Cawangan Terengganu

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e-Academia Journal

e-Academia Journal of UiTM Cawangan Terengganu 13 (2) 76-85, November 2024

A Study on Factors that Lead to Adoption of Cryptocurrency in Malaysia

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Submission date: 18 August 2024 Accepted date: 10 November 2024 Published date: 29 November 2024

To cite this article: Jamidin, J. N., Rozaimi, L. A. & Radi, M. F. M. (2024). A Study on Factors that Lead to Adoption of Cryptocurrency in Malaysia. *e-Academia Journal of UiTM Cawangan Terengganu, 13* (2) 76-85, November 2024

ABSTRACT

Cryptocurrency is a type of digital currency secured through cryptography which is the practice of writing or solving codes to ensure security. It operates on a decentralised blockchain technology. Adopting cryptocurrency may help people face inflation, recession, and economic problems. However, the adoption of cryptocurrency in Malaysia is still in its early adopter phase. Therefore, this study was constructed to investigate the factors that contribute significantly to the adoption of cryptocurrency in Malaysia and to obtain the best logistic model for adopting cryptocurrency. Logistic regression was handled with the independent variable age, gender, location of living, awareness of cryptocurrency, monthly income and attitude towards cryptocurrency which the dependent variable has two outcomes (1=Adopt Cryptocurrency, 0=Not Adopt Cryptocurrency). This study was carried out on people who live in Malaysia. The result of this study revealed that variable gender, awareness of cryptocurrency, monthly income and attitude towards cryptocurrency contribute significantly to the adoption of cryptocurrency in Malaysia. Policymakers, such as the Securities Commission Malaysia and Bank Negara Malaysia, must take the initiative to develop thorough laws and regulations pertaining to the future use of cryptocurrencies. With the growing awareness and ownership of cryptocurrencies, it is imperative to establish a well-defined legal framework to guarantee stability, security, and equitable practices in the digital asset ecosystem.

Keywords: *Cryptocurrency, Cryptography, Decentralized Blockchain Technology, Digital Currency, Logistic Regression*

1.0 INTRODUCTION

The rise of cryptocurrencies like Bitcoin in recent years has drawn a lot of attention from both the public and the media (Morisse, 2015). Cryptocurrency is a type of digital currency that is secured through cryptography which is the practice of writing or solving codes to ensure security. It operates on a decentralised blockchain technology (Nakamoto, 2008). According to Moorthy (2018), the most popular and well-known cryptocurrency is Bitcoin while Ethereum and Litecoin are examples of an existing cryptocurrency. There are several ways to own cryptocurrency, one of which is to purchase them on a cryptocurrency exchange such as Coinbase, Binance, or Luno. These exchanges allow users to buy Bitcoin using fiat currency or another cryptocurrency (Yussof & Al-Harthy, 2018). Moreover, Bitcoin can be received as payment for goods or services, like accepting payment in cash or credit card. Many businesses now accept Bitcoin as a form of payment, including Microsoft and Overstock (Middlebrook, 2014).

Furthermore, mining is also one of the ways to own cryptocurrency. Bitcoin and other cryptocurrency can be obtained through a process called mining. This involves using specialized hardware to solve complex mathematical problems and verify transactions on the Bitcoin network. However, mining is typically only profitable for those with significant technical expertise and expensive equipment (Antonopoulos, 2014). Regardless of the method used to acquire Bitcoin, it is important to store it securely using a digital wallet. These wallets can be software-based or hardware-based and provide a private key that is necessary to access Bitcoin (Nakamoto, 2008).

In the hype of owning cryptocurrency, there are advantages and disadvantages of doing so. One of the advantages is it can be used to generate income or profits. Cryptocurrency markets have skyrocketed in value over the past decade, at one point reaching almost $2 trillion. The more you own, the more you gain. Moreover, it is easier to transfer funds between two parties. Cryptocurrency users can transfer their money without having a trusted third party like a bank or a credit card company. However, there are also disadvantages of owning cryptocurrency like the volatility of the price. Bitcoin has once reached an all-time high value of $65,000 in 2021 before dropping to $20,000 a year and a half later. Furthermore, cryptocurrency also has become a popular tool that is associated with criminals such as money laundering and sales of drugs, weapon purchases and terrorism financing because of its high degree of anonymity (V.A.Petrova, 2018). One example is the Dread Pirate Roberts case who ran a marketplace to sell drugs on the deep web (Ron & Shamir, 2014).

