

*Should the Reserve Bank of New Zealand Continue their Endeavours to Implement a Central Bank Digital Currency for Retail Application?*

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A paper submitted in partial fulfilment of an LLM Degree - LAWCOMM 730

Faculty of Law  
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2022

Word count: 12385

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*Abstract*

*“Although we haven’t decided whether a digital euro will be introduced, I think it’s very likely to happen. In my view, it’s not a question of if but rather how and when.”*<sup>1</sup> British Economist Gabriel Makhouf, Governor of the Central Bank of Ireland.

9 out of 10 central banks globally have taken initiatives toward exploring central bank digital currencies (‘CBDCs’).<sup>2</sup> Such interest has been sparked due to a decline in the use of cash, disruptions caused by Covid-19 and the growing threat and influence of private currencies. The ensuing paper will argue that on the balance of the opportunities and challenges posed by CBDCs, the Reserve Bank of New Zealand (‘RBNZ’), should continue their endeavours to implement a CBDC for retail application.

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<sup>1</sup> [Digital Money \(centralbank.ie\)](#)

<sup>2</sup> [9 Out of 10 Central Banks Exploring Digital Currency, BIS Says \(coindesk.com\)](#)

## *I Introduction*

Throughout history, money has constantly been evolving and this is most true in the digital age. As individuals around the world continue to move their wallets from their pockets to smartphones and digital devices, there is an ever-growing debate around whether central banks should issue digital money for retail use. The RBNZ, New Zealand's steward of money and cash, entered this debate in September of 2021 when it initiated a comprehensive public consultation, called the *The Future of Money – Te Moni Anamata* ('RBNZ Consultation Paper'), including a proposal to develop a retail CBDC to improve resilience and efficiency in the New Zealand central bank money system.<sup>3</sup>

The RBNZ received a record-breaking number of responses to the consultation paper, with an overwhelming fear from New Zealanders that a CBDC would replace physical cash,<sup>4</sup> causing the RBNZ to clarify their view publicly; *“that CBDC and cash would be complementary, rather than conflicting.”*<sup>5</sup> Since then, no decision has yet been made by the RBNZ on the next steps for a potential CBDC, however Adrian Orr, former Governor of the RBNZ reiterated in February 2022 that; *“there is a historic opportunity for us [the RBNZ] to shape how money can better serve a sustainable and productive economy for all New Zealanders, both by considering how we can make use of digital technology to modernise central bank money, and how we can ensure cash remains an option for those who need it.”*<sup>6</sup>

This backdrop presents an opportunity to debate whether the RBNZ should continue their endeavours to implement a CBDC for retail application. This paper will commence that debate with some background on the key components and history of money, before introducing the concept of a CBDC and the associated RBNZ motivations for its intended use. It will then assess the opportunities and challenges posed by a CBDC, to ultimately determine that in order for the RBNZ to preserve their stewardship role (as a critical safeguard to monetary sovereignty),<sup>7</sup> they shall continue their endeavours toward implementing a CBDC for retail application. Moreover, this paper will provide some CBDC design suggestions, lessons from CBDC journeys overseas, and conclude with some additional CBDC considerations for the RBNZ to be wary of in the future.

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<sup>3</sup> RBNZ (2022) 'Future of Money – Te Moni Anamata: Summary of responses to our 2021 issues papers' April. At 3.

<sup>4</sup> At 6.

<sup>5</sup> [RBNZ says no decision yet on central bank digital currency | Reuters](#)

<sup>6</sup> RBNZ (2022) 'The Future of Money Demands Innovation' February. At 2.

<sup>7</sup> Fabio Panetta 'Central Bank Digital Currencies: Defining the Problems: Designing the Solutions' BIS (2022). At 1.

## *II What is money?*

To avoid confusion, there is a distinction between the terms of ‘money’ and ‘currency’ (notably around functionality), however the two will be used interchangeably in this paper, unless otherwise stated.

