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In This Issue

EXAMINE THE PEOPLE READINESS ON CENTRAL BANK DIGITAL CURRENCY (CBDC) IN MALAYSIA

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CONTENTS

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1.0. INTRODUCTION

1.1 Background of the study

The aim of this study is to examine the people readiness on Central Bank Digital Currency (CBDCs) in Malaysia. This will involve an examination and an analysis of the relationship between the four factors (optimism, innovativeness, discomfort, and insecurity) and perceived ease of use, perceived usefulness, and willingness. The framework on which this research study is based on the Technology Readiness Index (TRI) from Parasuraman (2000), Technology Acceptance Model (TAM) from Davis *et al.* (1989). These two frameworks are to investigate the people's readiness and acceptance level towards a new technology.

1.2 The rationale for the research

The financial industry is experiencing a fundamental shift due to technological progress and digital innovation, which is transforming the way we conduct financial transactions. There is now greater competition among banks as digital currency becomes increasingly sophisticated. Although cash and reserve balances are currently limited to a select few institutions, this may change as digital currencies become more prevalent. As the world becomes more digitalized, users are seeking to bypass intermediaries such as lawyers, brokers, and bankers, in favour of faster and cheaper transactions that put them at the centre. These changes and underlying factors are driving the introduction of digital currencies into our societies.

CBDCs have gained popularity in recent times, generating interest from the public, policymakers, regulators, and bankers. It is expected that the introduction of CBDCs will have an impact on the financial systems. As per the Bank of International Settlements (BIS) (2020), 80% of the central banks across the global are exploring CBDCs and have progressed beyond the research phase to pilot testing or launching. A few countries have already started distributing CBDCs to their citizens, such as the Bahamas (*Sand Dollar*) and China (*e-CNY*) (PwC, 2021). Moreover, blockchain technology and distributed ledgers were utilized to keep track of the transactions and movement of the digital currency. The country's central bank manages and issues this currency, which is considered an innovative financial technology. Central banks across the world are starting to adopt this technology, which challenges the existing rules and regulations that govern global monetary and payment systems (Zulhuda and Sayuti, 2017).

Moreover, with the covid-19 pandemic causing cash shortages and hygiene concerns, people in some countries are using physical currency less frequently. Consequently, there has been a growing trend towards digital financial transactions as people shift away from cash. Banks and financial institutions process a significantly larger number of transactions digitally compared to physical branch transactions. Thus, in this research, we will focus on the centralized digital currency development, which called the central bank digital currencies (CBDCs).

1.3 Theoretical background

In this study, Technology Readiness Index (TRI) and Technology Acceptance Model (TAM) will be used in the research which to investigate on a new technology. To adopt a new financial transaction method, it is important to understand the people readiness and whether they are going to accept this new technology. According to Parasuraman (2000), TRI is a theory that examines the people desire to use new technology to improve their efficiency in life or business whereas TAM is an information systems theory that examines the factors influence the people decision to adopt the new technology (Davis *et al.*, 1989). Past researchers has proven that the validity of TRI and TAM in effectively forecasting intention to utilize new technology such as online banking (Ahmad *et al.*, 2010), e-wallet (Lim *et al.*, 2022), and cryptocurrency (Ji-Xi *et al.*, 2021). Thus, it has been established that TRI and TAM are applicable models to investigate the factors that affect the readiness of accepting CBDCs in Malaysia.

In this study, the Willingness (WILL) of adopting CBDCs among Malaysian will be the dependent variable and both Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) whereas Optimism (OPT), Innovativeness (INN), Discomfort (DIS), and Insecurity (INS) will be the independent variables.

1.4 Research aim and objectives

This study aims to examine the readiness level of the Malaysian population towards central bank digital currency (CBDCs) as a potential replacement for physical banknotes. With the possibility of CBDCs becoming a more prevalent form of payment in the future, it could significantly alter daily transactions. This study seeks to achieve to following objectives:

- To investigate the readiness of accepting the CBDCs by the Malaysian
- To explore the willingness of the Malaysian towards using CBDCs in their daily transactions
- To examine the relationship between readiness and willingness of using CBDCs

1.5 Contribution

There are two major contributions that this research is expected to make it. Firstly, there has been a lack of study on the readiness towards CBDCs in Malaysia, and this study is intended to contribute on giving confidence to the CBDCs' developer (Bank Negara Malaysia, known as Central Bank Malaysia) to understand the people thought on this. As developing a new financial payment system will cost a lot of time and money in term of research and development.

Secondly, the results presented here can contribute to an understanding of the Malaysian's willingness on adopting CBDCs, as there CBDCs is still a new financial concept in Malaysia, and the e-wallet and online banking trend are boosting during the covid-19 period.

Besides, the inclusion of the relationship between the factors and willingness which addresses a gap in the research literature that is lack of study in Malaysia.

1.6 The structure of this study

To fulfil the above-stated objectives, this study is structed as follows:

Chapter 1 provides an introduction. It sets out the background of this study, the rationale for the research, the theoretical background, the research aim and objectives. Chapter 2 outlines the importance of the research domain by defining the scope of analysis and conducting a comprehensive review of digital currency and CBDCs, with particular emphasis on the perspective of Bank Negara Malaysia (BNM) and the theoretical and conceptual research framework of technology models. Chapter 3 elaborates on the methodology utilized in this research. Chapter 4 presents the results and analysis of the key findings obtained. Chapter 5 will be discussing the findings from Chapter 4 and it also states some potential research limitations and concludes by raising possible areas for future research. Finally, in the chapter 6, the main conclusions will be presented.

2.0. LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to review the readiness literature on the relationship between the four subscales, perceived ease of use, perceived usefulness, and willingness with a view to its application in adopting CBDCs. This will involve a detail review of digital currency, CBDCs, adoption in other countries, Malaysia perspective towards CBDCs, theoretical framework, and research gap.

This chapter is divided into the following six sections. The first section looking into what is a digital currency, and how a transaction works using the blockchain technology. The second section investigates what is a CBDCs, the differences between private digital currencies, CBDCs, and E-money, and the benefits of developing CBDCs. The third section of the review will be discussing the adoption in other countries based on the stages (research, proof-of-concept, pilot, and launched). The fourth section will be discussing the Central Bank of Malaysia perspective towards CBDCs. The fifth section will be disclosing the theoretical framework of Technology Readiness Index (TRI), Technology Acceptance Model (TAM), and Technology Readiness and Acceptance Model (TRAM). The conceptual framework of this study will be stated in the sixth section, following the empirical review in the seventh section, and research gap in the final section.

2.2 Digital Currencies

2.2.1 What is a digital currency?

Digital currency refers to a type of electronic currency that employs new technologies such as cryptography, peer-to-peer networking, database, and consensus systems. Bitcoin and Ethereum are some of the most well-known examples of digital currency. Advancements in technology have resulted in an increase in digital payments and a decrease in the use of physical money (CFI, 2022). Based on survey conducted by Statista (2022) in 2021, 12% of Malaysians were already utilizing digital currencies in their daily lives.

2.2.2 How a transaction work using blockchain technology

Blockchain technology was first introduced in 2008 by Nakamoto, and it has gained significant attention from businesses due to its potential to revolutionize operational processes. This technology's main features included traceability, transparency, smart contracts, and security, which it is suitable for various applications like cryptocurrency (Taherdoost, 2022). In addition, the blockchain is a decentralized database that maintains a public ledger of all executed transactions and digital events. The system relies on consensus from many participants to verify each transaction, and once a transaction is recorded, it cannot be deleted. Essentially, the blockchain provides an immutable and transparent record of all transactions that have occurred (Crosby *et al.*, 2015).

The blockchain network receives digitally signed transaction messages, which are then chosen and combined into a secured block by miners. These miners have substantial computing power and engage in competition to verify the transactions by solving intricate coded puzzles. In a typical digital currency

system, the miner who solves the complex coded problem and validates the block is rewarded with bitcoins and may also receive a transaction fee. This miner system is a common characteristic of all digital currencies, but it remains unclear who would perform this role in a Central Bank Digital Currency (CBDC), which is a crucial aspect of its design (Achord, 2017).

When a new set of transactions is confirmed by a miner, it is time-stamped and appended to a chain of previous blocks in a sequential manner, forming a blockchain that records the entire transaction history. The miner who first validates a new block broadcast it to the entire network, allowing other miners to verify and add it to their own chains. This ensures that the whole network is informed of all transactions through validated blocks, and every miner has a copy of the blockchain.

2.3 Central Bank Digital Currency (CBDCs)

Central banks usually issue two types of liabilities which are physical banknotes and digital central bank assets, also known as reserves or settlement balances (BIS, 2020). Physical banknotes are traditionally used for transactions between businesses and customers. However, with advancements in technology, the global payment system has shifted from a cash-based culture to a cashless one. This has led to the emergence of innovative payment methods, such as mobile and contactless payments, which are more convenient and cost-effective (Rahman *et al.*, 2020). Consequently, central banks are now compelled to create their own digital currency. This section will go into the concept of central bank digital currency.