Despite these concerns, the adoption and usage of cryptocurrency continue to grow with more businesses and individuals accepting it as a form of payment. Some of the businesses included are BMW, Tesla Motors, Expedia, Twitch and Balenciaga. As of 2023, there are estimated around 420 million cryptocurrency users worldwide which is also equivalent to 4.2% of the world's population. Adopting cryptocurrency may help in overcoming inflation as it is immune to inflation (Dumitrescu, 2017). People who live in countries that face high inflation rates like Türkiye, Argentina and Venezuela use cryptocurrency to overcome inflation, since it works as a digital asset. This means that people who invest in cryptocurrency are somewhat like investing in gold, both work the same way. Thus, adopting cryptocurrency may help people in facing inflation, recession and economic problems. Malaysians may also use cryptocurrency as a medium to counter inflation.

However, the adoption of cryptocurrency in Malaysia is still in its early adopter phase (Ku-Mahamud et al. 2018; Yeong et al. 2019). Several factors may be contributing to this low adoption rate, including the lack of awareness. Many Malaysians might not be aware of cryptocurrency or might not understand how it works. Next, the Malaysian government has not yet issued clear regulations for cryptocurrency, which may be discouraging some people from investing in it. Lastly, security concerns where some people may be concerned about the security of cryptocurrency, as it is a relatively new and untested technology. Thus, this article aimed at determining the factors that may result in the eventual decision to adopt.

2.0 LITERATURE REVIEW

This study focused on the factors of the adoption of cryptocurrency. Due to the assistance of previous studies, these factors were gathered to support and provide more details where it will benefit the researcher and add to the knowledge for the study that is now being implemented. Both independent and dependent variables will be involved in this section.

The first independent variable is age. Age is a period of human existence, defined in years from the moment of birth, during which a person or entity has existed. This period is frequently accompanied by a particular stage or level of mental or physical development and involves legal responsibility and competence. Age can be divided into six categories, according to the National Institutes of Health, including new-borns (birth to 1 month), babies (1 month to 1 year), children (1 year through 12 years), adolescents (13 years through 17 years), adults (18 years or more), and elderly adults (65 and older). In the previous study, although Doblas (2019) mentioned that those between the ages of 18-34 filled out the form more than those below 18 and 35 and above, only 49 of the total respondents stated understanding or awareness of cryptocurrency. Another study by Steinmetz, Von Meduna, Ante, and Fiedler (2021) in Germany divided the samples into 3 age groups which are 18-29 years old (young), 30-49 years old (adult) and 50-69 years old (old. It resulted by young people from the age of 18-29 years old tend to own cryptocurrency more than other age group. Meanwhile, in Europe, the average age of a 7 person who adopts cryptocurrency is in the range of 27–29 years old (Froehlich et al., 2021).

The next variable is gender. Generalisations about men and women are known as gender stereotypes, and they can be accepted as reality. The unequal distribution of men and women in social positions at home and work leads to gender stereotypes (Koenig & Eagly, 2014). There is a gender stereotype that males are more aware of the adoption of cryptocurrency than females because of the nature of cryptocurrency in the economic world. Cryptocurrency is a new thing that exists in our currency whose usage and functions are different from those of the current payment method. Gender stereotypes may be applied to generations before Generation Z since Generation Z is more knowledgeable and aware of new and up-to-date things. As a result, by looking at the ratio of gender, there are more men than women who participated in answering the study survey's questionnaire voluntarily, even if they only have basic knowledge about cryptocurrency or little to no knowledge at all (Chen et al., 2022). The findings for Austria (Stix, 2021) are also consistent with the findings for Japan, where crypto asset owners are more likely to be male and younger than 30 years old. Similarly, other research stated that in the US (Schuh & Shy, 2016), young males are more likely to adopt cryptocurrency than young females. In general, it is shown that males are more interested in the adoption of crypto more than female.