### *A. Three uses of money*

For money to be effective, whether it be physical or digital, it must fulfil the following three key functions: medium of exchange, unit of account, and store of value.

A medium of exchange need not be cash or coins, rather the key question is whether the medium is accepted as a trusted means of payment. *“In Romania under communist rule in the 1980s, for example, Kent cigarettes served as a medium of exchange; the fact that they could be exchanged for other goods and services made them money.”*<sup>8</sup> The importance of a medium of exchange is perhaps best exemplified in its absence. In barter economies where goods are exchanged directly for other goods, there is no medium of exchange, meaning, there is no one item that can anchor the market or be used as a common measure of establishing prices. Suppose the local supermarket was run via barter trade, then everyone would need to load a cart full of items that the grocer might accept in exchange for groceries. This double coincidence of wants is simply unsustainable in modern times.

Next is unit of account, meaning that money must possess a consistent means of measuring the value of things. To help explain this concept, consider that for \$10 you can get five \$2 chocolate bars, or for \$4 you can buy a bottle of milk - to be consistent and maintain the unit of account, we say the milk is \$4, not that it is two chocolate bars (or whatever other opportunity cost the bottle of milk may be). Related (and equally important) is that currency must be fungible. That is, money must be divisible into smaller units without loss of value.

The final function of money is store of value or an ability for an item to hold its value (and be durable) over time. For example, a \$2 coin found in your back pocket a year later is still valuable, whereas chocolate found in your back pocket a year later is unlikely to have held the value spent on it.

These three requirements are not always easily fulfilled and as Carl Andre says; *“money is a very complicated problem – the history of money is very curious.”*<sup>9</sup>

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<sup>8</sup> 24.1 What Is Money? – Principles of Economics (umn.edu)

<sup>9</sup> IBID.

### *III History of money*

Post the ancient times of barter trade,<sup>10</sup> money (in one form or another) has existed for nearly 3000 years,<sup>11</sup> and before the digital age, it took two major forms - firstly, commodity money, deriving its value from the commodity of which it is made; and secondly, fiat money, which has value by the order of the government.

#### *A. Commodity money*

The key characteristic of commodity money is that it comprises of a substance that holds value.<sup>12</sup> It is valuable outside of its use as money – it can be used, stored, or traded.<sup>13</sup> A good example is prison mackerel, which is commodity money because it can buy services from other prisoners, but also be eaten. Various other items have been used throughout history as commodity money, including “*scarce precious metals, conch shells and even barley seeds.*”<sup>14</sup> In fact, at one point in time, cowrie shells (belonging to sea snails) were used nearly everywhere across the globe. However, as time passed, these shells began to be replaced by more standardised currencies used by central authorities such as the Roman Empire.<sup>15</sup>

The era of precious metals perhaps marks the most dominant form of currency throughout history in the form of bullion and coins.<sup>16</sup> Gold and silver are alleged to have first been minted as coins in the Greek city-state of Lydia in the beginning of the 7<sup>th</sup> century B.C. and the practice continued persistently until modern times.<sup>17</sup> Both gold and silver are valuable outside of their use of money - they are durable and can be used for jewellery and even industrial purposes. Precious metals continue to hold value to this day; however, they do not make perfect currencies. They can be expensive to produce (and have inherent opportunity cost issues as further resources must be found), and there is inflation stress when supply of the commodity is not sufficiently flexible to keep up with demand. Further, they are heavy and difficult to divide, in turn rendering them somewhat illiquid.<sup>18</sup>

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<sup>10</sup> [History of Money and Currency in the World](#)

<sup>11</sup> IBID.

<sup>12</sup> [Functions of Money, Economic Lowdown Podcasts | Education | St. Louis Fed \(stlouisfed.org\)](#)

<sup>13</sup> [From Barter To Bits – History Of Money – CHAPTER\[1.2\] \(mybloggertricks.com\)](#)

<sup>14</sup> [Introducing Money | Boundless Economics \(lumenlearning.com\)](#)

<sup>15</sup> History of money, above n 10.