2.3.1 What is CBDCs?

A CBDCs refers to a type of digital money issued by a central bank that is distinct from the traditional reserve or settlement accounts typically used by banks (BIS, 2020). The concept of CBDCs and stable coins share similarities, but they are not identical. Stable coins are a form of cryptocurrency that is privately created and stabilized through being pegged to a currency, commodity, or financial instrument, aimed at maintaining a consistent value. On the other hand, CBDCs are created and managed by a government or central authority and are not decentralized like cryptocurrencies (McKinsey & Company, 2023).

The main advantage of CBDCs is the possibility for individuals and companies outside of the banking sector to have direct accounts with the central bank, as well as engage in transactions with each other using CBDCs as a legitimate form of currency (BNM, 2017). The distributed ledger

technology (DLT) used in private digital currencies has enabled this development.

According to BNM (2017), a "government cryptocurrency" could be said of CBDCs given the suggested underpinning DLT. It should be differentiated from e-money, which is just a new feature of the payment system that allows for cashless transactions. Table 1 was listed the key features of these payment methods.

2.3.2 Comparison of Private digital currencies, CBDCs and E-money

Private digital currencies or virtual currencies such as Bitcoin and Ripple are a digital form of value representation that is no involvement of central banks or governments in its issuance, and in the event of any issues, there are no such entities that can intervene or take corrective actions. However, the highly unstable nature of private digital currencies or virtual currencies causes it to fluctuate rapidly, which is not desirable when conducting transactions. Therefore, if Malaysia has introduced own digital currency, the government would need to maintain a stable value, ensuring their reliability and consistency over an extended period.

E-money or mobile money is a form of cashless retail payment system which the monetary value that is physically stored in an electronic device and can be utilized for various transactions and purchases across a range of retailers and purposes. However, e-money has several differences from other forms of money. Unlike physical banknote, which relies on physical security measures, e-money use cryptography to verify transactions and ensure the confidentially and integrity of data. E-money eliminates the need for physical exchange, making it ideal for remote payments. Additionally, it is most available e-

money schemes prevent recipients from reusing the received funds (European Central Bank, 1998).

	Private digital currencies / Virtual currencies	Central bank digital currencies	E-money / mobile money
Definition	• Digital representation of value, not issued by a central bank, credit institution or e-money institution, which, in some circumstances, can be used as an alternative to money • Cryptocurrencies are a subset of private digital currencies, which uses cryptographic proof for its verification process	• Monetary value stored electronically that is a liability of the central bank and can be used to make payments	• Actual monetary value stored in an electronic device that can be used to make payments across retailers and purposes
Key aspects	• New currency • New payment system (DLT)	• New currency • New payment system (DLT)	• A form of cashless retail payment system
Examples	• Bitcoin • Ripple	• Dinero Electronico (Ecuador)	• Touch'n'Go card (Malaysia) • Octopus card (Hong Kong)

Table 1: Comparison of Private Digital Currencies, CBDCs and e-Money

Source: Extracted from Bank Negara Malaysia (2017)

2.3.3 The benefits of developing CBDCs

Malaysians are becoming familiar to the use of going cashless to purchase goods and services, whether through online platforms or physical stores, in order to reduce contact with others since covid-19 pandemic steps into post-pandemic stage. At the same time, physical banknote usage was reduced because of the "go cashless" trends. Even though it is easy for users to make payments, at the same time, there are a number of variables that may prevent people from switching to a different financial payment method. Thus, there are benefits by developing CBDCs.

The adoption of blockchain technology in the development of CBDCs would enhance the trustworthiness and safety of financial transactions such as prevention of financial crime compared to the traditional financial transactions (*The Federal Reserve*, 2022) like physical banknote, online banking, and e-wallet. Take the example of physical banknote, it is difficult for central bank to track the transaction of the physical banknote as it is anonymous and non-traceable (Amstad *et al.*, 2019). Thus, money laundering and illegal activities and tax evasion are often occurred due to it anonymity and non-traceability. Therefore, financial institutions are required to follow a comprehensive set of rules designed to prevent money laundering and the financing of terrorism. These rules include fulfilling customer due diligence, keeping records, and fulfilling reporting requirements (BNM, 2019). Any CBDCs implementation should be designed to make following to these regulations to reduce the financial crime.

Furthermore, CBDCs have the potential to enhance cross-border payments in various ways, including the integration of modern technologies, the creation

of simple channels for distribution, and the provision of more opportunities for cooperation and interoperability across various authorities (BIS, 2022). However, to achieve these advantages would require necessitate substantial international cooperation to address various issues including the development of shared standards and infrastructure, determining which intermediaries would be granted access to the new infrastructure, creating legal frameworks, preventing unauthorized transactions, and controlling the cost and timeline of implementation (*The Federal Reserve*, 2022).

In addition, the utilization of blockchain technology in digital currency will expedite and lower the expenses of transactions. The digital transformation of payments will prompt businesses to facilitate the transaction to digital currency. Nevertheless, apprehensions exist that the implementation of blockchain and CBDCs could impinge upon the privacy and confidentiality of individuals. However, given the uncertainties surrounding the implementation of blockchain technology, it is highly beneficial to use a technique that assesses the maturity of various technical aspects to increase transparency regarding the current level of maturity (Holm and Goduscheit, 2020). Using blockchain technology, individuals can conduct transactions without relying on a centralized authority, as it utilizes a community databank. Researchers have examined both the technological and economic aspects of CBDCs. Central banks are considering the implementation of CBDCs to ensure that the public has a safe, publicly issued payment alternative that can supplement cash in the context of declining cash usage and limited access to traditional banking services (Carstens, 2021). Therefore, comprehending individuals' attitudes towards CBDCs usage can aid in obtaining a better understanding of the transition from physical cash to digital currency.

Therefore, in recent years, central banks have significantly expanded their research and development efforts on CBDCs. These initiatives are supported by an expanding amount of economic research, which frequently focuses on the "reserves for all" component of CBDCs for public use (BIS, 2021). On the other hand, CBDCs should be viewed in the context of the digital economy and the importance of data, which raises questions about safety, monetary system integrity, transaction efficiency, and easy of assess.

2.4 Adoption in other countries

The implementation of CBDC development typically occurs in three major stages, research, proof-of-concept, and launched stage. The stage of CBDC implementation based on countries will be covered in this section.

2.4.1 Research

Many central banks have been researching the potential for implementing CBDC in their economy. The United States of America (USA), the United Kingdom, countries in the European Union, and many countries which shown in Figure 1 were actively considering the approaching inclusion of CBDC into their monetary systems.

For instance, the US Federal Reserve has been actively developing CBDC. According to Dodev (2018), Massachusetts Institute of Technology and the Federal Reserve Bank of Boston are having their research in the advance stage, and they are nearly completing the payment system prototypes that linked to the digital dollar of the "Fedcoin" project.

Figure 1: Spectrum of motivations for CBDC work

Source: Extracted from Central Bank websites and publications, News flow (2020)

2.4.2 Proof-of-Concept

In addition, to the nations that are presently doing research, many countries have already in the final stage of proof-of-concept (PoC) like countries such as China, Canada, Saudi Arabia, Hong Kong, Thailand, and more. At the same time, they have started their pilot stage.

The People's Bank of China (PBOC) introduced "Digital Currency Electronic Payment (DCEP)", which known as "e-CNY" or "Digital RMB" and tested in some of the cities since April 2020. The develop of e-CNY is to digitalize Chinese fiat currency. The reserve money system was replaced with the DCEP,

which is 1:1 correlated to the RMB (Louie and Wang, 2021). In the PoC stage, China is one of the most advanced countries in developing the CBDC. The early pilot stages' locations for the e-CNY R&D project are chosen based on criteria like significant national development plans, coordinated regional development strategies, and city-specific industrial and economic aspects. The PBOC gave 200 yuan to each of 50,000 consumers who were chosen at random to participate in the early pilot stage, which is to test the two-tier system of the PBOC gives e-CNY to commercial banks, who may issue it to clients through procedures of their own (Bakar *et al.*, no date). Commercial banks (as well as other payment processors) are required to deposit reserves that are equal to the e-CNYs they issue in conjunction with the PBOC. By June 2021, the e-CNY has been used in over 1.2 million situations, including paying for utilities, transportation fees, government services, shopping, and etc. More than 3.51 million corporate wallets and over 20.87 million personal wallets have been opened, with a total of 70.75 million transactions occurring at a value of over RMB34.5 billion (Bansal and Singh, 2021).

Besides, Sweden is another country that is experimenting in their later stage of implementation of the Swedish E-Krona. Based on the distributed ledger technology (DLT), the Swedish E-Krona system has a database that is managed by the Riksbank (Swedish Central Bank) and on which authorized private payment of all transactions of CBDC account holders will be recorded (Riksbank, 2021). Digital currency would be issued by the Riksbank to banks, who would then distribute it to the end users (Riksbank, 2022). The governor of Riksbank has requested that the E-Krona become a legal currency even though the project has been operating in simulation mode throughout 2020. Sweden may be the country that with the lowest rate of using physical currency,

and its central bank agrees that a CBDC is necessary for the country to continue playing its traditional role as a reserve currency. The E-Krona project effectively addresses the issue of disintermediation in the banking sector caused by people migrating from CBDC accounts with the central bank commercial bank accounts. To avoid this issue, it suggests that balances in E-Krona up to a specific amount be maintained at zero interest, while amounts above the limit be subject to an interest rate lower than offered in commercial banks, and perhaps negative.

