

Digital Ringgit: A New Digital Currency with Traditional Attributes

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Abstract—The development of central bank digital currencies (CBDCs) is underway around the world. They are essential for modernizing the national financial network. While most countries are calling for proof of concept for CBDCs, central banks have taken various approaches to designing CBDCs and are progressing their research and development efforts. Independence. Without CBDCs, private digital currencies will increasingly be dominated by non-financial companies. The appeal and instant recognition of paper money has been established for over 100 years. It is designed to have the appearance of a sovereign currency. Even if there is a serial number written on it, the carrier is still considered the owner without any conditions. Launching a CBDC poses some major challenges. The first technical challenge was to provide an offline device for trading digital currencies. The second technical challenge is called the double spending problem. The third technical challenge is measuring and controlling the velocity of money flow in digital transactions. This project will propose and develop a digital ringgit in light of these challenges. A digital Malaysian ringgit (DRM) note can be uniquely assigned to multiple session numbers. Here there is a need for a blockchain on the digital ringgit. Digital currency initiatives will bring significant benefits to developing economies; hence the cashless system will be useful in the fight against corruption and money laundering. Eventually, the digital ringgit will provide a control mechanism to a central bank, such as Bank Negara Malaysia, on its monetary velocity and growth of electronic money in a cashless society. A digital ringgit has an enormous potential to spur a financial cycle in Malaysia.

Keywords—*Central Bank Digital Currency(CBDC), Velocity of Money, Digital Money, Blockchain*

I. INTRODUCTION

The development of central bank digital currencies (CBDCs) is underway around the world. They are essential to

modernize the nation's financial network. In a joint report, the International Monetary Fund (IMF), World Bank and Bank for International Settlements (BIS) proposed to the G20 that a central bank digital currency (CBDC) network) across borders, supported by effective technology integration. and proactive international cooperation, which can bring significant benefits to the global economy [1]. While most countries are calling for proof of concept for CBDCs, central banks have taken various approaches to designing CBDCs and are progressing their research and development efforts. Independence. China's digital yuan is leading the way in international markets, and several countries have tested CBDCs for cross-border use, including France, Switzerland, Singapore, and Bahrain, to name a few. other.

Without CBDCs, private digital currencies will increasingly be dominated by non-financial companies. Jack Ma's Ant Group is a good lesson for the banking industry. Ant has quickly grown into a consumer lending platform, with outstanding loans of 1.7 trillion RMB (\$262 billion) as of June 2020, more than any Chinese banking record. [2]. The Bahamas became the first country to launch a general-purpose CBDC, called Sand Dollar, in October 2020. China is conducting several active trials. [3]. The Central Bank of Russia is also planning to issue a digital ruble. This paper will propose a digital ringgit as a part of Bank Negara direction into an immediate part toward an almost cashless society. As a small country, Malaysia can be easily left behind once CBDCs have been deployed around the globe.

Humans are, in essence, greedy beings. Large numbers

of human beings in modern history have become too cheap to resist printing more money than needed for free. This year alone, the Federal Reserve is creating USD 120 billion out of thin air every month [4]. While money should grow at the population growth rate, most countries would print several times more than their national growth. Gold extraction rate from the ground has always been naturally governed by population growth rate [5].

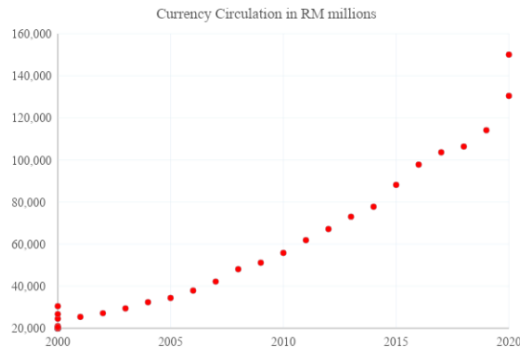


Fig. 1. An increase of paper currency in circulation

A. Post CoVid Pandemic Inflation

Inflation is running high worldwide after 2 years of the pandemic and free distribution of financial aid during several lockdowns. Let us list down an increasing source of money [6].

- Currency printing
- Sell government bonds and spend national savings
- The bank loan and interest system adopts a multiplier of 20 to 30 times
- Velocity of money
- Transfer money from large amounts to small amounts
- There are more large notes than small notes.

A country typically prints 20% per year instead of 2%. Recently, the central bank Bank Negara Malaysia (BNM) has printed on average 15% per year as depicted in Fig. 2. The first three expansions of monetary supplies are beyond the scope of this research. However, this project will try to address the last three issues which have been neglected for quite some time.

