DETERMINANTS OF CRYPTOCURRENCY ACCEPTANCE AS PAYMENT METHOD AMONG CONSUMERS IN PENANG, MALAYSIA

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ABSTRACT

Cryptocurrencies represent an innovative exchange medium to facilitate online mobile payment without physical form. Blockchain technology and cryptocurrencies are also believed to hold huge potentials which will revolutionize the future economic system. The objective of the study is to identify the significant determinants which influence consumer's intention to use cryptocurrency as payment method in Penang, Malaysia. The dependent variable involves consumer's acceptance of cryptocurrency whereas the proposed independent variables includes awareness, perceived ease of use, perceived usefulness and perceived trust. A quantitative approach is applied, and the investigation was performed on 160 subjects who are E-wallet and credit card users. The data collected is analyzed with factor analysis, reliability test and Multiple Regression Analysis using SPSS software. Multiple Regression results indicated that Perceived Usefulness (PU) and Perceived Trust (PT) are significant predictors of consumer's acceptance of cryptocurrency as a mobile payment method. The research aims to close the literature gap of cryptocurrency adoption as mobile payment method for consumers in Malaysia. This research will also be useful to researchers who are keen to investigate on other factors which will affect the consumer's acceptance on cryptocurrency as mobile payment methods.

Keywords: Cryptocurrency, Blockchain, Technology, Mobile Payment Methods

INTRODUCTION

Technology is progressing at a faster pace than ever and led to the creation of many innovative ideas and advancements in business operations. The rise of E-commerce popularity among consumers encouraged newer electronic mobile payment technologies and digital assets have emerged in various forms. Currently, conventional currencies transactions are centralized and controlled by a third-party organization such as banks and other financial institutions (Yusof et al., 2018). The transaction between the two entities is managed by the bank and a transaction fee will imposed for the services. This third party also manages information of those transactions. Blockchain technology however revolutionized this system. Blockchain's technological revolution generates a huge impact on society. After the global economic crisis, a new protocol called "A Peer-To-Peer Electronic Cash System" was introduced by Satoshi Nakamoto (Tapscott, 2017) and this system uses a cryptocurrency now termed as Bitcoin (BTC).

Bitcoin was the first cryptocurrency introduced as blockchain technology and is the world's best-known virtual cryptocurrency and widely used in commercial transactions (Deepika & Kaur, 2017; Singh & Singh, 2018). Five of the largest companies including Dell accepted cryptocurrency for payment in India, the first country to acknowledge and regulate Bitcoin as an alternative monetary system (Singh & Singh, 2018). Blockchain technology was pioneered as a data

management technology for Bitcoin to facilitate decentralized transactions. Bitcoin is cryptocurrency developed using open-source software with sophisticated protocols that utilizes peer-to-peer networks as a private irreversible instrument (Simser, 2015). With this protocol, all cross-border payments costs were reduced in comparison to centralized payments.

All cryptocurrency transactions implemented are stored in a virtual public ledger using the blockchain technology and shared among the participants. Every single Bitcoin transaction is registered as a block and is added into the blockchain. Participants then verify each transaction in the public ledger. All this information can never be altered or deleted after the data has been duly authorized. In addition, a verifiable record of each transaction was made available making blockchain a system with data integrity and security (Crosby et al., 2016; Mahomed, 2017; Lee et al., 2018; Liang et al., 2018). Al-Amri, et al., (2019) also shared same opinions such characteristics that there are more transparency in cryptocurrency compared to traditional centralized transactions involving third-party organizations.

Blockchain and cryptocurrencies are dramatically transforming how society performs transactions, just as how Internet revolutionized how humans communicate. Thus, many market sectors are integrating and utilizing blockchain technology within their operations (Mainelli & Smith, 2015). Today, blockchain technology is widely used in financial and non-financial organizations (Crosby et al., 2016). The World Economic Forum (2015) reported that by 2025, 10% of gross domestic products are expected to be stored using blockchain technology. This revolutionary blockchain tsunami is inevitable and billionaire investor Warren Buffet conceived this technology as groundbreaking (Olyveira, 2014).

Blockchain also received academic attention. Currently 42 percent of the world's top 50 universities offer at least one academic course on blockchain or cryptocurrency. Top universities like Massachusetts Institute of Technology, New York University, Stanford University, and University of California at Berkeley included blockchain in their syllabuses. Cryptocurrency is also rapidly increasing in Asia with Japan becoming the first major economy in Asia to recognize cryptocurrencies as a payment method. Today about 10,000 companies accept bitcoins in Japan and counting (Blair, 2018).

In Malaysia, there is also a rise in number of registered exchange entities, indicating the gaining popularity for cryptocurrency in Malaysia. The Malaysian Ministry of Science, Technology and Innovation (MOSTI) is mandated to ensure that Malaysia is abreast with blockchain development (MIMOS Berhad, 2017). The Malaysian Industry-Government Group for High Technology (MIGHT) stated that Malaysia would be adopting blockchain by 2025 (Sullivan, 2018). Two key Malaysian banks, Maybank and CIMB are already working with FinTech companies. With this goal, Malaysian banks have taken positive steps to encourage blockchain technology developments to reduce the cost, increasing efficiency and transaction turnover.

Malaysian Mobile Payment Trends

According to Statista, e-Commerce in Malaysia is experiencing a drastic growth and expected to continue growing from $1336 billion USD in 2014 to $4878 billion USD in 2021 (Statista, 2019a). The number of smartphone users in Malaysia increased from 15.6 million in 2017 to 18.4 million. This had led to the drastic increase for mobile payments transaction values in Malaysia from USD$445 million in 2017 to USD$893 million in 2019 and it is expected to continuously grow.

E-commerce has reshaped business models where traditional physical cash system is increasingly disadvantaged (Kbilashvili, 2018). Although existing electronic payment methods can fulfil the e-commerce requirement, consumers and merchants must pay higher transaction fees for the bank's service as the intermediary (Baur, 2015; Mahomed, 2017; Yusof et al., 2018; Shahzad

2018; Lee et al., 2018). Cryptocurrency which is a decentralized system will be more beneficial in this sense with the lower transaction cost and higher privacy. Mahomed (2017) agreed that there is also a trust deficit among consumers from the psychological cost perspective due to the financial controls and monetary regimes enacted. Many recognized the benefits of cryptocurrency commenced adopting cryptocurrency as payment method overseas.

