by shedding light on the regulation landscape in an emerging market. In view of the increased usage of cryptocurrency, the public should be educated, and relevant bodies should establish regulations to minimise possible related illegal activities while developing a cryptocurrency-friendly regulatory regime.

Keywords: cryptocurrency, text analytics, regulation, Malaysia, fintech

1. Introduction

Digital currency is an electronic payment method in intangible form. Transactions between users can be conducted using gadgets like computers or smartphones. It aids fast transactions during the borderless transfer of ownership. The platform required to support digital currency transaction is still evolving. The presence of digital currency aids in removing intermediaries and the associated processes and costs of the middle person or platform. In addition, unlike traditional payment methods, digital currency transaction helps to simplify the process and makes transactions quicker and more transparent. At present, Bank Negara Malaysia is yet to recognise digital currency as a legal tender [1]. Despite the benefits, there are hidden risks associated with the usage of digital currency. Some of these risks include security level, currency price changes

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and payment beneficiary identification. Some areas of uncertainty include compliance with regulations and customer identification along with risk and restricted acceptance of digital currency as a medium of exchange [2].

This paper aims to examine the perception of Malaysians about (1) regulation of cryptocurrency and (2) its associated benefit, issues, and its future. The focus was placed on these aspects because of the growing popularity of digital currency usage and the diverse regulations concerning cryptocurrency adopted by different countries. [3] revealed that there is a lack of either qualitative or quantitative method in addressing cryptocurrency related topic, and they suggested future study to examine the topic of cryptocurrency in depth by using a better method for data collection and analysis. This paper intends to address this gap by using Python to carry out text analytics on cryptocurrency.

2. Literature Review

Generally, cryptocurrency is defined as intangible cash or the electronic model of currency notes and coins that can be stored in the digital wallet, which is centrally backed, less volatile, and more secure. However, cryptocurrency is an unregulated and encrypted form of digital currency which is issued and usually controlled by its developer and is generally used and accepted among the members of specific virtual communities [4].

2.1. Regulatory Framework for Cryptocurrency

The increase in popularity of cryptocurrency trading raises concern over issues of safety and regulation. Some countries have established laws to regulate cryptocurrency activities to address money laundering, terrorism, and other fraud issues. Canada requires that dealers of cryptocurrencies register with the Financial Transactions and Reports Analysis Centre of Canada (Fintrac) and these services are regulated as money services businesses [37]. Additionally, customers are prohibited from buying cryptocurrency using bank debit and credit cards. Likewise in the UK, all crypto-asset related activities are required to have license to trade, and the cryptocurrency activities are regulated under the UK common law. Similarly, in Singapore, cryptocurrency activities, such as operating crypto exchanges and initial coin offerings, are legal and are regulated by the Monetary Authority of Singapore, Indonesia now regulates the trading of cryptocurrency as commodities after imposing an initial ban on all cryptocurrency activities, and Mexico

regulates the activities under its Fintech Law, 2018. In South Korea, Australia, Thailand, Switzerland, and Japan, cryptocurrency trades on registered exchanges using real name are allowed; however, they need to be carried out in compliance with the requirements of the anti-money laundering laws. Meanwhile, the US, Australia, Belgium, Croatia and Germany allow the transacting of cryptocurrency, but tax is to be imposed on it [38]. In contrast, some countries such as Pakistan, South Africa, Brazin are still in the process of discussing the measures to be implemented to regulate cryptocurrency activities.

In contrast to the varied legislation positions regarding cryptocurrency taken by the above-mentioned countries, China, India, Bangladesh, and Algeria have taken an opposite stance. Cryptocurrency exchanges and initial coin offering are prohibited in China; however, China forbids people from owning or trading cryptocurrency [36]. The use of cryptocurrency is legally limited in Russia, Vietnam, Turkey, Hong Kong, and Iran. In these countries, cryptocurrency cannot be used for payment and financial institutions are prohibited from dealing with cryptocurrency. While India has yet to ban cryptocurrency officially, the restriction is more intense in countries such as Nepal, Bolivia, Algeria, Egypt, Qatar, Saudi Arabia, and Morocco. As cryptocurrency transaction is banned, trading it these countries is therefore considered illegal.

Countries such as Brunei, Haiti, Cambodia, Cuba, Kenya, Jamaica, Macau, Tanzania, and Zimbabwe have no clear law or regulation on cryptocurrency. The governments of these countries only warn their people of the extreme risk and urge caution, and cryptocurrency is not recognised as legal tender. Likewise in Malaysia, cryptocurrency is not recognised as legal tender [39]. [6] released an annual report to address Central Bank Digital Currency (CBDC) issuance and framework as BNM foresees cryptocurrency's potential as it is growing in the market. Moreover, the recent Covid-19 pandemic is affecting Malaysians' past spending behaviour in cash as many have switched to online shopping and E-payment. However, BNM perceives that cash circulation has greatly surged because small retailers and the community are holding on to cash during the pandemic period [7]. Even though BNM withholds cryptocurrency issuance scheme in the current payment system in Malaysia, BNM has nevertheless strengthened anti-money laundering and financing of terrorism (AML/CFT) legislation by performing, supervising, and monitoring background checks on customers who trade in registered crypto platforms.

3. Research Methods

According to [8], text mining and text analytics are "broad umbrella terms describing a range of technologies for analysing and processing semi-structured and unstructured text data". Text analytics has been used for sentiment analysis [9], keyword extraction [10], content analysis [11] and text categorisation [12]. This study used text analytics for keyword extraction and content analysis of responses from the cryptocurrency survey.

Figure 1 shows the steps used for the text analytics process in this study which was adapted from [9]. The steps involved (1) Data Collection, (2) Data Cleaning, (3) Bag of Words (BOW) Generator and (4) Insights with Data Visualization.