<sup>16</sup> IBID.

<sup>17</sup> What is money, above n 8.

<sup>18</sup> IBID.

It was the transportability of gold (or lack thereof), that gave way to the idea of paper money, initially in China. At first, paper money served as a promissory note (much like an ‘IOU’), but soon became a proper form of currency, which was backed by a promise of redemption for gold upon demand, much like a certificate to redeem in specie (physical gold) from the vault.<sup>19</sup> At first these notes were redeemed by rulers, then later by banks around the 17<sup>th</sup> century. Over time people began to trust this representative money as much as actual gold, which eventually paved the way for fiat money - the type of currency used by modern central banks today.<sup>20</sup>

### *B. Fiat money*

Fiat is latin for “*let it be done*” and is used by economists to describe money where the value is not derived from any intrinsic value or guarantee that it can be converted into a valuable commodity. Instead, it has no value in-and-of-itself, rather the value stems only by government order.<sup>21</sup> Usually, such order, entails the government declaring the fiat currency to be legal tender, making it unlawful not to accept the fiat currency as a means of exchange.<sup>22</sup> Paper notes are an example of fiat money. Each bill in the United States even has the following printed on them: “*This note is legal tender for all debts, public and private.*”<sup>23</sup>

The United States led the transition away from gold-backed currency and into fiat money in the latter half of the 20<sup>th</sup> Century and there have numerous debates since over the advantages and disadvantages of the change.<sup>24</sup> The proponents for fiat, note that it gives governments more control over managing inflation and a country’s wider economy. While on the other hand, fiat’s lack of direct backing (to gold) means “*it can be susceptible to dangerous trends such as hyperinflation during tumultuous circumstances.*”<sup>25</sup> To that end, fiat money is a social institution that depends on trust,<sup>26</sup> and if circumstances arise whereby the public lose faith in fiat money, such as what happened with overprinting in Russia in the 1990s, then people may in turn call upon alternatives.<sup>27</sup>

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<sup>19</sup> History of money, above n 10.

<sup>20</sup> Functions of money, above n 12.

<sup>21</sup> [Currency Definition \(investopedia.com\)](https://www.investopedia.com/terms/c/currency-definition.asp)

<sup>22</sup> Introducing money, above n 14.

<sup>23</sup> What is money, above n 8.

<sup>24</sup> History of money, above n 10.

<sup>25</sup> IBID.

<sup>26</sup> Gianni ‘The age of central banks’, Edward Elgar Publishing Ltd (2011).

<sup>27</sup> Functions of money, above n 12.



### C. Digital – Bitcoin, Blockchain and Stablecoins

The basic notion of digital money, with computer-based money like assets, dates back a quarter of a century, with the emergence of internet banking.<sup>28</sup> In fact, 97% of the money in circulation in the United States today is from money deposited online and converted into a string of digital code by commercial banks, which can be used for transactions that were historically cash-based.<sup>29</sup>

So far, the shift to digital has left the banking business relatively unscathed, however, the emergence of the genesis cryptocurrency, Bitcoin ('BTC') in 2009, marked a dramatic shift from initial digital banking. The distinguishing feature of BTC is that it runs on decentralised distribution ledger technology (known as blockchain); meaning it sits outside the control of any sovereign monetary authority.<sup>30</sup> This feature facilitates two key values of the coin to users – scarcity and anonymity.<sup>31</sup>

The rise of BTC is somewhat fascinating, from humble beginnings around \$1 United States Dollar ('USD') in 2009 to a value surpassing \$60k USD in 2021. Bitcoin is believed to have been created by an individual named Satoshi Nakamoto out of the turmoil of the 2008 recession as distrust of banks and their role in the financial system grew.<sup>32</sup> In the 'Bitcoin Whitepaper' Satoshi Nakamoto famously noted – *“the root problem with conventional currency is all the trust that’s required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust.”*<sup>33</sup>

