

Factors Influencing Cryptocurrency Adoption Among Individuals: A Systematic Literature Review

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Abstract

A cryptocurrency is a form of digital currency that acts as a medium of exchange. Although many people know about cryptocurrency, only a few are using it. The lack of wider adoption of cryptocurrency is likely to hamper its future growth. Therefore, it is essential to understand factors that shape cryptocurrency adoption decisions. Prior research suggests that existing cryptocurrency adoption studies are fragmented. Therefore, the purpose of this dissertation is to systematically review the existing literature and classify the factors examined in previous studies that influence cryptocurrency adoption using the Push-Pull-Mooring (PPM) framework. The push factors are closely associated with limitations or problems with conventional money or the current financial system, which encourages individuals to move into cryptocurrencies; pull factors are linked with the benefits of adopting cryptocurrency technology. The mooring factors either directly or indirectly hamper or facilitate an individual's decision towards cryptocurrency adoption. The result of this research is based on 26 journal and conference articles: the review identified three push, ten pull and five mooring factors with 53 different subfactors affecting cryptocurrency adoption. The results suggest that push factors influence people to move away from conventional money to cryptocurrencies. These factors include losing trust in the government, as well as insecurity with conventional money and financial institutions. In addition, the results showed that pull factors, such as the perceived ease of use, perceived usefulness and alternative investment methods, attract people into cryptocurrencies. Finally, this study identified that mooring factors, such as risks, negatively influence the pull factors and adoption of cryptocurrency, while social factors, technological factors and security, positively influence the pull factors. It is also noticed that mooring factors, such as individual factors, directly influence people's cryptocurrency adoption decisions.

This study has both theoretical and practical contributions to the field of technology acceptance in general and cryptocurrency acceptance in particular. From the theoretical perspective, it provides an organising framework based on PPM theory to classify the factors influencing cryptocurrency adoption. From the practical perspective, this study provides knowledge for cryptocurrency stakeholders, such as banks, exchanges and other businesses to develop strategies to encourage people to use cryptocurrencies and for governments to establish policies and support to promote cryptocurrency adoption, and for developers to improve the features of cryptocurrency platforms.

Table of Contents

Abstract	i
Table of Contents	ii
List of Figures	iv
List of Tables	v
Attestation of Authorship	vi
Acknowledgements.....	vii
Chapter 1: Introduction	1
Chapter 2: Literature Review and Research Model.....	5
2.1 Cryptocurrencies	5
2.2 Theoretical Foundations in Cryptocurrency Adoption Studies.....	6
2.3 Proposed Research Model	10
2.3.1 Push Factors.....	11
2.3.2 Pull Factors.....	11
2.3.3 Mooring Factors.....	12
Chapter 3: Methodology.....	14
Chapter 4: Findings	21
4.1 Push.....	23
4.1.1 Losing Trust in the Government and Financial Institutions	23
4.1.2 Insecurity of Conventional Money	24
4.1.3 Government Policies for Conventional Money.....	25
4.2 Pull.....	25
4.2.1 Perceived Ease of Use and Effort Expectancy.....	26
4.2.2 Perceived Usefulness, Perceived Benefits and Performance Expectancy.....	28
4.2.3 Alternative Banking System	30
4.2.4 Alternative Investment Method.....	30

4.2.5 Alternative Payment Method	31
4.2.6 High Transaction Speed	32
4.2.7 Low Transaction Fees.....	33
4.2.8 Trust	34
4.2.9 Anonymity.....	36
4.2.10 Controllability	37
4.3 Mooring.....	38
4.3.1 Risks.....	39
4.3.2 Security.....	42
4.3.3 Individual Factors.....	44
4.3.4 Social Factors	47
4.3.5 Technological Factors.....	48
Chapter 5: Discussion and Conclusions.....	50
5.1 Discussion.....	50
5.2 Conclusion	54
5.2.1 Theoretical Contributions	55
5.2.2 Practical Contributions	56
5.2.3 Limitations and Future Research	57
References	59
Appendix	78

List of Figures

Figure 1 Flowchart of article selection.....	17
Figure 2 A theoretical model to understand the factors influencing cryptocurrency adoption	22

List of Tables

Table 1 List of articles used in the analysis.....	18
Table 2 Push factors affecting cryptocurrency adoption.....	23
Table 3 Pull factors affecting cryptocurrency adoption.....	26
Table 4 Mooring factors affecting cryptocurrency adoption.....	38
Table 5 Categories, sub-categories, and open codes for the findings.....	78

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Chapter 1: Introduction

In the last few decades, there has been rapid technological advancement in the financial industry (Pikkarainen et al., 2004). Technological enhancements, such as peer-to-peer financing, mobile payments and digital banking in the financial industry, enable people to minimise the transaction time and cost while improving convenience, flexibility and financial coverage (Alqaryouti et al., 2020a). Along with this development, a new virtual currency known as cryptocurrency was invented as an alternative to conventional money, using cryptographic algorithms (Alqaryouti et al., 2020a). Aggarwal et al. (2019) defined cryptocurrency as a new digital currency based on cryptologic algorithms that can act as a medium of exchange or store of value. They are different from fiat money because they do not exist physically; instead, individual ownership of coins is recorded in a digital ledger in the form of a computerised database. To prevent entries from unauthorised modifications, they are protected with cryptography algorithms. Cryptocurrencies operate with an underlying distributed ledger called blockchain technology (Tinu, 2018). Bitcoin is considered the first successful cryptocurrency (Nakamoto, 2008). It was first published under Satoshi Nakamoto's alias in a white paper in 2008 (Murko & Vrhovec, 2019). It was created as a type of electronic cash that would allow people to transfer money from one person to another without an intermediary (Murko & Vrhovec, 2019). As of May 2021, Bitcoin is the most popular cryptocurrency, which amounts to a total market capitalisation of USD 941 billion at current market prices (Bonneau et al., 2015; CoinMarketCap, 2021). Other popular cryptocurrencies that have been exchanged between traders and consumers are Ethereum, Litecoin, Zcash and Ripple (Yeong et al., 2019).

Cryptocurrency technologies have gained significant attention in recent years (Hileman & Rauchs, 2017). In 2013, there were only 13 cryptocurrencies (White, 2015), and their market capital was USD 1.5 billion (Xie, 2019). In addition, cryptocurrency usage as a financial transaction was minimal, and only a few merchants supported trade using cryptocurrencies in the early days (Mario et al., 2019). Today, 9,835 cryptocurrency types operate worldwide, with a total market capitalisation of USD 2.19 trillion; ten times greater than New Zealand's GDP in 2020 (CoinMarketCap, 2021). Also, people can buy products or services from more than 100,000 businesses worldwide using Bitcoins in February 2015 (Mallqui & Fernandes,

2019), which includes Overstock.com eGifter, Newegg, Shopify, Dish, Roadway Moving Company, Microsoft and CheapAir e-commerce websites (Murko & Vrhovec, 2019). According to the World Economic Forum, the cryptocurrency market will grow at 62.1% until 2025, and by 2027, it will hold 10% of the world's GDP (Mario et al., 2019).

The growth of cryptocurrencies impacts individuals and businesses (Morkunas et al., 2019) and regulatory bodies (ElBaharawy et al., 2017). Cryptocurrencies provide individuals with an alternative fund transfer system. As a result, people can send or receive money quickly, inexpensively and easily (Abramova & Böhme, 2016; Khairuddin et al., 2016). Also, it provides businesses with a new payment gateway to collect customer payments (Baur et al., 2015). This new payment gateway enables customers to make international payments with better exchange rates (Sobhanifard & Sadatfarizani, 2019), quickly (Sas & Khairuddin, 2017) and with low transaction fees (Sas & Khairuddin, 2017).

Although the cryptocurrency market has grown significantly over the years, global regulators have different views and positions towards embracing crypto-monetary law as a legal tender payment method (Schaupp & Festa, 2018). Using cryptocurrency for illegal transactions, such as money laundering, drugs and arms smuggling is one of debatable argument. Countries like the United States, Germany, Russia and France are studying the invisible aspects of technology in order to establish a monetary policy (Corbet et al., 2019; Zulhuda & Binti Sayuti, 2017). In addition, the Malaysian and Chinese governments already formed a regulatory structure to oversee cryptocurrency-related activities (Yeong et al., 2019).

Several scholars have shown that it is essential to investigate factors that influence cryptocurrency adoption among individuals (ElBaharawy et al., 2017). However, according to Alzahrani and Daim (2019b), existing cryptocurrency adoption studies are fragmented. These studies used various theories to investigate cryptocurrency adoption and acceptance. Most studies focused on cryptocurrency acceptance (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a, 2020b; Arias-Oliva et al., 2021; Gil-Cordero et al., 2020; Hwang & Moon, 2019; Mendoza-Tello et al., 2019; Nadeem et al., 2020; Saif Almuraqab, 2020; Shin, 2008) as adoption decisions and other studies considered behavioural intention as a proxy for adoption decisions (Anser et al., 2020; Schaupp & Festa, 2018). In addition, some studies considered specific factors, such as trust, security and the risk associated with

cryptocurrency, as antecedents to adoption (Huang, 2019; Murko & Vrhovec, 2019; Sas & Khairuddin, 2017). For this reason, to develop a comprehensive understanding of factors influencing cryptocurrency adoption, it is important to analyse and synthesise those studies together. When the knowledge is already available in the area of research, systematic literature reviews offer researchers the opportunity to consolidate insights on existing knowledge and identify gaps in prior research (Paré et al., 2015). Therefore, the purpose of this dissertation is to systematically review the existing literature and classify the factors examined in previous studies that influence cryptocurrency adoption. Previous research such as Bansal et al. (2005) recommended a Push-Pull-Mooring (PPM) framework to understand consumers' switching behaviour in various IS contexts. Liu et al. (2021) and Gupta and Garg (2021) used the PPM framework to organise factors affecting technology adoption in the IS domain. Hence, this study will use the PPM framework to systematically organise factors that influence cryptocurrency adoption in previous studies.

The Push-Pull-Mooring (PPM) framework is one of the most commonly used frameworks to understand consumer adoption and migration in the field of information systems (Aries et al., 2020). For example, Aries et al. (2020) applied the PPM model to understand e-commerce adoption in small and medium enterprises. Handarkho and Harjoseputro (2019) and Fan et al. (2021) applied the model to investigate the intention to adopt mobile payment systems, while Xin and Run-Ze (2021) applied the model to study consumers' intention to adopt food traceability systems. The PPM framework was developed from human migration studies (Lewis, 1982) which were ultimately derived from "Laws of Migration" introduced in 1885 (Everett, 1966). This framework categorised the factors that influence an individual's adoption into three groups: push, pull, and mooring factors (Zhang et al., 2008). Push factors motivate individuals to move into an alternative option. These factors are closely related to the existing approach's limitations from the user's perspective (Nimako & Ntim, 2013), such as the instability of conventional money and banking systems. Bansal et al. (2005) described pull factors as positive features that attract individuals to an alternative option. In this study, the benefits of cryptocurrency, such as quick fund transfers, low transaction fees and high returns, are considered to be pull factors. Mooring factors are the individual, social, and technological factors that hamper or facilitate an individual's decision towards cryptocurrency adoption (Zhang et al., 2008); they positively or negatively affect the push and pull factors (Boyle et al., 2014). In addition, Fu (2011) and Zhang et al. (2008) described mooring factors as those that are not a drawback of current options or benefits of the alternative option; however, these factors do affect the individuals' decision to adopt a

technology. Therefore, in this study, mooring factors include both factors that positively or negatively affect push and pull factors, as well as other factors that are not associated with the benefits of an alternative technology or a drawback of the current technology. Risks, security and individual factors are a few examples of mooring factors in the context of cryptocurrency. Therefore, this study will use the PPM framework to organise factors examined in previous studies into the push, pull, and mooring factors that influence cryptocurrency adoption. The research questions are:

1. What are the push factors that influence an individual to adopt cryptocurrencies?
2. What are the pull factors that encourage an individual to adopt cryptocurrencies?
3. What are the mooring factors that influence an individual to adopt cryptocurrencies?

The rest of the dissertation was organised into five chapters. Chapter 2 presents an overview of the related literature, major theories used in cryptocurrency adoption studies and the proposed PPM framework. Chapter 3 presents the research methodology, which consists of data collection and the method for data analysis. Chapter 4 elaborates on the results of the findings. Finally, Chapter 5 presents the discussion and conclusions of the research findings followed by theoretical and practical implications, limitations and possibilities for future research.

Chapter 2: Literature Review and Research Model

The purpose of Chapter 2 is to provide a review of the related literature, major theories used in cryptocurrency adoption studies and to propose the PPM framework that was used to organise previous cryptocurrency studies.

2.1 Cryptocurrencies

The concept of digital currency is not entirely new, and its history runs back to three decades ago. David Chaum is the first person who came up with the digital currency concept in 1983 (Chaum, 1983). In his paper he discussed an alternative payment method to pay for goods and services. However, this idea was not used until the launch of Bitcoin as a decentralised cryptocurrency in 2009 (Nakamoto, 2008). A cryptocurrency is a form of digital currency which is based on cryptologic algorithms that can act as a medium of exchange or store of value (Aggarwal et al., 2019). In cryptocurrency technology, the ownership of the coins is recorded in a computerised database called a digital ledger. To prevent the entries in the ledger from unauthorised modifications, they are encrypted with robust cryptographic algorithms. One can broadly classify cryptocurrencies into two categories: 1) centralised direct regulation cryptocurrencies; and 2) decentralised indirect regulation of cryptocurrencies (Nabilou, 2019).

Centralised cryptocurrencies rely on monitoring and controlling regulation bodies such as central banks (Nabilou, 2019). These bodies are responsible for defining governing of policies, security requirements, transaction verification and settlement processors of the given cryptocurrency. From the central bank of Sweden (e-krona) and DCEP (Digital Currency Electronic Payment) from China's central bank are examples of centralised cryptocurrencies. Since the government already backs these cryptocurrencies, they do not necessarily require any additional recognition in the financial market. (Nabilou, 2019).

On the other hand, decentralised cryptocurrencies work on cryptographic protocols in a distributed network that allow users to mine, store or transfer coins (Chan et al., 2017;

Nakamoto, 2008). Decentralised cryptocurrencies operate in an open and fully distributed system, with no federal or state regulatory agency issuing or controlling them (Chan et al., 2017; Nakamoto, 2008). Decentralised cryptocurrencies rely upon blockchain technology to achieve this objective (Tinu, 2018). Blockchain is a list of records, called blocks, linked together using cryptographic hash to form a chain. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Since blocks are connected, it is impossible to alter the data in a block without altering all subsequent blocks (Nakamoto, 2008). Blockchain technology uses nodes to manage and maintain the distributed ledgers.

Researchers such as Nabilou (2019) highlighted two challenges associated with centralised cryptocurrencies. The main challenge is the Hayekian knowledge problem. The Hayekian knowledge problem refers to the government's belief that they have the necessary knowledge, skills, and resources to implement and maintain a decentralised cryptocurrency network. Another problem is regulatory arbitrage. Regulatory arbitrage is the process of moving activities from a strongly regulated financial market to an unregulated or flexible financial market with the objective of profit maximisation. Since the government controls both conventional money and centralised cryptocurrencies, there is no significant difference in economic benefits between both currencies. Due to the above limitations and challenges, decentralised cryptocurrencies are more popular than centralised cryptocurrencies (Nakamoto, 2008). Therefore, this study will focus on decentralised cryptocurrencies and factors that influence their adoption.

2.2 Theoretical Foundations in Cryptocurrency Adoption Studies

Previous research on cryptocurrency adoption mainly draws on technology acceptance or behavioural theories. These theories include Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis, 1989), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2012) and Theory of Planned Behavior (TPB) (Ajzen, 1991). Some studies used Human-Computer Interaction (HCI) theories on trust (Card et al., 1980), Innovation Decision Process Model (IDPM) and Innovation Diffusion Theory (IDT) (Rogers, 1995) to investigate a specific area of cryptocurrency adoption, such as trust, security and risk associated with cryptocurrency adoption (Huang, 2019; Murko & Vrhovec, 2019; Sas & Khairuddin, 2017).