TABLE I
DENOMINATION RM MILLION IN CIRCULATION

Denomination	RM millions
5 sen	241.7
10 sen	910.5
20 sen	1,206.3
50 sen	1,427.5
RM1	3,264.7
RM2	125.2
RM5	3,179.4
RM10	7,640.6
RM20	4,212.0
RM50	74,151.0
RM100	63,977.5
Total	160,336.3

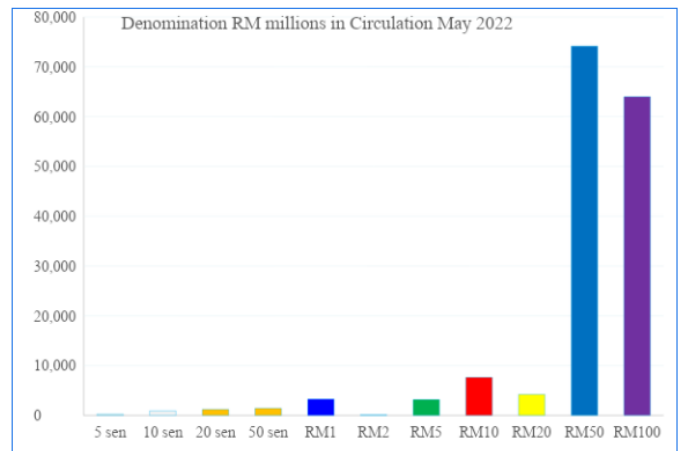


Fig. 2. Denomination RM million in circulation May 2022

B. Paper Currency

The appeal and instant recognition of paper money has been established for over 100 years. It is designed to have the appearance of a sovereign currency. It is made of light, durable material. It comes with a fixed denomination. It can be carried along and passed on with ease. Even if there is a serial number written on it, the carrier is still considered the owner without any conditions. It can change hands multiple times until it wears off. A unit of paper money is expected to last, on average 2 years. A local currency in Malaysia is called ringgit. A unit ringgit Malaysia (RM 1) has the highest denomination in Malaysia.

C. Bretton Woods Agreement

Bretton Woods System created a universal international currency exchange regime from 1944 to 1971. A currency is attached to a U.S. dollar, which is pegged to the price of gold. A detachment from the gold reserve will give any country more money annually. This role has been taken by a central bank, which also regulates financial entities and banks. A bank practices a fractional banking system. A bank keeps a small deposit percentage as reserves and loans out the rest. This system boosts the money supply and supports local economic growth.

D. Basel III

Due to increased fractional banking practice, Basel III will govern all capital and liquidity buffers a bank must carry to contain the incoming systematic risk of the 2008 financial collapse. During the 2008 financial crisis, a large bank has quickly gone bankrupt [7]. A strict measure is imposed on various fractional practical reserves to avoid running on any financial entities. Basel III is poised to shake up the gold market and derivative banking sector. These new banking rules aim at averting another global financial crisis. These recent changes also come at a time of accelerated monetary inflation. The full impact of Basel III will not be felt until January 2022.

E. Digital Ruble

The Central Bank of Russia plans to issue a digital ruble [8]. The Bank of Russia plans to gradually launch a pilot project for its digital currency in October 2020 through a public consultation report on the “Digital Ruble” project and announced “ Concept of the Digital Ruble” in April 2021. Bank of Russia will open a wallet to a financial institution and will, in turn, serve an individual on a digital ruble platform.

The April concept of the digital ruble assumes its following competitive advantages over other payment methods [9].

- The Use of digital rubles is cheaper for making payments than current non-cash rubles.
- Broader financial access for economic agents by making payments in digital rubles in the offline mode.
- Better competition in the banking sector to facilitate the transfer of funds from one form of ruble to another.

In 2020, Russia adopted four laws that are essential for digitalization: on the development of biometrics, on digital financial assets, on the marketplace, and on experimental legal regimes.

F. Digital Yuan

The digital yuan, a central bank digital currency (CBDC), will be used to pay certain workers. This digital yuan pilot is the country’s first Blockchain Fund Payment platform involving commercial banks and payment providers. During the 2022 Winter Olympics, visitors can use the digital yuan as a currency. It is also being set up for cross-border payment use.

For daily spending under 5,000 RMB (782 USD), it is possible to create a digital RMB wallet using just a mobile phone number. But as volumes increase, proof of identity and link to a bank account are required [10].