Figure 1: Text Analytics Process.

3.1. Data Collection

The interview guide was structured and written in the English Language as a guideline for the interview sessions. The interview guide consisted of two sections, one for the respondent's profile and the other containing open-ended questions related to cryptocurrency. The respondents' profile is presented in Table 1.

questionnaire comprised four open-ended questions which are divided into four themes covering areas of cryptocurrency from a legal and regulatory viewpoint (Q1, Q2 and Q3), in terms of the additional benefits, issues, and future of cryptocurrency (Q4).

Interview sessions were conducted where the qualitative data were collected from 59 respondents living in Malaysia. Purposive sampling was selected as the sampling technique to gather data from the sample of survey respondents who have prior knowledge about digital currency. The data were determined to be a sample that is representative of working adults from various industries.

The respondents were identified from the interviewers' contacts. For each of the interview sessions, the interviewers conduced face-to-face communication or phone interviews with the interviewees for approximately 15 – 30 minutes. All the interviewees voluntarily participated in the interview sessions without any incentives given. The interviewees were asked open-ended questions to which they provided responses

TABLE 1: Demographic Profile of Respondents.

Qualification	No.	%
SPM	3	5
Diploma	5	8
Degree	46	79
Postgraduate	5	8
	59	100
Position		
Students cum interns	2	3
Accountant & Auditor	22	37
Banking & Finance executive & senior	6	11
Software engineer & system analyst	4	7
Marketing executive & team leader	4	7
CEO & director	6	10
Educationist	6	10
Others	9	15
	59	100
Years of service		
<5 years	37	63
5-10 years	9	15
11-15 years	4	7
16-20 years	6	10
>20 years	3	5
	59	100

which were recorded in audio form. Prior to the interviews, the respondents were asked to provide consent for the interviews to be recorded. The interviewers were conducted until data redundancy was achieved, i.e., data reaching the saturation level [13]. After the interviews, the audio recording was transcribed into written text and subsequently exported and saved in Excel for data analysis.

The open-ended questions which were focused on concepts in cryptocurrency resulted in various responses in terms of sentence structure and use of words. There were 59 responses for each question which led to a large amount of text for analysis. To analyse the huge amount of responses, a systematic approach using text analytics was then applied to determine if insights could be obtained from these responses.

3.2. Data Cleaning

In text analytics, data cleaning is an important pre-processing step to ensure that words found are consistent, despite being written in upper- or lower-case or using different forms of the word. The Python Natural Language Toolkit (NLKT) library developed by [14] enables data cleaning with stemming, tokenising and corpus reading functions as shown in Table 2.

TABLE 2: Data Cleaning Steps.

No	Steps	Description
1.	Lowercase text	Converting the responses to all lower case
2.	Normalising text	Omits noisy texts that exist in selected paragraphs
2.1	Spelling normalisation	Normalise spelling of words
2.2	Non-alphabetical removal	Eliminate punctuation without whitespace
2.3	Stop words removal	Exclude common words with dictionary list
2.4	Lemmatise words	Converts verb or noun into original form

3.3. Lowercase Text

As the responses were transcribed in mixed case, case normalisation was first applied to convert the text into all lowercase format. The NLTK function, lower, was used to convert the text entirely into the lowercase format. Figure 2 shows an example of the responses for Q.1 which have been converted.

```
0    i heard some of my friend earn much by invest in cryptocurrency such as bitcoin and i do understand the application and concept of cryptocurren
1    yes. no, i'm not use it. but i know how to use it. if want to use cryptocurrency, first need a digital wallet. in fact, money is not stored in
2    i have heard about cryptocurrency but i don't use it. because i am afraid of cryptocurrency and not all countries presently accept it. but the
```

Figure 2: Lowercase Text Output.

3.4. Text Normalisation

Text normalisation was performed to clean the textual responses to retain the most relevant and semantic data. The steps used for text normalisation included spelling normalisation, punctuation and stop words removal, and lemmatisation.

3.5. Spelling Normalisation

There were several misspelt and similarly spelled words in the text responses which represent the same word. For example, for question one, this included words such as "thousand", "transactions", "cryptocurrencies", "crypto currency", "block chain", "blockchain", "knowing", "know use" and "currency digital". These words were identified and replaced with the normalised word to be used.

```
0    i heard some of my friend earn much by invest in cryptocurrency such as bitcoin and i do understand the application and concept of cryptocurre
1    yes. no, i'm not use it. but i know how to use it. if want to use cryptocurrency, first need a digital wallet. in fact, money is not stored in
2    i have heard about cryptocurrency but i don't use it. because i am afraid of cryptocurrency and not all countries presently accept it. but the
```

Figure 3: Spelling Normalisation Output.

3.6. Non-Alphabetical Removal

Character data which are non-alphabetic were removed in order to tokenise the text into single words. As an example, the token "wallet." is different from "wallet". Removal of the period '.' would help identify the token as "wallet". Punctuations were thus removed from each sentence and replaced with a single space by utilising re.sub() function from the Python's re package. It uses "\w\s" to split bigram words through any sequence of uppercase A to Z or lowercase a to z characters without whitespace. As an example, it separates "i'm" into "im".

```
0    i heard some of my friend earn much by invest in cryptocurrency such as bitcoin and i do understand the application and concept of cryptocurre
1    yes no im not use it but i know how to use it if want to use cryptocurrency first need a digital wallet in fact money is not stored in any sir
2    i have heard about cryptocurrency but i dont use it because i am afraid of cryptocurrency and not all countries presently accept it but the nu
```

Figure 4: Non-alphabetical Removal Output.