2.4.3 Launched

Furthermore, among the 97 countries that involved in CBDC research and development, Bahamas *(Sand Dollar)* and Nigeria *(eNaira)* have fully launched their CBDC in the year of 2020 and 2021 (International Monetary Fund, 2022) which shown in Figure 2. Bahamas launches their pilot test on the year of 2019, with the enrollment of wallet users through each of the participating financial institutions (Central Bank of The Bahamas, 2019). After maturing the financial policy through numberless pilot test, Bahamas has fully launched their CBDC, Sand Dollar in the following year (International Monetary Fund, 2022). The Sand Dollar is tied 1:1 to the US dollar. Since tourism accounts for two-thirds of all jobs in Bahamas and 80% of visitors are from North America, many businesses can take US dollar payments due to the convenient exchange rate.

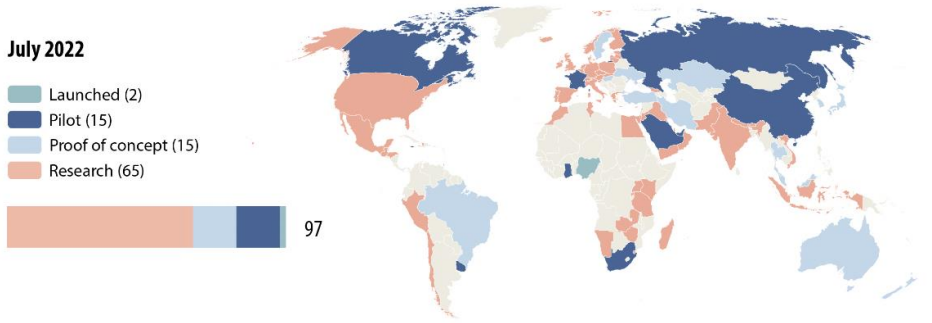


Figure 2: Countries CBDC stages tracker

Source: Extracted from International Monetary Fund (IMF) (2022)

2.5 CBDCs in Malaysia

The Central Bank of Malaysia, also known as Bank Negara Malaysia (BNM), is the primary organization in charge of issuing currency. It also acts as Malaysia's banker and advisor and controls the nation's financial institutions, credit system, and monetary policy. BNM is also charged with investigating the CBDC's implementation in Malaysia. The views and strategies of BNM are expressed and debated in the section that follows.

2.5.1 The Bank Negara Malaysia perspective towards CBDCs

According to Bank Negara Malaysia (BNM) (2018), the evolving payment and technology landscape, BNM is actively assessing the possibility of CBDC. BNM will explore the usage of CBDC through the Dunbar Project by collaborating with central bank of Australia, Singapore, and South Africa to establish a prototype for a shared platform that facilitates international settlements utilizing multiple CBDCs while minimizing reliance on intermediaries (Bernama, 2022). As it may increase the research speed by

collaborate with the neighbors' countries which have already in the mature stage of the CBDC's projects which shows in Figure 1.

However, BNM does not have any official announcement to issue CBDC currently due to the domestic payments such as online banking, e-wallet, and debit card continue to run effectively and safely to meet the demands of people and companies in Malaysia. Figure 3 has shown the growth rate of online banking transactions was 41.5% in 2021 to 3.5 billion compared to 2.5 billion in 2020. E-wallet transactions saw a rise of 74.4% to 1,098.5 million transaction compared to 629.7 million in 2020, while debit card transactions surged by 48% to 736.8 billion compared to 497.9 million in 2020.

Furthermore, people have continued the existing monetary and financial instruments due to their enhanced safety and convenience (BNM, 2021). Additionally, the existing payment methods remain effective in maintaining monetary and financial stability (BIS, 2022). However, to improve the country's technical and policy capabilities, BNM has explore CBDC via PoC in these years with a focus on different cases that bring greatest potential benefits for Malaysia. The PoC will be undertaken in collaborating with the industry to promote capacity-building and knowledge sharing.

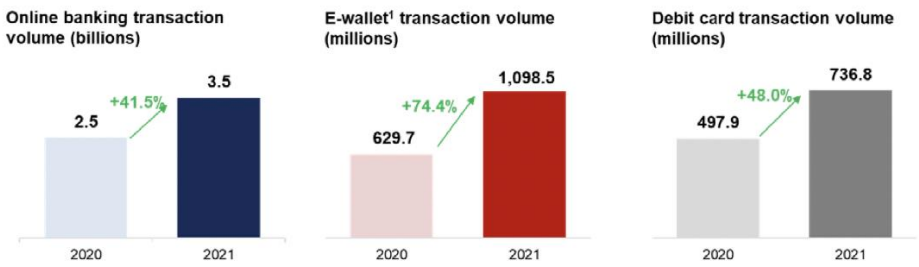


Figure 3: Key trends of digital payments adoption in Malaysia

Source: Extracted from Bank International Settlement (2022)

2.6 Theoretical research framework

According to Roger (1995), there was a differ among the users towards technology adoption with certain innovations being accepted more rapidly than others (Frei-Landau *et al.*, 2022). The adoption and diffusion research aims to investigate the factors that impact users to adopt new technology. A behavioral theory explaining users' attitudes and behaviors is required to forecast the success or failure of technology adoption (Roberts *et al.*, 2021). As a result, a behavioral approach is used to evaluate technological implementation. The Technology Readiness Index (TRI), Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT) are frameworks that commonly used for measuring technology adoption. However, only TRI and TAM will be used to measure in this study.

2.6.1 Technology Readiness Index (TRI)

Technology readiness that defined as people willingness to adopt new technology for strengthening their efficiency in life or business was proposed by Parasuraman (2000). One of the potential hypotheses that might be applied

by all parties to understand the difference process in which adopting new technologies. People readiness is an important factor in determining whether the user would adopt the technology.

The desire to adopt and implement new technologies to attain personal and professional goals is referred to as technological readiness. According to Parasuraman (2000), four factors are used to analyze human emotions, which are classified into two categories which are positive enablers (optimism and innovativeness) and negative inhibitors (discomfort and insecurity). According to Parasuraman (2000), optimism is defined as "a favorable view of technology", while innovativeness is defined as "a proclivity to be a technology pioneer and thought leader", discomfort is defined as "a sense of being overwhelmed by technology", and insecurity is "distrust of technology and skepticism about its ability to operate correctly" (Parasuraman, 2000) which shown in Figure 4.

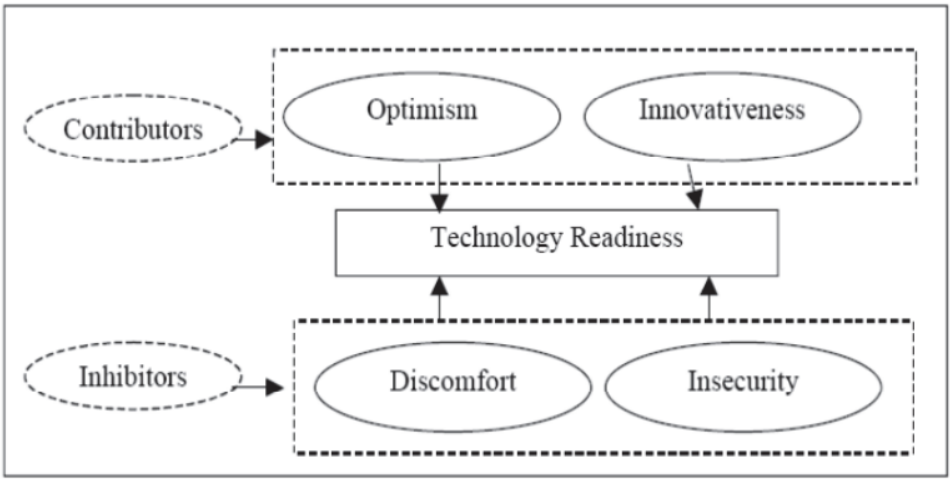


Figure 4: Technology Readiness Index (TRI) Model

Source: Extracted from Parasuraman (2000)

Figure 4 demonstrates how personality factors influence people's technology readiness. The TRI measures people's opinion in or commitment to technology, not their ability to adopt it. This concept allows the theorization of the general attitudes that people have about technology, which also reflects how often they use products and services that are based on technology (Parasuraman, 2000). The five user classifications of explorers, pioneers, sceptics, paranoids, and laggards are based on score for technology readiness. As optimism and innovativeness and the relative lack of discomfort and insecurity they experience, the type of explorers is more technologically prepared than others. Explorers are attracted to the newest technology rapidly and are typically the first to try it. Laggards who tend to be inhibitors and have poor contributing elements is the last group to accept the newest technology.