China’s version of its sovereign digital currency will simulate everyday banking activities, including payments, deposits, and withdrawals from digital wallets. The electronic yuan is one of the most liquid forms of money supply, consisting of banknotes and coins in public circulation, but in digital form. It is issued and backed by the country’s central bank. On June 2, Beijing distributed 200,000 digital red envelopes, each containing 200 yuan, through a lottery system to local residents [11].

G. Digital Rupee

The Reserve Bank of India (RBI) is working on creating its own CBDC. CBDCs function similarly to paper money and are digitally transferable. The digital rupee is considered a completely new thing in the vast country of India. After four years of recommendations by an inter-ministerial committee to launch fiat currency in digital form, the RBI said preliminary plans to test its feasibility may be completed soon.

However, Indian Prime Minister Narendra Modi launched the e-RUPI digital payment system on August 2, 2021. It is a personal and purpose-specific digital voucher. It is sent either as a QR code or SMS string to a beneficiary’s mobile phone. An e-RUPI Digital Payment System user can redeem a digital

coupon at any service provider. The service provider will get a payment immediately after it is processed.

H. Digital Pound

The digital pound is an ongoing effort to facilitate retail CBDCs for everyday payments to households and businesses, issued by the central bank, the Bank of England. Cash is still available and important to many people. Around 1.2 million adults in the UK do not have a bank account and around a fifth of them consider cash as their preferred payment method. A digital pound is easily exchangeable with cash and bank deposits but banknotes. In principle, it is one-to-one convertible with commercial bank money [12].

However, there is still no direct mechanism to achieve its transferability. Advanced cryptography can also be used to protect new digital identities. While the digital pound will be designed for UK users, it will also be available to non-UK residents.

To fully understand money, a good starting point is to understand gold. Gold is the key to financial wisdom. Its primary role is to serve as a universal money. Gold and silver are the most trusted currency based on its intrinsic value. It has always been money throughout human civilizations. No one questions its values; it has always been the real money [13].

I. Gold Reserve

The gold standard is when the central bank maintains a specific ratio between paper money and gold. Since there has not been any gold standard for more than 50 years, there is no way to determine the proper ratio. However, regardless of how much gold is appropriate, the feeling is that if the central bank has enough, it can declare a new gold standard.

There are billions of ounces of gold bullion in the world, 3 billion ounces to be exact (plus an additional 3 billion ounces in non-bullion equivalents). There is an ounce of gold for each person in the world. There are only 2 billion oz of silver available in the market. Russia and China have a strong reliable sovereign gold reserve to back their digital money distribution as listed in Table II.

TABLE II
TEN LARGEST GOLD RESERVES BY RICH COUNTRIES AROUND THE GLOBE.

Country	Gold Reserve in Tones
USA	8133.5
Germany	3358.5
Italy	2451.8
France	2436.5
Russia	2301.6
China	1948.3
Switzerland	1040.0
Japan	846.0
India	760.4
Netherland	612.5
Indonesia	78.57
Malaysia	38.88

Presumably, the United States has the most gold, but no one alive has seen it. Germany, Italy, and France have ac-

cumulated much gold since World War II. China and Russia have recently accumulated large amounts of gold in the last few decades. There are speculations that they both may have collected higher amounts via aggressive purchases. Unfortunately, Malaysia is not in the league and ranks at 52nd place. Malaysia's official reserve asset has amounted to more than USD 100 billion in the last few years and should take this opportunity to increase its gold reserve while it can [14].

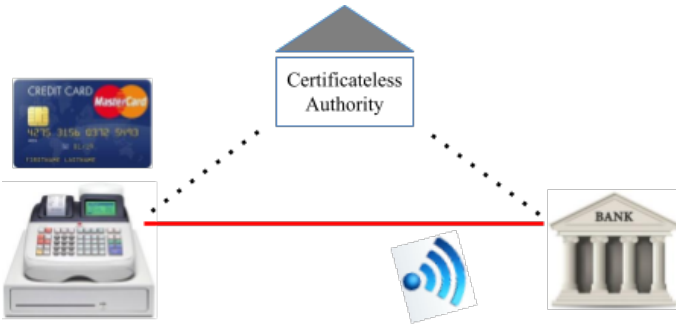


Fig. 3. An E-commerce secure payment mode

II. PROBLEM STATEMENT: CURRENT ON-GOING ISSUES

This section will focus on a specific problem related to using debit/credit cards for online transactions, as illustrated in Figure 3. Once a debit/credit card is used in an online transaction, anonymity issues make it vulnerable to potential misuse. One of the technical challenges we aim to address is the provision of an offline apparatus for digital money transactions. While most of the population is well-connected, a significant percentage of individuals remain unconnected to a network infrastructure or may have only sporadic access. Therefore, we propose an "almost online" system to cater to these users' needs.