3.7. Stop Words Removal

Common words in the text that did not contribute to the analysis of the responses were identified as stop words. The NLTK library includes a list of common English stop words. Additionally, a further 176 stop words were identified for removal from the survey responses.

```
0    heard friend earn much invest cryptocurrency bitcoin understand application concept cryptocurrency dont use much complicated technology
1    use know use want use cryptocurrency first need digital wallet fact money stored single place anywhere physical form exists records transactio
2    heard cryptocurrency dont use afraid cryptocurrency countries presently accept number countries agreeing accept growing
```

Figure 5: Stop Words Removal.

3.8. Lemmatization

Lemmatization returns words into their original form through NLTK. NLTK is a Word Net built-in library that is used to process text into affixes through natural language processing such as lemmatization [14]. For example, the word "used" is transformed into "use".

3.9. Bag of Words Generator

The cleaned textual data could now be used to generate the "bag of words". The process of bag of words generation applied in this study was adapted from [15], where vectors with text and indexing techniques were implemented for the text classification model.

TABLE 3: Steps to Build the Text Classification.

Steps	Function (library)
1. Text Document Representation	CountVectorizer() (sklearn.feature_extraction.text)
2. Indexing Techniques	
2.1 Feature Extracting using document frequency	get_feature_names ()
2.2 Feature Extraction using TD-IDF (term weighting)	TfidfTransformer() (sklearn.feature_extraction.text)
2.3 Cosine Similarity Measure	cosine_similarity() (sklearn.metrics.pairwise)
3. Encoding	transform ()

The Scikit-Learn library contains a bag of words function to generate the bag of words. The corpus was used to generate the frequency of each word [16]. Text corpus was transformed into a list of strings or dummy sentences.


```
59 dummy sentences:
['heard friend earn much invest cryptocurrency bitcoin understand application concept cryptocurrency dont use much complicated technology', 'use kno
```

Figure 6: Clean Sentences Output.

3.10. Count Vectoriser

Next, the list of strings was split into single words using the Count Vectorizer function. An example is "yes" occurring once or one time in line one as shown in Figure 7. Meanwhile, in Figure 8, bigram words involving one frequency count of "your money"

can be observed in line three. The function also helps to build a vocabulary of feature names.

```
        000  10  20  2013  43  able  ...  years  yes  yet  you  your  youtuber
    0    0    0   0    0    0    0    ...    0      0    0    0    0      0
    1    0    0   0    0    0    0    ...    0      1    0    2    0      0
    2    0    0   0    0    0    0    ...    0      0    0    0    0      0
```

Figure 7: Count Vectorizer with Single Words.

```
df_bag_of_words:
     000 dollars  10 000  20 000  ...  your money  your portfolio  youtuber as
    0    0          0       0      ...    0            0               0
    1    0          0       0      ...    0            0               0
    2    0          0       0      ...    0            0               0
    3    0          0       0      ...    1            0               0
```

Figure 8: Count Vectorizer with Bigram Words.

3.11. Feature Names

Feature names display a string of descriptions with feature values (Bird et al., 2009). It separates sentences into words in a dictionary list [15]. In this step, the vocabulary was constructed with single and bigram words using the Count Vectorizer function.

```
721 feature_names (each feature represents a distinct word):
['10000', '20000', '2013', '43', 'able', 'accept', 'acceptance', 'accepted', 'accepting', 'accepts', 'account', 'accounting', 'activities',
```

Figure 9: Feature Names with Single Words.

```
1671 feature_names (each feature represents a distinct word):
['10000 dollars', '20000 dollars', '2013 something', '2013 years', '43 thousand', 'able buy', 'able communicate', 'able cross', 'accept growing', '
```

Figure 10: Feature Names with Bigram Words.

3.12. TD-IDF Matrix

Term Frequency-Inverse Document Frequency (TF-IDF) was used as a weighting technique with SciKit-Learn in order to evaluate the importance of words using weight indication in the analysis [15]. SciKit-Learn implements Tfidf Transformer which indicates sparse matrix produced by Count Vectorizer [17]. This formula aims to scale down the importance of words that appear in almost all documents as it does not provide much insight into the analysis.

$$tfidf\,(w,d) = tf\,loglog\,\left(\frac{N+1}{N_w+1}\right) + 1(M\ddot{u}ller\,\&\,Guido,\,2016) \tag{1}$$

As shown in Eq. (1) above, tf represents term frequency, w represents weight, and d represents document. N is described as the number of documents in the training data set, tf measures the frequency of words which occur in d during w [17]. It detects a bag of words by allocating weights to represent the selected words. In the analysis performed, 59 words were generated in various combinations of single and bigram words.

```
df_tfidf[59,721]:
       10000    20000     2013       43      able    accept acceptance  accepted  accepting   accepts   account accounting activities  actually
0   0.000000 0.000000  0.00000 0.000000  0.000000  0.000000   0.000000  0.000000   0.000000  0.000000  0.000000   0.000000   0.000000  0.000000
1   0.000000 0.000000  0.00000 0.000000  0.000000  0.000000   0.000000  0.000000   0.000000  0.000000  0.000000   0.000000   0.000000  0.000000
2   0.000000 0.000000  0.00000 0.000000  0.000000  0.554344   0.000000  0.000000   0.000000  0.000000  0.000000   0.000000   0.000000  0.000000
```

Figure 11: TF-IDF Matrix for Single Words

```
df_tfidf[59,1671]:
   10000 dollars  20000 dollars  2013 something  2013 years  43 thousand  able buy  able communicate  able cross  accept growing  accept number
0      0.000000       0.000000        0.000000    0.000000     0.000000  0.000000          0.000000    0.000000        0.000000       0.000000
1      0.000000       0.000000        0.000000    0.000000     0.000000  0.000000          0.000000    0.000000        0.000000       0.000000
2      0.000000       0.000000        0.000000    0.000000     0.000000  0.000000          0.000000    0.000000        0.293001       0.293001
```

Figure 12: TF-IDF Matrix for Bigram Words.