There are two types of geographical areas urban and rural area. People who live in urban areas are more likely to adopt cryptocurrency than people in rural areas. The ability of people to adopt cryptocurrency can vary greatly between urban and rural settings in terms of socioeconomic factors, access to technology, and financial infrastructure. The study found in the literature that urban areas are highly interested in cryptocurrency adoption rates compared to rural areas, as shown in India (Schuetz & Venkatesh, 2020). Additionally, they stated that in India, generally, the urban area has a higher chance of adopting blockchain technology than the rural area. This is because urban areas have more access to the internet than rural areas. Then, rural India is still far behind in all aspects such as job employment, poverty, GDP, healthcare and literacy. The distinction between urban and rural locations plays a crucial role in the adoption of cryptocurrency. Urban areas tend to exhibit higher adoption rates due to factors such as better access to technology, internet connectivity, financial services, and digital literacy compared to rural areas. The difference between urban and rural areas is important for understanding how widely cryptocurrencies are being adopted. Urban locations give people better access to technology, particularly mobile networks and high-speed internet connectivity, according to a study by Jimenez-Castillo and Sanchez-Fernandez (2019). On the contrary, rural areas frequently experience less financial inclusion, limited access to technology and educational resources, and more serious financial issues. The research suggested that urban settings provide individuals with better access to technology, internet connectivity, and digital services, making it more conducive for cryptocurrency adoption.

The entire amount of money that a person or organisation makes in each calendar month is referred to as their income per month. This amount can come from a variety of sources, including salaries, wages, business profits, investment returns, and other inflows of cash. It provides a picture of the total earning potential for that month and is an essential statistic for evaluating financial stability, planning, and budgeting. The income effect seeks to understand how individuals change their spending habits due to a change in their income and whether it has positive or negative consequences, depending on many factors. The association between monthly income and the adoption of cryptocurrency has been the subject of much research, particularly in Malaysia. People with higher incomes are more likely to invest more in

cryptocurrency than people with lower incomes (Sukumaran et al., 2022). Cryptocurrencies are at high risk of losing money when a person has less knowledge about them despite having a huge amount of money because of price fluctuation. However, Yeong, Kalid, and Sugathan (2019) indicate that people with higher income levels are not likely to express interest in bitcoin adoption. This may be interesting as there were research that produced significant results and there were also studies that produced insignificant results.

The level of awareness of cryptocurrency plays a significant role in its adoption. Understanding the factors that contribute to awareness is crucial for promoting its usage among individuals and businesses. Several studies have explored this aspect and identified various factors influencing awareness. Ku-Mahamud, Omar, Bakar, and Muraina (2019) surveyed Malaysian citizens to assess their knowledge and awareness of cryptocurrency. The study revealed that the knowledge of cryptocurrency is at an intermediate level, where the respondents' knowledge level falls between basic to master level. Then, Vetrichelvi and Priya (2022) investigated the level of awareness among college students in India. The research found that most of the students have knowledge and understanding of cryptocurrency. Understanding individuals' awareness of cryptocurrency can help policymakers and businesses tailor their strategies to address concerns, enhance positive perceptions, and promote adoption.

The adoption of cryptocurrency is greatly influenced by one's attitude towards them. Individuals' attitudes, opinions, and ideas about cryptocurrency have an impact on how eager they are to adopt and use it. The relationship between attitude and cryptocurrency adoption has been the subject of numerous researches, providing more insights into the variables that influence people's attitudes towards cryptocurrency. In their study on factors influencing cryptocurrency adoption in Saudi Arabia, Alaklabi and Kang (2021) identified attitude as a significant factor. The research found that attitude towards cryptocurrency has a significant positive impact on the intent to adopt it. This supports the finding that was made by Doblas (2019), where he also found that attitudes have a significant impact on adopting cryptocurrency. Chen et al. (2022) stated in their study that attitude significantly impacts social influence to adopt cryptocurrency. However, there is research by Vetrichelvi and Priya (2022) produced a vice versa result. According to the study's findings, attitude is not a significant factor to bitcoin adoption due to several causes, including volatility, regulation, and other issues.