The way in which technology is seen varies considerably among other user classifications including pioneers, sceptics, and paranoids. The kind of explorers who are strong in optimism and innovative but weak in discomfort and insecurity. The lack of innovation, low self-assurance, and modest inhibition level displayed by sceptics suggested that they need to be persuaded in advance of the advantages of utilizing technology. On the other hand, paranoids are highly optimistic and interested in new technologies, but they also experience discomfort and insecurity.

2.6.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a popular behavioral theory that has been extensively utilized to predict users' adoption of technology. Its application in the field of information systems has enabled a better understanding and explanation of user acceptance behavior towards technology. TAM offers a simple framework for understanding the factors that influence user acceptance and utilization of technology which stated by Davis *et al.* (2004).

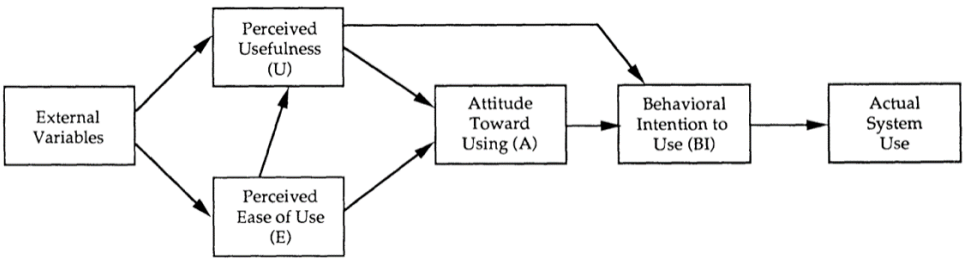


Figure 5: Technology Acceptance Model (TAM)

Source: Extracted from Davis *et al.* (1989)

According to Davis *et al.* (1989) proposed that perceived usefulness and perceived ease of use are the significant factors of user acceptance and utilization of technology, and as such, they strongly influence on why people use technology. A user's degree level of IT usage is directly influenced by their acceptance of the technology, which can be predicted by considering perceived usefulness and perceived ease of use. Study conducted by Davis *et al.* (1989) and several studies support the idea that these factors play an important role in explaining user behavior and have a significant impact on the adoption of technology.

The original TAM consisted of five constructs, which included perceived usefulness, perceived ease of use, attitude towards using, behavioral intention to use, and actual system use, as shown in Figure 5. However, the attitude towards use variable was eventually eliminated from the model due to its ineffectiveness in linking the gap between behavioral intention to use and user belief. The TAM model has gained a widespread of popularity as an instrument for predicting attitudes, aspirations, and behaviors related to the adoption of new technology. It accounts for approximately 40% of the variance in individual willingness to adopt information technology, as stated by Venkatesh *et al.* (2003). Moreover, perceived usefulness and perceived ease of use are influenced by various external factors such as trust, social influence, gender, age, and others (Karahanna and Straub, 1999).

The relative effectiveness of perceived usefulness and perceived ease of use in influencing behavior intention differs, with perceived usefulness being considered the main determinant and having greater explanatory power than perceived ease of use. This may be attributed to people prioritizing the utility

of a system or technology over their level of comfort with it. TAM is a widely used framework to examine user interactions with new technologies across various industries, and it can accurately measure the level of technology adoption by users (Venkatesh *et al.*, 2003).

Unexpectedly, information suggests that user who are tech-savvy did not use the available technologies. Evidence from the fieldwork suggests that the TRI model is unable to adequately explain why some people accept new technology while others do not. Therefore, several academics worked to refine the TRI model, hypothesizing that the personality qualities in the TRI model were precursors to the technology acceptance model. In other words, psychological traits affected TAM's cognitive aspects.

In addition, while understanding of technology is beneficial when dealing with complex financial solutions such as CBDCs, an individual's demographics and personality traits may impact their level of technological proficiency. Those who possess optimistic and innovative traits tend to be more willing to adopt new technology, while feelings of insecurity and discomfort may refuse adoption. Given those new technologies like CBDCs may not be easily adopted by individuals, a thorough examination of technology readiness is needed (Alharbi and Sohaib, 2021).

2.6.3 Technology Readiness and Acceptance Model (TRAM)

Although the measurement of perceived ease of use and perceived usefulness in TRI shows the impact of an individual usage on the adoption of new technology, while TAM predicts the users' acceptance of new technology. Therefore, Lin *et al.* (2007) has suggested to integrate the two research frameworks and proposed the TRAM model which they used to study the

uptake of e-services in Taiwan. The TRAM model explains why individuals with high levels of TR do not always adopt new technologies, as it highlights two key factors in the TAM that influence technology adoption behavior (Wahyuni, 2020).

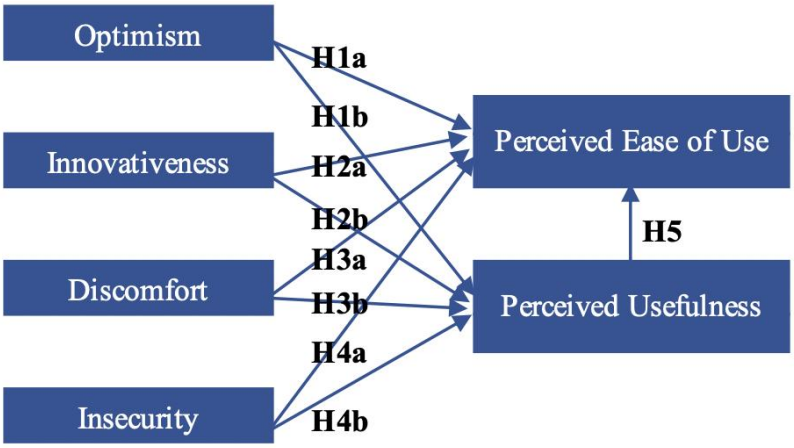


Figure 6: Conceptual Research Model (TRAM)

Source: Extracted from Adiyarta *et al.* (2018)

According to Lin *et al.* (2007), they proposed and tested TRAM to measure technology adoption, particularly in situations where adoption is not influenced by organizational objectives. Their study found that technology readiness was a factor that caused perceived ease of use and perceived usefulness, which then affected people's intentions to use e-services. The combined effect of perceived ease of use and perceived usefulness completely mediated the relationship between technology readiness and people's use

intentions. Overall, their model expanded on previous ones and improved the explanatory power and applicability of technology adoption models.

Moreover, this model was supported by Leong *et al.* (2021) because the researchers believe that the two models were related and opted to combine them. As TRI and TAM has been commonly used to examine people's readiness and opinions on various technologies. At the same time, the integration of TRI and TAM could be utilized together to forecast the adoption of new technologies which been observed in a study conducted by Alharbi and Sohaib (2021). Thus, this conceptual framework will be used as this research study framework that will be discussed in the next part below.

2.7 Conceptual research framework and Hypothesis

The use of TRAM in this study will help to better understand people's readiness for CBDCs by promoting a complete comprehension of the concept. As TRAM model was used commonly for explaining why some individuals choose to adopt new technologies while others do not. This is because the TRAM model considers on both the system-specific factors and a particular technology as well as the individual-specific technology beliefs.

Based on the TRAM research framework, a new research framework will be implemented by adding the element of willingness which shown in the Figure 7 below. As this study is investigating the readiness of the Malaysian on towards CBDCs. One way to assess the readiness of Malaysian is to examine their willingness to transition from a familiar payment method such as physical banknote, e-wallets, online banking to a new transaction payment method. The following sections will set out the hypothesis.

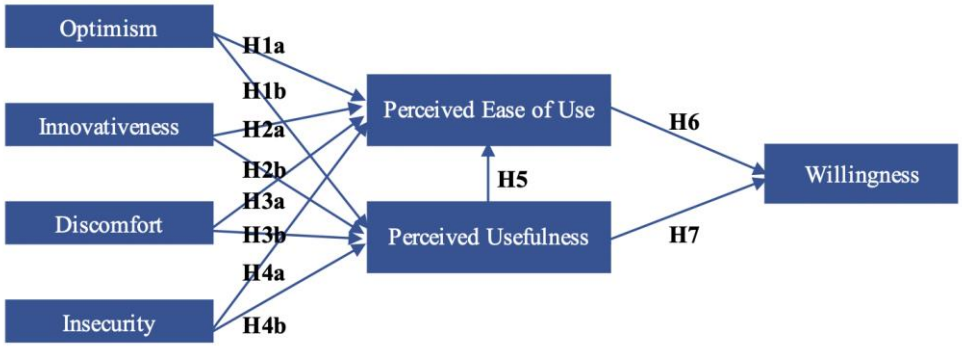


Figure 7: Proposed Conceptual Research Framework

H1a: Optimism (OPT) has a positive impact on Perceived Ease of Use

H1b: Optimism (OPT) has a positive impact on Perceived Usefulness

H2a: Innovativeness (INN) has a positive impact on Perceived Ease of Use

H2b: Innovativeness (INN) has a positive impact on Perceived Usefulness

H3a: Discomfort (DIS) has a negative impact on Perceived Ease of Use

H3b: Discomfort (DIS) does not impact the Perceived Usefulness

H4a: Insecurity (INS) has a negative impact on Perceived Ease of Use

H4b: Insecurity (INS) has a negative impact on Perceived Usefulness

H5: Perceived Ease of Use has positive impact on Perceived Usefulness

H6: Perceived Ease of Use has a positive impact on Willingness

H7: Perceived Usefulness has a positive impact on Willingness

2.8 Empirical review

According to Bakirtas and Akkas (2017), they investigated the correlation between technology readiness, departments, and undergraduate student class levels based on the conceptual research framework shown above. Parasuraman's (2000) technology readiness index scale was used. In Turkey's Aksaray University's Faculty of of Economics, Administrative Sciences, and Engineering, 891 undergraduate students participated in an empirical inquiry that served as the study's foundation. Participants have completed a survey that included 36 items and four subscales, rating their level of agreement with each technology statement on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The four subscales are optimism (10 items), innovativeness (7 items), discomfort (10 items), and insecurity (9 items). The hypothesis was tested using chi-square analysis, independent sample t-tests, and analysis of variance (ANOVA). The study's findings revealed a substantial difference in DIS and INS scores between two undergraduate students' groups (computers weighted departments vs. noncomputer weighted departments). Similarly, there was a substantial difference in gender scores for only the two criteria. Females outperformed males in terms of score. The subscales of the technology reading index differed depending on the student's department and class level.