3.13. Bag of Words (BOW)

The bag of words (BOW) generated was subsequently used to count the number of recurrent words [17]. It generated single and bigram words with frequency of occurrence as word counts. The weight highlighted each word in terms of its importance in providing meaningful information about the text corpus.

```
df_weights:
                      word    count      weight
0          cryptocurrency      150    0.140742
1          use               90    0.108641
2          know              34    0.069911
```

Figure 13: Bag of Words (BOW) for Single Words.

```
df_weights:
                      pair_word  pair_count    weight
0      use cryptocurrency            17    0.034247
1      dont use                      11    0.029542
2      know cryptocurrency           14    0.025429
```

Figure 14: Bag of Words (BOW) for Bigram Words.

Lastly, horizontal bar graph and word cloud were generated to retrieve the words and word count as a way to display information of the words visually for analysis. The words were then sorted based on word count in descending order.

4. Results and Discussion

This section covers areas concerning the themes of cryptocurrency from the legal point of view, its benefits and issues of concern. It also presents a summary of the findings on cryptocurrency based on the analyses of data from the responses and graphs to highlight insights derived from the findings.

Q1: Do you think our government should regulate the cryptocurrency transaction in view of illegal activities (such as money laundering and terrorism)? How? Why?
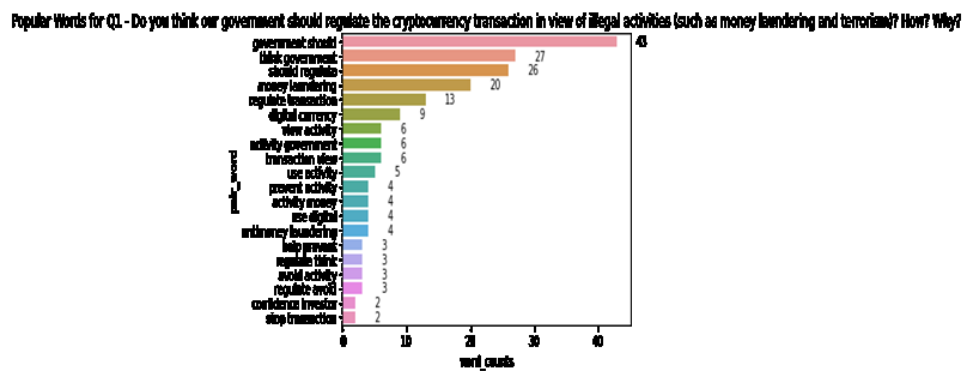
Figure 15: Frequency of Top 20 Bigram Words.

Figure 16: Word Cloud Showing Words Popularly Associated with Cryptocurrency Regulation.

The respondents expressed their concern over safety of cryptocurrency. As stated by Respondent 13, there is the worry that cryptocurrency could easily provide opportunities for individuals or organisations to be involved in criminal syndicates that conduct money laundering and scamming using anonymous identities. Moreover, cryptocurrency has

been found to serve as a funding channel to legalise the funds obtained from illegal activities for individuals or organisations involved in criminal activities [18].

To counter trading and payment risks that may occur in cryptocurrency transactions, the Malaysian government has introduced ways to curb various crimes such as fraud, money laundering and scams related to these transactions. [19] reported that law enforcement authorities have imposed laws including AML/CFT [5], to enhance investors' confidence. The regulatory department through supervision and monetary control of financial industries and system detects suspicious transactions to halt money laundering, tax evasion and terrorist financing.

Q2: Do you think our government should issue our own cryptocurrency and develop our own cryptocurrency-friendly regulatory regime? How? Why?
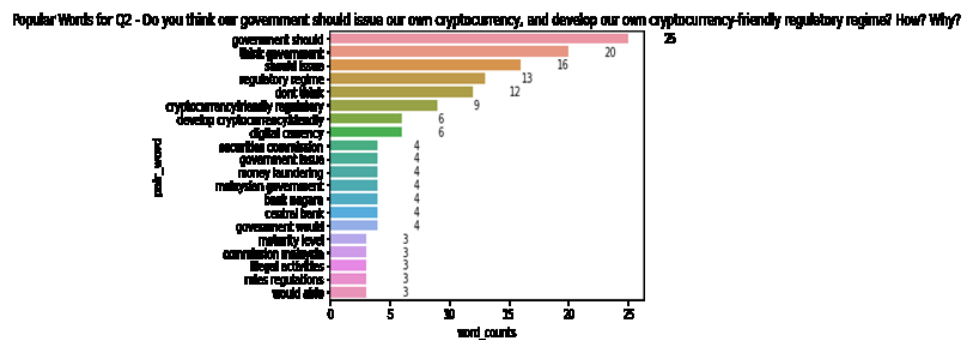

Figure 17: Frequency of Top 20 Bigram Words.

Figure 18: Word Cloud Showing Words Popularly Associated with Issuance of Cryptocurrency.

In Malaysia, regulators are still at the observation level on the issue of national cryptocurrency [20]. In 2021, BNM had announced that they have postponed any plans to issue Central Bank Digital Currency (CBDC) [21]. Posed with the question of whether the Malaysian government should issue government-controlled cryptocurrency, the respondents found the matter contentious and debatable.