Logistic regression has been widely employed as a statistical method to analyse the factors influencing the adoption of cryptocurrency. This technique allows researchers to assess the impact of various independent variables on the likelihood of individuals or organizations adopting cryptocurrency. One such study by Steinmetz et al. (2021) utilized logistic regression to identify the significant factors influencing cryptocurrency adoption in Germany. The research considered variables such as age, gender, education and income. It results in higher age and education has a negative impact on ownership of cryptocurrency, but male gender and higher income have a positive impact.

Then, another study was made by Reddick et al. (2019) to study the determinants of blockchain adoption in the public sector using logistic regression. The following six factors for blockchain adoption were examined: cybersecurity, control of corruption, e-government development, government effectiveness, political stability, and democratic participation. The analysis demonstrates that political stability, government effectiveness and cybersecurity are significant determinants. Surprisingly, more political stability makes it less likely that blockchain technology will be adopted quickly.

Additionally, Doblas (2019) conducted a study in a private tertiary institution in Philippines regarding the awareness and attitudes towards cryptocurrency in relation to adoption among college students. Logistics regression was used to identify the knowledge and attitude on cryptocurrency relates to adoption. The study's findings demonstrated that attitude significantly influences potential adoption at a significance level of 0.05, whereas awareness shows significance only at the 0.10 significance level. The application of logistic regression in studying cryptocurrency adoption provides valuable insights into the specific factors that influence individuals' decisions. By considering multiple independent variables, researchers can identify the significant predictors and their impact on adoption behaviour.

3.0 METHODOLOGY

The main idea was that the reliability of a research study was determined by its methodology, which comprised a set of practices followed in a specific field of study. This section explained the details of the method that was used to achieve the objectives of the study on awareness of cryptocurrency.

A causal research design was implemented for this study. Causal study, also known as explanatory research, was the term used in this study. According to Bennett (2004), the application of causal design aimed to assist in assessing the consequences of modifying practices and methods. This assessment focused on understanding what would happen if one of the independent variables changed, leading to a corresponding change in the dependent variable. Causal research was applied in this study to identify the cause-and-effect factors that led to the adoption of cryptocurrency. A minimum of 385 respondents from the 32.7 million of Malaysians were needed for the survey to be conducted. Applying a sampling method from Cochran (1977), the sample size was determined. For this formula 95% CI were used. Then, the margin of error will be 0.05. Lastly, p equals to 0.5 so that required the largest sample size for the confidence level and margin of error that have been selected (Watts, 2022).

$$n = \frac{Z^2 pq}{e^2}$$

$$n = \frac{(1.6449)^2(0.5)(0.5)}{0.05^2}$$

$$n = 385$$

where

n	:	sample size
Z	:	z-score
e	:	margin of error
p	:	probability
q	:	1-probability

In statistical analysis, sampling is the procedure by which researchers select a specific number of observations from a larger population. This study used convenience sampling, a non-probability sample technique. According to Frost (2022), Convenience sampling also referred to as a chance or availability sampling and it is a non-probability sampling technique where units were chosen for the sample based on their accessibility to the researcher or participants choose if they want to join after the researcher makes the study announcement. Convenience sampling is common because it is inexpensive, takes less time than other sampling techniques, and is simple. Therefore, the results were valid for the sample involved in this study only and cannot be inferred to the population.

3.1 Theoretical Framework

A theoretical framework is a structure or set of concepts and theories that provide a foundation for understanding and analysing a specific research problem or topic. It established a systematic framework for examining the relationships between variables under investigation. The figure below shows the theoretical framework of the model in the study that includes independent and dependent variables. It described how does age, gender, location, income per month, level of awareness of cryptocurrency and attitude towards cryptocurrency influence the adoption of cryptocurrency.