TRA is one of the most widely used theoretical frameworks to evaluate an individual's technology adoption in the field of information systems (IS), mainly due to its simplicity (Ajzen, 1980). According to TRA, people's behaviour is determined by their attitudes and subjective norms (Fishbein & Ajzen, 1975). In the context of cryptocurrency, an 'attitude' refers to an individual's feelings towards a particular behaviour (belief about the cryptocurrency). These feelings regarding the behaviour can either be positive, negative or neutral. Fishbein and Ajzen (1975) define subjective norms as the perceptions of close individuals that affect an individual's behaviour. It is social pressure on an individual to perform or not perform the behaviour. Due to the simplicity of TRA, some studies, such as Sohaib et al. (2020) have used it in their study to investigate cryptocurrency adoption and usage.

However, Madden et al. (1992) argued that TRA is not suitable for explaining a person's behaviour when volitional control is involved. Ajzen (1991) has developed TPB by adding perceived behavioural control into TRA to address this limitation. TPB is another widely used theory to explain information systems adoption behaviours (Jokonya, 2017). According to this theory, a person's behavioural intentions are determined by their attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991). Perceived behavioural control (PBC) refers to a person's perception of how easy or difficult it is to accomplish a particular action (i.e., cryptocurrency adoption in this study). Some scholars used TPB to study factors that influence cryptocurrency adoption (Anser et al., 2020; Schaupp & Festa, 2018; Walton & Johnston, 2018). However, Jokonya (2017) argued that this theory is generic and cannot identify the specific beliefs associated with a particular behaviour; for example, beliefs about how significant technology is to an individual. For this reason, the Technology Acceptance Model (TAM) is a more appropriate model to study technology adoptions than TPB (Mathieson, 1991).

Technology Acceptance Model (TAM) was developed by Davis (1989), and it was derived from the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). Several researchers use TAM to study technology adoption and usage because it incorporates both social psychology and technology usage factors that affect adoption (Fusilier et al., 2008). Davis (1989) used two primary constructs in TAM: perceived usefulness (PU), originally defined

as the user's belief that the adoption of technology will improve their performance, and perceived ease of use (PEOU; this describes the user as believing that the use of a system is free from effort). TAM is considered to be an influential theoretical framework to explain IT/IS adoption (Lu et al., 2003) and has been successfully used in a significant number of studies to examine factors that influence cryptocurrency adoption (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a, 2020b; Baur et al., 2015; Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Nadeem et al., 2020; Roussou et al., 2019; Shin, 2008; Walton & Johnston, 2018). However, Roussou et al. (2019) criticised TAM because it ignores the social and external influence and difficulty of application for a large set of users where the use of technology was essential. Therefore, Venkatesh et al. (2000) enhanced TAM by incorporating subjective norms and then developing TAM2. Baur et al. (2015) used this model to study user adoption of Bitcoin. However, according to Legris et al. (2003), TAM2 can predict or explain 40% of the variance in technology adoption decisions. Therefore, Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and Acceptance of Technology (UTAUT) to address this limitation.

UTAUT is one of the popular technological acceptance models which is based on seven distinct technological acceptance variables further linked to four core categories. Venkatesh et al. (2003) described performance expectancy as "the degree to which individuals believe that using a system will help them improve their job performance" (p. 447); effort expectancy as "the degree of ease associated with the use of the system" (p. 450); social influence as "the degree of which peers and important people influence the use of the system" (p. 451); facilitating conditions as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (p. 453). According to Dwivedi et al. (2019), the UTAUT model explains more than 70% of all usage intention variance. For this reason, Hwang and Moon (2019), Arias-Oliva et al. (2021), and Saif Almuraqab (2020) have used the UTAUT model for their cryptocurrency adoption studies. However, according to Williams et al. (2015), this model views technology acceptance as the usage and does not measure actual usage, which is considered one of the most critical weaknesses in the UTAUT model.

Innovation Diffusion Theory (IDT) suggests that how an individual perceives phenomenon affects information technology usage (Rogers, 1995). This model is widely used to understand the influence of individuals' perceptions on technology adoption (Chen, 2014).

As Makovholo et al. (2017) explained, the innovation diffusion theory provides a robust foundation to understanding the aspects that influence the information system's innovation dissemination process. Yoo et al. (2020) used IDT with TPB to understand the Bitcoin transaction services adoption. However, Zanello et al. (2016) argue that this theory is not suitable to study all the innovations in the IS field.

Rogers (1995) also proposes an Innovation Decision Process (IDP) in which individuals go through their innovative knowledge to adopt new technology which is mainly based on perceptions of the technology. In IS research, innovativeness refers to the willingness of an individual to try new technology (Midgley & Dowling, 1978). Rogers has identified a five-factor process that shapes the diffusion of innovation: 1) relative advantage, 2) compatibility with existing values and practices, 3) complexity, 4) trialability, and 5) observability. Scholars used IDP to analyse user adoption in IS research (Machfud & Kartiwi, 2013). Roussou et al. (2019) used this model and TAM to investigate the commercial adoption of digital currencies. However, Moore and Benbasat (1991) argue that IDP does not target the acceptance of IS, and its constructs overlap with each other.

Human-Computer Interaction (HCI) is another highly cited and groundbreaking general theory that has been used in information and communication technology adoption studies (Viorres et al., 2007). Gunkel (2018) described HCI as an "innovative method for framing human-computer interactions by putting emphasis on the terms and conditions of the interactive relationship prior to determinations concerning the human subject and its computational object" (p. 11). HCI research is characterised by analysing human behaviour, cognitive processes and task structures faced by the user (Krukar et al., 2016). HCI models of trust were used to investigate the key factors impacting user's trust between people and technology (Corritore et al., 2003). According to this model, credibility, ease of use, risk and trust factors have an impact on the users' trust in technology. Sas and Khairuddin (2017) used this model to study Bitcoin users' experience and trust challenges in Malaysia.

Overall, most existing studies on the adoption of cryptocurrency among individuals use the TRA, TPB, TAM, UTAUT, DOI, IDP and HCI theoretical models (Ajzen, 1991; Card et al., 1980; Davis, 1989; Richard, 1977; Rogers, 1995; Venkatesh et al., 2012). These theories investigated different constructs, such as technological, behavioural, trust, risk, and security

issues that may influence cryptocurrency adoption. Since this study aims to comprehensively analyse the factors influencing cryptocurrency adoption, there is a need for an organising framework to synthesise those cryptocurrency adoption factors together. Bansal et al. (2005) proposed a PPM framework to understand the consumers' switching behaviour and it has been applied in various IS disciplines. Scholars used this framework for customer technology adoption or switching decision studies. For example, Liu et al. (2021) used this model to organise their findings to investigate the switching intention from free to paid question and answer services, and Gupta and Garg (2021) used this model to organise their findings to identify factors that enable a smooth transition to technology-enabled virtual teaching. Therefore, this study employs the push-pull-mooring (PPM) theoretical model to integrate the findings from previous cryptocurrency adoption studies in the literature.

2.3 Proposed Research Model

The Push-Pull-Mooring (PPM) framework is one of the most commonly used frameworks in technological adoption and migration studies (Aries et al., 2020). This theory is applied to investigate the adoption of several technologies, including e-commerce (Aries et al., 2020), mobile payment systems (Handarkho & Harjoseputro, 2019; Xin & Run-Ze, 2021), and traceability systems (Fan et al., 2021). These studies define individual switching behaviour as an underpinning strategy used to explain particular technology adoption in the given context (Aries et al., 2020; Fan et al., 2021; Handarkho & Harjoseputro, 2019; Xin & Run-Ze, 2021). Lei et al. (2017) define consumer switching as "consumer's voluntary decision to move from an existing incumbent option to a new option" (p. 101). It is a consumer transition from traditional services to new and innovative methods (Zhang et al., 2014). In IS research, consumer switching can be described as a consumer shifting from old services to new or an alternative technology (Shen et al., 2016). Liu et al. (2021) and Gupta and Garg (2021) used the PPM framework to logically organise findings in their studies. Therefore, this study uses the PPM framework to group contextualised factors (e.g., attitudes, ease of use, risks) based on various theoretical models used in previous studies into high-level factors (push, pull and mooring) that influence cryptocurrency adoption. According to the Push-Pull-Mooring (PPM) theory, factors that influence an individual's migration decisions can be categorised into three groups: push, pull, and mooring factors (Zhang et al., 2008).

2.3.1 Push Factors

Nimako and Ntim (2013) define push factors as those that motivate people to move into an alternative option. These factors are closely associated with the limitation of the current option from the user's perspective. In other words, these factors negatively affect people and push them to the new technology. Bansal et al. (2005) showed that dissatisfaction with the existing service leads consumers to switch to a new service provider. Several IS studies that apply PPM, classified dissatisfaction as a push factor (Bansal et al., 2005; Zhang et al., 2008). For example, Bansal et al. (2005) defined dissatisfaction with the existing service provider as a push factor to move into a new service provider. In addition, another study shows that trust influences a person's commitment to a long-term relationship (Sharma & Patterson, 2000). The trust issue with the existing relationship encourages individuals to migrate to alternative options (Richmond, 1988). For this reason, Bansal et al. (2005) used trust issues with the existing service provider as a push factor to move into a new service provider in their study.

2.3.2 Pull Factors

Pull factors are the positive features that attract an individual to an alternative option (Bansal et al., 2005). These factors may include the perceived benefits of the new alternative option. According to previous research on mobile payment system adoption, perceived enjoyment, convenience, and the perceived benefit were considered as pull factors (Handarkho & Harjoseputro, 2019). In their study, these factors encourage and attract customers to use mobile payment systems in a physical store rather than conventional money.

In some cases, peoples' desire to accept new technology is because of its expected enjoyment (Koenig-Lewis et al., 2015). Farivar et al. (2017) defined enjoyment in the context of information technology as the degree to which the usage of a given technology is seen to be enjoyable regardless of expected performance or consequences. A previous PPM study conducted by Handarkho and Harjoseputro (2019) considered the enjoyment of mobile payment as a pull factor.

Another important feature of payment systems is their capacity to provide a simple and convenient mode of transaction (Özkan et al., 2010). A good payment service, in particular, provides convenience not just during the transaction process but also before and after the purchase, guaranteeing that the consumer may complete their transaction quickly and with minimal effort (Özkan et al., 2010). Handarkho and Harjoseputro (2019) considered those features of the mobile payment system as pull factors in their PPM study.

Also, Handarkho and Harjoseputro (2019) defined the perceived benefit in an economic context as a pull factor because it attracts customers to new payment services. These economic benefits included discounts and financial rewards (Lichtenstein et al., 1995). When the new payment service delivers those values to the customers, the person's perception towards the technological service changes, and as a result, they tend to adopt the technology (Wang et al., 2019).

2.3.3 Mooring Factors

Boyle et al. (2014) define mooring factors as the factors that positively or negatively affect the push or pull factors. In addition, Fu (2011) and Zhang et al. (2008) considered the factors that are neither the limitation of the current option nor the benefit of the alternative option; however, it affects the individuals' decision to adopt a technology as mooring factors. These factors are mostly related to individual factors, social factors, technological capabilities and risks that facilitate or hamper the switching decision (Zhang et al., 2008). Although push and pull factors are strong, an individual may not switch to a new technology due to the mooring factors (Bansal et al., 2005).

According to Everett (1966), personal factors may facilitate or inhibit the switching decision. Individual's preferences are determined by their past switching habits and willingness to try new things (Lattin & McAlister, 1985). Jackson (1986) noted that while for a group of people pushing and pulling may appear the same, migration choices could vary because of their attitude toward migration. In addition, Ganesh et al. (2000) showed that an individual's behaviour has a moderating effect on the relationship between the expected benefit of the

new service and the switching behaviour from the existing service to the new service provider. For these reasons, a PPM study conducted by Bansal et al. (2005) considered personal factors as mooring factors and showed that they inhibit or facilitate push and pull factors.

Technological factors play a significant role in customer's adoption and usage in payment systems (Rong et al., 2021). Another PPM study conducted by Zixin et al. (2021) identified technological factors as mooring factors, either hampering or supporting the pull factors. In particular, they consider features, user interface, speed, platform, and security of the new mobile QR code payment system as technological factors. Putri et al. (2020) showed that those technological factors positively or negatively affect the pull factors that influence the switching intention to mobile payment systems.

Social factors also influence an individual's switching intention to a particular technological service (Latané, 1981). Social groups, public opinion, and subject norms are a few examples of social factors (Cheng et al., 2019). These factors encourage or discourage individuals' to switch to new technology (Fishbein & Ajzen, 1975; Venkatesh et al., 2000). For this reason, a previous PPM study conducted by Bansal et al. (2005) showed that social factors such as mooring factors, can either inhibit or facilitate push and pull factors.

Risks and trust were considered mooring factors in several PPM studies (Featherman & Pavlou, 2003; McCloskey, 2006). Featherman and Pavlou (2003) define risks as "uncertainty regarding possible negative consequences of using a product or service" (p. 453). It influences adoption decisions by creating feelings of uncertainty, discomfort and/or anxiety, conflict aroused in the consumer, concern, psychological discomfort (Featherman & Pavlou, 2003). Therefore, they are negatively affecting the pull factors. On the other hand, Lewicki and Wiethoff (2000) described trust as "the belief and willingness of an individual to act on the words, actions and decisions of another" (p. 87). It increases the level of comfort, confidence, and security that consumers have when using technologies (McCloskey, 2006). Hence, trust positively affects the pull factors.

Chapter 3: Methodology

This study aims to summarise prior research on cryptocurrency adoption to comprehensively identify the factors that shape it. As different adoption factors have been suggested in the cryptocurrency studies, the systematic literature review helps extract those factors and synthesise them into an organised framework (Paré et al., 2015). Therefore, the study adopted a systematic literature review as its research method to identify the factors influencing cryptocurrency adoption. Wright et al. (2007) explained that researchers must follow a specific process when conducting a systematic literature review. Therefore, this study follows a procedure for conducting systematic literature reviews from Paré et al. (2015).

According to Paré et al. (2015), the first step is to identify the research problem, which is to understand the push, pull, and mooring factors that influence an individual's cryptocurrency adoption. The second step was defining search criteria and identifying information sources for the research. This study followed Jane and Richard's (2002) structural approach to determine the study's source material, as they suggest that significant contributions to the body of knowledge are likely to be in the leading journals. Badawi and Jourdan (2020) involved ACM digital library, IEEE Explore, Scopus and Web of Science; four major databases for their cryptocurrency systematic literature of emerging threats and defensive mechanisms. Therefore, the same databases were selected and then searched for the articles in March 2021. As suggested by Kawaljeet Kaur et al. (2014) and Ismagilova et al. (2019), this study used a keyword search to search for articles. To do this the researcher used (("cryptocurrency" OR "cryptocurrencies" OR "digital currency" OR "digital money" OR "virtual money" OR "virtual currency" OR "virtual currencies" OR "Bitcoin" OR "cryptocurrency" OR "crypto-currencies" OR "coin mining" OR "Ethereum" OR "Litecoin" OR "XRP" OR "Tether") AND ("Adoption" OR "Acceptance" OR "Diffusion" OR "Usage" OR "Satisfaction" OR "Intention" OR "Use Behavior" OR "Use Behaviour")) search query which was developed by combining search terms similar to Badawi and Jourdan (2020) in their threats and defensive mechanisms of cryptocurrency, and Alkhowaiter (2020) in his digital payment and banking adoption systematic literature reviews. Following Jane and Richard (2002) suggestion, the forward and the backward search was performed to identify additional papers that are relevant to cryptocurrency adoption. The initial search results

returned 329 articles, as summarised in Figure 1. After removing duplicates, 267 unique articles remained in the initial pool.

Next, the collected articles were screened and then evaluated and filtered using inclusion and exclusion criteria in the third step. This study's inclusion criteria were English language research papers, empirical studies, literature reviews, case studies, conference papers and journal articles that have discussed cryptocurrency adoption factors. Exclusion criteria included non-English publications, book chapters, commercial publications and lectures. Studies that were not related to the research topic, articles that did not include individuals as a subject, studies with inadequate data or not discussing cryptocurrency adoption were removed after reading through titles and abstracts. After filtering articles from initial search results according to the inclusion and exclusion criteria, 34 journal articles and 16 conference papers were identified for further evaluation. These articles span 13 years, from 2008 to 2021. Freyne et al. (2010) showed the importance of both journal and conference papers in the IS domain; therefore, several IS systematic literature reviews involved both conference and journal articles in their research, particularly in the context of emerging technologies such as cryptocurrency (Badawi & Jourdan, 2020; Karsen et al., 2019; Ouiddad et al., 2018; Thuan et al., 2016). For this reason, this study includes both journal and conference articles.