2.9 Research gap

In the theoretical review has mentioned, CBDCs is a new financial concept in Malaysia, it is difficult to know whether the Malaysian are willing to use CBDCs and meanwhile there is no literature on the study of Malaysian readiness on CBDCs and has not been conducted by any researchers in

Malaysia. Besides that, there are only two countries has launched CBDCs, while 95 of the countries are still in their pilot test and research stage. Therefore, it is not possible to have all research data conducted.

In addition, Malaysian are getting used to the e-wallet and online banking due to hygiene purpose during covid-19 pandemic, as people are encouraged to do contactless payment. It might have a large probability that Malaysian might not want to adopt another new transaction system as they might feel comfort in using the contactless payment method that they are using now for their daily transaction. Hence, the necessity of developing CBDCs has stay unknown. Besides, e-wallet platform would have some promotion to encourage people to use it frequently whereas CBDCs is just a normal use like physical banknote, thus the people willingness to use CBDCs will be discussed.

2.10 Conclusion

The financial systems will undoubtedly be impacted by CBDCs. Around 86% of the world's central banks are investigating the pros and cons of central bank digital currency according to the World Economic Forum (Morris, 2021). The adoption of digital currency in China that operates by central bank of China and the use of the blockchain technology and distribution ledger to capture the transaction and movement of the digital currency. It is a new innovative financial technology that is growing in popularity by the central bank worldwide. It challenges current financial and regulatory regulations governing the world's currency and payment systems (Zulhuda and Sayuti, 2017).

Blockchain has shown its worth by facilitating collaborative business operations by handling digital transactions in real time across corporate boundaries. The potential of blockchain to reduce transaction management costs is its primary value. Aside from the digital economy, blockchain has the potential to transform all aspects of businesses and remaining connected to the social world. To enhance knowledge production and innovation via the use of technology, collaboration between diverse industries is essential (Ku-Mahamad *et al.*, 2018).

Malaysia has taken a "minimalist" approach towards CBDCs and may take a wait-and-see strategy in the future. The government must take a deeper look and consider setting up a clearer regulatory response to handle and accommodate key elements and dangers while engaging an industrial self-regulating system. As a result, the new financial transaction method will become a solution rather than a cause of issues. Well, it recommends for more study be done on the various regulatory frameworks that may be explored for the CBDCs innovation (Zulhuda and Sayuti, 2017).

3.0. RESEARCH METHODOLOGY

3.1 Research design

The aim of study is to explore the people readiness towards CBDCs which influenced by four subscales (Optimism, Innovativeness, Discomfort, and Insecurity), perceived ease of use, perceived usefulness, and willingness.

In this study, a survey was used as the primary data as the data collection tool, and an online survey form was served as the data instrument. Data was collected by using a self-administered questionnaire in a Microsoft Form.

3.2 Population and Sampling

In this study, the target population is all Malaysian who is above 18 years old.

Primary data will be used when conducting this study as it collected from original course without any existing sources. Primary data is more reliable, authentic, and objective because it is gathered specifically for the study. This data is vital for processing, analyzing, and achieving the study's objectives (Hox and Boeije, 2005). There will be contribution on new information to the existing social knowledge. Secondary data will not be used in this study because secondary data was created by the previous researchers that available for reuse by the general research community (Hox and Boeije, 2005). The secondary data collection may not relevant and original data. Thus, it may affect the test in this study.

This study will apply quantitative data which refers to observations that are expressed in numerical terms. The questionnaire indicated that a minimum of

answers were needed because the largest scale has five elements. Additionally, a total of 210 participants completed the surveys through simple random sampling technique. Simple random sampling was used in this study because it involves each unit within the population having an equal probability of being chosen to be included in the sample (Taherdoost, 2016).

3.3 Instrument of the variables

The instrument for collecting the data in this study was online survey questionnaire by using Microsoft form. It consisted of eight sections. Section 1 was designed to see what the people outlook about CBDC. Section 2 was designed to investigate the adaptive and acceptance of CBDC. Section 3 was designed to examine what is the problems that will occur while CBDC was adopted. Section 4 was designed to investigate the security concern of CBDC. The ease of use and the usefulness of CBDC questions will be designed in section 5 and section 6. Section 7 was designed to explore the people's willingness of using CBDC. The demographic data (gender, age, employment status, preferred mode of transaction) will be included in section 8.

3.4 Measurement of the variables

A survey form with 38 items was created to verify the proposed theoretical model. All items were measured using a 5-point Likert scale varying from 1 = Strongly disagree to 5 = Strongly agree. By utilizing the TRAM framework (combination of TRI and TAM framework), the questionnaire of this study was adopted from Parasuraman (2000). Consists of 4 subscales (Optimism, Innovativeness, Discomfort, and Insecurity), 3 dependent variables (Perceived

Ease of Use, Perceived Usefulness, and Willingness). The data collected is to examine the people readiness towards CBDC in Malaysia.

3.5 Validity and Reliability

A pilot test was conducted before the actual data collection to measure the reliability of the items and its flow, as well as any other questionnaire related issues. The questionnaire was approved by supervisor. The Cronbach's alpha was used to determine the significance and reliability of the items and variables under study, as well as whether the constructs exceeded the minimum Cronbach's alpha value of 0.6 to show the reliability of the variables.

As there was a time limitation for the pilot test, there were only 30 respondents participated in the pilot test, and the respondents were between the age of 18 to 25 which faced a problem of age distribution. The result from the reliability test indicated that all variables were reliable because they were above 0.6, except the innovativeness variable were shown below 0.6, hence amendment was done for this section. In addition, some of the survey questions have conducted paraphrasing work for easier understanding based on the feedback from the respondent. For example, "If currencies digitalize will give you greater control over your budget" has paraphrased to "DC provides better oversight on your spending". After finalizing the questions, survey link was sent out to all connections.

3.6 Data collection

The data collection was collected within two weeks' time from 6th March 2023 to 19th March 2023. The survey was conducted by using Microsoft Form and was sent out to all connections in Malaysia. About 500 connections were sent and only 210 of them completed the survey. The survey will take 5 to 10 minutes to complete.

3.7 Questionnaire design

Table 2: Statement of Optimism

	Statement
OPT 1	DC will give you greater control over how you manage your cash flow.
OPT 2	You prefer to use DC in your daily transaction over physical banknotes.
OPT 3	DC will be efficient for business.
OPT 4	You find DC to be interesting.
OPT 5	DC is cheaper to use compared to traditional banking.
OPT 6	DC provides better transparency.

Table 3: Statement of Innovativeness

	Statement
INN 1	You can easily adapt to DC.
INN 2	Your friends will likely be more informative about DC than you.
INN 3	Keeping up with the latest developments of DC as an area of interest.
INN 4	Anyone may seek you to understand DC due to your adaptability and/or knowledge.
INN 5	It will be a challenge for some users, especially for the elderly.

Table 4: Statement of Discomfort

	Statement
DIS 1	Technical support lines are not helpful because they are not precise and concise when explaining.
DIS 2	Occasionally, the thought of DC is not meant for ordinary users.
DIS 3	You **DO NOT** prefer to have a DC with a basic module over those with tons of extra features.
DIS 4	Payment might not get through when the traffic is overloading the server's capacity.
DIS 5	You feel troublesome going through the transaction processes to avoid mistakes.
DIS 6	Technology always seems to fail at the worst possible time.

Table 5: Statement of Insecurity

	Statement
INS 1	It is risky to perform a transaction through an electronic device.
INS 2	It might constitute a breach of privacy.
INS 3	Fear of transaction you made will be observed by unauthorised users.
INS 4	The technology makes it way easy for governments and corporations to trail on an individual.
INS 5	You prefer to pay by physical banknotes rather than DC due to the possible risk of leaking personal information to the public.
INS 6	Many new technologies have security or safety risks that are yet to be discovered until they received feedback from users.