It wasn't until May 2010 that the first economic transaction was made with BTC, when a Florida man negotiated to have two Papa John's pizzas, valued at \$25, delivered for 10,000 BTC (or \$300m USD in 2022).<sup>34</sup> Since then, thousands of similar decentralised cryptocurrencies have spawned, collectively generating billions of dollars in global transaction volume every day,<sup>35</sup> the most well-known (besides BTC) being Ethereum, XRP Ripple and Dogecoin.<sup>36</sup> Although, despite this growth, several obstacles, such as difficulty of use, lack of scalability, sustainability and resistance from central banks have (up until now) prevented cryptocurrency from becoming a dominant form of money. Perhaps, however, the

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<sup>28</sup> [Central bank digital currency and stablecoin: Early coexistence on an uncertain road | McKinsey](#)

<sup>29</sup> Ajay S Mookerjee 'What If Central Banks Issued Digital Currency?' Harvard Business Review (2021). At 1.

<sup>30</sup> McKinsey, above n 28.

<sup>31</sup> Though strictly speaking it is pseudonymous (as every transaction is still recorded on open chain, but wallet to wallet, rather than personal).

<sup>32</sup> *“To this day, no one knows who Satoshi Nakamoto is or was”* - [The History of Bitcoin, the First Cryptocurrency | Cryptocurrency | US News](#)

<sup>33</sup> [What are the lessons from history for digital currency? - Economics Observatory](#)

<sup>34</sup> [The History of Bitcoin, the First Cryptocurrency | Cryptocurrency | US News](#)

<sup>35</sup> Anneke Kosse et al 'Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies' Monetary and Economic Department (2022). At page 11.

<sup>36</sup> McKinsey, above n 28.

most significant concern with cryptocurrencies is volatility - "*Bitcoin's history is largely one of astronomical growth punctuated by a few severe price retrenchments,*"<sup>37</sup> says Economist, Peter C. Earle. Numerous critics of Bitcoin have pointed at the same question - how is anyone supposed to transact or save BTC when they do not know whether the value will swing 10% up or down the next day?<sup>38</sup>

It was this volatility issue that birthed the creation of stablecoins. Stablecoins such as Tether and USD Coin (or the lesser known NZDS closer to home),<sup>39</sup> are a category of cryptocurrencies that give investors a chance to invest in a digital currency, however, with an aim to maintain a stable value by tying their value to one or more assets (whether fiat such as USD, or commodities such as gold),<sup>40</sup> to avoid extreme price fluctuations.<sup>41</sup> At the end of 2021, 6% of the value of cryptocurrency was estimated to be in stablecoins.<sup>42</sup> Private technology companies such as Facebook (with Diem), with billions of customers, are now even entering the market.

Given their design to maintain a stable value, stablecoins are tipped by central banks to have a higher potential (and thus threat) than other, unbacked, cryptoassets as a means of currency.<sup>43</sup> As such, they are attracting attention from central banks and regulators around the world as a challenge to monetary sovereignty, which in turn has prompted the emergence of CBDCs.

#### *IV What is a CBDC?*

A CBDC is a form of money issued by a central bank in the national unit of account (say NZD), that represents a direct liability and legal claim on the central bank (meaning it is fiat currency).<sup>44</sup> However, instead of being a physical note or coin, it is digital. In essence, it is a 1:1 direct alternative to cash, on digital rails, and notably differs from existing cashless payment instruments such as credit and debit transfers, which instead represent liabilities of a private financial institutions.<sup>45</sup> Much like cash, if implemented appropriately and with suitable regulatory parameters it could provide a safe, digital, medium of exchange, unit of account and store of value.

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<sup>37</sup> US News, above n 34.

<sup>38</sup> History of money, above n 10.

<sup>39</sup> [NZDS the New Zealand Dollar Stablecoin issued by Techemynt](#)

<sup>40</sup> Adachi et al 'A regulatory and financial stability perspective on global stablecoins,' Macroprudential Bulletin (2020).