Traditional paper money has been in circulation for over a century, and it has garnered trust and familiarity on a global scale. One of its distinctive features is its physical presence, often accompanied by a unique serial number. In contrast, digital money can be easily replicated without losing quality. When someone possesses digital money, they can simultaneously send identical copies to multiple recipients. This raises a significant concern for payees who cannot verify whether the sender has not duplicated the same digital money for others, a problem commonly referred to as "double spending." In 2009, Satoshi Nakamoto proposed a solution to this issue through a peer-to-peer network. However, this problem becomes more complex in an almost online system, where complete centralization is not feasible [15].

Another challenge associated with digital electronic money is the decrease in the velocity of money during a given period. To counteract this downward trend and ensure economic growth, the money supply (M1) has often been increased in

traditional economies. Herein lies the third technical challenge: measuring and controlling the velocity of money in digital transactions. In the context of our digital ringgit proposal, we will implement a specialized mechanism to enable a predetermined number of transactions using digital ringgit to control its velocity. [16].



Fig. 4. A basic payment system over a cloud.

A. Owner Privacy

In part 10: Privacy Satoshi explains how banks ensure customer privacy, not to mention how Bitcoin can do the same. Banks simply limit access to ongoing transactions and are the only banks that record the identities of participants [17]. While Bitcoin publishes every transaction in real time, blockchain users must use a public key infrastructure to identify themselves within the network and an associated private key to sign the coins sent to them.

B. A Smartphone

Smartphones have become an essential part of life. It is a source of connection and direct communication. Smartphone owners will protect and defend their smartphones at all costs, at all times. It is more convenient to use electronic digital currency on smartphones.

A direct link to a wallet to a subscriber number will enable more flexible digital currency management. A smartphone will store or transfer funds and pay to another entity directly. Thanks to the massiveness of communication services, telco operators can ensure a rapid launch and distribution of digital ringgit. Mobile ID can act as an identifier to bind digital ringgit to a digital wallet to provide an individually secure entity. Writing a user's crypto keys to a SIM card is also possible.

III. RESEARCH OBJECTIVES

There are three research objectives in this project. The first objective is to identify key success factors of CBDCs as a new digital money. The second objective is to develop and build a technical infrastructure on a digital ringgit. The third objective is to test and simulate a digital ringgit as a payment system as a proof of concept [18].

A. Digital Ringgit Malaysia

A digital ringgit Malaysia (DRM) note is uniquely assigned to a multiple session number. This DRM number is a 256-bit number. An owner of a digital ringgit Malaysia (DRM)

is addressed as an ID. This ID is uniquely assigned to a person. In a specific DRM payment system, an ID is a 256-bit number. Original user identification must be unique by itself. In Malaysia, a MyKAD number is recognized by a Registration Authority (RA).

An issuing bank may use this unique user identification to input a seed to generate an individual ID. An ownership code is stored in a blockchain controlled by this ID. An ID represents a person. And this person must carry a pair of private-public keys.

Initially, a DRM with a specified amount from a paper currency note is validated by a digital signature from an issuing bank. This bank will issue a DRM note to an ID named Alice. This ID person, Alice, can spend the money by making a transaction to whom (another ID) he/she wants to pay or send to Bob. A transaction consists of a current owner ID, an amount or total amount to another ID. A current owner will digitally sign this transaction. Any amount less than the full amount on an original image of paper currency, a DRM must be returned to the bank [19].

Later, an ID, namely Bob, who owns a DRM from a previous transaction, can spend this DRM as input to a new transaction. A transaction must start from a total amount with a valid date before expiry. Any DRMs near an expiry date can be returned to an issuing bank and replaced by a new DRM. Bob can then sign and spend this DRM to another ID Carol [20].

The total amount of DRM in one's digital wallet is a total sum of paper note images. This visual output will give a traditional wallet looks and feels. A digital wallet, in this case, can still be hacked. However, an attacker needs full access to the owner's private key to spend the money.

There are three research questions in this project. First, what are the elements of success in developing an electronic payment system? Second, how do we measure and control the velocity of electronic money? Third, what is the right technology to protect digital money?

B. Elements of Success

This research project will evaluate current online payment systems according to seven elements of success. Elementary membership factors consist of Claimability, Transferability, Recognition, Anonymity, Denomination, Validity Date and Velocity of Money.