Table 6: Statement of Perceived Ease of Use

	Statement
PEOU 1	Using DC for payment will reduce time-consuming procedures from banks.
PEOU 2	It is easy to use DC as a mode of payment.
PEOU 3	The DC system is resilient.
PEOU 4	It is easy to use DC to perform any daily transaction.
PEOU 5	One device is all it needs for the users instead of bulky physical notes.

Table 7: Statement of Perceived Usefulness

	Statement
PU 1	DC provides better oversight on your spending.
PU 2	DC will improve your financial literacy.
PU 3	DC is a better alternative option as a mode of payment.
PU 4	Using DC for payment will eliminate unnecessary remittance intermediaries for and reduce costing.
PU 5	Countries are no longer required to budget for new physical notes to be issued.
PU 6	The time of receiving payments is greatly reduced especially with overseas transactions.

Table 8: Statement of Willingness

	Statement
WILL 1	Will you be willing to use, if DC were launched?
WILL 2	Will you be willing to use DC more than physical note?
WILL 3	Will you be willing to use DC for your daily transaction?

3.8 Data analysis

After data collected from respondents has been processed and adjusted, the data for the current study will be analyzed using Statistical Package for the Social Sciences (SPSS) where descriptive analysis and inferential analysis will be done to test the people willingness and the relationship among the variables. According to Rahman and Muktadir (2021), the SPSS was used by most of the social science researchers for statistical data analysis.

Descriptive analysis will be used in this study as it is a method used to provide a detailed overview of the key characteristics of the study data (Thompson, 2009) which may include means, standard deviations, skewness, and kurtosis, offering straight forward summaries of the sample and measurements. In this study, inferential analysis will be used to demonstrate the strength, direction, and statistical significance of the relationship among dependent and independent variables at interval rates (Thompson, 2009). Thus, ANOVA, coefficients, coefficient correlations, collinearity diagnostics, P-P plot of regression standardized residual, and scatterplot will be used to answer the hypothesis of the study.

3.9 Ethical considerations

The current study was subject to certain ethical issues. In the beginning of the survey form, the study's aim and objectives will be mentioned, continue with the consent, debriefing, and withdraw notice below. The purpose of this notification was to reassure participants who are involved in the research study is voluntary and that they were free to withdraw at any time and for any reason.

Next, participants were given a full explanation of the objectives of the study, while they were reassured that their responses would be kept as private and used only for the research and for academic purposes. Furthermore, participants were not harmed or abused, both physically and psychologically while conducting the survey questionnaire for the research.

3.10 Justification of research choice

In summary, the research choice was based on a comprehensive literature review, with a particular focus on Parasuraman's (2000) article, which provided the conceptual and operational definition of the construct variables. Similarly, Davis *et al.* (1989) and Lin *et al.* (2007) were also consulted for their contributions to the construct variables. The researcher opted for a quantitative method using a survey for data collection, which has the advantage of using validated research scales from previous studies, as well as being cost-effective and efficient, especially when the sample size is large and with wide coverage. The findings of the study will be discussed in the next chapter.

4.0. RESULTS and ANALYSIS

4.1 Introduction

This chapter presents the questionnaire findings, first evaluating the descriptive statistics to determine the control variables. The remaining variables and aspects of the questionnaire will then be analyzed under the categories of (i) optimism (ii) innovativeness (iii) discomfort (iv) insecurity (v) perceived ease of use (vi) perceived usefulness (vii) willingness. This will be followed by a critical discussion of the findings in order to examine the readiness of the people in Malaysia towards CBDCs.

4.2 Descriptive analysis

This section of the chapter sets out the descriptive statistics. As noted in the previous chapter, the research population comprised 210 research participants and using survey form for data collection to reach a wider age population. 50% of the respondents were males, 47% were females and 3% prefer not to say. On the age group responses, 18-25 is 33%, 26-35 is 14%, 36-45 is 14%, 46-65 is 30%, and 9% is above 65. In addition, for employment status, 27% are student, followed by 5% unemployed, 30% are self-employed or freelance and lastly, 39% are employed. Also, 13% of the respondents prefer physical bank note as their mode of transaction, e-wallet and credit or debit card both are 29%, followed by online or bank transfer (25%), and 4% no specific preference.

Table 9: Demographic Profile of Respondents

Demographic Characteristic	Category	Frequency	Percentage (%)
Gender	Male	106	50
	Female	98	47
	Prefer not to say	6	3
	Total	**210**	**100**
Age	18-25	70	33
	26-35	29	14
	36-45	30	14
	46-65	62	30
	>65	19	9
	Total	**210**	**100**
Employment status	Student	56	27
	Unemployed	10	5
	Self-employed/ Freelance	62	30
	Employed	82	39
	Total	**210**	**101**
Mode of transaction	Physical bank note	59	13
	E-wallet	128	29
	Credit/ Debit card	129	29
	Online/ Bank transfer	112	25
	No specific preference	18	4
	Total	**446**	**100**

4.3 Reliability analysis

The study used Cronbach's alpha to evaluate the internal consistency reliability, which measures the reliability of a research instrument in the social sciences, to examine the internal consistency of the research instrument and the individual reliabilities for the components of the scale which presented in Table 10. It is generally considered that for Cronbach's alpha, 0.8 and above are very good, between 0.7 to 0.8 are considered good, and between 0.6 to 0.7 are adequate. Results for Cronbach's alpha below 0.6 are consider poor and therefore should be delete. Hence, the table shows that all the independent variables had Cronbach alpha (α) values greater than 0.6, indicating that the internal consistency of the independent variables was supported.

Table 10: Reliability Test

Factors	Total items	Cronbach Alpha
Optimism (OPT)	6	0.870
Innovativeness (INN)	5	0.644
Discomfort (DIS)	6	0.793
Insecurity (INS)	6	0.829
Perceived Ease of Use (PEOU)	5	0.871
Perceived Usefulness (PU)	6	0.861
Willingness (WILL)	3	0.927

4.4 ANOVA analysis

ANOVA summarized result for regression model (Perceived Ease of Use) that effects of CBDC by items are presented in Table 11 below. The ANOVA results indicate that, F (5, 204) = 76.243, p = < .001, hence the result has shown a statistically significant as α lesser than 0.05.

Table 11: One-way ANOVA for Regression Model (Perceived Ease of Use)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	65.152	5	13.03	76.243	< .001
Residual	34.865	204	0.171		
Total	100.017	209			

a. Dependent Variable: Perceived Ease of Use (PEOU)

ANOVA summarized result for regression model (Perceived Usefulness) that effects of CBDC by items are presented in Table 12 below. The ANOVA results indicate that, F (4, 205) = 44.937, p = < .001, hence the result has shown a statistically significant as α lesser than 0.05.

Table 12: One-way ANOVA for Regression Model (Perceived Usefulness)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	49.64	4	12.41	44.937	< .001
Residual	56.613	205	0.276		
Total	106.253	209			

a. Dependent Variable: Perceived Usefulness (PU)

ANOVA summarized result for regression model (Willingness) that effects of CBDC by items are presented in Table 13 below. The ANOVA results indicate that, F (2, 207) = 112.933, p = < .001, hence the result has shown a statistically significant as α lesser than 0.05.

Table 13: One-way ANOVA for Regression Model (Willingness)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	74.826	2	37.413	112.933	< .001
Residual	68.576	207	0.331		
Total	143.402	209			

a. Dependent Variable: Willingness (WILL)

4.5 Regression analysis

The hypothesis testing based on regression analysis using SPSS tool. As explain in research methodology, there are 11 hypothesis related to TRAM model being tested in the context of CBDCs. The hypothesis will be divided into 3 model of regression as follows:

OPT, INN, INS, DIS, and PU on PEOU	(1)
OPT, INN, INS, and DIS on PU	(2)
PEOU and PU on WILL	(3)

The regression model was testing on the TRI variables (Optimism, Innovativeness, Insecurity, and Discomfort) and Perceived Usefulness towards TAM variables (Perceived Ease of Use), which shown in Table 14 below:

Table 14: Regression Model of Perceived Ease of Use

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.453	0.246		1.843	0.067
Optimism (OPT)	0.119	0.055	0.135	2.145	0.033
Innovativeness (INN)	0.203	0.064	0.179	3.165	0.002
Discomfort (DIS)	-0.084	0.050	-0.086	-1.697	0.091
Insecurity (INS)	0.120	0.050	0.122	2.408	0.017
Perceived Usefulness (PU)	0.557	0.055	0.574	10.141	< .001

a. Dependent Variable: Perceived Ease of Use (PEOU)

Based on the t-test conducted, the hypothesis H1a is supported in this study because Optimism had significantly positive influenced Perceived Ease of Use. The result showed positive coefficient regression (0.119), and the probability of significant was 0.033 (< .05) with t-value 2.145 (> t table). Hypothesis H2a is also supported in this study since Innovative had significantly positive influenced Perceived Ease of Use. The coefficient regression obtained was positive (0.203) and the probability of significant 0.002 (< .05) with t-value 3.165 (> t table).