The Malaysian government produces fiat money through BNM. Respondent 9 believed that it is difficult for cryptocurrency to replace fiat currency unless there is
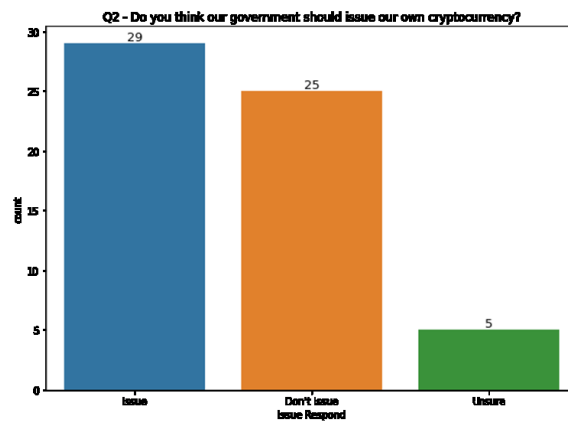
Figure 19: Frequency of Issue Response.

a spike in crypto demand among the public. Respondent 4 perceived the existing cryptocurrencies sufficient for the current market and thus the implementation of a new cryptocurrency is unnecessary. Moreover, it would take a long period of time to implement a national cryptocurrency in the market. Thus, this suggests that the government should review the execution of national cryptocurrencies in other countries. One example is Iceland who launched their own cryptocurrency, the Aurora coin, in the year 2014 and this was highlighted by Respondent 9 [22]. Respondent 9 claimed that the Auroracoin (AUR) was the peer-to-peer cryptocurrency developed by Iceland after the 2008 financial crisis; however, the value crashed soon after its launch in 2014, and it was later revived in 2015. As a result, the people of Iceland had raised their scepticism towards the establishment of the national cryptocurrency. Cryptocurrency has also led to the risk of price volatility and data security protection. This was raised by respondent 14 who stressed that "Malaysian Securities Commission reminded investors of the risks of ICOs and warned that some ICO companies would be regulated by securities laws".

Numerous countries such as the United States (US) and Singapore have adopted their own crypto coin, namely USTD and xsgd, respectively. Respondent 56 believed that regulatory bodies should exert full control and supervision on national cryptocurrency with blockchain system being used to track purchase activities as a form of check and balance. Respondent 52 proposed the invention of "blockchain system where the audit is done itself through ledgers which can be held by certain entities from the public and private sectors". This would address the risk of illicit financial flow through transparent transactions.

However, the respondents acknowledged that crypto issuance has several benefits. Respondent 51 believed that "crypto supports the growth process in a developing country especially Malaysia". For example, users favouring the use of cryptocurrency

would result in a decrease of the demand for fiat currency, leading to the reduction of the need for BNM to supply money. This would support national debt reduction through boosting of crypto's value in the national exchange list, as suggested by Respondent 51.
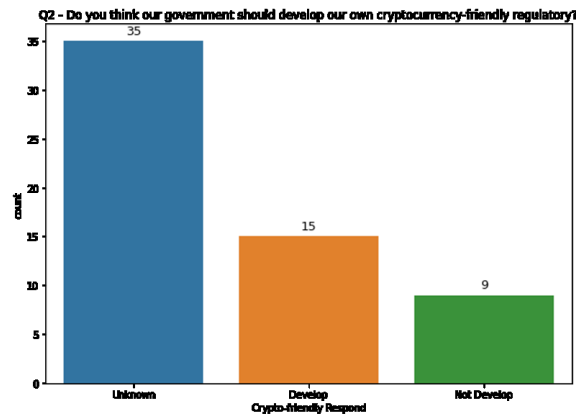

Figure 20: Frequency of Crypto-friendly Response.

Twenty five percent (25%) of the respondents agreed that the Malaysian government should develop a cryptocurrency-friendly regulatory regime. Regulations play a critical role in regulating the interests of investors and financial institutions in Malaysia. It provides a guideline in performing CBDC exchange rates with investors who own cryptocurrencies issued by other countries. The establishment of monetary guidelines promotes a healthy progress and stability.

Respondent 12 insisted that the Malaysian government should project a strong regulatory enforcement through the relevant bodies to control and prevent fraudulent activities associated with cryptocurrency. Based on the text analytics, popular words associated with issuance of a national cryptocurrency included words such as money laundering and terrorism as shown in Figure 17. In Malaysia, the Securities Commission Malaysia (SCM) regulates initial exchange offerings (ICOs) under the existing cryptocurrency exchange framework [23]. SCM collaborates with BNM to build and encourage a safe and secure environment to launch ICOs and to perform investment in the registered platforms following the regulatory guidelines. ICOs are launched by the issuer. Respondent 20 stated, "In an ICO, the issuer will publish a white paper stated details about the project for which money is intended to be raised from the public. Public may then subscribe to the tokens offered on the ICO with fiat currency, such as Bitcoin". Respondent 41 remarked that based on a report released by BNM, SCM strongly encourages investors to investigate features of the ICO scheme and to be risk-averse before investing in cryptocurrency. It was reported that the Malaysian authority would be revising the regulatory guidelines on virtual currency into an applicable scope [24].

CBDC can therefore be seen to deliver endless possibilities and benefits for the economy. In terms of regulations, Respondent 15 believed that cryptocurrency-friendly regulatory regimes have unlimited potential in attracting foreign investment and talented individuals with expertise in cryptocurrency-related fields. It would thus enhance the employment rate while helping to build the economy, ensuring the growth and progress of the country.