The fourth step was to validate the internal/external validity and quality of the identified studies. The objective of this step was to select articles with similar quality. As Higgins and Altman (2008) showed, it is essential to assess the quality and validity of studies involved in a literature review to avoid them being biased. Hence, under internal validity, the shortlisted studies were verified whether they answered their research question without bias by clearly defining research objectives, using appropriate data collection methods, discussing appropriate data analysis methods and clearly presenting the findings (Dybå & Dingsøyr, 2008). Also, the quality of the articles was assessed by determining to what extent the selected studies are contributing to the body of cryptocurrency adoption knowledge (Guyatt et al., 2011). In this step, 23 articles extracted from the previous step were removed because the abstract review showed that those papers do not examine factors that influence cryptocurrency adoption. For example, one study proposed a new model for analyzing the Bitcoin market capitalization (Van Vliet, 2018), another study investigated using cryptocurrencies for conversational commerce (Rungvithu & Kerdvibulvech, 2019), and

another research investigated cryptocurrency mining (Li et al., 2019). Therefore, 27 studies were selected for further analysis.

In the fifth step, the data was extracted from the 27 selected studies and then organised for analysis and synthesis. As Paré et al. (2016) suggested, identifying, extracting, and organising steps were followed to extract and synthesise the data. In the identifying stage, the full text of the articles was further reviewed for their relevance. In this step, Alshamsi and Andras (2019) article was removed because it was not related to cryptocurrency adoption. Instead, the article compares features of cryptocurrencies and credit/debit cards. Table 1 presented the final list of selected articles for this study. The data extraction was the next step; the selected articles were reviewed independently to extract data items and then entered into a spreadsheet: article title, author(s), year of publication, country or region, methodology and theoretical foundation. The articles were then analysed in detail based on the adopted theories, research methodology and context for the investigation.

After that, shortlisted papers have been reviewed and coded using Bandara et al. (2015) inductive approach since it allows analysis of the existing literature and then builds more abstract ideas (Thomas, 2006). Some examples of the open codes are as follows: no banks, quick fund transfers, cheap money transfer, cyber attackers, the credibility of the technology and social media impacts. Next, all the open codes were categorised into subcategories to gain more understanding of cryptocurrency adoption. Some examples of subcategories identified are: alternative banking systems, high transaction speed, low transaction fees, risks, trust and social factors. In this study, the Push-Pull-Mooring (PPM) framework is used to organise previous studies on cryptocurrency adoption. Therefore, all conceptually related subcategories were grouped into categories and classified into push, pull and mooring factors. In the context of this study, categories that are associated with the limitation of conventional money were grouped under push factors, such as “losing trust in the government and financial institutions” and “insecurity of conventional money.” Next, categories that encourage people to adopt cryptocurrencies were grouped under the pull factors. For example, “alternative investment method,” “low transaction fees,” and “high transaction speed.” The mooring factors consist of categories that hamper or facilitate an individual’s decision towards cryptocurrency adoption. In addition, mooring factors include categories that are not a drawback of regular currencies or benefit of new cryptocurrencies; however, it affects the individuals’ decision to adopt cryptocurrencies. Risks, individual,

social and technological factors, are some examples of mooring factors. Table 5 in the Appendix presents the full list of main categories, subcategories, open codes and associated text from selected journal articles. As per the sixth steps of the Paré et al. (2015) model, the extracted data was evaluated systematically and synthesised.

Figure 1 Flowchart of article selection

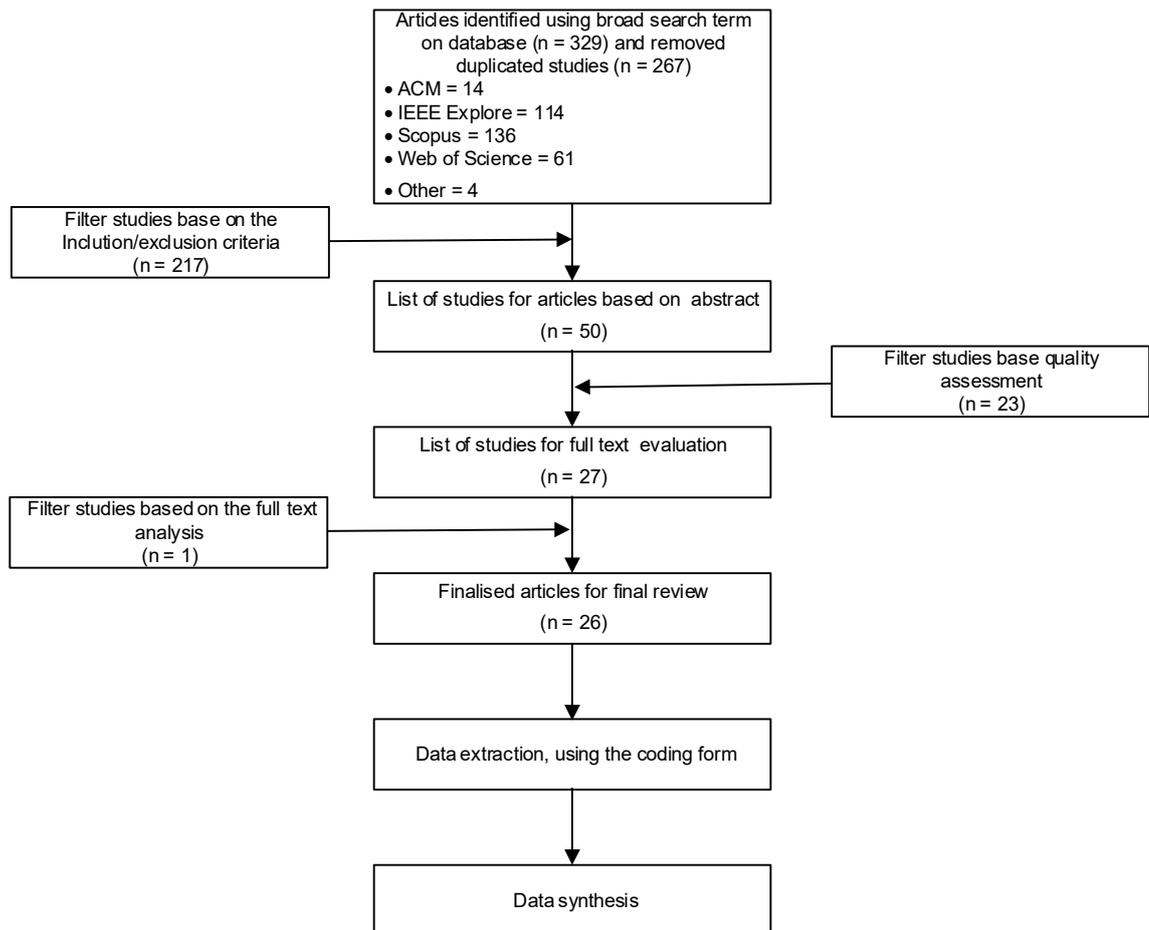


Table 1 List of articles used in the analysis.

#	Article Title	Author	Year	Country/Region	Study Method	Theoretical Foundation
1	Perceived benefit and risk as multidimensional determinants of Bitcoin use: A quantitative exploratory study.	Abramova, S.;Böhme; R.	2016	Europe	Quantitative	TAM
2	Accepting financial transactions using blockchain technology and cryptocurrency: A customer perspective approach.	Albayati, H.;Kim, S. K.;Rho, J. J.	2020	N/A	Quantitative	TAM
3	Cryptocurrency usage impact on perceived benefits and users' behaviour.	Alqaryouti, O.;Siyam, N.;Alkashri, Z.;Shaalán, K.	2020	N/A	Quantitative	TAM
4	Users' knowledge and motivation on using cryptocurrency.	Alqaryouti, O.;Siyam, N.;Alkashri, Z.;Shaalán, K.	2020	UAE	Qualitative	TAM
5	Social media usage and individuals' intentions toward adopting Bitcoin: The role of the theory of planned behavior and perceived risk.	Anser, M. K.;Zaigham, G. H. K.;Imran Rasheed, M.;Pitafi, A. H.;Iqbal, J.;Luqman, A.	2020	China	Quantitative	TPB
6	Fuzzy set qualitative comparative analysis of factors influencing the use of cryptocurrencies in Spanish households.	Arias-Oliva, M.;de Andrés-Sánchez, J.;Pelegriń-Borondo, J.	2021	Spain	Quantitative	UTAUT
7	Cryptocurrencies as a disruption? Empirical findings on user adoption and future potential of Bitcoin and Co.	Baur, A. W.;Bühler, J.;Bick, M.;Bonorden, C. S.	2015	N/A	Qualitative	TAM2
8	Bitcoin: Drivers and impediments.	Ermakova, T.;Fabian, B.;Baumann, A.;Izmailov, M.;Krasnova, H.	2017	Germany, Austria, Switzerland, UK, USA and Israel	Quantitative	N/A

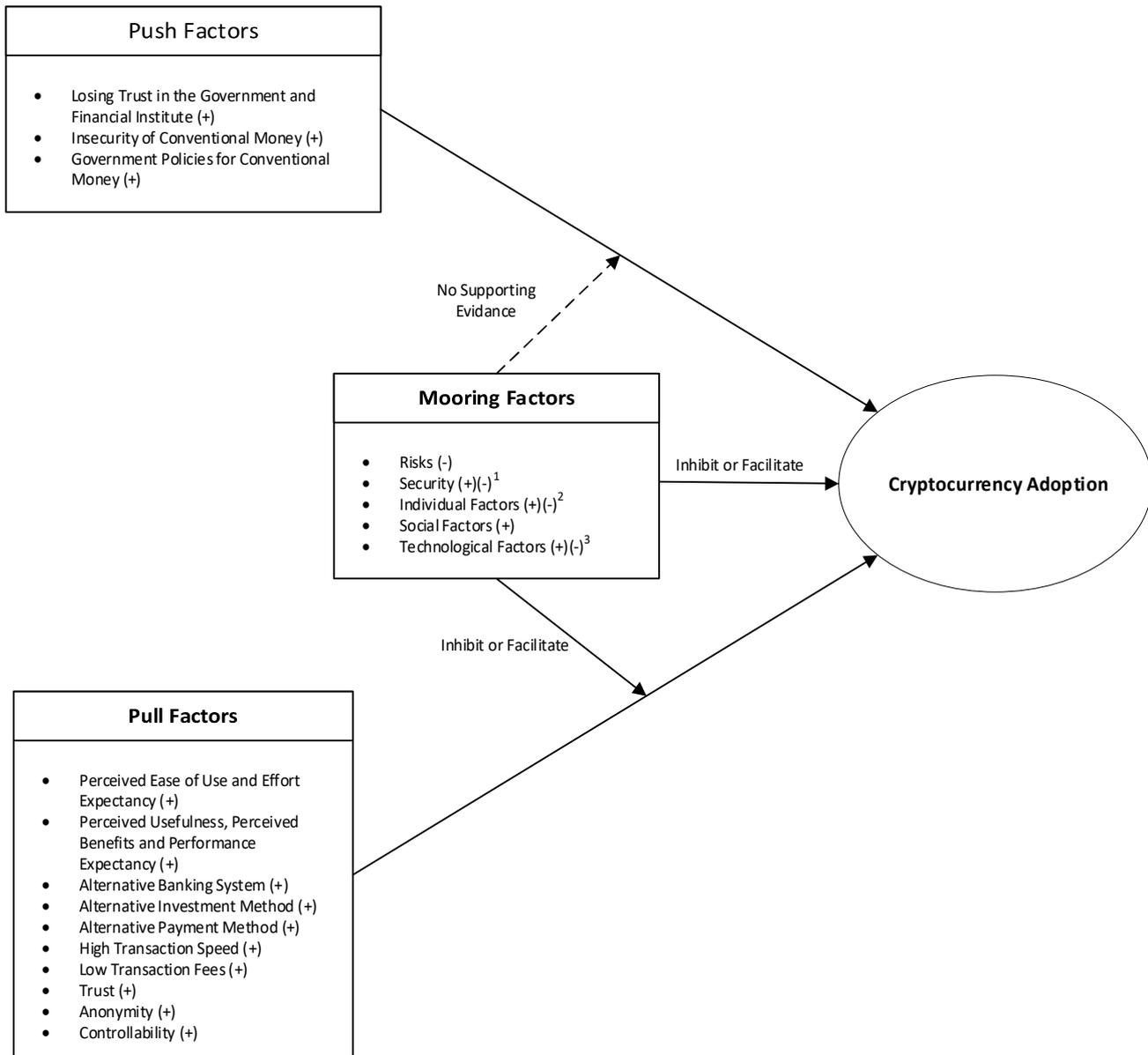
9	Cryptocurrencies as a financial tool: Acceptance factors.	Gil-Cordero, E.;Cabrera-Sánchez, J. P.;Arrás-Cortés, M. J.	2020	N/A	Quantitative	TAM
10	The impact on people's holding intention of Bitcoin by their perceived risk and value.	Huang, W. L.	2019	China	Quantitative	N/A
11	A quantitative model of determinants of use behavior for the cryptocurrency system in terms of security concerns and risks.	Hwang, Y. H.;Moon, Y. J.	2019	Korea	Quantitative	UTAUT
12	Determining the usability of Bitcoin for beginners using change tip and coinbase.	Kazerani, A.; Rosati, D.; Lesser, B.	2017	Canada	Qualitative	N/A
13	Exploring motivations for Bitcoin technology usage.	Khairuddin, I. E.; Sas, C.; Clinch, S.; Davies, N	2016	Malaysia	Qualitative	HCI
14	Bitcoin distribution in the age of digital transformation: Dual-path approach.	Lee, W. J.;Hong, S. T.;Min, T.	2019	Korea	Quantitative	N/A
15	Disruptive innovation of cryptocurrencies in consumer acceptance and trust.	Mendoza-Tello, J. C.;Mora, H.;Pujol-López, F. A.;Lytras, M. D.	2019	Spain	Quantitative	TAM
16	Bitcoin adoption: Scams and anonymity may not matter but trust into Bitcoin security does.	Murko, A.; Vrhovc, S.	2019	Slovenia	Quantitative	N/A
17	Investigating the repurchase intention of Bitcoin: Empirical evidence from China.	Nadeem, M. A.;Liu, Z. Y.;Pitafi, A. H.;Younis, A.;Xu, Y.	2020	China	Quantitative	TAM
18	An empirical study on the commercial adoption of digital currencies.	Roussou, I.;Stiakakis, E.;Sifaleras, A.	2019	Worldwide	Quantitative	IDPM, TAM
19	Predicting determinants of the intention to use digital currency in the UAE: An empirical study.	Saif Almuraqab, N. A.	2020	UAE	Quantitative	UTAUT
20	Design for trust: An exploration of the challenges and opportunities of Bitcoin users.	Sas, C.; Khairuddin, I. E.	2017	Malaysia	Qualitative	HCI

21	Cryptocurrency adoption and the road to regulation.	Schaupp, L. C.; Festa, M.	2018	USA	Quantitative	TPB
22	Understanding purchasing behaviors in a virtual economy: Consumer behavior involving virtual currency in Web 2.0 communities.	Shin, D. H.	2008	N/A	Quantitative	TAM
23	Consumer-based modeling and ranking of the consumption factors of cryptocurrencies.	Sobhanifard, Y.;Sadatfarizani, S.	2019	Iran	Mix	N/A
24	A PLS-SEM neural network approach for understanding cryptocurrency adoption.	Sohaib, O.;Hussain, W.;Asif, M.;Ahmad, M.;Mazzara, M.	2020	Australia	Quantitative	TRA
25	Cryptocurrency adoption in Malaysia: Does age, income and education level matter?	Yeong, Y. C.;Kalid, K. S.;Sugathan, S. K.	2019	Malaysia	Quantitative	-
26	Understanding the diffusion and adoption of Bitcoin transaction services: The integrated approach.	Yoo, K.;Bae, K.;Park, E.; Yang, T.	2020	-	Quantitative	TPB, IDT

Chapter 4: Findings

This chapter discusses the findings from the analysis of the articles listed in Table 1. The factors identified from previous studies have been grouped into categories and sub-categories, then organised into a Push-Pull-Mooring framework to get a summarised understanding of the factors influencing cryptocurrency adoption (See Figure 2).