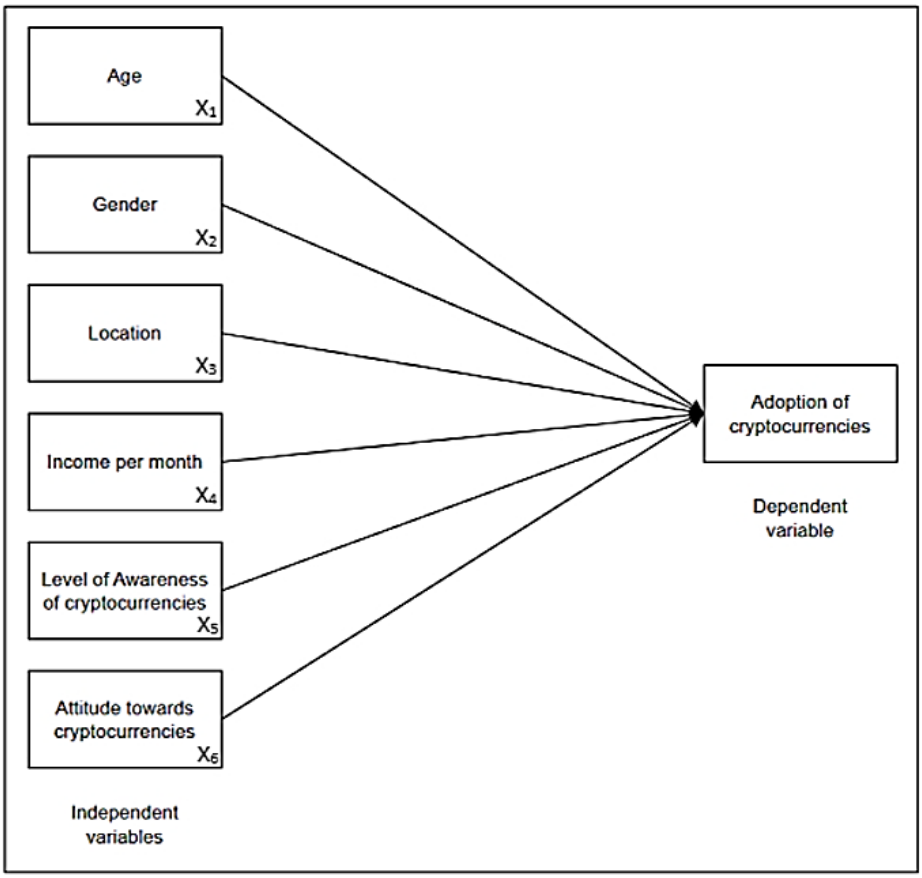

Figure 1: The theoretical framework of Adoption of Cryptocurrencies in Malaysia

3.2 Logistic Regression Model

Logistic regression analysis is a binary classification regression analysis involving two binary values for the dependent variable. The main purpose of this analysis is to define variables and identify the relationship between the dependent binary variable and the independent variables. Furthermore, logistic regression analysis is not the same as linear regression, as logistic regression produces a constant output. However, linear regression produces a continuous output. Logistic regression output contains only a limited number of possible values and can only predict between two possible outcomes. Before attempting to fit a model to a data set, some logistic regression assumptions are required. Firstly, logistic regression must assume that the dependent variable has only two possible outcomes. Second, the observations of the dataset must be independent of each other, and the dependent variable must have mutually exclusive and exhaustive properties. Third, logistic regression requires that the independent variables do not exhibit multicollinearity, which should not be highly correlated with other variables. Fourth, this analysis does not require linearity of dependent and independent variables. However, it assumes a linear relationship between independent variables and logarithmic odds.

The general model for this study is:

$$\log\left[\frac{P_i}{1-P_i}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

where

P_i : The probability for adoption in cryptocurrency (1=Yes, 0=No)
X_1 : Age
X_2 : Gender (1=Male, 0=Female)
X_3 : Income

X_4 : Location (1=Urban, 0=Rural)
X_5 : Awareness of cryptocurrency
X_6 : Attitude towards cryptocurrency

For the model's evaluation, five factors are taken into consideration. The logistic regression model is evaluated using these five criteria. The Omnibus Test will be applied to examine if any regression coefficients are significantly different from all other coefficients. As for the hypotheses, if the p-value is lesser than the alpha value, it indicates that there is a relationship between the variables.