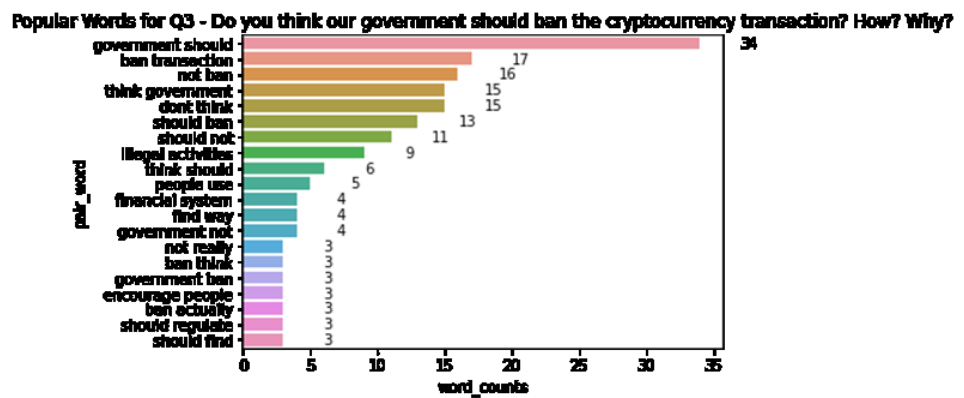**Q3: Do you think our government should ban cryptocurrency transactions? How? Why?**
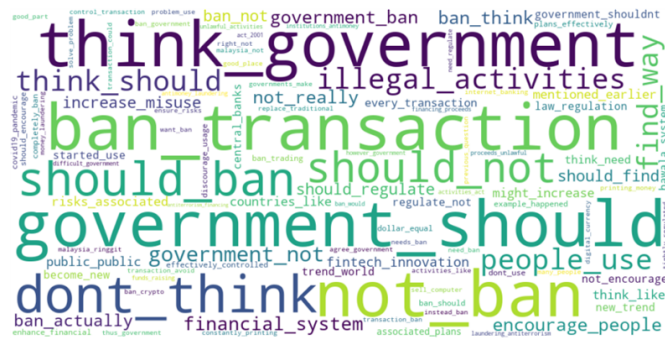

Figure 21: Frequency of Top 20 Bigram Words.

Figure 22: Word Cloud Showing Words Popularly Associated with Cryptocurrency Ban.

Figures 21 and 22 show that there is indeterminate and divided opinion among the respondents regarding banning of cryptocurrency transactions where interesting words such as government should, ban transaction, not ban etc emerged from the text analytics. 52 respondents (88%) were of the opinion that the government should not ban cryptocurrency transactions. The respondents were inclined towards the idea of developing a system that would monitor and regulate cryptocurrency transactions.

The continuous pandemic crisis has developed widespread economic recession that has disrupted the income of many lives. According to Respondent 18, the pandemic, however, has accelerated the transition to digital economy with electronic payment
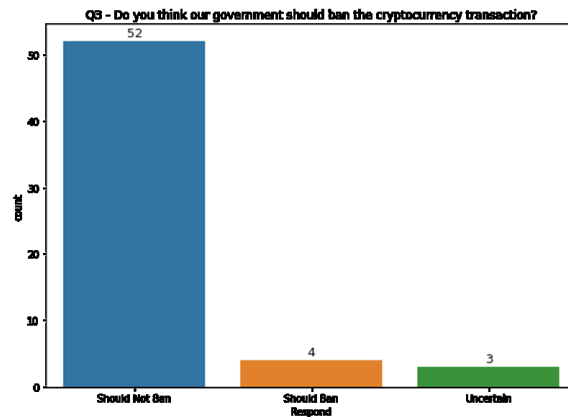
Figure 23: Frequency of Response to Cryptocurrency Ban.

methods such as QR payment and Internet banking becoming more prevalent in the recent years. [25] found that scammers have taken this opportunity to conduct investment fraud through social media such as through private group chats in WhatsApp claiming certified license approved by BNM and SC. Investment scams, unauthorised trading and speculation consultation had increased by 158% from the year 2019 to 2020.

Meanwhile, Respondent 9 asserted that "cryptocurrencies erode the monopoly of central banks to issue and regulate currencies". The Malaysian government has alerted the public about the risks of cryptocurrency by advising the public to be cautious of the risks associated with its usage. Nonetheless, despite cryptocurrency not being recognised as a legal tender in Malaysia, the authorities seem to allow the usage of cryptocurrency. As a result, during the period of 2020, SC had closely coordinated with the Malaysian Communications and Multimedia Commission to block conspiracy websites [25] to protect the public.

The issue of allowing or prohibiting cryptocurrency is divided the world over as different countries appear to have different stance when it comes to cryptocurrency. Respondent 45 mentioned that the Chinese government discouraged usage of cryptocurrency and decided not to recognise cryptocurrencies, but its usage is not penalised by law. Respondent 4 remarked that the Reserve Bank of India had initiated a ban on cryptocurrency in 2018 but overturned the rule to allow trading with cryptocurrency issuance in 2020. Accordingly, Respondent 12 suggested for the Malaysian authorities to conduct risk assessment evaluation to gauge whether a ban imposition on cryptocurrency should be implemented in this country. This measure could minimise the risk and provide ways to improve and innovate on cryptocurrency's weaknesses.

The fact that cryptocurrency facilitates and fosters cases of criminal abuse highlights the importance of safety precaution. Respondent 3 expressed wariness that "cryptocurrency market attracts criminals and people interested in tax evasion and money laundering". [26] explained that these criminals perform money transactions through the hawala system which is often referred to as underground banking. Hawala is a technique that facilitates the transfer of illegal proceeds as it operates outside the formal banking system and other financial channels. Respondent 9 views the hawala system as a platform for terrorist financing, money laundering and tax evasion through the hawaladars who act as an intermediary agent. The hawaladars transfer funds based on trust and extensive connections among regional affiliations or family relationships, unlike those practised in formal banking systems which have formal and legal protection for such remittance. Respondent 13 recommended that cryptocurrency be strictly regulated to crack down on the use of cryptocurrencies for illegal activities. This would protect consumers and investors from fraud and other abuses as the integrity and overall financial stability of the market and payment system can be upheld.