Some jurisdictions such as United States, Japan, South Korea and Australia recognized bitcoin as a valid commodity (Aguirre, 2018). The U.S. Commodity Futures Tradition Commission (CFTC) categorized bitcoin as commodities and governed by the Commodity Exchange Act (Zhao 2018). U.S. Department of Treasury's Financial Crimes Enforcement Network (FinCEN) defined Bitcoin not as currency but as a Money Services Business (MSB) and places it under Bank Secrecy Act for governance while the Canada Revenue Agency (CRA) viewed it as barter transaction between businesses (Bajpai, 2019).

Although Malaysia is taking the wait-and-see approach, the government is also interested in the potential of cryptocurrency and welcomed the usage of cryptocurrencies (such as Bitcoin, Litecoin, Dogecoin) for transaction and innovation purposes (Ku-Mahamud et al., 2019). Bank Negara Malaysia published a study on cryptocurrency in 2017 and expressed interest to explore the possibility to introduce Central Bank Digital Currency (CBDC) to unlock central bank's ability to capture rapid, real time economic surveillance (Fintec News Malaysia 2017). Malaysia Finance Minister also stated that the Ministry of Finance (MoF) views the blockchain technology as having the potential to bring innovation to both new and old industries (The Star, 2019). The Minister added that cryptocurrencies could be used as digital assets can also play as an alternative fundraising avenue for new business and entrepreneurs. It is an alternative asset for investors.

Malaysia Securities Commission (MSC) introduced the Capital Markets and Services (Prescription of Securities) (Digital Currency and Digital Token) Order 2019 to regulate cryptocurrency (Lim, 2019). A regulation was imposed on 15th January 2019 which required the Initial Coin Offerings (ICOs) and cryptocurrency exchanges to be registered with Malaysian Securities Commission (MSC) before 1st March 2019. A penalty of 10-year sentence in jail and a maximum of $2.4 million in fines imposed for noncompliance (Pikri, 2019). MSC collaborates with Bank Negara Malaysia (BNM) to ensure Malaysia can implement the regulatory framework on digital assets. The method of using cryptocurrency in Malaysia will determine the regulations imposed (Pikri, 2019). Cryptocurrency will fall under the purview of securities laws when traded. On the other hand, it is uncaptured under the prescription order and is not considered as securities when used to pay for transactions.

The Securities Commission Malaysia (SC) registered three recognized market operators to establish and oversee cryptocurrencies in Malaysia, which are Luno Malaysia Sdn Bhd, Sinergy Technologies (M) Sdn Bhd and Tokenize Technology (M) Sdn Bhd (Ooi, 2019). Bank Negara Malaysia (BNM) published a list of 56 cryptocurrency exchanges in Malaysia which has registered as a reporting entity with the regulator (Fong, 2019). However, the adoption in Malaysia is still at the adolescent stage (Chan et al., 2018; Alaeddin & Altounjy, 2018; Yusof & Al-Harthy, 2018; Ku-Mahamud et al., 2019).

Polasik, et al., (2015); Luther (2016); Kbilashvili (2018); Yusof & Al-Harthy (2018); shared that the major challenges faced by companies on cryptocurrency adoption are high price volatility and lack of governmental regulations. Despite the higher adoption of smartphones indicating higher acceptance to mobile technology, the introduction of governmental regulations to help protect the consumers, and introduction of new generation cryptocurrencies, consumers using cryptocurrency as mobile payment method is not widely applied. Luno, a software development company which provides application for transferring currencies, facilitates bitcoin storage, trading and exchanges between traditional currencies and bitcoin conducted a survey for Malaysia in 2017 (Bloomberg 2019). According to Luno in their survey, 55% of the respondents in Malaysia were familiar with

Blockchain technology while 39% of the respondents own cryptocurrency (Luno, 2017). When asked about using Bitcoin as a payment system, 48% of the users trust Bitcoin, while 32.8% responded unsure and the remaining 19.2% does not trust it. Besides that, 13.2 % perceive that it has a better method of payment than credit card, as there is no fraud and better privacy while 16.3% provided better preference due to speed as it is faster and cheaper. Comparing between Bitcoin to gold, 35.4% would rather prefer to own Bitcoin and 18.2% would rather own gold. The remaining 36.3% remained neutral for this comparison. With just 48% of the respondents responding they trust bitcoin, this shows Malaysia's bitcoin community is still underdeveloped and it is likely heavily comprised of people casually experimenting the technology (Haig, 2017).

Sas & Khairuddin (2017) in their research also affirmed that majority of the participants used bitcoin as a tool for storing value, investments or savings and not for transactions. Ku-Mahamud, et al., (2019)'s research argued that although there are 26 Bitcoin-accepting merchants with 2,000 Bitcoin users in Malaysia as of 2017, the numbers dwarf compared to 18 million users of cryptocurrencies around the world. Furthermore, Bank Negara Malaysia (The National Bank of Malaysia) observed that the recorded transaction value per capita for mobile payment showed only a slight increase from RM0.50 to RM 2.20 in 2019. This further supported that many consumers in Malaysia still prefer conventional e-payment methods such as debit card, credit card and others.

Although there are many benefits with cryptocurrencies, its adoption is weak (Yusof et al., 2018; Alaeddin & Altounjy, 2018; Lee et al., 2018; Ku-Mahamud et al., 2019). A strong cryptocurrency adoption can help Malaysian to explore, understand and uncover the potential benefits from blockchain technology. The Malaysian Ministry of Science, Technology and Innovation (MOSTI) argued that Malaysia might fall behind the blockchain technology competition to due to lack of understanding and adoption of this technology (MIMOS Berhad, 2017). This prevents Malaysia from achieving the Shared Prosperity Vision 2030 released by the Malaysia Government. One of the key focus in Shared Prosperity Vision 2030 (Malay: Wawasan Kemakmuran bersama, 2030) includes growing the digital economy, Fourth Industrial Revolution (IR4.0) technologies such as IoT, Big Data and blockchain technology which is outlined in the National Entrepreneurship Policy 2030 (Sharon, 2019). Therefore, this paper investigates the determinants of cryptocurrency adoption of the consumers in Penang and consumer's consciousness towards this technology. This helps to uncover and understand Malaysian's perception towards the technology and helps increase the adoption rate.