<sup>41</sup> Financial Stability Board (FSB) (2020): "Regulation, Supervision and Oversight of 'Global Stablecoin' Arrangements, Final Report and High-Level Recommendations", October.

<sup>42</sup> Financial Stability Board (FSB) (2022): "Assessment of Risks to Financial Stability from Crypto-assets", February.

<sup>43</sup> Coindesk, above n 2.

<sup>44</sup> Deloitte (2021) 'Central Bank Digital Currencies: Building Block of the Future of Value Transfer' December. At 7.

<sup>45</sup> Anneke Kosse et al, above n 35. At 2.

## *V Why is the RBNZ considering a CBDC?*

To recap, money has taken many forms through the ages, as society and technology has evolved.<sup>46</sup> The RBNZ, as steward of money and cash in New Zealand, aims to ensure that central bank money contributes to “*a sound and dynamic monetary and financial system*” – noting that their role is two-fold; to ensure (i) a stable anchor of value and confidence and convertibility in New Zealand money; and to provide (ii) a fair and equal way to pay and save in a modern and inclusive economy.<sup>47</sup> Fundamental to this role is ensuring the stability and trust of central bank money, which was recently highlighted in the Covid-19 pandemic, where due to uncertainty, many people decided to insulate themselves by withdrawing cash from their bank accounts.<sup>48</sup> This safety in central bank money, is deep-rooted and manifests in times of particular uncertainty.<sup>49</sup> The task then for the RBNZ is to preserve the faith in central bank money moving forward, particularly in the digital era.

Earlier in the year, Ian Woolford of the RBNZ noted that; “*money is evolving in an increasingly digital global economy. Day-to-day use of physical cash is continuing to decline. COVID-19 has reinforced this trend ... New Zealanders have demonstrated a clear preference for digital ways to pay that are convenient, efficient, and secure.*”<sup>50</sup> These trends, coupled with the emergence of digital currency innovations, have triggered the RBNZ to consider an opportunity (as proposed in the RBNZ Consultation Paper) to provide New Zealanders with another choice of central bank money, alongside cash, in a digital form.<sup>51</sup>

In light of those motivations and context, the next few sections will weigh up the opportunities and challenges of a CBDC.

## *VI Opportunities of a CBDC*

This section will consider the key opportunities of a CBDC for the RBNZ, in respect of their two-pronged stewardship role above, along with some additional benefits that a CBDC might have on the wider payments ecosystem in New Zealand.

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<sup>46</sup> Functions of money, above n 12.

<sup>47</sup> RBNZ (2021) ‘The Future of Money – Stewardship Issues Paper’ September.

<sup>48</sup> Economics Observatory, above n 33.

<sup>49</sup> RBNZ (February 2022), above n 6. At 2.

<sup>50</sup> At 1.

<sup>51</sup> RBNZ (2021) ‘The Future of Money – Central Bank Digital Currency’, December. At 12.

## A. Monetary anchor

### a. Improving the technology of money to remain relevant for the digital future

As mentioned earlier, emerging innovations in privately issued money, coupled with declining cash use, pose the need for central bank money to stay relevant and meet the demands (pace, efficiency, and reliability) of citizens in the digital world. As Adrian Orr of the RBNZ notes, the RBNZ has; “*a positive responsibility to innovate in pursuit of economic wellbeing and prosperity for all New Zealanders*”<sup>52</sup> adding that “*it is important to embrace the opportunity to harness technological advances to deliver better and cheaper services to customer*” as “*those that don’t keep up risk being left behind.*”<sup>53</sup>

Most of the money and payments made in New Zealand are digital – reflecting an overwhelming reliance to pay and save using digital forms of money as opposed to cash and coin. While cash and coin remain the only form of central bank money in New Zealand, there is a growing cash paradox whereby the amount of cash in circulation continues to grow but is used proportionately less for transactions. Interestingly, in 2020, only 9% of New Zealanders preferred to use cash as their main form of paying (down from 12% in 2019).<sup>54</sup> As cash continues to lose its transactional relevance, a shift to a CBDC (offering instant peer-to-peer settlement opportunities in a convenient and safe form) seems timely to preserve the role of central bank money as a stable and convertible value anchor.