Figure 2 A theoretical model to understand the factors influencing cryptocurrency adoption



¹ Perceived Security and Security Protection have positive influence and Security Concerns has negative influence.

² Attitude to New Technology, Experience with Similar Technology, Technological Awareness, High Income, Gender (Male), Hedonic Motivation, Perceived Enjoyment, Optimism, Innovativeness have positive influence and Technological Discomfort has negative influence.

³ System Design, Trialability, Facilitating Conditions show positive influence while Lack of Wallet Usability has negative influence.

4.1 Push

The push factors constitute various factors associated with limitations or problems with conventional money and the current financial system, which encourages individuals to move into cryptocurrencies. Those factors are grouped into three categories: losing trust in the government and financial institutions, insecurity of conventional money, and government policies for conventional money (See Table 2).

Table 2 Push factors affecting cryptocurrency adoption

Categories	Sub-Categories	Frequency	Positive
Losing Trust in the Government and Financial Institutions	Losing Trust in the Government and Financial Institutions	1	+1
Insecurity of Conventional Money	Insecurity of Conventional Money	1	+1
Government Policies for Conventional Money	Government Policies for Conventional Money	1	+1

Notes: Positive(+1) means statistically significant at $p < .05$ in quantitative studies or strong supporting evidence in qualitative studies.

4.1.1 Losing Trust in the Government and Financial Institutions

Trust plays a vital role in financial development and investments in the global economy (Sulin & Paul, 2002). Trust in the financial system refers to the reliability of the financial service, following the rules and regulations and providing better service for customers (Pauline & Van Raaij, 2017). According to Beckmann and Mare (2017), trust in the financial system has a significant impact on the adoption of the financial system. Saiedi et al. (2020) showed that people began to lose faith in the centralised financial system, such as banks and financial institutions, for many reasons. For example, the world economic crisis between 2007 and 2009 mainly led people to question the stability and protection of the existing centralised financial systems (Saiedi et al., 2020). Cryptocurrencies operate in a peer-to-peer decentralised public ledger called blockchain technology. This technology offers an appealing alternative that bypasses government and financial institution involvement. In addition, the Quantity Theory of Money (QTM) is one of the important theories used in economics that attempts to explain the relationship between prices and the amount of money circulating in the market (Friedman, 1989). According to this theory, the general price

level of goods and services is proportional to the amount of money circulating in the market. In other words, if the amount of money circulating in any particular market is high, the consumers have to pay a high price for the goods and services. On the other hand, if the amount of money circulating in a market is low, the price of goods or services will be low. Since the government controls the conventional money, they can issue these currencies into the market according to their desire. As a result, the value of the currency becomes low compared to the goods and services. For example, 1 Zimbabwean Dollar (ZWD) was equal to 1.47 United States Dollars (USD) in 1980. However, due to the substantial increase in money supply, 10 billion ZWD was equal to 0.33 USD in 2008 (Lilian et al., 2021). Many of the cryptocurrencies have a limited supply. That means that when a cryptocurrency reaches its maximum limit, there will be no more new coins for mining. Due to this limited supply, the cryptocurrency will protect customers from inflation (Bohr & Bashir, 2014). For these reasons, people are moving away from regular money to cryptocurrency because they are losing trust in the government and financial institutions (Sas & Khairuddin, 2017).

4.1.2 Insecurity of Conventional Money

Due to the unstable political conditions in some countries, their national currency is consequently unstable (Spiridonov, 2015). For instance, the Libyan government failed to maintain its currency value due to their political issues. As a result, Libyan Dinar lost about 85% of its value in US dollars, and further, people were paying unaffordable prices for goods and services (Spiridonov, 2015). For this reason, some people believe that regular currencies are insecure, and therefore there is a need for a stable currency (Baur et al., 2015). For them, cryptocurrency is a better solution since it resolves hyperinflation, inflation, exchange, fraud, counterfeiting, and inaccessibility problems associated with regular currencies (Prethus & O'Malley, 2017). People who live in countries with high fluctuating and unpredictable exchange rates, such as Brazil, Argentina, Nicaragua, and Venezuela, could use cryptocurrencies to save their wealth or hold value (Folkinshteyn & Lennon, 2016; Prethus & O'Malley, 2017).

4.1.3 Government Policies for Conventional Money

With the expansion of online shops, emerging economies can ship products to remote locations but cannot receive funds due to capital market restraints (Baur et al., 2015). The government policies are the main cause of such market restrictions (Hyytinen & Toivanen, 2005). For instance, the government policies between Cuba and the USA have restricted money transfers between those two countries (Barberia, 2002). For this reason, a person in the USA cannot send money to Cuba, and similarly, a person in Cuba cannot send money to the USA. Thus, these government policies hamper the financial freedom of regular money. Therefore, people are moving away from regular money to avoid restrictions from these rigid government policies (Baur et al., 2015).

4.2 Pull

The pull factors list various beneficial factors associated with cryptocurrency that encourage individuals to move into that technology. Those factors are grouped into nine categories based on their relevancy. These categories are “perceived ease of use and effort expectancy”, “perceived usefulness, perceived benefits and performance expectancy”, alternative banking system, alternative investment method, alternative payment method, high transaction speed, low transaction fees, trust, anonymity, and controllability. Although perceived ease of use and effort expectancy are two different constructs, this study groups them into one category due to their similarities. In addition, perceived usefulness, perceived benefits and performance expectancy are three different constructs grouped into one category since they are conceptually similar. Table 3 illustrates the push factors which influence individuals to adopt cryptocurrencies.

Table 3 Pull factors affecting cryptocurrency adoption

Categories	Sub-Categories	Frequency	Positive
Perceived Ease of Use and Effort Expectancy	Perceived Ease of Use	8	+8
	Effort Expectancy	1	+1
Perceived Usefulness, Perceived Benefits and Performance Expectancy	Perceived Usefulness	8	+8
	Perceived Benefits	2	+2
	Performance Expectancy	2	+2
Alternative Banking System	Alternative Banking System	2	+2
Alternative Investment Method	Alternative Investment Method	5	+5
Alternative Payment Method	Online Payment Method	2	+2
	Compatibility	3	+3
High Transaction Speed	High Transaction Speed	4	+4
Low Transaction Fees	Low Transaction Fees	7	+7
Trust	Perceived Trust	4	+4
	Credibility of the Technology	1	+1
	Reliability of the Technology	1	+1
	Transparency	2	+2
	Government Regulations and Support	1	+1
Anonymity	Anonymity	3	+3
Controllability	Financial Freedom	1	+1
	Individual Empowerment	1	+1
	Control on the Exchange Rate	1	+1

Notes: Positive(+1) means statistically significant at $p < .05$ in quantitative studies or strong supporting evidence in qualitative studies.

4.2.1 Perceived Ease of Use and Effort Expectancy

Perceived ease of use as one of the constructs used in TAM by Davis (1989) has been used in several technological adoption studies (Lu et al., 2003). Davis (1989) defined perceived ease of use as the "degree to which a person believes that using a particular system would be free of effort" (p. 320). According to Pavlou (2003), perceived ease of use influences the acceptance of information technologies, either directly or indirectly. This is because if a new technology is simple to learn and operate, people are more likely to adopt and use it (Yi et al., 2003). Researchers such as Shahzad et al. (2018) have argued that perceived ease of use is an essential characteristic of cryptocurrencies such as Bitcoin for adoption. This research identified eight studies that investigated the relationship between perceived ease

of use and cryptocurrency adoption (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Nadeem et al., 2020; Saif Almuraqab, 2020; Sohaib et al., 2020) and all studies found that perceived ease of use significantly and positively influenced cryptocurrency adoption. Saif Almuraqab (2020) has shown that perceived ease of use is a major factor in the intention of people to utilise cryptocurrencies. When we analyse previous cryptocurrency studies, it can be seen that scholars involved different geographical locations such as Australia, Spain, South Africa, China, Europe, Slovenia and UAE to investigate the perceived ease of use of cryptocurrencies for adoption (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Nadeem et al., 2020; Saif Almuraqab, 2020; Sohaib et al., 2020). This evidence may indicate that perceived ease of use is another common factor affecting the adoption of cryptocurrencies worldwide.

Similarly, effort expectancy, one of the main constructs in the UTAUT model, is a conceptually related construct to perceived ease of use. Venkatesh et al. (2003) define effort expectancy as the effort required to learn new technology on the part of an individual. It determines the complexity associated with the new technology. The user-friendly technology offers the operator freedom, comfort and efficiency (Catherine et al., 2018). According to Mehdi et al. (2018), the amount of work required to learn financial technology significantly impacts its acceptability. One study found that effort expectancy is positively related to intention to use cryptocurrency (Arias-Oliva et al., 2021).

However, findings also indicate that some cryptocurrency features may negatively impact the perceived ease of use of cryptocurrency. For example, Abramova and Böhme (2016) argue that cryptocurrencies such as Bitcoin are sophisticated but not a very intuitive technology which requires some learning effort, especially during the early stages of adoption. Therefore, new users must first educate themselves and learn common terminology and basic operational principles, which are not intuitive to people with less technological knowledge. In addition, Sohaib et al. (2020) showed that the complexity of cryptocurrency technology increases an individual's discomfort and reduces easiness and usefulness, leading to uncertainties in accepting them. Finally, Mendoza-Tello et al. (2019) showed that the conceptual difference between cryptocurrencies and fiat money reduces the ease of use. For instance, they suggested that users are using only two decimal places in regular electronic transactions. They are unaware of the divisibility (5 or more decimal

places) of cryptocurrencies, and this gap in understanding reduces the ease of use of cryptocurrency. For these reasons, an average user may face learning challenges due to the complexity of the underlying technology and encryption algorithms. Some scholars did not agree with the above idea that cryptocurrencies are not easy to use. For example, Hwang and Moon (2019) argued that cryptocurrency systems are simple, and users like the experience that results from interacting with the system. Hence, the perceived ease of use is one of the factors discussed differently by various authors.

4.2.2 Perceived Usefulness, Perceived Benefits and Performance Expectancy

According to TAM, perceived usefulness (PU) influences the acceptance and actual use of technology. Davis (1989) defines PU as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). In the payment systems context, PU is usually associated with efficiency, performance, and effectiveness (Alalwan et al., 2018). According to these studies, people believe that cryptocurrencies have high transaction speed (Abramova & Böhme, 2016) and better controllability (Khairuddin et al., 2016) than regular currencies. These beliefs affect perceived usefulness and in turn influence cryptocurrency adoption decisions (Albayati et al., 2020; Lee et al., 2018; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Roussou et al., 2019; Saif Almuraqab, 2020; Shin, 2008; Sohaib et al., 2020). In addition, the influence of perceived usefulness on the intention to use cryptocurrencies was supported by studies across several countries such as Korea, Spain, Slovenia, UAE and Australia (Lee et al., 2018; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Roussou et al., 2019; Saif Almuraqab, 2020; Sohaib et al., 2020). Therefore, it can be concluded that the perceived usefulness of cryptocurrencies is a globally relevant factor.

According to Lee et al. (2018), perceived benefits influence the adoption of new technology. Perceived benefits can be defined as a consumer's belief in a positive outcome (Yoon, 2011). Previous studies showed a strong positive effect from perceived benefits on behavioural intention to use technology-enabled services, such as online banking services (Martins et al., 2014), credit card services (Ooi & Tan, 2016), and mobile payment services (Oliveira et al., 2016). Therefore, two cryptocurrency adoption studies investigated whether the perceived benefits of cryptocurrencies influence a person's intention to use the services (Abramova & Böhme, 2016; Yoo et al., 2020). In these studies, perceived benefit is

described as a person's perception that using cryptocurrency will have both direct and indirect favourable consequences (Abramova & Böhme, 2016). The perceived benefits of cryptocurrency is generated through the usage of the cryptocurrency service and its decentralised capability (Abramova & Böhme, 2016; Yoo et al., 2020). They showed that perceived benefits of cryptocurrencies directly influence the consumer's intention to use. In addition, Yoo et al. (2020) claimed that decentralisation is the primary benefit of cryptocurrency adoption. However, Abramova and Böhme (2016) argued that cryptocurrency's decentralised nature had a low effect on the perceived benefit. They have identified three possible reasons for such a premise. Firstly, there is a lack of understanding about decentralisation technology among less tech-savvy users. When people do not have sufficient knowledge about decentralised technology, they may not be able to identify the true benefit of the technology. Secondly, the cost of decentralisation technology is high. Due to the high level of redundancy required, decentralised technology incurs significant storage and computational expenses. With the increasing number of users and transactions, the cryptocurrency network maintenance cost is likely to go up. This cost increase will trade-off the benefits of the platform. Lastly, the decentralisation feature of the cryptocurrency was often implemented as a centralised system. Therefore, it is not easy to achieve the theoretically defined level of decentralisation in practice. For these reasons, Abramova and Böhme (2016) questioned the perceived benefits associated with the decentralisation feature of cryptocurrencies.

In addition, two studies investigated the relationship between performance expectancy and the intention to use cryptocurrencies (Arias-Oliva et al., 2021; Gil-Cordero et al., 2020). Performance expectancy is one of the independent variables used in the UTAUT model and is hypothesised to positively influence technology acceptance (Venkatesh et al., 2003). Venkatesh et al. (2003) described performance expectancy as an individual's belief that employing a specific technology will help them improve their performance in specific tasks. According to Charles and Simolini (2018), a person's behavioural intention to accept currencies is positively influenced by performance expectations. The existing electronic payment and fund transfer systems are slow, insecure, inefficient and cannot be used globally (Arias-Oliva et al., 2021; Gil-Cordero et al., 2020). Cryptocurrencies address these issues by providing fast, secured, and higher global coverage payment and fund transfer systems (Arias-Oliva et al., 2021; Gil-Cordero et al., 2020). In 2010, cryptocurrency usage for financial transactions was relatively limited, and people were able to purchase food from Papa Johns Pizza in Florida (Mario et al., 2019). Today, over 18,500 businesses worldwide

accept Bitcoin as a medium of payment, and, as a result, consumers can easily buy goods and services using cryptocurrencies (Arias-Oliva et al., 2021). For these reasons, Arias-Oliva et al. (2021) and Gil-Cordero et al. (2020) studies showed that the performance expectancy of cryptocurrency influences an individual's behavioural intention towards using cryptocurrencies.

4.2.3 Alternative Banking System

Some studies argued that the traditional banking system is failing, and people lose hope in it (Saiedi et al., 2020). Cryptocurrency peer-to-peer financial technology transforms long-standing financial systems by directly connecting senders and receivers (DeVries, 2016). According to DeVries (2016), cryptocurrency can fill the gaps in the current financial technologies and help solve trust, efficiency, and cost issues faced by the traditional banking system. In a study conducted by Alqaryouti et al. (2020b), all participants mentioned that “banks are not involved in the transactions since it is peer-to-peer transactions with no middle party” (p. 119). In another study, 54.55% of the participants believed that cryptocurrencies remove existing traditional banks and provide a better way of doing banking (Ermakova et al., 2017). For this reason, cryptocurrency provides an alternate banking system for consumers by removing intermediaries and banks (Alqaryouti et al., 2020b; Ermakova et al., 2017).

4.2.4 Alternative Investment Method

The law of supply and demand is one of the most common economic theories, which ties into many economic principles. According to this theory, the price of a good or service will be determined by the willingness of people to either buy or sell them. In other words, when the supply for a particular product or service is high, then the price of that product will decrease. On the other hand, when the supply for a particular product is lower than the demand, the price of that product will increase. Most of the cryptocurrencies have limited supply, and therefore based on the law of supply and demand, the overall value of cryptocurrency will increase over time. The Bitcoin price analysis clearly shows the price of a Bitcoin increase over the past few years (Xie, 2019), and this increase has led individuals to consider cryptocurrencies such as Bitcoin as an alternate financial asset (Yelowitz &

Wilson, 2015). This study identified five different cryptocurrency adoption studies which discussed cryptocurrency as an alternative investment option (Alqaryouti et al., 2020b; Huang, 2019; Khairuddin et al., 2016; Lee et al., 2018; Sas & Khairuddin, 2017)⁴.