Hypothesis H3a is accepted in this study because Discomfort had significantly negative influenced Perceived Ease of Use. The result showed that negative coefficient regression (-0.084) and the probability of significant was 0.017 (< .05) with t-value -1.697 (> t table). On the other hand, hypothesis H4a is supported in this study because Insecurity had significantly positive influenced Perceived Ease of Use. The coefficient regression obtained was positive (0.120) and the probability of significant 0.017 (< .05) with t-value 2.408 (> t table).

Based on the t-test conducted, hypothesis H5 is supported in this study because Perceived Ease of Use (PEOU) had significantly positive influenced to Perceived Usefulness (PU). The result showed positive coefficient regression (0.557), and the probability of significant was < .001 (< .05) with t-value 10.141 (> t table).

The regression model was testing on the TRI variables (Optimism, Innovativeness, Insecurity, and Discomfort) towards TAM variables (Perceived Usefulness), which shown in Table 15 below:

Table 15: Regression Model of Perceived Usefulness

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.661	0.309		2.137	0.034
Optimism (OPT)	0.467	0.062	0.513	7.479	< .001
Innovativeness (INN)	0.256	0.080	0.219	3.215	0.002
Discomfort (DIS)	-0.038	0.063	-0.038	-0.599	0.550
Insecurity (INS)	0.136	0.062	0.134	2.172	0.031

a. Dependent Variable: Perceived Usefulness (PU)

Based on the t-test conducted, hypothesis H1b is supported in this study because Optimism had significantly positive influenced Perceived Usefulness. The result showed positive coefficient regression (0.467), and the probability of significant was < .001 (<0.05) with t-value 7.479 (> t table). Hypothesis H2b is also supported in this study since Innovative had significantly positive influenced Perceived Usefulness. The coefficient regression obtained was positive (0.256) and the probability of significant (0.002) (< .05) with t-value 3.215 (> t table). Hypothesis H3b is supported in this study because Discomfort had no significantly influenced Perceived Usefulness. The result showed that negative coefficient regression (-0.038) and the probability of significant was 0.550 (> .05) with t-value -0.599 (< t table). Besides, hypothesis H4b is also supported in this study since Insecurity had significantly negative influenced Perceived Usefulness. The coefficient

regression obtained was positive (0.136) and the probability of significant 0.031 (< .05) with t-value 2.172 (> t table).

The regression model was testing on the TAM variables (Perceived Ease of Use and Perceived Usefulness) towards Willingness, which shown in Table 16 below:

Table 16: Regression Model of Willingness

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.342	0.232		1.472	0.143
Perceived Ease of Use (PEOU)	0.403	0.091	0.336	4.439	< .001
Perceived Usefulness (PU)	0.499	0.088	0.430	5.672	< .001

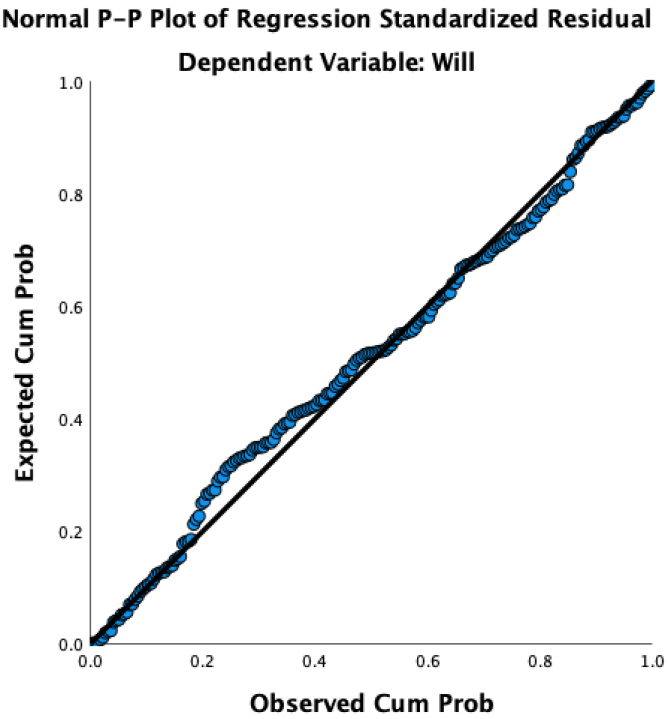
a. Dependent Variable: Willingness (WILL)

Based on the t-test conducted, hypothesis H6 is supported in this study because Perceived Ease of Use (PEOU) had significantly positive influenced Willingness (WILL). The result showed positive coefficient regression (0.403), and the probability of significant was < .001 (< .05) with t-value 4.439 (> t table). Hypothesis H7 is supported in this study because Perceived Usefulness (PU) had significantly positive influenced Willingness (WILL). The result showed that positive coefficient regression (0.499) and the probability of significant was < .001 (< .05) with t-value 5.672 (> t table).

4.6 Normal P-P plot

Figure 8 shows the normal P-P plot of regression standardized residual which indicates that the residual is nearly in line with line of best fit and there is no unusual high value that can affect the regression model. Therefore, it indicated that the regression analysis was not violated.

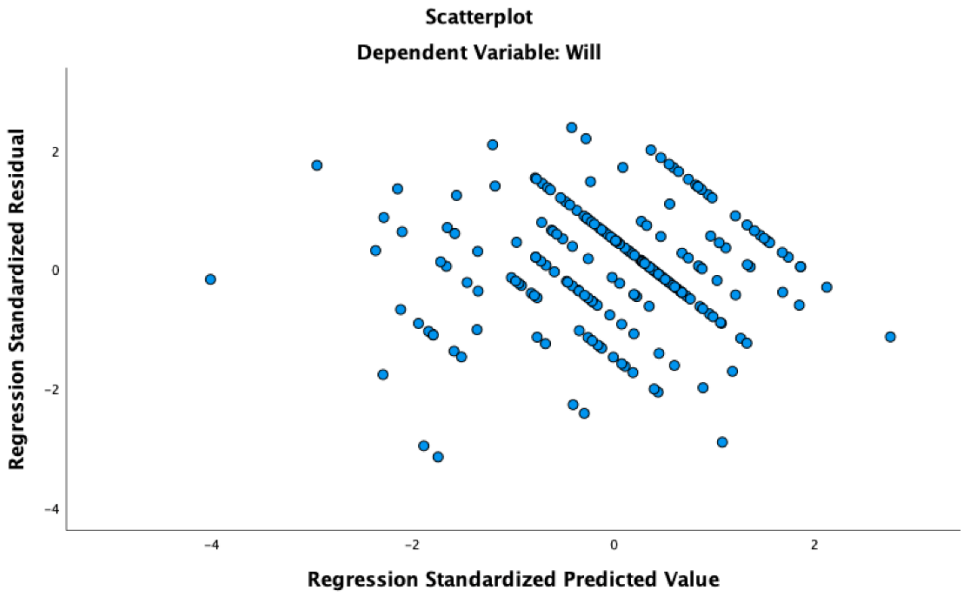
Figure 8: Normal P-P Plot of Regression



4.7 Scatterplot

As shown in the Figure 9 below, the standardized residuals are no randomly and no evenly dispersed throughout the scatterplot. This indicates that there has no heteroscedasticity in the data.

Figure 9: Scatterplot



5.0. DISCUSSION

5.1 Introduction

The main purpose of this chapter is to discuss and summarize the main findings in the chapter 4, and to seek to answer the research hypothesis which set out in chapter 2. Furthermore, there is a discussion of the potential implications for the future development of CBDCs in Malaysia. Finally, some of the possible research limitations and findings will be addressed, together with some suggestions as to what future research could and should carried out on.

5.2 The summary of research findings

It is perhaps useful to begin with a summary table of the research hypothesis set out in the chapter 2 in relation to the survey findings as stated in chapter 4.

Table 17: Summary Research Hypothesis

Hypothesis		**Supported**	**Relationship**
H1a	Optimism (OPT) has a positive impact on Perceived Ease of Use (PEOU)	Yes	Positive
H1b	Optimism (OPT) has a positive impact on Perceived Usefulness (PU)	Yes	Positive
H2a	Innovativeness (INN) has a positive impact on Perceived Ease of Use (PEOU)	Yes	Positive
H2b	Innovativeness (INN) has a positive impact on Perceived Usefulness (PU)	Yes	Positive

H3a	Discomfort (DIS) has a negative impact on Perceived Ease of Use (PEOU)	Yes	Negative
H3b	Discomfort (DIS) does not impact the Perceived Usefulness (PU)	Yes	No impact
H4a	Insecurity (INS) has a negative impact on Perceived Ease of Use (PEOU)	Yes	Positive
H4b	Insecurity (INS) has a negative impact on Perceived Usefulness (PU)	Yes	Negative
H5	Perceived Ease of Use (PEOU) has positive impact on Perceived Usefulness (PU)	Yes	Positive
H6	Perceived Ease of Use (PEOU) has a positive impact on Willingness (WILL)	Yes	Positive
H7	Perceived Usefulness (PU) has a positive impact on Willingness (WILL)	Yes	Positive

5.3 The research findings and its implications

There are thus a series of positive results that can be derived from testing the 11 hypothesis. It remains to discuss whether there can be argued to be potential implications of the people readiness towards CBDCs in terms of technological readiness, usefulness, and willingness was one of the study's key objectives. Technology Readiness Index was measured by four factors (Optimism,

Innovativeness, Discomfort and Insecurity) as the independent variables. Technology Acceptance Model was measured by two factors (Perceived Ease of Use and Perceived Usefulness) and Willingness as the dependent variables.