Claimable Money: It measures the ability of an owner or carrier of digital electronic money to claim it from the financial provider or bank in case of any theft or loss. The founders of the South African Bitcoin exchange, Africrypt, with 69,000 bitcoins, disappeared to the United Kingdom. The matter has been reported to the Financial Sector Conduct Authority (FSCA), the Hawks and the SA Reserve Bank [21].

Unfortunately, a formal investigation has not been launched since cryptocurrency is not considered a financial product in South Africa. This incident is the second significant loss to South African cryptocurrency investors in two years, after

Johann Steynberg, CEO of trading platform Mirror Trading International, disappeared with 23,000 bitcoins [22].

Transferable Money: It classifies whether electronic money is contagious or not with ease to another person. The first kind of money transferable will be between users. The second kind of electronic money transfer will be between users without any claim from the bank. After that, the end user will pay a merchant, and the merchant can claim the money from its financial provider or a bank. Non-transferable electronic money can only be used for one-time payments.

A digital currency recipient must trust its status. He or she is not receiving counterfeit money or a digital currency already sent to someone else. To achieve this trust offline without requiring direct connection to a central server or a central authority, its status and complete transaction history must be publicly verifiable. **Recognition of Valid Money:** It measures the acceptance and recognition given toward electronic money as formal money by a central bank. A cryptocurrency, especially Bitcoin, is not recognized as formal money by central banks. Any loss or theft will not be treated as monetary loss nor backed by a central bank [23].

Billionaire Bitcoin owner Mircea Popescu has reportedly died off the coast of Costa Rica, leaving behind a cache of virtual currency valued at USD 1 billion. Word of Popescu's reported death was circulating in crypto circles, with some wondering where his holdings would go. Any losses can hardly be accessed or recovered via legally recognized title [24].

Anonymity: It measures an electronic money attachment to an owner or carrier of the money. Digital money in a financial account belongs to an account holder. Anonymity is an important element of privacy. A financial provider wants to trace to whom electronic money belongs at any given moment [25]. However, a paper currency by itself is still anonymous to whom it belongs without any reporting to the money issuer or financial provider.

An open blockchain defies any basic understanding of anonymity since it publicizes the complete transaction histories of its users. A digital currency should attempt to provide the same anonymity as its traditional paper currency. A digital number assigned to it must be anonymous from any account numbers and origin of funds [26].

Denomination: Traditionally, paper money always comes along in a specific denomination. A fixed denomination on new digital money is expected in a new electronic payment system. Introducing a fixed denomination on new electronic money is particularly crucial to be successful and popular in a new electronic payment system. A fixed, stable denomination in each electronic money rather than having an open amount depending on a transaction will limit any risk of loss or theft.

Validity Date: A metal coin comes with an issue year. Traditionally, money is expected to stay forever. A paper currency does not come with an expiry date even though it can be recalled at some later in the future. However, it can be identified by a central bank at the expense of disruptive maneuvers on a special occasion. In Malaysia, oversized RM 500 and RM 1000 notes were recalled.

A credit card carries a validity date for a periodical limit against future risk exposure. A digital money with an expiry date will ensure that the currency will be recalled and returned to a central bank on time.

A digital ringgit can trace all transactions and thus allow the central bank to measure rather than approximate its velocity. A validity date on a digital ringgit will give the central bank better control of its expected velocity and volume of money in an economy.

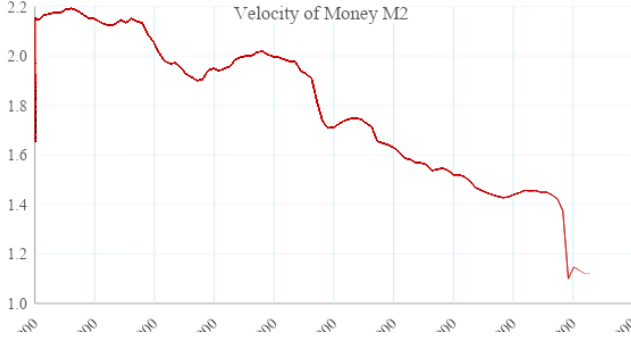


Fig. 5. A declining trend on velocity of money in the past 25 years (FRED, 2021).

Velocity of Money: A velocity of money is central to the quantity theory of money [27]. Traditionally, the velocity of money denotes the average number of transactions per monetary unit within a year. In this instance, however, it measures the frequency of the use of digital electronic money within a monetary payment system. Electronic money should support more than one-time use. Essential electronic money can only be used once only as payment money.