Researchers such as Lee et al. (2018) investigated the profitability expectancy of Bitcoin for their adoption. In this study, they referred to the profitability expectancy as the value increase due to the limited amount of Bitcoin. The results indicated that consumers are moving to Bitcoin due to high profitability (Lee et al., 2018). Huang (2019) conducted a similar cryptocurrency study and confirmed people's perception on Bitcoin's high return rate would increase its holding quantity. In addition, Alqaryouti et al. (2020b) investigated user's knowledge and motivation to invest in cryptocurrency. In this study, all participants mentioned that "I have decided to invest some amount to make some profit". This quote indicates that people consider cryptocurrency as an alternative investment option. In another study conducted by , future value growth is another reason to adopt cryptocurrencies such as Bitcoin. In their study, around 50% of participants mentioned that they are keeping their savings in Bitcoin because they expect that the value of this currency will increase over time. In such circumstances, the authors argue that participants will look for cryptocurrency as an alternative form of currency for future investment.

4.2.5 Alternative Payment Method

In recent years, the rapid growth of the internet and e-commerce has created several novel online payment methods (Baur et al., 2015). Traditional online payment methods, such as credit cards, have been on the decline as the number of alternative payment methods has expanded, and they offer greater user-friendliness, security, and reduced fees (Bourgeois, 2010). With the advanced and dynamic expansion of technologies, cryptocurrency provides a better alternative payment method to buy products and services online (Alqaryouti et al., 2020b; Sas & Khairuddin, 2017). This research identified two previous cryptocurrency studies which investigated cryptocurrency as an alternative payment method (Alqaryouti et al., 2020b; Sas & Khairuddin, 2017). According to those studies, the ability to use cryptocurrency as an online payment method and other compatibility factors, influence cryptocurrency adoption. For example, one participant in Alqaryouti et al.'s (2020b) study

⁴ These studies were conducted before the recent cryptocurrency price crash.

mentioned that “It can be used for trading and e-commerce websites for replacing currencies” (p. 118). This quote indicates that people believe in the use of cryptocurrencies for online payment. In addition, some customers already started using cryptocurrencies to buy goods or services as their regular currency. For instance, another participant in Sas and Khairuddin’s (2017) study mentioned that they were able to pay utility bills on the cryptomarket.my website and buy flight tickets and book hotels using cheapair.com using Bitcoin. This diverse way of spending Bitcoin provides evidence that it can be used as a currency rather than the existing norm (Sas & Khairuddin, 2017). In addition, many businesses have begun to accept various other altcoins as the payment method as customer interest in paying for goods and services using Bitcoin increases. For example, Overstock.com, eGifter, Newegg, Shopify, Dish, Roadway Moving Company, Microsoft and CheapAir websites allow customers to pay using Bitcoin (Murko & Vrhovec, 2019).

However, the ability of cryptocurrency use as a payment method will depend on its compatibility. Therefore, three other cryptocurrency studies conducted by Lee et al. (2018), Roussou et al. (2019) and Yoo et al. (2020) showed that cryptocurrency transaction compatibility is positively related to using cryptocurrencies. Compatibility refers to the users’ belief that technology innovation fits with their expectations and experiences (Chen et al., 2004). In cryptocurrency studies, the ability of a person to use it as a regular currency to buy and sell goods is considered compatible (Lee et al., 2018). In addition, several studies showed the compatibility of new technology as a key determinant of user adoption (Rogers, 1995). Therefore, the ability of cryptocurrency technology to meet the consumers’ expectations and experiences significantly influences their intention to use the technology (Lee et al., 2018; Roussou et al., 2019; Yoo et al., 2020).

4.2.6 High Transaction Speed

Transaction speed is an essential characteristic of payment systems when a user is performing a financial transaction (Do et al., 2019). ElBaharawy et al. (2017) defined transaction speed as the time necessary to complete a transaction or the number of transactions to be taken during a specific period. The existing banking system takes a long time to move funds from the sender's account to the receiver's account, particularly in international wire transfers (Sas & Khairuddin, 2017). This is mainly because traditional

banks require lengthy security clearance for the source of funds based on the amount of money to be transferred. Cryptocurrency funds transfer from one account to another appear to be instant, taking only a few minutes compared to the traditional banking system (Abramova & Böhme, 2016). The cryptocurrency transfer time only depends on the network busyness. In addition, these transfers are available 24 hours a day, seven days a week, and is not affected by centralised system failures. Also, payment or transfer delays and account lockouts can occur in the traditional banking system, which may further delay the fund transfers. Among the articles identified in this review, four studies showed that cryptocurrencies offer a faster transaction speed than regular currencies, which therefore encourages people to tend to move into cryptocurrency (Abramova & Böhme, 2016; Baur et al., 2015; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019).

4.2.7 Low Transaction Fees

Another interesting characteristic of cryptocurrencies is the low transaction fee or fee incurred when transferring money from one account to another. In comparison to typical banks and other intermediaries, the cryptocurrency transfer cost is extremely minimal (Böhme et al., 2015). For example, one participant in Alqaryouti et al. (2020b) mentioned that “Yes, of course. The cryptocurrency is the future of currency because it allows the individual to easily control and transfer their wealth without high bank fees or government control” (p.119). This positive view toward cryptocurrency is due to high transaction fees for cross border funds transfer through services such as PayPal or Skrill (Baur et al., 2015).

Economic cost-benefit analysis reveals that transaction fees of cryptocurrencies are likely to be low. Theoretically, fees are optional and paid to miners for computing the hash block. However, most blockchain transactions have a fee set by the cryptocurrency exchange (Möser et al., 2014). The study conducted by Kim (2017) on Bitcoin transaction fees associated with cross-border transfers, showed that Bitcoin offers a higher foreign exchange rate than regular exchange houses. For example, Bitcoin's bid-ask spreads are 2% narrower than those of retail foreign exchange markets (Kim, 2017). Similarly, a study conducted by Ermakova et al. (2017) showed that almost half of the participants believed that Bitcoin has lower transaction fees than regular bank charges. In another qualitative study, a participant mentioned that “Bitcoin is a very cheap money transfer” (Khairuddin et al., 2016, p. 2875).

The low transaction fees associated with cryptocurrency are reinforced in two additional studies, the participants mentioned that “it only costs me 10 cent for each transaction” (Sas & Khairuddin, 2017, p. 6504) and “Yes of course. The cryptocurrency is the future of the currency because it allows the individual to easily control and transfer their wealth without high bank fees or government control” (Alqaryouti et al., 2020b, p.119). These outcomes indicate that the low transaction cost of cryptocurrencies in international transactions contributes to cryptocurrency adoption (Abramova & Böhme, 2016; Alqaryouti et al., 2020b; Baur et al., 2015; Ermakova et al., 2017; Khairuddin et al., 2016; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019). In addition, this adoption factor was identified in the studies conducted in Germany, Austria, Switzerland, UK, USA, Israel, Iran, Malaysia, Canada, and other European countries (Abramova & Böhme, 2016; Alqaryouti et al., 2020b; Baur et al., 2015; Ermakova et al., 2017; Khairuddin et al., 2016; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019). Therefore, it is another commonly accepted adoption factor across countries and regions.

4.2.8 Trust

Studies have extensively evaluated trust in information systems adoption (McKnight et al., 2002). When it comes to technology, trust relates to a consumer's level of comfort and confidence (McCloskey, 2006; Sirkka et al., 2000). Matemba and Li (2018) showed that customer trust directly affects their intention to adopt new technology. This study identified nine different cryptocurrency adoption studies which discussed five different trust factors. According to those studies, perceived trust, the credibility of the technology, reliability of the technology, transparency, and strong government regulations are positively associated with cryptocurrency adoption.

Several cryptocurrency adoption studies investigated the relationship between perceived trust and the intentions to use cryptocurrencies. According to their findings, perceived trust positively influences the intention to use cryptocurrencies (Albayati et al., 2020; Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Saif Almuraqab, 2020). In addition, their studies show that perceived trust helps individuals to overcome risk and security concerns on cryptocurrency technology (McKnight et al., 2002). Also, their studies showed that trust in cryptocurrency positively impacts cryptocurrency adoption (Pavlou, 2003). The more people

trust cryptocurrencies, the less effort they make to scrutinise the details of the cryptocurrencies. When people trust the cryptocurrency platform, the consumers will not waste time and cognitive effort to read about underlying technology because they assume the benevolence of the technology (Pavlou, 2003).

In cryptocurrencies, mining is a process of validating and securing recent transactions in the cryptocurrency system (Nakamoto, 2008). Li and Wang (2017) described the mining difficulty as the computing power required to generate the hash block. Although it is difficult to calculate individual miners' actual power, mining difficulty is a good proxy for miners' average mining effort. Li and Wang (2017) showed that mining difficulty and cryptocurrency robustness are correlated. In other words, if the cryptocurrency system can generate a complex hash code, it is less likely to crack the hash and change transaction records. When the bitcoin mining process is complex, the technology's credibility will increase, and more people will use cryptocurrencies (Sas & Khairuddin, 2017). In addition to that, the decentralised system, unlike the centralised system, does not have a single point of failure. For these reasons, people trust the reliability of the cryptocurrency technology and then use it for regular transactions (Murko & Vrhovec, 2019).

Unlike a centralised financial system, blockchain technology does not allow transactions to be reversed once the transaction is finalised (Nakamoto, 2008). This feature improves the system reliability (Khairuddin et al., 2016). Participants in the study by Khairuddin et al. (2016) mentioned that "I admire the blockchain platform. How it gets the data recorded, it cannot be deleted, and it doesn't need to be centralized." (p. 2875). This sense of feeling is due to the reliability of the cryptocurrency system. Therefore, the reliability of cryptocurrency technology positively affects cryptocurrency adoption.

Transparency is a valuable characteristic of cryptocurrencies such as Bitcoin (Sas & Khairuddin, 2017). In the blockchain platform, transparency is the ability to track data from the public key or address (Olmez & Karaarslan, 2019). Since all transactions are published in a public ledger, all users on the network can read them. In addition, users can view the history of their cryptocurrency transactions from the very first until the present day. Also, when a person performs a cryptocurrency transaction, they can view their transaction entries from the ledger, increasing the transparency of the transactions (Khairuddin et al., 2016).

According to Corritore et al. (2003), the credibility of technology is reflected through transparency. Therefore, the transparency of the cryptocurrency technology increases the trust of users towards cryptocurrency adoption (Khairuddin et al., 2016; Sas & Khairuddin, 2017).

Government regulations and support play an important role in financial system implementation as they protect buyers (Barksdale et al., 1976). Fortino et al. (2019) described government regulations and support as legal frameworks developed by the government to monitor and ensure that service providers and technology customers perform their commitments and prevent infractions. Government regulation and rules are necessary for dealing with cryptocurrency technology, monitoring the service quality, and deploying it in the country under the rule of law (Albayati et al., 2020). These laws are employed to ensure that all operations run smoothly and fairly. Therefore, it is essential to have a regulatory framework to avoid or reduce uncertainty (Wunsche, 2016). According to Lu (2018), government policies for cryptocurrency technology enhance the users' trust by reducing the potential threats and developing the users' confidence in cryptocurrencies. Therefore, strong government laws and regulations positively impact client trust in new technology blockchain applications and encourage more people to use cryptocurrencies (Albayati et al., 2020).

4.2.9 Anonymity

In the financial industry, anonymity is a critical feature, and cryptocurrencies such as Bitcoin have provided a higher level of anonymity than the existing banking system (Khairuddin et al., 2016). According to Khairuddin et al. (2016), the anonymity of the cryptocurrencies has attracted customers to adopt them. Bitcoin and other cryptocurrencies have pseudo-anonymity, which implies that every transaction is recorded; the sender and receivers' identities are kept private with a digital code called a 'public key,' so no one knows who sends or gets money unless the sender or receiver claims ownership of the transaction. The sender's or receiver's identity can only be determined when they attempt to cash out their coins at exchange sites and then transfer the money back to their bank account. Ermakova et al. (2017) conducted a study to understand the drivers and impediments for cryptocurrency adoption. According to a survey of 98 Bitcoin users, around 80% believe that the anonymity of Bitcoin is a great feature. Similarly, Khairuddin et al. (2016) and Alqaryouti

et al. (2020b) conducted two similar studies, and the results indicated that the anonymity of the people behind transactions is one of the benefits of cryptocurrency.

4.2.10 Controllability

The decentralised nature of cryptocurrency eliminates the need for a central authority because decentralised blockchain technology manages transactions without governing bodies, unlike traditional national currencies (Khairuddin et al., 2016). For this reason, people can transfer and receive money from each other without consideration for their geographical location and government restrictions which will increase their financial freedom. Khairuddin et al. (2016) showed that consumers appreciate the freedom of this aspect of cryptocurrency technology.

In conventional money, consumers need to involve an intermediary, such as a bank or exchange house, to maintain their deposits or transfers. Blockchain technology eliminates this need because decentralised blockchain technology can operate without third-party intervention (Khairuddin et al., 2016). Therefore, cryptocurrency technology empowers individuals by providing better control over their own money and reduces the risk of abuse of power on personal assets (Sas & Khairuddin, 2017).

In addition, Bitcoin provides customers with better control over the exchange rate than other foreign exchange markets since there are no intermediaries (Lee et al., 2019). Edwards (1989) describes the exchange rate as the unit of domestic currency per unit of foreign currency. For example, when a person in New Zealand is purchasing a good or service from the US market, how many New Zealand dollars they should pay for one US dollar. Due to the decentralised nature of cryptocurrency, the exchange rate is determined by the demand and supply rather than by a company. For this reason, it provides a better exchange rate than other payment settlement providers like VISA or Mastercard (Lee et al., 2019). According to Kim (2017), when converting US dollars to other currencies, Bitcoin provides 5% better exchange than the retail foreign exchange rates. Hence, people are moving to cryptocurrencies more because it provides better control of exchange rates (Sobhanifard & Sadatfarizani, 2019).

4.3 Mooring

The mooring category will look into the various factors that hamper or facilitate an individual's decision towards cryptocurrency adoption. In addition, mooring factors also include categories that are not a drawback of regular currencies or benefit of new cryptocurrencies; however, they affect the individuals' decision to adopt cryptocurrencies. These factors are grouped into five categories: risks, security, individual factors, social factors and technological factors (See Table 4).

Table 4 Mooring factors affecting cryptocurrency adoption

Categories	Sub-Categories	Frequency	Positive	Negative
Risks	Perceived Risk	3		-3
	Irreversibility of Transaction	1		-1
	Financial Losses Due to Password Loss	3		-3
	Financial Losses Due to Price Fluctuation	2		-2
	Fraud	1		-1
	Cyberattack	2		-1
	Legal Risks	1		-1
	Government Intervention	2	+1	-1
Security	Perceived Security	1	+1	
	Security Protection	2	+2	
	Security Concerns			-1
Individual Factors	Attitude to New Technology	2	+2	
	Experience With Similar Technology	2	+2	
	Technology Awareness	1	+1	
	Higher Income	1	+1	
	Gender (Male)	1	+1	
	Hedonic Motivation	1	+1	
	Perceived Enjoyment	1	+1	
	Optimism	1	+1	
	Innovativeness	1	+1	
Technological Discomfort	1		-1	
Social Factors	Social Influence	3	+3	
	Subjective Norm	3	+3	
	e-WOM	2	+2	
	Observability	1	+1	
Technological Factors	System Design	1	+1	
	Trialability	1	+1	

	Facilitating Conditions	1	+1	
	Lack of Wallet Usability	2		-2

Notes: Positive(+1) means statistically significant at $p < .05$ in quantitative studies or strong supporting evidence in qualitative studies. Negative(-1) means statistically negative significant at $p < .05$ in quantitative studies, or there is strong negative supporting evidence in qualitative studies.

4.3.1 Risks

Risk related factors have been found to shape information system adoption (Featherman & Pavlou, 2003). Pavlou (2003) described risk as the possible negative consequences of using a product or service. This study considers threats associated with cryptocurrency transactions as risks. From the analysis, eight risk factors were identified from eight different studies, and these factors are: perceived risk, irreversibility of the transaction, financial losses due to password loss, fraud, cyberattack, security concerns, financial losses due to price fluctuation, legal risks and government intervention.