Germany, Singapore, Portugal, Malta, Belarus, and Switzerland have similar regulation efforts as Malaysia [27]. All these countries have imposed tax exemption for traders and individuals involved in cryptocurrency trades. Respondent 34 supports the government's initiative in strengthening the existing rules and regulations and establishing relevant taxation law for cryptocurrencies. Active traders who trade in Digital Asset Exchange (DAX) are thus required to declare their profits in their annual income tax [28]. However, traders who trade infrequently in cryptocurrency could obtain returns as capital gains which is non-taxable in Malaysia [29].

Respondent 6 believed that foreign countries adopting cryptocurrency in businesses should consider blockchain technology for safety purposes in the future. Corporate entities would lose business opportunities if Malaysia were to pose a ban on the usage of cryptocurrency as it would result in the country not being able to compete with foreign markets. Respondent 17 perceived that "cryptocurrency placed a strong value in the world economy". Thus, the use of blockchain technology for cryptocurrency is fundamental to enhance innovation in the financial system to promote a prosperous economy. It can be leveraged to contribute to the economic growth of Malaysia.

Q4: Any benefit of and issue on using cryptocurrency? How? Why? Any suggestion to overcome the issue?

Figure 24 and 25 illustrate popular words associated with the benefits and issues related to the use of cryptocurrency based on the text analytics which included words such as illegal activities, overcome issues, benefit use etc.
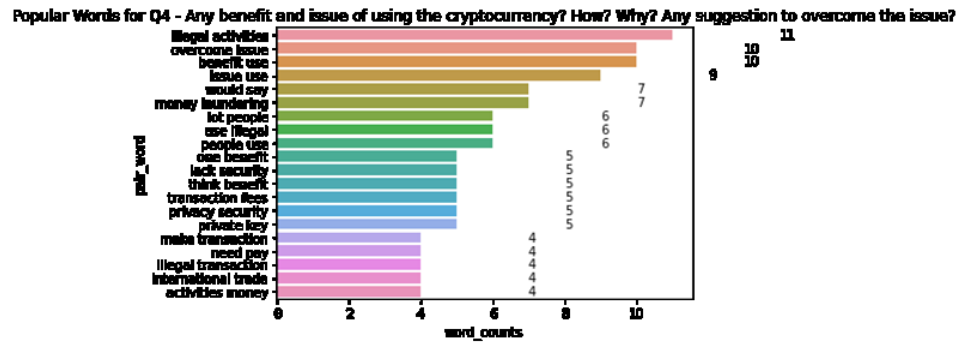
Figure 24: Frequency of Top 20 Bigram Words.

Figure 25: World Cloud Showing Words Popularly Associated with Cryptocurrency Benefits and Issues.

5. Findings and Conclusion Benefits

Cryptocurrency is beneficial as a form of investment as it involves low transaction fees, is convenient and secure. Cryptocurrency guards against inflation because of the limited supply of digital tokens or money such as Bitcoin. Its digital issuance form functions differently from traditional fiat currency which is a government-issued currency or a physical currency. Respondent 42 argued that "expansion can essentially decrease the buying intensity of any officially sanctioned lawful tender". Cryptocurrency acts as an alternative payment where payment can be performed without having to go through BNM. This eases small retailers in receiving payment from users as the transactions can be processed quickly [30]. Additionally, users can conduct international transfers without having to bear any additional charges such as commissions extracted from the transactions. Cryptocurrencies eliminate intermediaries between two trading parties and thus save users from processing fees that have to be borne when dealing with international money exchange.

Cryptocurrency also removes international barriers to foreign exchange among countries. Cryptocurrency simplifies international trade as users do not have to deal with exchange rate and interest rate restrictions of a particular country. Respondent 57 felt

that "some poor people will choose this option to transfer their money between countries with lower banking costs". In cryptocurrency transactions, the sender and receiver are allowed to track and pay crypto payments from electronic devices through the Internet. Additionally, each user's identity is kept confidential throughout the transaction process.

Cryptocurrency uses a decentralised peer-to-peer system to prevent monopoly and control by any one organisation. Respondent 9 mentioned that "decentralised utilise the distributed system of blockchain innovation". It determines flow and value of currency to maintain a safe and reliable financial system. Users trade cryptocurrency using secure private keys as the sole owner and their identity is kept anonymous. All users are rendered to view the transactions stored in the digital ledger [41]. Transactions are recorded with high transparency which can be viewed through a public ledger. Moreover, transactions are secured with two-factor authentication for e-payment. Respondent 16 believed that "cryptocurrency provide safe and confidential transactions than banks". This is because blockchain uses cryptography algorithms and protocols to encrypt information, validate payment and prevent overwrite issues by intruders or third parties [35].

As can be seen in Figure 24 and 25, popular words associated with cryptocurrency issues identified by the text analytics include overcome issue illegal activities, benefit use etc.

5.1. Issues

Cryptocurrency faces challenges of price volatility, cybersecurity issues and legalisation problems. The rate or price of cryptocurrency is unpredictable and inconsistent as it fluctuates on a daily basis. The exchange rate of domestic currency has high volatility which indicates that it is a risky investment. Respondent 3 mentioned that "the excessive volatility of cryptocurrency market will lead to the prices of cryptocurrencies on exchange platforms escalated and fall dramatically over a short period of time". For instance, [6] reported a significant 39% decline in the price of Bitcoin within a single day in March 2020. The volatility of cryptocurrency has led to users being reminded and necessitated to check on prices before they trade or invest in cryptocurrency [30]. Such action prevents non-refundable problems if users had accidentally transferred incorrect amounts through currency exchanges on payment.