RESEARCH OBJECTIVES AND RESEARCH QUESTIONS

The study attempts to answer the few questions below:

    i.   Is there a significant relationship between the Awareness and consumer's acceptance of cryptocurrency?
    ii.   Is there a significant relationship between the Perceived Ease of Use and consumer's acceptance of cryptocurrency?
    iii.   Is there a significant relationship between the Perceived Usefulness and consumer's acceptance of cryptocurrency?
    iv.   Is there a significant relationship between Perceived Trust and consumer's acceptance of cryptocurrency?

Research Objectives

In this research, the key objective is to identify the significant determinants, which influence consumer's intention to use cryptocurrency as payment method in Penang, Malaysia. Objectives of this research are:

    (a) To study whether Awareness has significant relationship with consumer's acceptance to use cryptocurrency.

(b) To study whether Perceived Ease of Use has significant relationship with consumer's acceptance to use cryptocurrency.

(c) To study whether Perceived Usefulness has significant relationship with consumer's acceptance to use cryptocurrency.

(d) To study whether Perceived Trust has significant relationship with consumer's acceptance to use cryptocurrency.

LITERATURE REVIEW

Cryptocurrency

Wiatr (2014) defined cryptocurrency as:

> A modern digital medium of exchange which is a new decentralized, limited and peer-to-peer payment system. Most of the cryptocurrency created introduces new unit of currency which the total amount is limited and uses cryptography to control and transfer.

Ametrano (2014) states that cryptocurrency:

> Can be transferred instantly and securely between any two parties through Internet and cryptographic security without the need of a trusted third party and the value is not backed by any government or organization.

Summarizing from the definitions, there are four main components of cryptocurrency. Firstly, cryptocurrency works through a decentralized network, thus it is free from any external regulation. Secondly, it has a strong Peer-to-Peer approach, which guarantees direct money transaction between the two parties regardless of Business-To-Business (B2B), or BUSINESS-TO-CONSUMER (B2C) or Consumer-To-Consumer (C2C). Thirdly, cryptocurrency uses public Internet, which provides speed, flexibility and efficiency. Finally, it uses public-key cryptography during the money transactions, which enables it to be as secure as possible.

The system behind cryptocurrencies such as Bitcoin ensures some pivotal characteristics of the network of (fiat) currencies. Firstly, cryptocurrencies are scarcity to keep inflation low. For example, bitcoins are limited to 21 million only (Papp, 2014). Secondly, the security of cryptocurrency is high. For example, Bitcoin adheres to the highest security standards of public and private keys (Bayern, 2014). Once a person registers as a Bitcoin user, they get a digital wallet Identification Number (ID) represented publicly. Third is simplicity. Bitcoin transactions are easy, as it only requires the Bitcoin app with the required Bitcoin amount. The transfer only takes a few minutes regardless of geographical distance. Since the introduction of the first cryptocurrency Bitcoin in 2009, there is a rise in the number of new cryptocurrencies with different capabilities (Vigna, 2015; Dinu, 2014; Liang et al., 2018).

Historical Development of Cryptocurrency

Money had evolved across time as our technology improves. In 2008, a white paper was distributed through metzdowd.com, an electronic mailing list that tracks developments in cryptography by an entity named Satoshi Nakamoto (Nakamoto, 2009; Singh & Singh, 2018). The nine-page summary of open source entitled "Bitcoin: A Peer-to-Peer Electronic Cash System" which is an electronic currency system managed by community rocked the cryptography world. Other attempts to produce an electronic, blind signature transaction system failed as it lacked

security required for a payment system (Chaum, 1983). Conversely, Nakamoto stated that two willing parties who wish to transact directly with each other only needs an electronic payment system based on cryptographic proof instead of a trusted third party (Nakamoto, 2009).

There are three generations of cryptocurrency, the first generation, the second generation and the third generation (Spurjeon, 2018). The first-generation cryptocurrency represents the peer-to-peer accounting system to enable transaction without the need of any centralized third party such as bank. However, it has scalability problems, as the blocks in the blockchain are limited to one-megabyte size. The second generation was enhanced with some programming language for smart contracts, smaller transactions and higher security with lesser scalability problems. The third generations are the newest cryptocurrencies, which focuses on governance, improved scalability, and improve interoperability and interacts with other cryptocurrencies allowing higher usability for merchants and consumers.

In Malaysia, some companies such as Success Resources Ltd created a digital currency payment ecosystem such as Unihash to increase interoperatibility and ensure merchants are able to use cryptocurrencies to perform payment for the products and services (Unigram, 2018). These ecosystem helps to build up the merchant's participation in accepting cryptocurrency as a payment method by ensuring merchants can liquidate their cryptocurrencies conveniently. Unigram is a stable cryptocurrency built on Unihash blockchain complementing those weaknesses observed in Bitcoin. Unigram is pegged at $1 USD per coin and the value does not fluctuate as it is back by low volatility assets such as government bonds and liquid cash (Unigram, 2018). Thus, it does not fluctuate in exchange to fiat currency like Bitcoin. Today Unigram is being used by many merchants in both product and services field. For example, Humble Beginings Cake shop in Queensbay Mall, Eton Hotel in Penang, Car Tinting Shop Safz Auto Sdn. Bhd., Kimochi Hair Studio, Petronas Perol Station in Jalan Changkat Jong, Puchong Herbs & Foods store market, GC Furniture Concept Sdn Bhd, and even hawker stalls.

Anatomy of Cryptocurrency and Blockchain Technology

A cryptocurrency is a digital currency termed as virtual currency that uses cryptography for security (Singh & Singh 2018). It is digital money, secured, and anonymous in many cases by decentralising it. Cryptography is a process, which converts legible information into an almost uncrackable code for purchase and transfer purposes. Bitcoin is the cryptocurrency created by Nakamoto, which uses blockchain technology to address decentralization and security (Nakamoto 2009). Blockchain technology utilised in the cryptography process to record and verify each of the Bitcoin's public transaction record (Darlington & James, 2014).