According to Shin (2008), perceived risks influence consumers' purchasing decisions. If a particular product's or service's expected risk is high, consumers may not consider it for their purchasing decision. Several adoption studies showed that risks create anxiety and discomfort for consumers (Igbaria, 1993). When there is a feeling of doubt, fear, conflict, emotional distress, or cognitive dissonance, perceived risk enters the buying/adoption decision (Featherman & Pavlou, 2003). Therefore, some studies found that the perceived risk of cryptocurrencies negatively affects the perceived benefit of cryptocurrencies (Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Shin, 2008).

Irreversibility is one of the major security features of cryptocurrency technology. Irreversibility refers to the fact that it is impossible to alter a transaction once it is added to the blockchain (Nakamoto, 2008). This feature improves the system's reliability because, unlike a centralised financial system, it does not allow transactions to be reversed once the sales are finalised (Nakamoto, 2008). However, according to Sas and Khairuddin (2017), unlike the traditional financial system, the irreversibility feature fails to help consumers recover money if they lose them due to hacking or dishonest trading parties. Therefore, the

irreversible nature of cryptocurrency negatively impacts its perceived usefulness, as suggested by Sas and Khairuddin (2017).

A cryptocurrency wallet is a piece of software that holds an individual's cryptocurrencies. Every person who has a cryptocurrency wallet has a private key (secret number) that corresponds to the wallet's address. It allows users to send and receive coins while granting access to their cryptocurrency account balance. There are four different types of cryptocurrency wallets: desktop, mobile, web and hardware. Since the blockchain does not save the private key of an individual wallet, users will not be able to recover the password if they forget it. As a result, users will lose all their money in the wallet. Protecting the cryptocurrency wallet password is one of the major challenges faced by many cryptocurrency users (Abramova & Böhme, 2016; Ermakova et al., 2017; Sas & Khairuddin, 2017). Therefore, financial losses due to the loss of passwords negatively impacts the individuals' decision to select cryptocurrencies as an investment method.

Another risk factor is financial losses due to price fluctuation. Since cryptocurrencies operate in an open distributed ledger, the currency value is uncontrollable, and it is volatile to the demand and supply, and internal and external events. Such price fluctuation in cryptocurrencies leads to sudden price crashes. Bitcoin, as an example, lost nearly half of its value in a couple of hours just after the United States published legislative guidance on virtual currencies in 2013 (Brière et al., 2015). As a consequence, many people have lost their investments due to the sudden market crash. For this reason, Abramova and Böhme (2016) and Ermakova et al. (2017) showed that financial losses due to the price fluctuation of a cryptocurrency reduce the intention of selecting cryptocurrency as an investment method.

Fraud from dishonest parties is another risk associated with cryptocurrency transactions (Sas & Khairuddin, 2017). According to Pavlou (2003), trust is an essential characteristic of an electronic payment system. All the users in the cryptocurrency network are anonymous. Due to this feature, dishonest participants can easily commit fraud without revealing their actual identity (Baur et al., 2015). For example, one participant in Sas and Khairuddin (2017) mentioned that "I transferred some Bitcoins, but the buyer didn't pay me" (p. 6502). In addition, if there is fraud, there is no mechanism to investigate and reverse the transaction

because the cryptocurrency transactions are irreversible (Sas & Khairuddin, 2017). For this reason, trust in cryptocurrency technology is hampered by the potential fraud caused by dishonest participants (Sas & Khairuddin, 2017).

In addition, cyberattacks are one of the major threats to individual wallets (Kim & Lee, 2018). CryptoShuffler and Rabbit Ransomware are the two most common cyber attacks on the individuals who maintain their cryptocurrency wallets on personal devices such as PC or smartphones (Kim & Lee, 2018; Tziakouris, 2018). A CryptoShuffler is a trojan that can change the wallet's private key stored in the user's computer clipboard and then steal the coins in the wallet. According to Tziakouris (2018), people have lost hundreds of thousands of US dollars from CryptoShuffler attacks in 2017. Rabbit Ransomware encrypts all the files in the infected computers, using the RSA 2048 key. After that, the attacker request 0.05 Bitcoin to provide the key to remove the malware and recover the files back. Since the objective is to obtain cryptocurrency, such as Bitcoin, cryptocurrency users frequently become victims of these attacks (Kim & Lee, 2018). People who maintain their cryptocurrency wallets in cryptocurrency exchange houses are also at risk of cyberattacks (Möser et al., 2014). A cryptocurrency exchange, also known as digital currency exchange, is a third-party financial intermediary that facilitates consumers' trading cryptocurrencies for other assets like fiat money or other digital currencies (Dutta & Vijayakumaran, 2019). Without exchanges, it is difficult for an individual to acquire their first Bitcoin. In order to provide these facilities to the customers, they usually store the private key of their customers' cryptocurrency wallets in their exchange system. So, if a malicious user hacks the cryptocurrency exchange system, they can obtain the private keys of customers' wallets and then steal their money (Kim & Lee, 2018). In 2014, the high-volume exchange Mt. Gox lost 754,000 Bitcoins from its customers (equivalent to approximately \$450 million at the time of closure) from such an attack (Möser et al., 2014). Moreover, hackers observed wallets' security vulnerabilities and launched attacks, such as phishing or brute-force and stole the user's coins by obtaining their wallet password. As a solution, some users implemented double authentication to protect their wallets from hackers. Although such security measures are implemented, sometimes, it is difficult to protect the wallet from such attacks: "A friend lost 14 Bitcoins even though he applied double authentication on multiple devices" (Sas & Khairuddin, 2017, p. 6504). Therefore, factors such as cyberattacks on the cryptocurrency wallet hampers trust in the technology and creates feelings of uncertainty in using them (Hwang & Moon, 2019).

Finally, one study discussed the legal risk of cryptocurrency. Legal risk refers to the uncertainty in Bitcoin holders about the possible government intervention restricting the use of Bitcoin (Abramova & Böhme, 2016). A study conducted by Abramova and Böhme (2016) indicates that legal risk negatively influences trust in Bitcoin technology. In order to have higher user trust in Bitcoin, the authors suggest a clear legal framework for regulating decentralised currencies to ensure consumer protection and Bitcoin stakeholders' compliance with the law. However, Huang (2019) observed slightly different impacts. He found that the greater the perceived transaction and speculative risks of Bitcoin, the less government intervention is expected. The higher the perceived value of Bitcoin, the more government action they desire. This is an interesting finding because it shows that some users expect government protection while others do not.

4.3.2 Security

Studies have extensively evaluated security in information system adoption (Chou et al., 1999). Users should be able to feel that the system is secure and capable of protecting their information (Chellappa & Pavlou, 2002). This research identified four previous cryptocurrency studies which investigated security factors. According to those studies, perceived security and security protection positively and security concerns negatively influencing pull factors.

Fraud and theft are two of the main economic drains faced by the current financial system. In cryptocurrency technology, a peer-to-peer network and encryption mechanisms work together to assure the system's security (Nakamoto, 2008). Cryptocurrency transactions are transparent because they are stored in an open ledger. For this reason, digital currencies can contribute to reducing fraud and theft (Coffin, 2003). Furthermore, cryptocurrencies do not save personal information on computer systems, unlike conventional payment methods like debit/credit cards, providing greater security to prevent hacking and cyberattacks (Antonopoulos, 2014). Therefore the perceived security of cryptocurrency positively affects its perceived trust towards cryptocurrency adoption (Roussou et al., 2019).

The only way to hack decentralised cryptocurrencies is to obtain control of more than half of the mining computers in the network. In order to do that, hackers require massive computing power, since establishing decentralised cryptocurrencies on a peer-to-peer network is nearly impossible to achieve (Saiedi et al., 2021). Furthermore, unlike the centralised system, the decentralised system does not have a single point of failure. For these reasons, it provides greater security to customers from hackers and cyberattacks (Antonopoulos 2014). Abramova and Böhme (2016) argue that perceived security protection measures in the blockchain positively influences trust in digital currencies. In addition, Sas and Khairuddin (2017) explained that cryptocurrency mining difficulties increase the system's security protection. If the cryptocurrency system can generate a complex hash code, it is less likely for hackers to hack the blockchain. Therefore, when the cryptocurrency mining process is complex, the security protection of the technology will increase, and as a result, trust in the cryptocurrency technology will be developed (Abramova & Böhme, 2016; Alqaryouti et al., 2020b).

Apart from that, Hwang and Moon (2019) studied the security concerns of cryptocurrency. Security concerns refers to how people believe that using the Bitcoin system may generate security problems (Yoon & Barker, 2013). They considered security concerns as possible losses caused by fraud or hacking due to the security vulnerability of cryptocurrency services (Yoon & Barker, 2013). If a user has higher security concerns, the lower the trust in the cryptocurrency services will be. In addition, Hwang and Moon (2019) showed that security concerns moderate the performance expectancy of cryptocurrency users.

4.3.3 Individual Factors

Researchers have shown that individual factors significantly affect the adoption of information systems (Said et al., 2019). According to Talukder (2012), individual factors are one of the most important determinants of decisions to adopt innovative technologies. Individual factors describe the factors that relate to the individual viewpoint on the technology (Said et al., 2019). Therefore, this study considers the individual perspectives of cryptocurrency technology adoption from the point of view of individual factors. From the analysis, seven unique studies associated with ten different individual factors positively affecting cryptocurrency adoption were identified. These factors are: attitude to new technology, experience with similar technology, technological awareness, high income, gender (male), hedonic motivation, perceived enjoyment, optimism, innovativeness and technological discomfort.

Attitude is one of the constructs in TPB, and is widely acknowledged to have a significant impact on the intention to use technology (Davis, 1989). Attitude refers to an individual's feelings towards a particular behaviour (Davis, 1989). Individuals with positive attitudes towards technology have greater acceptance of new technological products and services. On the other hand, people with extremely negative attitudes towards technology are reluctant to adopt technology-related services or products. Therefore, attitude can be used to determine whether or not a given technology will be used (Said et al., 2019). Davis (1989) and Park (2019) found that users' perceived utility of specific products or services was a notable determinant of their attitudes. For this reason, Albayati et al. (2020) and Schaupp and Festa (2018) studied the relationship between attitude to new technology and the intention of users to use cryptocurrencies. These studies showed that a person's attitude to new technology positively affects their experience (Albayati et al., 2020), optimism (Sohaib et al., 2020), innovativeness (Sohaib et al., 2020), and hedonic motivation (Hwang & Moon, 2019) associated with cryptocurrency adoption.

A persons' experience with information technology affects their adoption decision (Alalwan et al., 2018). Albayati et al. (2020) and Huang (2019) showed that users' experiences with other similar information systems, such as online payment systems, make them confident in using cryptocurrencies. When individuals have previous experience of similar technologies,

it cuts down the time required for learning other such technologies (Davis, 1989). Also, according to Albayati et al. (2020), users' experience positively influences the perceived ease of use. So, if a person has a good experience in IT, then there is a high chance of that person adopting cryptocurrency. On the other hand, if a person has low or no experience in IT, then there is a lower chance of them adopting cryptocurrency.

Saif Almuraqab (2020) showed that technological awareness mediates the relationship between perceived ease of use and the intention to use cryptocurrencies. Aloudat et al. (2014) described technological awareness as providing information about the technology. According to Hall and Khan (2003), technology awareness, such as its existence, benefits, and usage, is critical for technology diffusion. Individuals' decisions on adopting the technology will be facilitated by full awareness (Devanur & Fortnow, 2009). Therefore, Saif Almuraqab (2020) showed that people's awareness of cryptocurrency positively affects ease of use.

Another cryptocurrency study conducted by Huang (2019) showed that gender (male) and higher income are key factors affecting people's intention to hold cryptocurrencies. Their study indicates that the male holding intention is more robust than females. As Furnham and Okamura (1999) showed, this might be because females are less likely to take moral risks with money than men. In addition, according to Asgary et al. (1997), the income and wealth of an individual, impacts the demand for money. For this reason, people who have higher incomes have less concern about the perceived future value of cryptocurrency than lower-income people; therefore, they are more likely to use cryptocurrency than individuals with low incomes (Huang, 2019).

According to the analysis, two cryptocurrency adoption studies showed that hedonic motivation and perceived enjoyment, influence the perceived benefit of cryptocurrency technology (Hwang & Moon, 2019; Nadeem et al., 2020). Hedonic motivation is one of the constructs in UTAUT (Venkatesh et al., 2012). A cryptocurrency adoption study conducted by Hwang and Moon (2019) considered hedonic motivation as the level of pleasure or enjoyment received from using cryptocurrency services. Cryptocurrency is an innovative technology that provides a unique financial experience to the user (Baur et al., 2015). For instance, there is no central control, there is anonymity for the participants and there is a

distributed ledger technology. Hedonic motivation encourages individuals to explore those features and influences them to use cryptocurrencies. Arnold and Reynolds (2003) define perceived enjoyment as happiness, interest and experience that a person may encounter during the purchasing process. Previous studies found that perceived enjoyment is positively associated with the benefit of the new system (Wen et al., 2011). Hsiao et al. (2016). When people are satisfied with a system, their intention to continue using the service is high. Therefore, Nadeem et al. (2020) showed that when people enjoy the benefits of cryptocurrencies, such as Bitcoin, their repurchasing attitude will be high.

Optimism and innovativeness are individual aspects discussed in previous cryptocurrency studies (Sohaib et al., 2020). Walczuch et al. (2007) define optimism as the positive view of an individual towards technology. Therefore, optimism and the use of technology are correlated. When a person has high optimism, their perception of the technology is high. Innovativeness refers to individuals' desire to pioneer in the technological domain (Parasuraman, 2000). Innovative individuals take risks and try new things (Connolly & Kick, 2015). Godoe and Johansen (2012) showed that optimism and innovativeness have a positive effect on the attitude towards the ease of use (PEOU) and perceived usefulness (PU) of a given technology. Therefore, these two individual aspects positively impact cryptocurrency technology readiness, making individuals more inclined to use it (Sohaib et al., 2020).

However, Parasuraman (2000) described technological discomfort as a persons' feeling of being overloaded by technology. When a person has higher technological discomfort with new technology, they usually find it more difficult to use (Walczuch et al., 2007) and then tend not to accept it (Parasuraman, 2000). Sobhanifard and Sadatfarizani (2019) argued that cryptocurrency technology is at the early stage of its introduction. Therefore, technological discomfort negatively influences the perceived ease of use and perceived usefulness which affects the adoption of cryptocurrencies, such as Bitcoin (Sohaib et al., 2020).

4.3.4 Social Factors

Social factors influence user adoption of new technology (Hester, 2010). Cheng et al. (2019) described social factors as close groups, social groups, communication and public opinion that influence individuals' motivation and attitudes for certain behaviour. According to the extracted data, nine cryptocurrency adoption studies identified four social factors that positively affect cryptocurrency adoption: social influence, subjective norm, e-WOM and observability.

According to the findings, three cryptocurrency adoption studies investigated social influences (Albayati et al., 2020; Hwang & Moon, 2019; Saif Almuraqab, 2020). Social influence refers to an individual's norms, roles, memberships and values, influencing the individual's perception of what they should do (Chaouali et al., 2016). Therefore, customer's cryptocurrency adoption behaviour can be understood by studying the effect of social influence on cryptocurrency technology. Albayati et al. (2020) showed that social influence positively influences perceived usefulness toward cryptocurrency adoption. It also encouraged the individuals to explore, evaluate the risk associated with the cryptocurrency technology and then develop trust towards the technology (Hwang & Moon, 2019).

Subjective norm is a part of the TRA model used in several technological adoption studies (Jokonya, 2017). Subjective norms are defined as the belief that important people think that users should or should not perform the behaviour (Bohr & Bashir, 2014). A person's peer groups encourage certain behaviours well accepted within that group while discouraging other behaviours. In other words, it refers to a person's sense of social influences to engage in a particular behaviour. Three cryptocurrency studies conducted by Baur et al. (2015), Schaupp and Festa (2018), and Murko and Vrhovec (2019) reveal that subjective norms positively affect trust and influence individuals to use cryptocurrency. Also, those studies indicate that those influences could be explicitly through direct discussion or implicitly through observed behaviour.