In this case, several times per unit, digital money is transferred or expenses to purchase service and goods per unit note before it is claimed back to an issuing bank or financial provider. The velocity of money has been observed to slow down recently due to economic slowdown and the introduction of electronic money within a local economy. The velocity of money M2 has declined in the past quarter of a century, as shown in Figure 5. A significant injection of money is needed to keep economic activities afloat as a financial means of adjustment for this decrease in the monetary level.

Electronic money has followed, on average, a constant growth in the last decade. However, the velocity of paper money has gone down at the same time. Banks and non-financial corporations have created electronic money. They provide electronic money without any attachment to any paper money. Bank Negara Malaysia started to lose its grasp from the moment of electronic money inception into a cashless transaction [28].

IV. COMPARISON AMONG POPULAR DIGITAL MONEY IN MALAYSIA

This proposal will identify elements of success factors on traditional attributes in a digital payment system. A new mechanism for digital ringgit will be proposed that can fulfill

success factors in an online payment system. A brief evaluation of the effectiveness of the proposed digital ringgit compared to popular digital money will be tabulated.

A dozen popular electronic money have been reviewed and compared to this proposal on a session and multiple session digital ringgits. A colour scheme as a membership criterion has been listed in Table III.

A session digital ringgit satisfies all elements of success factors but the velocity of money [29]. A multiple-session digital ringgit will have a better chance to play a role in exercising the velocity of money. A digital ringgit is expected to represent a paper currency with an extra claimable feature. Many cryptocurrencies get lost or stolen without being able to recover.

A. Scalability and Performance

In an open public ledger, Bitcoin can process 7,000 transactions per second. A modern payment system needs to process about 100,000 transactions per second. At this initial design phase [30], it is crucial to project growth on a blockchain ledger. In this digital ringgit, ledger growth will be limited to the number of transactions allowed, determining the velocity of money and expiry date. Digital signing here in this project is by far the most time-consuming part. A selection on an elliptic curve will make a severe computational difference.

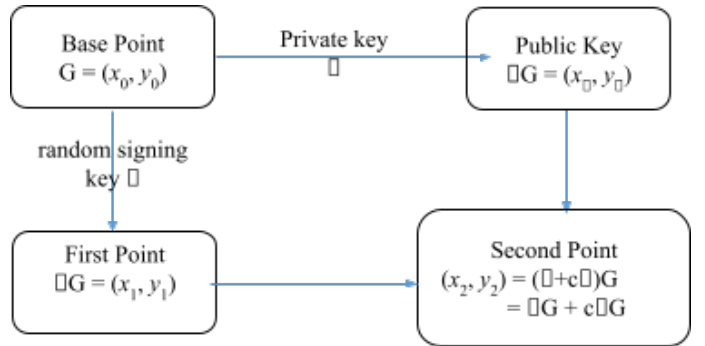


Fig. 6. Point projection in a basic digital signing and verification.

B. Digital Signature

Typically, an elliptic curve with a given parameter pair (a, b) is defined as the set of all points with coordinates (x, y) satisfying a basic Weierstraß equation,

$$E : y^2 = x^2 + ax + b \text{ where } a, b, x, y \in F_q.$$

Let G be a base point generator, q be a prime, and Φ be an order on an elliptic E .

Let λ be a private key. Then, take precomputed λG as a public key. Computing a multiple λ of point G is considered as a one-way function. Given both base point G and λG , it is intractable to extract λ from them.

- Generate random scalar α and compute αG .
- Compute $c = \text{SHA2}(m)$.
- Calculate a signature scalar $s \equiv \alpha + c \cdot \lambda \pmod{\Phi}$.
- Output a signature pair $(\lambda G, s)$

TABLE III
A MEMBERSHIP EVALUATION OF ELECTRONIC MONEY

Electronic Money	Claim-able	Transfer-able	Recognition	Anonymity	Denomi-nation	Validity Date	Velocity
Paper Currency							
Credit Card							
Debit Card							
e-check							
Digital Cash							
e-Wallet							
Touch n Go							
Pay Pal							
Bitcoin							
Samsung Pay							
Session DRM							
Digital RM							

An output pair $(\alpha G, s)$ is expected to be a digital signature on a message m from an owner of public key λG . It should be noted that α is a random session number in a traditional digital signature algorithm [31]. A digital signature here consists of an EC point αG , a signature scalar s , and a public key K . They can be compactly represented in $32 + 32 + 32$ bytes. They will be visualized as 3 visual emblems in this project.

C. Signature Verification

From a signature pair $(\alpha G, s)$, public key λ and a message m .