According to the study's results, the Malaysian are willing to adopt CBDCs to improve their daily transaction efficiency. The dimension of optimism had a larger coefficient compared to other dimensions in the TRI. This indicates that it was the most influential variable in the model. A high level of optimism suggests that users have a positive perception of technology and believe that adopting new technology will improve their productivity. They may also have confidence that technology will provide them with greater control, flexibility, and be more efficient in their daily lives.

The study showed that innovativeness had a significantly positive impact on both perceived ease of use and perceived usefulness. Thus, the Malaysians are receptive to new technology and are willing to experiment with it. They are also likely to be aware of the latest technological developments and may be the early adopters who are eager to try out new technology before others.

Unexpectedly, the study found that discomfort did not have any impact on perceived ease of use. One possible explanation is that Malaysians do not experience doubts or hesitation when it comes to using technology. They do not feel challenged by it, which could explain the lack of impact of discomfort on perceived ease of use.

Unexpected, the study found that insecurity had a positive impact on both perceived ease of use and perceived usefulness which different from the prediction of negative significant in the hypothesis framework. Insecure users

tend to have low levels of trust in the security and privacy of technology. It means that the respondents are risk taker even though that risk may be arisen while CBDCs was implemented. Thus, one possible explanation for this result is the respondent is willing to use CBDCs despite it will faces some risk, because the respondent feel comfortable or feel useful to use CBDCs.

The study found that perceived ease of use had a positive impact on perceived usefulness, which was an expected result. This suggests that technology users take ease of use into account when considering the adoption of new technology.

Finally, the study showed that both perceived ease of use and perceived usefulness had a significantly positive influenced the willingness which indicating that Malaysian are willing to use the new technology while it was launched.

5.4 The comparison with past researchers

Technology Readiness Index (TRI) and Technology Acceptance Model (TAM) were commonly used to investigate on a new technology and it were used by past researchers such as e-wallet (Lim *et al.*, 2022), online banking (Ahmad *et al.*, 2010), and e-Government services (Adiyarta *et al.*, 2018). According to Parasuraman (2000), TRI is a theory that examines the people desire to use new technology to improve their efficiency in life or business whereas TAM is an information systems theory that examines the factors influence the people decision to adopt the new technology (Davis *et al.*, 1989). Thus, a comparison between with the other three past research study will be discussed.

According to Lim's *et al.* (2022) research, there are five factors that affect the behavioral intention of TNG e-wallet, but to having a comparison with this CBDCs' study, there are two factors would be discussed which are perceived ease of use and perceived usefulness. Based on Lim's *et al.* (2022) research on TNG e-wallet, it shown the perceived ease of use has a significant positive impact on the behavioral intention which it is understandable and easy to use the applications. The perceived ease of use in this CBDCs' study has found a significant positive impact on the willingness which it is similar to the past finding. In contrast, the perceived usefulness has an insignificant relationship with the behavioral intention on continuing using the TNG e-wallet application because respondent would not necessarily use the application even though there are benefits from the TNG e-wallet whereas in this CBDCs' study, it has a significant positive impact towards willingness because the using concept of CBDCs is the same as the physical banknote, thus it is necessarily for the respondents to use CBDCs in their daily transaction.

Furthermore, according to Ahmad's *et al.* (2010) research, the acceptance of online banking system was affected by six factors, but to compare with this CBDCs' study, there are two factors would be discussed which are perceived ease of use and perceived usefulness. Based on Ahmad's *et al.* (2010) research, both perceived ease of use and perceived usefulness have a strong and positive effect on respondents to accept online banking system which having a similar finding on this CBDCs' study. However, Ahmad *et al.* found that lots of the respondents in this research still think that is not easy to use online banking system and they want their money to be secure.

Lastly, according to Adiyarta's *et al.* (2018) research, the e-Government services acceptance was affected by six factors which it is similar to this CBDCs' study. The TRI factors (optimism, innovativeness, insecurity, discomfort) and TAM factors (perceived ease of use and perceived usefulness) has significant high impact towards the new technology which may offer more control, flexibility, and efficiency in the people's daily lives. However, there is a difference on the insecurity findings. The insecurity factors have a negatively relationship towards the acceptance of e-Government services which might explain the people are risk averse because of the unknown risk whereas it is a positive relationship towards the willingness of using CBDCs in this study which might explain the people in CBDCs may be a risk taker even though there may be risks while using CBDCs.

Table 18: Factors used in the past research

Past research	**Factors affected**	**References**
E-wallet (Touch ‘n Go)	Perceived Usefulness Perceived Ease of Use Perceived Security Perceived Trust Social Influence	Lim *et al.* (2022)
Online banking	Perceived Ease of Use Perceived Usefulness Perceived Enjoyment Information of Online Bank Security and Privacy Quality of Internet Connection	Ahmad *et al.* (2010)
E-Government services	Optimism Innovativeness Insecurity Discomfort Perceived Ease of Use Perceived Usefulness	Adiyarta *et al.* (2018)

5.5 Limitations and Future Research

Although this study meets the ideal objective, it experiences its limitations. One of the limitations in this study is its sample size, there are only 210 participants which the respondents of each age group is not equally distributed. The data collected mostly focuses on the age group of 18-25 (33%) and 46-65 (30%), thus it creates a greater opportunity for further researchers to conduct the related study with a more equally sample size for each age group in Malaysia.

In addition, the newly developed theories and measurement tools can be utilized to study the technology readiness and acceptance among the researchers, and the results can be compared with previous research in this field. Besides, further researchers may adopt other than Technology Readiness Index (TRI) and Technology Acceptance Model (TAM) in order to have a better understand the willingness of Malaysian towards CBDCs. Lastly, the future researcher can consider exploring the adoption of the CBDCs, while CBDCs was implemented in the future.

6.0. CONCLUSION

6.1 Introduction

The main purpose of this chapter is to summarize the main conclusions that stated from the results and from the discussion in Chapter 5.

6.2 Conclusion

According to the findings of the research, TRI personality characteristics has a significantly impact on the cognitive dimension of TAM, the perceived ease of use and the perceived usefulness. The hypothesis was supported that TRI has a relationship with the TAM model. Thus, TRI was combined with TAM into TRAM model. TRAM model has been proven by empirically to accurately predict people's adoption in technology. Furthermore, TRAM model could be used to explain some of the people could adopt new technologies while others could not as TRAM would not only examines the particular system (system-specific) but also will include the technology beliefs (individual-specific).

Moreover, the findings indicated that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are positively impact the willingness of the adoption of CBDCs system among Malaysian. This indicated that Bank Negara Malaysia would be given a great confidence on focusing to develop own country's digital currency and how to design their policies to increase the willingness to use CBDCs. At the same time, many central banks worldwide are either researching or implementing CBDCs, which could have significant implications for national currencies. However, there are still many uncertainties surrounding this major shift.

Furthermore, CBDCs raise many unresolved questions about the potential effects on security of the financial, economic, and environmental stability. These include their effect on both conventional and unconventional monetary instruments, the transmission of monetary policy, financial and price stability, the function of central bank as lenders of last resort, the target of inflation, liquidity creation, and cross-border monetary policy spillovers in the digital currency age. Additionally, concerns about the social impacts, ethical considerations, privacy concerns, and technological and environmental limitations of CBDCs remain. To address these critical issues, researchers seek to expand the understanding of CBDCs and their implications for financial institutions, policymakers, and the public.

The study takes a user-centric perspective to explore the factors that affect the Malaysian population's willingness to adopt CBDCs, with most participants relying on e-wallets, credit, or debit cards for everyday transactions. This research addresses a gap in the literature on CBDCs, which has yet to thoroughly investigate the human-centered approach to examining the willingness to use CBDCs during times of financial instability.

6.3 Practical recommendations

According to this study, to increase the flexibility and effectiveness of CBDCs, the central bank should take real steps to increase people's awareness. While CBDCs are accepted by both young generations and also the elder generations. Hence, governments should work to develop the CBDCs as they can be an instrument for the state of use to implement a more effective and secure welfare system through direct, immediate, and flexible payments.

Additionally, the government may also enhance the advantages that Malaysian experience as a result of their consistent, regular, and daily use of CBDCs.

Finally, central bank should establish guidelines to ensure Malaysians have confidence towards the CBDCs system while launching it. Over the past few decades, confidence in the current system of linked fiat currencies has declined and it has gotten worse during the covid-19 pandemic. The develop of CBDCs would to be a possible substitute, but in this study shows that people think that digital currencies issued by central banks are more reliable. Therefore, central bank would have more confidence on developing CBDCs which it is easier to use for the citizen and to accept the effectiveness of the CBDCs' system provided by the central bank by raising confidence in the currency system and motivating Malaysians to value this criterion.

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