Next, the statistical significance of each independent, regressor, or predictor variable is shown by Wald Statistics. Each regression coefficient is evaluated independently by Wald Statistics, where if the p-value is lesser than the alpha value, it is a significant predictor. However, if the p-value is more than the alpha value, it is not a significant predictor.

The Hosmer and Lemeshow Test is a statistical test for the goodness of fit of the logistic regression model. It is used to see if the data were a good fit test for the logit model or not. If the p-value or significant value is more than the alpha value, it can be concluded that the regression model fits well. However, if the p-value is less than the alpha value, the regression model does not fit well.

Predictive efficiency generally refers to the ability of a model to accurately predict outcomes or make predictions on new, unseen data. It is a measure of how well the model performs in terms of predictive accuracy and generalization. It is a good predictive efficiency model if the aggregate percentage is more than or equal to 60% and if it is less than 60%, it is not a good predictive efficiency model.

Cox and Snell and Nagelkerke R-Square were also used in this study. This method displays the amount of variation of the dependent variable can be explained by independent variables in the current model. The range of values is between 0 and 1.

4.0 RESULT AND DISCUSSION

This chapter covers the results and discussion of the findings of the research. The collected dataset was used to analyse for us to obtain the best model that suits this study by going through the logistic regression model.

4.1 Model Evaluation

The Omnibus test is used to allow better prediction from the independent variable to the dependent variable. The Omnibus Test was used to check that the new model is an improvement over the baseline model. Hosmer and Lemeshow tests were used to check that the model was a good fit for the data. From Table 1, the model is significantly better since the p-value of the Omnibus test is less than the α value, 0.05. The p-value of Hosmer and Lemeshow was 0.470 which is larger than the significance value, 0.05 indicates a good fit for the data.

Table 1: Model Evaluation

Model Evaluation	p-Value
Omnibus Test Model	0.000
Hosmer and Lemeshow	0.470

Cox Snell R^2 and Nagelkerke R^2 were used to calculate the total variation of the adoption of cryptocurrency. From Table 2, both R^2 values indicated that the total variation of adoption of cryptocurrency among respondents is between 31.7% and 42.9% related to all the independent variables included in the model.

Table 2: Model Summary

R^2	Value
Cox & Snell	0.317
Nagelkerke	0.429

Finally, are predictive efficiency criteria. The predictive efficiency model was used to compare the predicted value for the adoption of cryptocurrency based on the logistic regression model with the actual observed value in the data set. Sensitivity was used to show the probability that the test would accurately measure the adoption of cryptocurrency while specificity was used to show the probability that the test would successfully detect a person who does not own cryptocurrency.

Table 3 shows that the sensitivity value of the model is 63.20% and the specificity is 82.10%. It has a good overall predictive efficiency in predicting the adoption of cryptocurrency, with the full model's overall percentage being higher than 60% at 74.60%. Hence, it can be concluded that this model has a good overall predictive efficiency in predicting the adoption of cryptocurrency

Table 3: Classification Table

Predictive Efficiency	Percentage
Sensitivity	63.2
Specificity	82.1
Overall	74.6

4.2 Fitting Logistic Regression Model

The purpose of this study was to determine the best logistic model for the adoption of cryptocurrency by Malaysians as well as to investigate the factors that significantly impact this adoption. To simplify and make the conclusion easier to understand, Table 4 was created as follows.

Table 4: Model Coefficient

Variable	Estimated Coefficient	Standard Error	p-Value
Age	-0.024	0.012	0.051
Gender	-1.546	0.300	0.000
Income	0.001	0.000	0.000
Location	0.124	0.299	0.679
Awareness	0.094	0.041	0.021
Attitude	0.065	0.022	0.003
Constant	-3.591	0.705	0.000

It can be determined that the main factors influencing the adoption of cryptocurrency are gender, income, awareness of cryptocurrency and attitude towards cryptocurrency since all the p-values of these variables are less than 0.05.