The transactions information includes purchaser ID, recipient ID and the amount of transaction. These users' ID is randomly generated series of numbers and letters and each user can have multiple IDs linking to the same wallet. An example of an ID is 1Pejb8fQU97JaSCEiD4MJh72UwtBU" (Darlington & James, 2014). With blockchain technology, each Bitcoin transaction are pseudo-anonymous even though the transactions can be traced back using proper computing equipment. Every few minutes the transactions on the Bitcoin network compiled into a "block". The signatures from previous blocks are included in this block and recorded in the block chain.

The blocks form the basis of the blockchain technology ensure that users do not double spend their money (Darlington & James, 2014). Whenever a block is formed, it will be broadcast to Bitcoin users who are called miners. The miners will perform a complex algorithmic computation called 'hashing' on the block. When the computation results a number smaller than the 'difficulty' a public target number adjusted based on the number of miners on the network and the user will broadcast the solution to the network. A valid solution where all transaction in the block

corroborated by other miners' blocks will enable the block to be passed and broadcasted as a new block. This new block incorporates the old block's signature, creating a seamless record of accurate transactions. A variable number of new Bitcoin awarded to the correctly solved block (Nakamoto, 2009).

With the decentralized concept, transactions through cryptocurrency are cheaper compared to traditional online payment mechanisms (Singh & Singh, 2018). These cryptocurrencies such as Bitcoin are completely virtual coins designed to be self-contained thus it does not require bank to more or store money. As it is not physical, only the balances kept in a public wallet in the cloud and the transactions verified through the massive computing power as explained above. This personal database can be stored in a computer drive, on smart phone or anywhere in a cloud and transferred from one personal wallet to another with ease. Yussof & Al-Harthy (2018) noted that cryptocurrency is not produced by minting money in an unlimited supply and its's supply of 'money' is controlled through a virtual 'mining' process and this makes it more valuable.

Technology Acceptance Model (TAM)

There are many theories that explain the acceptance of Information Technology (Oliveira & Martins, 2011). Some of the commonly used theories include the Theory of Planned Behavior (TPB) (Ajzen, 1985; Ajzen, 1991), the Technology Acceptance Model (TAM) (Davis, 1986; Davis, 1989; Davis et al., 1989), the Diffusion of Innovation (DOI) (Rogers, 1995) and UTAUT (Venkatesh et al., 2003). For the context of Malaysia, UTAUT are commonly used to help apply the technology acceptance of cloud computing adoption among manufacturing (Ooi et al., 2018). For this study, the TAM model underpins this research to analyze the components influence consumer's adoption of cryptocurrency.

TAM is an influential extension theory originated from the Theory of Reasoned Action (TRA) by Ajzen (1985). It models the decision-making process on whether consumers will or will not adopt and implement a new technology. Davis, et al., (1986) introduced TAM modeling the user's adoption of information system. Originating from TRA, TAM proposed that there are two key beliefs for individual's acceptance and usage of a technology, which are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Usefulness (PU) refers to the degree of the users believing that a technology can enhance his or her job performance and Perceived Ease of Use (PEOU) is perceived as the degree to which users believe the technology will be free from effort (Davis, 1989). There is an extensive literature, which examine and supports Perceived Ease of Use and Perceived Usefulness's relationship (Al-Gahtani & King, 1999; Horton et al., 2001; Venkatesh & Davis, 1996; Lee et al., 2003).

Perceived Ease of Use is shown to impact on Perceived Usefulness and a user's Behavioral Intention (BI), both directly and indirectly (Davis et al., 1989). Szaja (1994) concluded that Perceived Usefulness has a more relevant direct effect with Perceived Ease of use and the indirect effect between both as being less important. Researches (see Agarwal & Prasad, 1999); Hu et al., 1999; Taylor & Todd, 1995) supported that Perceived Usefulness is a strong determinant towards usage Behavior and User Acceptance. However, some results were inconsistent (Ma & Liu, 2004). In the study, a meta-analysis was performed to synthesize the empirical evidence based on 26 selected empirical studies. The relationships in TAM model was examined in a larger sample size which is not achievable in the traditional empirical study. The strength of the relationship between technology acceptance, perceived usefulness and perceived ease of use measured. Ma & Liu (2004) concluded the ease of use, acceptance is weak, and the significance does not pass the fail-safe test. Few academic researches utilized TAM as the theoretical framework for the Malaysia context, and this presents a theoretical gap for this paper.

There are more advance models like TAM 2, UTAUT and UTAUT2 with additional assessment criteria. TAM 2 is an extended version of the original TAM model by Venkatesh & Davis (2000) to explain usage intention and perceived usefulness in terms of social influence and cognitive instrumental process. According to Venkatesh, et al., (2003); social influence is the extent to which others trust one should utilize the new framework. The degrees to which a person listens to the opinions of others who are significant to him or her are the indicator of social influence and subjective standard (Jackson et al., 2013). Venkatesh & Davis (1996) shared that the resourceful information framework perception heavily influenced by the user's mindset and awareness of new technology and information system in social influence. Thus, if customers are unwilling to be aware of innovation and information framework, it is unable to transfer full favorable circumstances to the association. Venkatesh, et al., (2003) further improved the UTAUT to Unified Theory of Acceptance and use of Technology 2 by integrating three further variables. For UTAUT2 model, Raman & Don (2013) shared that the moderator of the constructs is the individual differences such as income. The variables include Facilitating Condition, Trust, Perceived Risk, Hedonic Motivation, Price Value and Habit. Thus, there are seven key determinants in UTAUT2 which affect acknowledgement and six moderating factors which show individual differences (Wahl 2016).

Cryptocurrency is still infancy in Malaysia and therefore it is crucial to select a simpler model to ensure adequate and accurate data collected for study. Selecting newer models with additional assessment criteria may be too complex for respondents. TAM model with the additional Awareness and Perceived Trust is deployed for this research design (Gibbs & Yordchim, 2014; Schuh & Shy, 2016; Shahzad et al., 2018; Ku-Mahamud et al., 2019). As TAM has been proven to analyze nascent technologies, it will be selected as the theoretical framework for analyzing the adoption of cryptocurrency in Penang Malaysia.