- Compute $c' = \text{SHA2}(m)$.
- Compute $Q = sG$ and $Q' = \alpha G + c' \cdot \lambda G$
- Check on validation whether $Q = Q'$?

Referring to Figure 6, there are 2 paths to compute and project from a base point G to a second point $(\alpha + c \cdot \lambda)G$. First, given a signature scalar $s = \alpha + c \cdot \lambda$ and system parameter base point G , the second point can be computed directly via a point multiplication sG .

Second, given a first point αG as part of a signature, take a public key λG and message m , then a scalar c can be independently computed as $c = \text{SHA2}(m)$. Next, $c \cdot \lambda G$ will be projected from a public key λG via a point multiplication. Thus, αG and $c \cdot \lambda G$ will be added together to form $\alpha G + c \cdot \lambda G = (\alpha + c \cdot \lambda)G$.

In the case of both first and second paths giving the same answer, then the pair $(\alpha G, s)$ is considered a valid signature on a message m from an owner of public key λG who must have used a private key λ in computing $s = \alpha + c \cdot \lambda$ to digitally sign it.

V. IMPACT STATEMENT

A CBDCs is an idea whose time has come. If properly designed, they present an opportunity to improve payments with a technologically advanced representation of central bank money [32]. Further exploration of CBDC design choices and their macro-financial implications is essential.

The Federal Reserve has released a long-awaited review of the potential for creating a CBDC for US Dollar on 20 Jan 2022. Introducing a CBDC would represent a significant innovation in US Dollars. The Fed report notes that creating a

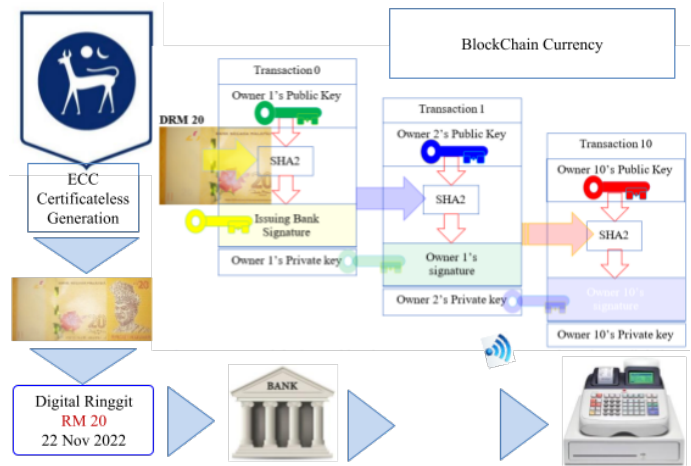


Fig. 7. An overall infrastructure of DRM from a paper currency to a merchant.

CBDC will seek to complement current financial systems, not replace them. Any digital currency the central bank issued would have to protect consumer privacy while supporting faster and cheaper payments [33].

Money plays three prominent roles in civilization.

- As a unit of account, the yardstick of economic activity;
- A means of exchange to make payments; and
- As a store of value to transfer purchasing power over time.

With a digital ringgit, BNM main goal is to provide a universal means of exchange for the digital economy. A digital ringgit will be crucial for correctly designing CBDCs as a new form of money for Malaysia in the digital era, as illustrated in Figure 7. A digital ringgit should be introduced to the public gradually.

First, a one-session digital ringgit payment system shall be introduced to minimize one-time payment risk. Each random digital ringgit session number will only be used once. This session number will be dynamically changed and updated to a new number once a transaction has been executed. Therefore, it will be a randomly unique number per transaction recognized by a financial service provider.

The financial provider will digitally sign each new session's digital ringgit number. Once used, it will be digitally returned to its issuing financial provider. Bank Negara will save the physical money printing since the banks will keep the future notes. Only digital ringgits will be floating around. This new era will save paper printing in the future.

Second, a blockchain digital ringgit for multiple sessions will be attached to a real paper money note. A blockchain digital ringgit movement across numerous transactions can be tracked down by control authority as each blockchain DRM will be based on real paper money kept by the banks [34]. At the same time, the velocity of this paper money can be traced from various transactions. It is changing hands from one person to another, but in the end, it will return to the bank that issues it.

During the post-COVID era, Malaysian society will learn how to interact in cashless and contactless transactions. A digital ringgit will spur the growth of the national economy. Industrial and financial will play intermediary roles instead of losing control of cryptocurrencies.

Ideally, a digital ringgit should serve as electronic money via traditional attributes with privacy protection, bank mediation, transferability and identity verification. These attributes are taken from the latest publication on [35] from the Board of Governors of The Federal Reserve System.