Following is the estimated logit model for the full model obtained:
Logit(Y=1) = –3.591 – 0.024 Age – 1.546 Gender + 0.001 Income + 0.124 Location + 0.094 Awareness + 0.065 Attitude

4.3 Odd Ratio

The odds ratio is another way of representing the chances Malaysians will adopt the cryptocurrency. Odds are how likely it is that something will or will not happen. Table 5 shows the odds ratio for the significant variables.

Table 5: Odd Ratio of the Estimates

Variable	Odd Ratio
Gender	0.213
Income	1.000
Awareness	1.099
Attitude	1.067

Based on Table 5, the odds of Malaysians who have adopted cryptocurrency increase by 1.000 for every unit increase in income. On the other hand, the odds of a Malaysian that adopts cryptocurrency awareness about 1.099 times more likely compared with those that do not adopt it. Furthermore, the odds of a Malaysian who adopts cryptocurrency have a positive attitude by 1.099 times more likely compared with those that do not adopt it. Lastly, compared to females, male are 0.213 times more likely to have adopted cryptocurrency.

5.0 CONCLUSION

Through a study of the key variables associated with cryptocurrency adoption, this study has illuminated variables that may have an impact on variations in the number of people adopting cryptocurrency. It has been demonstrated that young people are more likely than old or adult people to adopt cryptocurrencies. According to a previous study, people between the ages of 18 and 29 are more likely than people in other age groups to own cryptocurrencies (Froehlich, Wagenhaus, Schmidt, & Alt, 2021). According to Stix

(2021) findings, cryptocurrency assets are more likely to be adopted by men and people under the age of thirty. The survey's findings showed that 63.8% of the observations were male and 35.9% of the total were female. This supports the study's findings, which state that men are 0.213 times more likely than women to have used cryptocurrencies. Furthermore, the study's researcher found that a significant percentage of respondents, 74.6% lived in urbanised areas, while 25.1% did so in rural areas. This discovery is consistent with previous research, like the results from Schuetz and Venkatesh (2020) in India, which show that people are more interested in the adoption rates of cryptocurrencies in urban than in rural areas. Moreover, the results of this study show that the likelihood of adopting cryptocurrency increases by 1% for every unit increase in income. This indicates there is a positive correlation between income levels and the probability of adopting cryptocurrencies. The study's findings are consistent with those of Sukumaran, Bee, and Wasiuzzaman (2022), who highlighted that people with higher earnings are more likely than people with lower incomes to invest in cryptocurrencies. Vetrichelvi and Priya (2022) investigated to determine the level of cryptocurrency awareness among Indian college students. The study found that most people demonstrated an understanding and comprehension of cryptocurrencies, highlighting a significant awareness within this group of students. The study, which was expanded to include Malaysia, discovered that those who are aware of cryptocurrencies had 1.099 times more likely to adopt than people who are not.

It is advised that to achieve better results in future research, the sample size for data collection should be greater than 385 observations. More independent variables should also be included in this study because, although it focuses on finance, there will likely be other factors that influence the adoption of cryptocurrencies. Therefore, increasing the sample size and including more independent variables in the study will help the research. In terms of the financial aspect, financial inclusion, which is made possible by cryptocurrencies, is the empowerment of people who have historically been shut out of standard financial services. Bitcoins are crucial to this because they offer a decentralised and convenient means of conducting financial transactions. People can use cryptocurrencies to access a variety of financial services and engage in cross-border transactions, especially in areas where traditional banking infrastructure is few or non-existent. The inclusive character of this platform allows individuals who are underbanked or unbanked to create savings accounts, investigate investment options, and participate effectively in the global economy. Policymakers, such as the Securities Commission Malaysia and Bank Negara Malaysia, must take the initiative to develop thorough laws and regulations pertaining to the future use of cryptocurrencies. With the growing awareness and ownership of cryptocurrencies, it is imperative to establish a well-defined legal framework to guarantee stability, security, and equitable practices in the digital asset ecosystem. To create a fair and flexible regulatory framework, policymakers should work with financial institutions, technological specialists, and industry stakeholders. This proactive approach would improve the legitimacy and longevity of Malaysia's cryptocurrency in addition to giving users legal clarity.

ACKNOWLEDGEMENTS

The authors extend our heartfelt gratitude to all those who contributed to the completion of this research article.

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