Dependent Variable

Existing Cryptocurrency Acceptance

There are several researches performed that focuses on cryptocurrency's regulatory concerns as it affects the electronic transactions (Plassaras, 2013; Baur, 2015; Zahudi & Taquiddin, 2016). Pakrou & Amir (2016)'s research which studied the factors affecting consumer's tendency to use Bitcoin concluded that culture have the largest impact among other variables in Iran. There are other researches performed to investigate the factors affecting the intention to using Bitcoin using the Technology Acceptance Model (TAM) framework in United States (Folkinshteyn & Lennon, 2016), Saudi Arabia (Alaklabi & Kang, 2018), and Indonesia (Kumpajaya & Dhewanto, 2015).

Based on Baur, et al., (2015) research in Berlin (Germany), all the 13 individuals which were interviewed through inductive exploratory interview agrees that Bitcoin have future potential as payment method. The study consider perceived ease of use is low and mix responds on the perceived usefulness. According to Schuh & Shy (2016)'s study on Bitcoin's acceptance, Awareness and Intention to use are correlated with various demographic and economic characteristics of consumer. However, their findings are such that the adoption of cryptocurrency is low although about half of U.S consumers had heard of Bitcoin by the end of 2015. As they are unfamiliar, they struggle to answer the survey questions accurately.

Based on Shahzad, et al., (2018)'s study, they proposed additional Awareness and Perceived Trust for their study. They had concluded that Awareness, Perceived Usefulness, Perceived Ease of Use and Perceived Trust to have significant positive association to consumer's acceptance of cryptocurrency among people of China. The study was conducted with sample size of 376 through

structured questionnaire. They also conclude that people of China are eager to adopt Bitcoin as mode of exchange given the opportunity they know well on the functions and usage of Bitcoin with ultimate trust level.

Alaklabi & Kang (2018)'s study on the adoption of Bitcoin presented the potential use of blockchain technology. They distributed their questionnaire to people living in Saudi Arabia. Their findings concluded that individual behavioral intention to adopt blockchain is predicted by Perceived Innovativeness, Perceived Value and Perceived Risk. In Indonesia, Taufiq, et al., (2014) studied the blockchain and cryptocurrency adoption specifically for the banking industry. They proposed nine variables (Usefulness, Risk Perception, Behavior Intention to Use, Ease to Use, Attitude Toward, Cognitive Style, Transaction Fee, Subjective Norm and Effectiveness). The findings showed that Ease to Use, Privacy, Efficient is perceived as key factors and a competitive advantage for banking industry in Indonesia in the adoption of cryptocurrency technology.

There are a few researches conducted based on the Malaysia context. Yusof, et al., (2018) conducted a study on factors influencing blockchain technology adoption for the context of Malaysia Banking industry. The study proposed Performance Expectancy (PE), Effort Expectancy, Social Influence, and Facilitating Conditions. They concluded that all determinants except Effort Expectancy play dominant role in influencing blockchain adaptation. Alaeddin & Altounjy (2018) studied on the factors affecting Generation Z into adopting cryptocurrency. They also detected a significant impact of awareness and perceived trust towards the intention to use cryptocurrency besides customer's satisfaction. Their study highlighted the importance of high trust level is main predictor and heavily influenced acceptance due to lacking government regulatory.

Lee, et al., (2018) studied the relationship between behavioral intention to use Bitcoin in Malaysia using key determinants of UTAUT2 and Trust. 250 sets of self-administered survey questionnaires were distributed through snowball sampling technique and they concluded that Performance Expectancy, Price Value, Hedonic and Trust have a significant positive relationship towards the intention to use Bitcoin. Lee, et al., (2018)'s research to study the behavior intention to use bitcoin in Malaysia concluded the importance of Trust.

This finding is also supported by Chan, et al., (2018)'s study. They observed that the acceptance of cryptocurrency among residents of Ipoh, Malaysia is significantly influenced by six variables which are Performance Expectancy, Social Influence, Price Value, Trust, Perceived Risk, Effort Expectancy and Facilitating Condition. As these researches were conducted before Malaysia government's new regulation, thus it is a good opportunity to revisit this as the behavioral intention may change over time.

Independent Variables

Awareness

Awareness towards a technology and the benefits is a main factor in technology diffusion (Hall & Khan, 2003). In the adoption of innovative technology, awareness helps to provide information about the transformation and the specific purpose of the implementation (Aloudat et al., 2014). Awareness is one of the key factors in understanding the various aspects of technology and the advantages. Dinev & Hu (2007) also shared similar understanding whereby a complete and conceptual awareness regarding a certain technology can help in changing an individual's decision towards cryptocurrency adoption. Baker (1994); Krishnaraju, et al., (2016); Krishnan, et al., (2017)'s study which tried to prove this concluded that the low awareness creates a challenge for an efficient technology adoption.

Bitcoin is a product of financial system's innovation which is assumed to be used as a digital currency globally. Adoption usually starts in the process of recognizing the need to change or innovate which results in the efforts for searching the solution (Mendel et al., 2008). This process then continues to the intention to adopt such solution to finally deciding whether the solution will be executed or not. This theory suggests that before having any intention and actual adoption, the expected users need to be aware of the existence of that innovation. Wisdom et al., (2014)'s research showed that in the theoretical frameworks related to individual characteristics, awareness of innovation is positively correlation to pre-adoption. His findings support that user's awareness will influence technology or innovation adoption. Gibbs & Yordchim (2014)'s research in examining the factors which influence Bitcoin's value success in Thailand concluded that awareness and knowledge regarding cryptocurrency is one of the main factors besides the usefulness of cryptocurrency. A research by Polasik, et al., (2015) examined the bitcoin adoption and price formation by surveying on merchants who already adopted cryptocurrency globally. The research was performed through modeling on the share of sales paid using alternative currency and ordinary currency and concluded that consumer's knowledge regarding cryptocurrency are one of the significant determinants in the success of cryptocurrency.