Several studies investigated the impact of Electronic Word of Mouth(e-WOM) and social media on technology adoption (Yoon, 2012). According to Hennig-Thurau et al. (2004),

eWOM refers to “any positive or negative statement made by potential, actual, or former customers about a product or company, which is made available to a multitude of people and institutions via the Internet.” (p. 39). With the advancement of the Internet, a person can share his or her views and opinions of a product or service with other people worldwide (Hennig-Thurau et al., 2004). Social media is an example of such an e-WOM platform (Yoon, 2012). A study conducted by Mangold and Faulds (2009) showed that consumers believe in the information published on social media and other online platforms about a product or service rather than information provided by sellers. Similarly, studies found that e-WOM about cryptocurrencies positively influences trust toward adopting Bitcoin and other cryptocurrencies (Anser et al., 2020; Gil-Cordero et al., 2020).

According to the finding, one cryptocurrency adoption study investigated the observability of Bitcoin (Yoo et al., 2020). Rogers (1995) described observability as the ability of an individual to identify the benefit of a product or service by observing other members of the society. According to Shiau and Chau (2016), when a person observes the benefit that the other members of the society enjoy from a particular technology, their trust toward that technology will change. When a person observes that other members of the society enjoy the social, economic, and individual benefits of Bitcoin, their trust towards the technology will be developed, and as a result, they will start using Bitcoin (Yoo et al., 2020).

4.3.5 Technological Factors

Studies have shown that technological factors influence the adoption of new technology (Hester, 2010). Technological factors refer to the characteristics of the underlying technologies to support a particular system (Alhazmi et al., 2015). Therefore, factors related to the cryptocurrency wallet and blockchain technology that influence cryptocurrency adoption were considered technological factors in this study. According to the extracted data, five cryptocurrency adoption studies analysed technological factors. These studies identified system design, trialability, facilitating conditions, and lack of wallet usability as technological factors.

Studies showed that good system design significantly influences the adoption of IT systems (DeLone & McLean, 1992). Zhou et al. (2009) described navigation, appearance, and layout

as a good system design that influences users' tendency to use a system. According to DeLone and McLean (1992), system quality and information quality influence system success. A study conducted by Alqaryouti et al. (2020a) showed that good design features, such as a user-friendly wallet interface and fast response time of the blockchain system, positively influence the perceived ease of the use of cryptocurrency.

Trialability is another technological factor positively affecting the adoption of cryptocurrencies (Yoo et al., 2020). A person prefers to try new technologies or services before they make a purchasing decision (Rogers, 1995). Therefore, Yoo et al. (2020) showed that the trialability of cryptocurrency minimised the users' fears of cryptocurrency technology and, therefore, it positively impacts perceived ease of use.

Venkatesh et al. (2003) described facilitating conditions as the degree to which the required infrastructure is available to run a specific technology. In the context of cryptocurrency, when the number of mining computers increases in the cryptocurrency network, the network will be more robust (Hwang & Moon, 2019) and faster (Abramova & Böhme, 2016). Therefore, facilitating conditions positively affected the perceived benefit of cryptocurrency towards cryptocurrency adoption (Arias-Oliva et al., 2021).

However, people are expecting wallet functionality to be similar to the existing systems. For example, a cryptocurrency adoption study conducted by Kazerani et al. (2017) reveals that a participant did not understand that a wallet address should be a string of alphanumeric characters. This participant expected the user interface of the Bitcoin wallet to be similar to her PayPal account's email address to send and receive money. Also, another study conducted by Baur et al. (2015) showed that Bitcoin is difficult to use in general; therefore, users require learning before using it. Therefore, these usability differences of wallets hamper the perceived ease of use of cryptocurrency technology (Baur et al., 2015; Kazerani et al., 2017).

Chapter 5: Discussion and Conclusions

5.1 Discussion

This study has identified 18 different factors that influence cryptocurrency adoption (See Figure 2). In particular, three push factors associated with limitations or problems with conventional money and the current financial system and ten pull factors associated with the benefits of cryptocurrency which influence its adoption. In addition, this study identified five mooring factors that either directly influence or indirectly influence cryptocurrency adoption by hampering or facilitating.

According to the findings, people are moving away from conventional money to cryptocurrencies due to the push factors. These factors include losing trust in the government and financial institutions (Sas & Khairuddin, 2017), insecurity of conventional money (Baur et al., 2015) and government policies on conventional money (Baur et al., 2015). These findings indicate that governments and financial institutions lack the appropriate capabilities to manage the current financial system, and as a result, conventional money becomes unsecured. In addition, the government policies to control the fund transfers makes the matter worse.

This study identified that people are adopting cryptocurrency due to several pull factors. This implies that various beneficial factors associated with cryptocurrency technology attract individuals into cryptocurrency. According to this review, perceived ease of use and effort expectancy, perceived usefulness, perceived benefits and performance expectancy, alternative banking system, alternative investment method, alternative payment method, high transaction speed, low transaction fees, trust, anonymity and controllability. According to the Table 3, the most commonly found pull factors by frequency are “perceived ease of use and effort expectancy” and “perceived usefulness, perceived benefits and performance expectancy”. This implies that customers are willing to use cryptocurrencies if it is easy to use (Albayati et al., 2020), easy to learn (Arias-Oliva et al., 2021), has direct and indirect benefits (Abramova & Böhme, 2016), can perform financial transactions effectively (Albayati et al., 2020) and efficiently (Arias-Oliva et al., 2021). In addition, low transaction costs

indicate that people are moving into cryptocurrency because they can save on money (Sas & Khairuddin, 2017); alternative investment implies that people intend to earn more profit from cryptocurrency than other ordinary investments (Alqaryouti et al., 2020b). Also, people valued their ability to control their money in the cryptocurrency platform. For example, a participant in the study of Khairuddin et al. (2016) expressed, "Bitcoin give us 100% freedom to control our money" (p. 2875). Although payment systems are good, people will not use them if they do not trust them (McKnight et al., 2002). According to the findings, people trust cryptocurrency because it is reliable (Khairuddin et al., 2016), transparent (Khairuddin et al., 2016; Sas & Khairuddin, 2017) and more credible (Sas & Khairuddin, 2017) than regular currencies.

As presented in Table 4, individual factors are the most commonly found mooring factor. The attitude to new technology can be found at the core of the individual, and a person's attitude shapes their experience (Albayati et al., 2020), optimism (Sohaib et al., 2020), innovativeness (Sohaib et al., 2020), and hedonic motivation (Hwang & Moon, 2019). Individuals exist in society; therefore, one cannot neglect the influence coming from social factors. These social factors positively influence individuals' motivation and attitudes toward cryptocurrency adoption (Baur et al., 2015; Schaupp & Festa, 2018). If users do not feel that the cryptocurrency technology is safe, they may not use it (Roussou et al., 2019). The previous literature showed that blockchain, the underlying cryptocurrency technology, provides better security protection to the users than other payment systems (Abramova & Böhme, 2016; Alqaryouti et al., 2020b; Roussou et al., 2019). In addition, cryptocurrency technology requires fast computer networks and mining servers (Arias-Oliva et al., 2021), user-friendly user interfaces (Baur et al., 2015) and an advanced software platform (Alqaryouti et al., 2020a) with its expansion. Hence, the development of those technologies in parallel to cryptocurrency technology is highly crucial for its adoption. Cryptocurrency is associated with several potential risks, including cyberattacks, financial losses due to price fluctuation, and legal risks that create barriers for its adoption.

As shown in Figure 2, mooring factors directly or indirectly affect the adoption of cryptocurrencies. In particular, mooring factors including security, social factors, technological factors positively moderate pull factors. For example, technological factors associated with good design features, such as a user-friendly wallet interface and fast response time of the blockchain system, positively influence the perceived ease of the use

of cryptocurrency (Alqaryouti et al., 2020a). Risks were the only mooring factor that negatively moderating the pull factors. Risks associated with cyberattacks on the cryptocurrency wallet hamper trust in the technology and create feelings of uncertainty in using cryptocurrency (Hwang & Moon, 2019). It also noticed that mooring factors such as individual factors directly or indirectly influence people's intention to adopt cryptocurrencies. For instance, as Asgary et al. (1997) showed, people who have higher income have less concern about the perceived future value of cryptocurrency than those with lower income; therefore, they are more likely to use cryptocurrency than individuals with low incomes (Huang, 2019). On the other hand, individual factors such as experience with similar technology positively influences perceived ease of use of cryptocurrency because it cuts down the time required for learning (Davis, 1989). However, this study does not find any mooring factors that influence cryptocurrency adoption through push factors.

It is important to point out that some pull factors are commonly reported in the studies conducted in multiple geographical locations. For example, perceived ease of use and perceived usefulness were found in the studies conducted in Australia, Spain, South Africa, China, Europe, Slovenia and UAE. Low transaction fees were found in studies conducted in Germany, Austria, Switzerland, UK, the USA, Israel, Iran, Malaysia, Canada, and other European countries. Cryptocurrency as an alternative investment method was found in studies conducted in UAE, China, Malaysia, Korea and Malaysia. Therefore, those factors are considered salient across countries.

The analysis also indicates that there are mixed findings on the role of usability, security and government intervention on the adoption of cryptocurrencies. Firstly, Sohaib et al. (2020) showed that the complexity of cryptocurrency technology builds the individual's discomfort and reduces perceived ease of use and perceived usefulness, leading to uncertainties in adopting it. Also, Mendoza-Tello et al. (2019) showed that the conceptual difference between cryptocurrencies and fiat money reduces perceived ease of use. However, this idea was rejected by Hwang and Moon (2019), who argued that cryptocurrency systems are simple, and users like the experiences that result from interacting with these systems. Similarly, Saif Almuraqab (2020) has shown that perceived ease of use is a major factor in the intention of people to utilise digital money. In addition, Alqaryouti et al. (2020a) found that perceived ease of use of cryptocurrency transactions has a positive and significant impact on people's attitudes regarding blockchain technology.

The studies identified in this review have reported conflicting results regarding the role of government interventions and policies. Abramova and Böhme (2016) showed that government intervention into cryptocurrency through policies and procedures positively influences cryptocurrency adoption because they increase trust in cryptocurrencies. However, Huang (2019) found that people expect more government intervention only when their holding coin quantity is low. Conversely, if a person holds a large number of coins, they are expecting lesser government intervention on cryptocurrency. This suggests that government cryptocurrency policies should not be generic for all customers. Instead, it should be tailored to different categories of consumers.

The finding also suggests that anonymity is a significant cryptocurrency feature that attracts customers to the technology (Khairuddin et al., 2016). This feature enables customers to get involved in transactions without revealing their identities. However, Baur et al. (2015) showed that anonymity enables dishonest participants to get involved in fraud without revealing their actual identity. These two factors are transitively dependent because improving one factor reduces the benefits of the other. Therefore, the success of cryptocurrency technology would depend on its ability to maintain the benefits to users while managing threats from fraud.

Finally, cryptocurrency security is another factor that shows conflicting results. For example, Kim and Lee (2018) showed that cyber-attacks such as CryptoShuffler, Rabbit Ransomware and the hacking of cryptocurrency exchange systems are major risks in the cryptocurrency technology. As a result, people are losing a large amount of money although they implemented security protection, such as virus guards on their PC, double authentication on wallets and security firewalls on the cryptocurrency exchange. However, other authors in this analysis, such as Roussou et al. (2019), Abramova and Böhme (2016) and Alqaryouti et al. (2020b), showed that distributed ledger technology and encryption mechanisms in cryptocurrency technology prevent hackers from stealing coins by changing transaction records. Previous information system studies show that cyber-attacks are a common threat for payment systems like mobile wallets (Abdulrahman et al., 2018) and online banking (More & Nalawade, 2015). These findings suggest that cyber-attacks are a threat not only for cryptocurrency but also for other payment technologies.

5.2 Conclusion

A cryptocurrency is a form of digital currency that acts as a medium of exchange. Although many people know about cryptocurrency, only a few are using it. The lack of wider adoption of cryptocurrency is likely to hamper its future growth. Therefore, it is essential to understand factors that shape cryptocurrency adoption decisions. However, according to Alzahrani and Daim (2019a), existing cryptocurrency adoption studies are fragmented. For this reason, to develop a comprehensive understanding of factors influencing cryptocurrency adoption, it is important to analyse and synthesise existing studies on cryptocurrency adoption together. Therefore, this dissertation systematically reviews the existing literature and classify the factors examined in previous studies that influence cryptocurrency adoption. The Push-Pull-Mooring (PPM) framework is one of the most commonly used frameworks to understand consumer adoption and migration in the field of information systems (Aries et al., 2020). Therefore, this is using the PPM framework to organise factors examined in previous studies into the push, pull, and mooring factors that influence cryptocurrency adoption.

This study is using the framework set out by Paré et al. (2015) to conduct the systematic literature review. In the first step, the research problem was formulated as “What are the push, pull, and mooring factors that influence an individual’s cryptocurrency adoption?” In the second step, the search keywords were identified and then searched on ACM digital library, IEEE Explore, Scopus and Web of Science databases. In the third step, the collected articles were screened and then evaluated and filtered using inclusion or exclusion criteria. The fourth step assessed the quality of identified articles by including only those with similar quality and discussing similar issues regarding cryptocurrency adoption. In the fifth step, the data was extracted from those studies and then organised for analysis. The final step was systematically evaluating extracted data, coding factors used in previous studies and classifying them into push, pull, and mooring factors, and presenting the findings in a meaningful way. The result of this research is based on 26 journal and conference articles.

Overall, the analysis identifies 18 different factors with 53 different subfactors affecting cryptocurrency adoption. The result suggests that push factors positively influence people

to move away from conventional money to cryptocurrencies. These factors include losing trust in the government and financial institutions. In addition to that, the result showed that pull factors such as perceived ease of use, perceived usefulness and alternative investment methods attract people into cryptocurrencies. Finally, this study identified that mooring factors, such as risks, negatively influence the pull factors, while social factors, technological factors, and security, positively influence the pull factors. It is also noticed that mooring factors, such as individual factors, directly influence people's cryptocurrency adoption decisions.

5.2.1 Theoretical Contributions

This study has four theoretical contributions. Firstly, according to Alzahrani and Daim (2019a), existing cryptocurrency adoption studies are fragmented. In addition, many cryptocurrency adoption studies rely on TAM (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a, 2020b; Baur et al., 2015; Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Nadeem et al., 2020; Roussou et al., 2019; Shin, 2008), UTAUT (Arias-Oliva et al., 2021; Hwang & Moon, 2019; Saif Almuraqab, 2020), TRA (Sohaib et al., 2020), TPB (Anser et al., 2020; Schaupp & Festa, 2018) or HCI principles (Sas & Khairuddin, 2017) to investigate cryptocurrency adoption. Different constructs such as technological, behavioural, trust, risk, and security were found to influence cryptocurrency adoption. To fill any previous research gaps, this study develops an organising framework based on PPM theory to analyse and synthesise previous cryptocurrency adoption factors together. This framework offers a comprehensive understanding of how weaknesses with conventional money, benefits of cryptocurrency and other factors including risks, security, individual factors, social factors and technological factors directly or indirectly influence cryptocurrency adoption.

Secondly, this literature review highlights that the limitations of the current financial system push people from conventional money to using cryptocurrencies. According to the previous literature, people are losing trust in the government and financial institutions (Sas & Khairuddin, 2017), they feel conventional money is insecure (Baur et al., 2015), and that government policy limits financial freedom (Baur et al., 2015). For these reasons, people are moving from conventional money to decentralised cryptocurrencies.

Finally, this study shows that several benefits of cryptocurrency that are not offered in the traditional currencies attract individuals to adopt it. In particular, this study drew these beneficial factors from studies that used different theoretical perspectives and comprehensively combined them as pull factors. These benefits range from how easy it is to use cryptocurrency (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Nadeem et al., 2020; Saif Almuraqab, 2020; Sohaib et al., 2020), low transaction fees (Abramova & Böhme, 2016; Alqaryouti et al., 2020b; Baur et al., 2015; Ermakova et al., 2017; Khairuddin et al., 2016; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019), alternative investment (Alqaryouti et al., 2020b; Huang, 2019; Khairuddin et al., 2016; Lee et al., 2018; Sas & Khairuddin, 2017), high transaction speed (Abramova & Böhme, 2016; Baur et al., 2015; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019) and trust (Albayati et al., 2020; Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Saif Almuraqab, 2020). These factors encourage people to use cryptocurrencies. Also, some studies identify mooring factors that directly or indirectly influence people to adopt cryptocurrency. The mooring factors, such as risks, negatively influence the pull factors (Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Shin, 2008), while social (Albayati et al., 2020; Hwang & Moon, 2019; Saif Almuraqab, 2020), technological (Alqaryouti et al., 2020a), and security (Roussou et al., 2019) factors positively influence the pull factors. These mooring factors suggest that, in addition to the weaknesses of conventional money and benefits of cryptocurrency, one needs to consider the importance of mooring factors often associated with social factors, technological factors and individual factors that may shape people's decision to adopt cryptocurrency.