There are issues with the characteristics of cryptocurrency such as the decentralised system. There is no central place to store digital token or money for safekeeping purposes. Investigations of cybersecurity issues are performed when users encounter

system crashes with concerns of identity theft and information loss occurring. This is because it is easy for hackers to hack into users' account to breach personal information and crypto assets with malware and DDOS attack [31]. Users will have difficulty recovering private key as a result of sole ownership. This is supported by [40] who specified that private key is owned by a single key holder. Thus, the system could not retrieve lost private key even if the users entrust the private key to a third party in advance [32].

The absence of federal government in cryptocurrency transactions has resulted in these digital currencies facing challenges of gaining users' trust and confidence. In the effort to protect the safety and privacy of each user, governments often experience problems when they are required to track down wallet addresses to detect illegal activities associated with cryptocurrency [27]. This is because each user's identity is retained anonymously. Respondent 6 expressed opposition to cryptocurrency usage because of the occurrence of "numerous illegal transactions such as drug dealing in the dark web". [20] argued that the anonymity nature of cryptocurrency could contribute to possible failure to trace the source of illicit transactions such as drug activities. Additionally, it mentioned that crypto transactions arising from illegal activities may not be easy to verify even with the help of regulators due to its nature of anonymity. In addition to the issues described above, crypto traders who hold bigger volumes may possibly encounter problems when converting digital coins into real cash because of scrutiny from authorities.

5.2. Respondents' Suggestions

Various ways were suggested by the respondents to overcome issues associated with cryptocurrency usage. Essentially, government enforcement plays a crucial role in regulating cryptocurrencies. Respondent 18 affirmed that "central bank can also issue its cryptocurrency to supervise transactions and reduce issues in cryptocurrency". The regulatory bodies should enact appropriate legislation and regulation to protect consumer rights. As stated by Respondent 38, they should establish frameworks to ensure companies do not mistreat consumers. This hinders any use of cryptocurrencies for illegal activities. The Malaysian government should actively join forces with other nations to control and regulate cryptocurrency transactions and money laundering. Additionally, the framework established should embody a set of rules on crypto trade transaction with real-name system [33]. The government through its regulatory bodies should cooperate closely with IT experts to uncover proper mechanisms to regulate cryptocurrency related crimes. Top leading IT professionals should be employed to

review and execute proper security assessments on each wallet. Meanwhile, forensic analyses should be performed to assist authorities to trace and arrest criminals [31]. Respondent 20 asserted that "heavy punishments should be implemented in order to prevent users from misusing cryptocurrency". This measure goes beyond cybersecurity checkpoint so as to encourage mass adoption in the community.

Respondent 24 believed "community lacked familiarity and education regarding cryptocurrency which serves a deterrent for most people to use it". For this reason, workshops aimed at educating the younger generation and the public should be organised to increase public awareness on cryptocurrency and its usage [33]. Government should adopt public education to increase usability and confidence in cryptocurrency usage among the public. This would ensure misleading cryptocurrency information that may cause unwanted financial problems to individual investors could be dealt with and avoided.

Risks associated with cryptocurrency can be overcome through security enforcement. Traders or investors should evaluate the risk before committing to cryptocurrency. Respondent 59 cautioned that "investors do not connect to e-wallet, bank account and cryptocurrency account via public Wi-Fi". Additionally, users wishing to attempt recovery of their wallet account or password should not perform the retrieval of their account through a "guardian".

5.3. Summary of Views on Regulation

Crypto interferes with the functional role of the traditional financial system. The general Malaysian society has differing views regarding cryptocurrency. Respondent 18 remarked that "cryptocurrency trading has grown dramatically in Malaysia". [20] highlighted that cryptocurrency is not controlled by any authorities. Prior to 2020, Malaysia had no jurisdiction in relation to cryptocurrency regulation [34]. Nevertheless, the relevant regulatory bodies such as BNM and SCM have recently been authorised to define regulations for cryptocurrency [6]. Hence, they can play their role in educating the public so that financial awareness on cryptocurrency information and benefits can be developed and heightened. Investors should conduct research and obtain investment information from BNM and SCM to develop strong knowledge and fundamentals of cryptocurrency to prevent from being tricked into scamming and illegal activities. This would protect the interest and welfare of all parties involved in cryptocurrency investment and allow the parties to use these digital currencies with trust.

5.4. Summary of Views on The Benefits, Issues, and Future of Cryptocurrency

Respondent 37 felt that "there are pros and cons of using in cryptocurrency". The respondent went on to state that "Cryptocurrencies such as Bitcoin still have numerous significant obstacles to overcome before they could totally current currency systems such as banking and cash". This suggests that companies must fall in line with the technological changes for them to compete with international corporations.

The US and Europe have taken the issue of privacy seriously when considering the use of cryptocurrency. However, Respondent 32 believed that China will predominate the crypto market in the future.

6. Implications, Limitations, and Suggestions

This study surveyed the perception of Malaysians on the regulation of cryptocurrency and its associated benefits, issues, and future. The main findings revealed that Malaysians at large are open to cryptocurrency usage and are looking forward to a cryptocurrency-friendly regulatory regime. However, the majority expressed their concern over safety of cryptocurrency usage. In view of the expansive growth of cryptocurrency, any regulatory effort should be complemented by heightening financial education among the public. The relevant regulatory bodies should establish regulations to minimise possible cryptocurrency-related illegal activities while developing a cryptocurrency-friendly regulatory regime. Future research may want to focus on how various jurisdictions are managing the fast-growing cryptocurrency market.

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