Mthethwa (2016) research on blockchain technology and challenges that hampered the adoption also found that a lack of awareness regarding the blockchain technology contributed to the lower adoption rates. Similar findings are observed on other Asia countries as well. Shahzard, et al., (2018)'s study in China showed that awareness has a positive association with the intention to use Bitcoin among people in Mainland China. In addition, Doblas (2019)'s study on cryptocurrency adoption among college students in Philippines concluded that awareness is significant (p=0.082) at 0.10 significance level. However, Schuh & Shy (2016)'s study which aims to discover the consumer payment preference in Boston concluded that there are different correlations between consumer's awareness, adoption and usage. The different correlations are categorized by different demographic and economic characteristics. A consistent and significant correlation with payee's choice was observed in consumers who had adopted more payment instruments compared to consumers who adopted lesser payment instruments. The findings showed that bitcoin owners are typically more likely to be a non-white male with lower education, young, expecting to obtain profit from bitcoin and have responsibility for household shopping.

Thus, most of the prior research presented that Awareness would significantly affect customer's behaviour towards adopting cryptocurrency. It is hypothesized that Awareness had significant and positive relationship with consumer's acceptance towards cryptocurrencies.

Perceived Ease of Use

Davis, et al., (1989) interpreted Perceived Ease of Use as the degree a person believes that using a system would be physically and mentally effort free. The degree of ease on using a certain technology will influence consumer's intention to use a new technology had been conducted and proven to show positive relationships in different fields such as healthcare (Gao et al., 2015), mobile technology (Hew et al., 2015) and mobile banking industry (Alalwan et al., 2017). Baur (2015)'s literature findings show that using cryptocurrencies such as Bitcoin is easy. The transferring of Bitcoin is easy as it only requires the Bitcoin app with the required Bitcoin amount. The transfer only takes a few minutes regardless of geographical distance. However, his research findings concluded that consumers found Bitcoin and mobile wallet to be difficult to use although one of his interviewees regarded Bitcoin as self-explanatory and easy. These findings are similar to Spenkelink (2014) where consumers focus on convenience especially at offline stores (POS). Through this, cryptocurrencies such as Bitcoin will gain higher acceptance and users may start to like to use it if consumers perceive it as easy to use. Similar findings were found in Wood et al.

(2017)'s study which integrated both Technology Acceptance model (TAM) and Innovation Diffusion Theory (IDT) to examine factors associated to adopt bitcoin as payment method. The study which surveyed 121 participants of cryptocurrency worldwide showed that perceived ease of use has significant positive effect on consumer's intention to use Bitcoin.

However, Janssen, et al., (2015); Lee, et al., (2018) has differing views regarding Perceived Ease of Use. Janssen, et al., (2015)'s study in examining cryptocurrency as a promising payment method shared different results. In the interview with 13 consumers, most of the stakeholders considered perceived ease of use as low and not a key factor. In the study conducted by Lee, et al., (2018); it is observed that there is no relationship between the effort to use and behavioral intention to use Bitcoin. They concluded that the ease of using Bitcoin does not affect individual's behavior intention to use Bitcoin.

The Perceived Ease of use is also being influence by the age of consumers. Younger generations are more receptive to new technologies and easily get along with them (Alaeddin & Altounjy, 2018). Their study showed that having higher technology awareness reflects better supportability towards cryptocurrency compared to old generation whom reported to be less educated in terms of new technology. Due to the highly technical technology background of blockchain underneath cryptocurrency, the higher level of technological awareness is assumed to be important for cryptocurrency adoption. Thus, the literature review on the variable Perceived Ease of Use shows an inconsistent result. Based on TAM's model, Perceived Ease of Use would have significant positive influence on consumer's acceptance of cryptocurrencies.

Perceived Usefulness

Davis, et al., (1989) defined Perceived Usefulness (PU) as the degree a person believes that a technology will improve his or her job performance. Usefulness is commonly mentioned as an enabler that influences individual's intention into adopting a technology (Mingxing et al., 2014). This assessment was repeated by Hsu & Lin (2015); Pham & Ho (2015); who focused on the benefits one can obtain and how useful the technology is to individuals. Bourgeois (2010), Anderson & Wegdell (2015) supported the argument that cryptocurrencies such as Bitcoin has a significant beneficial future and become a great threat to credit card companies. Grinberg (2011) supports this argument as Bitcoin have the potential to be a new revolutionary payment method for micropayments as usually credit card companies are unable to profit from small amount transactions. Gibbs & Yordchim (2014); Alalwan, et al., (2018); Baabdullah (2018) suggested that there is a strong influence on usefulness in Behavioral Intention (BI). Thus, consumer's expectation for a higher PU in cryptocurrency could potentially increase their behavioral intention to use it.

Crosby, et al., (2016) believes that blockchain technology is not a threat to the traditional business models in the financial segment. The world's banks are also looking for opportunities by studying innovative blockchain applications. Yussof & Al-Harthy (2018) mentioned that conventional money functions as a medium of exchange, legal tender for debt repayment, standard of value, accounting measure's unit and a means of purchasing power. Although cryptocurrencies such as Bitcoin may not possess these characteristics money, the scarcity value, anonymity or pseudonymity, transparency, and autonomy from the government, make it attractive to users. They also shared that cryptocurrency is not produced by minting money in an unlimited supply and the supply of "money" is controlled through a virtual "mining" process and this makes it more useful and valuable unlike "fiat" money. "Fiat" money's supply is controlled by the central banks such as Bank Negara Malaysia.

However, Bohr & Bashir (2014); Antonopoulos (2015) argues that it will only be limited to specific fields. Böhme, et al., (2015) also argues on the point whether Bitcoin is useful, and the design meets the requirements to replace credit card payments on the security standard for everyday

consumer. They explained that Bitcoin needs to achieve overall reliance in value offer and user adoption first. Spenkelink (2014) also concluded that the future of cryptocurrencies is still unclear in overall as many different stakeholders' requirement prevails with different usage scenarios. This burdens the Bitcoin's mass adoption to consumer. In addition, perceived usefulness among consumers also showed a fluctuating result in Janssen, et al., (2015)'s research in examining cryptocurrency as a payment method. This indicates that there are still uncertainties regarding the usefulness of cryptocurrency among certain consumers and whether it can be widely adopted.

Across the seventeen literatures reviewed above, it can be observed that the Perceive Usefulness appears to be inconsistent. According to TAM, it is hypothesized that Perceived Usefulness would have significant impact on consumer's acceptance of cryptocurrencies.