A. Privacy-Protection

Even though Malaysia does not have a privacy act, protecting consumer privacy is critical. A digital ringgit would need to strike an appropriate balance between safeguarding consumers' privacy rights and affording the transparency necessary to deter criminal activity.

B. Bank Intermediation

The digital ringgit is unlikely to contribute to a significant expansion of BNM's role in the financial system and economy. According to the banking intermediary, the private sector will provide digital accounts or wallets to facilitate the management of the digital ringgit payment system. These potential intermediaries are ready to operate in an open market for Ringgit digital services [36].

C. Transferable

For the digital ringgit to function as a widely accessible means of payment, it needs to be easily transferable between customers of different intermediaries. The ability to seamlessly transfer value between different intermediaries makes payment systems more efficient by allowing money to flow freely throughout the economy [37].

D. Identity-Verification

Financial institutions in Malaysia are subject to strict regulations designed to combat money laundering and terrorist financing. The digital Ringgit must be willing to comply with these rules. In effect, the issuing bank must verify the identity of the person accessing the digital ringgit for a large sum of

money, just as other banks and financial institutions currently verify the identity of their customers.

E. Latest Update

Central banks are taking advantage of the recent turmoil in cryptocurrency markets to aggressively promote central bank digital currencies (CBDCs). They gave their views at the 2022 World Economic Forum in Davos. Someone must be responsible for the value, which must be widely accepted as a medium of exchange. Digital currencies issued by central banks, officially recognized by governments and distributed throughout the economy in cooperation with major commercial banks will be expected to be a digital currency. Safe, secure and stable digital.

A privately issued crypto token such as the Luna token, which was touted as being pegged to the U.S. dollar via TerraUSD, turned out to be pegged to zero once it crashed by over 99% in May [38]. The collapse of the Terra ecosystem – a prominent experiment in decentralized finance – began with the loss of its algorithmic anchor to the US dollar and ended with a bank run that caused \$40 billion worth of tokens are virtually worthless [39].

After cryptocurrency's final two-year hibernation ended in 2020, the sector reached total assets of around \$3 trillion last November before falling below \$1 trillion. Today, at around \$1 trillion, the cryptocurrency market is only slightly above the roughly \$830 billion mark it reached in early 2018. Bitcoin, meanwhile, has fallen nearly 70% from its record high. In addition, a series of altcoins also decreased. These unfortunate events have proven that a sovereign authority must appropriately handle digital money systems but individuals or small corporations [40].

VI. USES AND FUNCTIONS OF A DIGITAL RINGGIT

Digital ringgit transactions should be final and completed in real time, allowing users to pay each other using risk-free assets. Individuals, businesses and governments can use CBDC to make purchases of key goods and services or pay bills, and governments can use the digital ringgit to collect taxes or disburse funds direct benefits to the people.

Additionally, the digital ringgit can be programmed to make payments at certain times. The digital ringgit can serve as a new basis for the payment system and a bridge between different payment services, old and new. This could also maintain the centrality of the secure and trustworthy paper ringgit in a rapidly digitizing economy. Innovative efforts are needed to graphically represent what it feels like to touch a paper ringgit.

Globally, a joint international effort (IMF, World Bank and BIS) aims to expand the vision beyond central bank studies on CBDC to national economies. Effective technology integration and proactive international cooperation can enable cheaper, faster and cleaner cross-border payments and thus bring significant benefits to the global economy.

VII. CONCLUSION

A cashless economy describes an economic state in which financial transactions are not conducted with money in the form of notes or coins but through the digital transfer of information between the parties involved in the transaction. The newspaper found that adopting a cashless economy policy could improve the country's financial stability. It seems that much has been done to raise awareness about the cashless economy and a significant proportion of the population is awaiting the advent of the cashless economy.

Digital currency initiatives will bring significant benefits to developing economies; hence the cashless system will be useful in the fight against corruption and money laundering. One of the most important contributions of a cashless economy is that it is expected to reduce the risks associated with carrying cash. Since most transactions will now be settled electronically, people will have less need to carry cash and therefore cash losses, thefts and armed robberies will be significantly reduced.

The digital ringgit will ensure that the Malaysian ringgit remains available and valuable in an increasingly digital economy. In this project, a digital ringgit for several sessions was proposed, linked directly to banknotes. With the original banknotes in the safe, any disputes about the origin of the digital ringgit can be verified. Indirectly, the digital ringgit will provide Bank Negara Malaysia with a mechanism to control the velocity of money and the development of cryptocurrencies in a cashless society.

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