5.2.2 Practical Contributions

This research has three practical contributions. Firstly, this study identified that people are frustrated with the existing banking system and financial system, and therefore, they are looking for an alternative banking system (Alqaryouti et al., 2020b). The knowledge of this study will enable cryptocurrency stakeholders, such as banks, exchanges and businesses, to develop strategies that encourage people to use cryptocurrencies in their daily lives.

Secondly, this study showed the importance of government regulation and support for cryptocurrency adoption (Schaupp & Festa, 2018). Therefore, it is important for governments to establish appropriate policies and support to promote cryptocurrency adoption while managing risks associated with cryptocurrency in their countries.

Finally, this study has identified multiple technical challenges that users face with the existing cryptocurrency platforms. Some challenges are the inability to recover lost passwords, the irreversibility of transactions and wallet usability issues. Those challenges hamper the wide adoption of cryptocurrency. Therefore, it is prudent for cryptocurrency platform developers to understand customer concerns and address these issues to improve the existing cryptocurrency platforms or develop a new one.

5.2.3 Limitations and Future Research

There are a few limitations of this study. Firstly, this research is based on the data collected from previous cryptocurrency adoption studies. Since it does not collect primary data or biases, the limitations and validity issues of those studies may have been reflected in this study (Kitchenham & Charters, 2007). To overcome this limitation, a careful assessment of the quality of the included articles was done as part of the systematic literature review process. Secondly, this study was based on previous journal articles and conference papers. However, cryptocurrency is a relatively new and dynamic concept, and therefore, there is a vast amount of information available on other information sources such as online materials and commercial publications. Although this study did not include those resources, the finding of this study is still relevant since it involved studies from well-recognised, peer-reviewed journals and conferences. Lastly, this study is based on the articles that were identified from four major databases, including ACM digital library, IEEE Explore, Scopus, and Web of Science. It did not include other databases such as JSTOR, ProQuest (computing) and SpringerLink; therefore, some journal or conference papers available in those databases are not part of this study. Hence, it is another limitation of this study. However, the findings of this study are still applicable since the selected studies were from the four popular databases that other systematic literature review studies have used (Badawi & Jourdan, 2020).

This study suggests some areas for future research. Most of the current research on cryptocurrency adoption focuses on technological acceptance or behavioural intention. However, Burton-Jones and Volkoff (2017) showed that technology adoption does not actually reflect effective use. They described effective use as actions and interactions in which the desired outcome can be achieved using IT. Therefore, future studies may want to move beyond adoption decisions and investigate effective use of cryptocurrencies.

Furthermore, this study observed that the number of push factors is significantly lower than pull factors. However, it was not able to identify the reason for those significant differences. For this reason, this study recommends that future research be conducted to identify why there are such a low number of push factors on the adoption of cryptocurrencies. Therefore, it is suggested that future studies use push-pull-mooring factors as a guiding framework to investigate factors that shape cryptocurrency adoption.

The findings suggest that most cryptocurrency adoption studies focused only on Asia, Europe, North America, Africa, and Australia. According to the PWC report, Latin American countries such as Brazil and Mexico play a significant role in the world's economy and will have the 9th and 10th biggest economies by 2030. However, there were no studies conducted on Latin American people. Therefore, it is recommended that studies should look into cryptocurrency adoption in the Latin American region.

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Appendix

Table 5 Categories, sub-categories, and open codes for the findings

Factors	Main categories	Sub-categories	Open codes	Text associated
Push	Losing Trust in the Government and Financial Institutions	Losing Trust in the Government and Financial Institutions	Losing Trust in the Government and Financial Institutions	People are moving away from regular money to cryptocurrency because they are losing trust in the government and financial institutions (Sas & Khairuddin, 2017)
	Insecurity of Conventional Money	Insecurity of Conventional Money	Insecurity of Conventional Money	People believe that regular currencies are insecure, and therefore there is a need for a more stable currency, such as cryptocurrency (Baur et al., 2015)
	Government Policies for Conventional Money	Government Policies for Conventional Money	Government Policies for Conventional Money	People are moving away from regular money to avoid restrictions from these rigid government policies (Baur et al., 2015)
Push	Perceived Ease of Use and Effort Expectancy	Perceived Ease of Use	Perceived Ease of Use	This research identified eight studies that investigated the relationship between perceived ease of use and cryptocurrency adoption and all studies found that perceived ease of use significantly and positively influenced cryptocurrency adoption (Abramova & Böhme, 2016; Albayati et al., 2020; Alqaryouti et al., 2020a; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Nadeem et al., 2020; Saif Almuraqab, 2020; Sohaib et al., 2020).
		Effort Expectancy	Effort Expectancy	Effort expectancy is positively linked with the intention of using cryptos." (Arias-Oliva et al., 2021, p. 4)
	Perceived Usefulness, Perceived Benefits and Performance Expectancy	Perceived Usefulness	Perceived Usefulness	These beliefs such as high transaction speed and better controllability than regular currencies affect perceived usefulness and in turn influence cryptocurrency adoption decisions (Albayati et al., 2020; Lee et al., 2018; Mendoza-Tello et al., 2019; Murko & Vrhovec, 2019; Roussou et al., 2019; Saif Almuraqab, 2020; Shin, 2008; Sohaib et al., 2020)
		Perceived Benefits	Perceived Benefits	The perceived benefits of cryptocurrencies directly influence the consumer's intention to use (Abramova & Böhme, 2016; Yoo et al., 2020).

		Performance Expectancy	Performance Expectancy	Arias-Oliva et al. (2021) and Gil-Cordero et al. (2020) studies showed that performance expectancy of cryptocurrency influences an individual's behavioural intention towards using cryptocurrencies.
	Alternative Banking System	Alternative Banking System	No banks, No intermediation or Supervision	Cryptocurrency provides an alternate banking system for consumers by removing intermediaries and banks (Alqaryouti et al., 2020b; Ermakova et al., 2017).
	Alternative Investment Method	Alternative Investment Method	Investment, Expected value growth, High return, High profitability, Future financial benefits	This study identified five different cryptocurrency adoption studies which discussed cryptocurrency as an alternative investment option (Alqaryouti et al., 2020b; Huang, 2019; Khairuddin et al., 2016; Lee et al., 2018; Sas & Khairuddin, 2017)
	Alternative Payment Method	Online Payment Method	Online payment, Online transactions	The ability to use cryptocurrency as an online payment method and compatibility factors influence cryptocurrency adoption (Alqaryouti et al., 2020b; Sas & Khairuddin, 2017).
		Compatibility	Compatibility	Lee et al. (2018), Roussou et al. (2019) and Yoo et al. (2020) showed that cryptocurrency transaction compatibility is positively related to using cryptocurrencies.
	High Transaction Speed	High Transaction Speed	Instance fund transfers, Instance settlement, Immediate payment, High-speed transactions	Four studies showed that cryptocurrencies offer a faster transaction speed than regular currencies, and therefore people tend to move into cryptocurrency (Abramova & Böhme, 2016; Baur et al., 2015; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019).
	Low Transaction Fees	Low Transaction Fees	Low or no fees, Low cost, Cheap money transfer	The low transaction cost of cryptocurrencies in international transactions contributes to cryptocurrency adoption (Abramova & Böhme, 2016; Alqaryouti et al., 2020b; Baur et al., 2015; Ermakova et al., 2017; Khairuddin et al., 2016; Sas & Khairuddin, 2017; Sobhanifard & Sadatfarizani, 2019)
	Trust	Perceived Trust	Perceived Trust	According to the previous finding, perceived trust positively influences the intention to use cryptocurrencies (Albayati et al., 2020; Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Saif Almuraqab, 2020).
		Credibility of the Technology	Credibility of the Technology	"Almost a quarter of participants mentioned this complexity and the cost of the mining procedure. Their appreciation for miners' expertise fosters credibility in bitcoin currency and transactions." (Sas & Khairuddin, 2017, p. 6503)

		Reliability of the Technology	Reliability of the Technology	Participants in Khairuddin et al. (2016) mentioned that "I admire the blockchain platform. How it gets the data recorded, it cannot be deleted, and it doesn't need to be centralized." (p. 2875).	
		Transparency	Transparency	The transparency of the cryptocurrency technology increases the trust of users towards cryptocurrency adoption (Khairuddin et al., 2016; Sas & Khairuddin, 2017).	
		Government Regulations and Support	Government regulations and support	"Government regulation and instructions positively affect the customers' trust in new blockchain technology applications." (Albayati et al., 2020, p. 11)	
	Anonymity	Anonymity	Anonymity	The anonymity of the people behind transactions is one of the benefits of cryptocurrency and this positively influencing cryptocurrency adoption (Alqaryouti et al., 2020b; Ermakova et al., 2017; Khairuddin et al., 2016).	
	Controllability	Financial Freedom	Financial freedom	"First, some participants have noted the importance of freedom and control over one's finances: Bitcoin give us 100% freedom to control our money"(Khairuddin et al., 2016, p. 2875)	
		Individual Empowerment	Individual Empowerment	"more than half of participants perceive this as an opportunity to become more empowered and privileged to regain control over their own money" (Sas & Khairuddin, 2017, p. 6503)	
		Control on the Exchange Rate	Control on the Exchange Rate	"five important motivations for using cryptocurrencies are: training development of the cryptocurrencies, low cost of an international transaction, benefits from blockchain technology, users control on exchanges and high-speed transaction" (Sobhanifard & Sadatfarizani, 2019, p. 7)	
	Mooring	Risks	Perceived Risk	Perceived risk	When there is a feeling of doubt, fear, conflict, emotional distress, or cognitive dissonance, perceived risk enters the buying/adoption decision and therefore perceived risk of cryptocurrencies negatively affects the perceived benefit of cryptocurrencies (Gil-Cordero et al., 2020; Mendoza-Tello et al., 2019; Shin, 2008).
			Irreversibility of Transaction	Irreversibility of Transection	"The rationale for irreversible transactions addresses the limitation of the centralized financial system which allows reversible transactions without being bound to enforce the parties' contract stating that the sale is final" (Sas & Khairuddin, 2017, p. 6505)
Financial Losses Due to Password Loss			Financial Losses Due to Password Loss	Financial losses due to the loss of passwords negatively impact the individuals' decision to select cryptocurrencies as an investment method (Abramova & Böhme, 2016; Ermakova et al., 2017; Sas & Khairuddin, 2017)	

		Financial Losses Due to Price Fluctuation	Financial Losses Due to Price Fluctuation	Abramova and Böhme (2016) and Ermakova et al. (2017) showed that financial losses due to the price fluctuation of a cryptocurrency reduce the intention of selecting cryptocurrency as an investment method.
		Fraud	Fraud	"Findings indicate that a considerable risk factor is dishonest partners with whom one engages in bitcoin transactions." (Sas & Khairuddin, 2017, p. 6502)
		Cyberattack	Cyberattacks, Malicious hacker attacks	"A friend lost 14 Bitcoins even though he applied double authentication on multiple devices" (Sas & Khairuddin, 2017, p. 6504). Therefore, factors such as cyberattacks on the cryptocurrency wallet hamper trust in the technology and creating feelings of uncertainty to use them (Hwang & Moon, 2019).
		Legal Risks	Legal Risks	"The empirical analysis also shows that Financial Losses, Legal Risk and Adoption Risk tend to substantially influence Perceived Risk, while Operational Risk has a lower impact." (Abramova & Böhme, 2016, p. 12)
		Government Intervention	Government Intervention	"The more perceived transaction and speculation risks of Bitcoin the people understand, the less government intervention they are expected to prefer to have" (Huang, 2019, p. 3582)
	Security	Perceived Security	Perceived Security	"First, the results indicate the significant role of perceived security onto the actual use of digital currencies by businesses." (Roussou et al., 2019, p.249)
		Security Protection	Security Protection	When the cryptocurrency mining process is complex, the security protection of the technology will increase, and as a result, trust in the cryptocurrency technology will be developed (Abramova & Böhme, 2016; Alqaryouti et al., 2020b).
		Security Concerns	Security Concerns	"Based on the research results, security concerns and risk have been proved to be important moderating effects as a great interest for cryptocurrency users." (Hwang & Moon, 2019, p. 4633)
	Individual Factors	Attitude to New Technology	Attitude to New Technology	Albayati et al. (2020) and Schaupp and Festa (2018) showed that customer's attitude to new technology strongly affect their behavioural intention towards cryptocurrency adoption.
		Experience with Similar Technology	Experience with Similar Technology	Albayati et al. (2020) and Huang (2019) showed that users' experiences with other similar information systems such as online payment systems make them confident to use cryptocurrencies.
		Technological Awareness	Technological Awareness	"Awareness of digital currency will have a positive influence on UAE citizens' perceived ease of use of digital currency." (Saif Almuraqab, 2020, p. 3)

		Gender (Male)	Gender (Male)	"Their gender, income, and experience of digital token usage would affect the relationship ranging from the Perceived Value to Holding Intention;" (Huang, 2019, p. 3582)
		High Income	High Income	"Their gender, income, and experience of digital token usage would affect the relationship ranging from the Perceived Value to Holding Intention;" (Huang, 2019, p. 3582)
		Hedonic Motivation	Hedonic Motivation	"a deep understanding of performance expectancy, social influence, hedonic motivation, security concerns, and risk in cryptocurrency system can be very useful to determine strategies and actions in leading cryptocurrency users to become real traders." (Hwang & Moon, 2019, p. 4633)
		Optimism	Optimism	"optimism and innovativeness act as motivators, making individuals more inclined to use new technology" (Sohaib et al., 2020, p. 13145)
		Innovativeness	Innovativeness	"optimism and innovativeness act as motivators, making individuals more inclined to use new technology" (Sohaib et al., 2020, p. 13145)
		Perceived Enjoyment	Perceived Enjoyment	"Perceived enjoyment is positively associated with repurchase intention of Bitcoin." (Nadeem et al., 2020, p. 628)
		Technological discomfort	Technological discomfort	"insecurity and discomfort act as inhibitors to acceptance and adoption of a given technology." (Sohaib et al., 2020, p. 13145)
	Social Factors	Social Influence	Social Influence	According to Hwang & Moon (2019) and Saif Almuraqab (2020), customer's cryptocurrency adoption behaviour can be understood by studying the effect of social influence on cryptocurrency technology, and Albayati et al. (2020) showed that social influence positively influences perceived usefulness toward cryptocurrency adoption.
		Subjective Norm	Subjective Norm	Baur et al. (2015), Schaupp and Festa (2018), and Murko and Vrhovc (2019) reveal that subjective norms are positively affecting trust and influence individuals to use cryptocurrency.
		e-WOM	e-WOM, Social media	Studies found that e-WOM about cryptocurrencies positively influence trust toward adopting Bitcoin and other cryptocurrencies (Anser et al., 2020; Gil-Cordero et al., 2020)
		Observability	Observability	"Whereas complexity did not notably affect attitudes, other factors (compatibility, observability, and trialability) played key roles in this process." (Yoo et al., 2020, p. 7)
	Technological Factors	System Design	System Design	"Good application design and friendly interface have a positive and significant impact on perceived ease of use toward cryptocurrency transactions that are supported by blockchain technology." (Alqaryouti et al., 2020a, p. 7)

		Trialability	Trialability	Whereas complexity did not notably affect attitudes, other factors (compatibility, observability, and trialability) played key roles in this process. (Yoo et al., 2020, p. 7)
		Facilitating Conditions	Facilitating Conditions	Facilitating conditions are related positively with the intention of using cryptos." (Arias-Oliva et al., 2021, p. 4)
		Lack of Wallet Usability	Lack of Wallet Usability	The usability differences of cryptocurrency wallets hamper the perceived ease of use of cryptocurrency technology (Baur et al., 2015; Kazerani et al., 2017).