Perceived Trust

Davis, et al., (1989) conducted a study for Fintech service adoption among industrial engineers in Taiwan. It was found that if the Fintech enterprise provided a safe and secure transaction system, it creates a high level of trust for Fintech service and eventually will boost customer's positive attitude in using Fintech service. Bayern (2014) also conducted a study on how the trust disposition of individuals will set the expectation towards trustworthiness and defined Trust as a situation where a person is dependent on another party in an uncomfortable and risky situation. First-hand personal and positive experience is important in building up disposition of trust towards technology adoption.

Mayer, et al., (1995) defined Perceived Trust as one's willingness to obey and believe in other party's action with the expectation that the action will be beneficial to them. Gutscher (2007)'s trust model attempts to conceptualize trust for decentralized systems in cryptocurrency. He integrates public key authenticity verification into the trust model to evaluate arbitrary trust structures which allow multiple keys per user. Besides that, it enables the signer to define the sematic of trust and enables the signer of trust certificate to limit the length of the trust chains. Gefen, et al., (2008)'s study also concluded when users are deciding to use a new technology, trust is being considered due to the limited knowledge on blockchain technology. Zarifis, et al., (2014) conducted a research on the digital currency's trust by extending the trust theories from e-commerce to include cryptocurrency. The research focuses on validating the proposed cryptocurrency trust models among consumers when carrying out ecommerce transactions using cryptocurrency. The outcome of the study supports the validity on the reputation of cryptocurrency and rate of adoption as part of situational normality. There is positive influenced trust on participants which understood the cryptocurrency's technological innovation compared to participants which were less clear about it. Zamani & Babatsikos (2017)'s research which studied on the Bitcoin usage in light of financial crisis also recommended on further investigating on the consumer's trust. Alaeddin & Altounjy (2018)'s study also supports the importance of high level of trust in cryptocurrency adoption due to lack of government regulatory. Ku-Mahamud, et al., (2019)'s research which surveyed 304 respondents in Malaysia regarding the trust factor demonstrate that majority of the respondents are confident and trust cryptocurrency. The respondent feedback that it is because the blockchain technology provides secure traceability and transparency for all transaction with no alteration or deletion.

Conversely, Sas & Khairruddin (2017); Gutscher (2007)'s study fails to address trust from the sole perspective of user in decentralized systems as Bitcoin is a grassroots driven technology that involves multiple stakeholders. The transactions between two parties is known to all users (Kbilashvili, 2018) and once bitcoins are transferred, it is recorded in the publicly viewable blockchain (Bayern, 2014). Lee, et al., (2018) defined Trust as the extent which the users believe in

the integrity, capability and benevolence of cryptocurrencies when engaging in online transactions. Their study concludes that some of the trust concerns from the users include whether their personal details and transactions are secured and confidential to third party. Eyal & Sirer (2014) who researched on Bitcoin's social trust between the Bitcoin miners also shared different view. Today, Bitcoin's decentralized system is maintained by a group of anonymous miners who decrypt each block and the reward structure with incentivize miners includes the collection of Bitcoins. Eyal & Sirer (2014)'s work concluded that there may be miners who circumvent to the Bitcoin protocol and mine selfishly at the cost of honest miners, creating a trust issue between the same stakeholder category. Hence, majority of the research presented that Perceived Trust would significantly affect customer's behavior towards adopting cryptocurrency. It is hypothesized that Perceived Trust had significant and positive relationship with consumer's acceptance towards cryptocurrencies.

Hypotheses Development

This research embarks on the goal to investigate the determinants of cryptocurrency acceptance among consumers in Penang, Malaysia. The following hypothesis is formulated to closely examine the questions under investigation.

H1: Awareness has significant relationship with Consumers' Acceptance of cryptocurrency as payment method.
H2: Perceived Ease of Use has significant relationship with Consumers' Acceptance of Cryptocurrency as payment method.
H3: Perceived Usefulness has significant relationship with Consumers' Acceptance of Cryptocurrency as payment method.
H4: Perceived Trust has significant relationship with Consumers' acceptance of Cryptocurrency as payment method.

Research Methodology

Target Population and Unit of Analysis

As cryptocurrencies are based on blockchain technologies, technological knowledge is required to have a basic understanding on it. Thus, the targeted population and unit of analysis for this research will focus on consumers who are credit card holders and uses e-wallet mobile payments in Penang, Malaysia. E-wallet payment is also an electronic mobile payment which is cashless and similar to cryptocurrency (Zukarnain et al., 2019). In addition, Penang's Chief Minister is promoting cashless society by encouraging e-wallet payments to the hawkers and wet markets as well (Mok, 2020). Thus, Penang consumers represent a group of consumers that may have knowledge towards electronic mobile payment technologies given that it is one of the developed cities in Malaysia with high level of development. This is to ensure the respondents would have the minimum required knowledge. There were studies conducted which justified the selection of highly educated sample to help ensure the collected data meets the research purpose (Hastings et al., 2013; Lin et al., 2016; Stolper & Walter, 2017).

Sample Size and Sampling Technique

Sample size should be more than 200 to avoid non-convergence and inappropriate solutions happening under normal and non-normal circumstances. As proposed by Garver & Mentzer (1999) and supported by Sekaran (2013), the sample size for this research will be at least 200 to ensure it is

effective. Two commonly used sampling techniques are probability and non-probability techniques (Zikmund et al., 2013). Non-probability purposive sampling will be applied in this research as it helps to locate the correct individuals to provide data with better accuracy (Cooper & Schindler, 2014).

Measuring Instruments

Self-administered questionnaire is used as the measuring instrument to study the determinants of cryptocurrency adoption in Penang, Malaysia. Self-administered questionnaires are questionnaires which respondent can complete by themselves without existence of interview or assistance (Aaker et al., 2007). According to Park (2006); survey questionnaire enables generalization of the entire population, facilitates qualitative analysis and is suitable for social attitudes and economic decision studies. Thus, survey questionnaire will be used for this research.

A survey form will be planned and designed based on the research objectives. Once the questionnaire is finalized, it will be distributed online to the respondents using Google Forms. Google Forms is selected as the data collection will be faster, cost-friendly and convenient to be shared through emails and social media apps. Besides that, the questionnaire will also be prepared in paper and distributed to the respondents. Respondents who will be answering the questionnaire online will need to be familiar with internet technology which helps to ensure respondents have certain level of understanding on internet technology and accessibility to internet. Their information will be safely protected.

FINDINGS AND ANALYSIS

Table 2 shows the results from Multiple Regression Analysis is used to evaluate the hypothesis in this research.

Table 2 MULTIPLE REGRESSION ANALYSIS					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-320	169		-1.887	0.061
AW	0.059	0.053	0.051	1.110	0.269
PEOU	0.060	0.066	0.054	902	0.368
PU	622	0.085	537	7.305	0.000
PT	0.365	0.073	0.323	5.014	0.000

Hypothesis 1 (H1): Awareness has significant relationship with Consumers' Acceptance of cryptocurrency as payment method.
Table 2 shows that the relationship between Awareness (AW) and Consumer's Acceptance (CA) is insignificant with β=0.051 and p=0.269. Thus, the null hypothesis is accepted with the rejection of Hypothesis 1.
Hypothesis 2 (H2): Perceived Ease of Use has significant relationship with Consumers' Acceptance of Cryptocurrency as payment method.
It can be observed that there is a insignificant relationship between PEOU and CA with and β=0.054 and p=0.368 which is p>0.05. Therefore, null hypothesis is accepted and Hypothesis 2 is rejected.
Hypothesis 3 (H3): Perceived Usefulness has significant relationship with Consumers' Acceptance of Cryptocurrency as payment method.

According to Table 2, the relationship between PU and CA is significant as the generated and β=0.0537 and p=0.000 which is p<0.05. Thus Hypothesis 3 is accepted with the rejection of null hypothesis.

Hypothesis 4 (H4): Perceived Trust has significant relationship with Consumers' acceptance of Cryptocurrency as payment method.

Table 2 shows that there is a significant relationship between PT and CA as obtained and β=0.0323 and p=0.000 which is p<0.05. Thus, the Hypothesis 4 is accepted, and the null hypothesis is rejected.

Key Findings

Subjects in this research are not completely novel to cryptocurrency. Among the subjects, 35% of them are also an active cryptocurrency user, which demonstrated a sufficient level of awareness and knowledge regarding cryptocurrency. Besides that, it is found out that many consumers have a high preference to use cryptocurrency as a mobile payment method for retail store, food and beverage store and movie ticket purchases. This indicates that the consumers had adopted the mode of using cashless mobile payment rather than using the physical cash payment. This might be due to the improvement on the communication technology which enables better information transfer among the consumers regarding cryptocurrency.

From Multiple Regression Analysis results, it is found that some of the independent variables and dependent variable is significant respectively. The findings showed that PU is a significant predictor of CA for cryptocurrency adoption. This finding is also consistent with the research studies conducted by Grinberg (2011); Crosby, et al., (2016); Yussof & Al-Harthy (2016); Alalwan, et al., (2018); Baabdullah (2018) which verified that PU is a significant factor to influence consumer' acceptance to use cryptocurrency as a mobile payment method. Besides PU, this research also presented PT another significant factor which influences the CA. This finding is aligned with the research studies carried out by Zarifis, et al., (2014); Zamani & Babatsikos (2017); Alaeddin & Altounjy (2018); Ku-Mahamud, et al., (2019). It can be observed that the standardized coefficient (β)) for PU (0.537) is much higher compared to PT (0.323). This indicates that PU is the most significant predictor to influence the CA followed by PT.

However, the AW and PEOU factors are proven to be insignificant predictors of CA. This finding is inconsistent with the findings from Gibbs & Yordchim (2014); Mthethwa (2016); Shahzard, et al., (2018); Doblas (2019) which showed that AW have a positive significant relationship with CA. Findings from Spenkelink (2014); Baur (2015); Alalwan, et al., (2017) regarding PEOU's relationship with CA is different compared to the finding from this study. Nevertheless, similar findings which showed PEOU have insignificant correlation with CA were presented by Lee, et al., (2019).

Since most respondents (65%) are not existing cryptocurrency user, it is assumable that majority of the respondent as potential users places high emphasis on the perceived usefulness and perceived trust before focusing on perceived ease of use. In short, the multiple regression reveals that the model is able to predict 81.1% of the variances in CA.

CONCLUSION

Findings from the study indicated the standardized coefficient (β) for Perceived Usefulness (PU) (0.537) is much higher compared to PT (0.323). These results indicates that PU is the most significant predictor to influence the Consumer Acceptance (CA) followed by Perceived Trust (PT). This observation portrays that the consumers in Malaysia places high emphasis on the usefulness of cryptocurrency and the ability of cryptocurrency to improve his or her task and performance. Usefulness is commonly mentioned as an enabler that influences individual's intention into

adopting a technology (Davis et al., 1989; Mingxing et al., 2014). The first-generation cryptocurrency such as Bitcoin represents the peer-to-peer accounting system to enable transaction without the need of any centralized third party such as bank while the second generation's cryptocurrency added intelligence into the technology which enables cryptocurrency to be used as smart contracts. Although the third generation's cryptocurrencies currently focus on governance, improved scalability and improve interoperability, the innovation should not halt there. The innovation and evolution of cryptocurrency to improve the execution of task for consumers should continue to evolve so that cryptocurrency is able to stay relevant to the future consumer's requirement.

In addition, PT is the next most significant predictor to influence CA after PU. Consumers in Malaysia place importance in one's willingness to obey and believe in other party's action with the expectation that the action will be beneficial to them. Thus, more focus should be placed on improving the consumer's trust on cryptocurrency. There are existing laws to govern and regulate the existing fiat currencies. However, cryptocurrency is a new technology which the previous regulation and governance may not be relevant anymore (Yussof et al., 2018). The evolution of electronic payment technology in the mobile payment area requires new assessment standards to ensure robustness and performance of cryptocurrency in terms of operation and application. The Initial Coin Offerings (ICO)s, merchants and Malaysian Security Commission (MSC) should pay equal focus to validate, qualify and regulate the new generation cryptocurrency based on the feedbacks from the future consumer prospects.

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