### b. Preserving the NZD as a single unit of account

New Zealand operates with a ‘single unit of account’ meaning all prices are denominated in NZD. This singleness is not to be taken for granted. People trust the value and the stability of the NZD and the convertibility of this currency across different forms at face value – be that banknotes and coins or transaction accounts at commercial banks.<sup>55</sup> In turn, this ensures that that the composite of central and commercial bank money can be convertible at par,<sup>56</sup> and that New Zealanders can retain confidence to approach a branch or a cash machine and convert private deposits into cash.<sup>57</sup>

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<sup>52</sup> RBNZ (February 2022), above n 6. At 8.

<sup>53</sup> At 2.

<sup>54</sup> RBNZ (December 2021), above n 51. At 6.

<sup>55</sup> Fabio Panetta, above n 7. At 1.

<sup>56</sup> Bindseil et al ‘The evolving role of central bank money in payments’ Central Banking (2020).

<sup>57</sup> Fabio Panetta, above n 7. At 1.

The concern with the emerging private currencies such as cryptocurrency, as earlier explained, are that they have the potential to threaten this singleness and to fragment the existing payment system. As Adrian Orr states, *“Imagine having a ‘choice’ of 6000 different currencies just to buy a bottle of milk from your local dairy ... Imagine needing to hold a range of currencies, some with very uncertain values, in order to purchase necessities ... Imagine having to find out how much your money is worth relative to other forms of money all the time so you can work out how much you are actually getting paid or what the real value of something is. What we know from history is that systems that require people to transact in multiple currencies of different value, quality and risk are very inefficient, and can scarcely be described as having equity, fairness and the public interest at heart.”*<sup>58</sup>

A CBDC, would preserve the singleness of account of the NZD and provide a digital alternative to cash – henceforth ensuring central bank money remains a monetary value anchor in the digital world.<sup>59</sup>

c. Providing an additional monetary policy tool

The ability of the RBNZ to enact monetary policy is critical to the macroeconomic framework, allowing New Zealand to manage economic cycles.<sup>60</sup> The threat of off-balance sheet currencies, such as BTC, denominated in units other than NZD, limits RBNZ oversight and the ability to use monetary policy intervention to influence interest rates, along with inflation and employment targets, in turn resulting in a loss of monetary sovereignty for New Zealand. Unlike BTC, which has no public interest at its core to step in during the event of a crisis, the value of central bank money lies in its institutional legitimacy – assisted by aspects such as prudent monetary and fiscal policymaking and counterfeit prevention.

The introduction of a CBDC would likely prevent the erosion of the ability of the RBNZ to enact monetary policy (and retain the role that central bank money plays as monetary value anchor) – firstly by providing a digital currency that is not off-balance sheet and secondly, by offering unique, seamless, and transparent monetary policy tool opportunities such as instant monetary stimulus to account holders to reduce liquidity squeezes.<sup>61</sup>

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<sup>58</sup> RBNZ (February 2022), above n 6. At 7.

<sup>59</sup> Bank of England (2022) ‘What is a central bank digital currency?’ May. At 3.

<sup>60</sup> RBNZ (February 2022), above n 6. At 4.

<sup>61</sup> Deloitte, above n 44. At 10.

*B. Fair and equal way to pay and save*

a. Providing a direct, basic form of payment and saving to all, at a low cost

Since the Covid-19 pandemic, “*the world has unleashed an unprecedented amount of fiscal and monetary stimulus,*”<sup>62</sup> and a CBDC has the potential to enable governments and central banks to get money in the hands of those in need, via a faster and safer means; ranging from benefit payments, crises payments (such as covid, or natural disasters) and even those affected by a banking failure. Being digital, a CBDC improves access to funds anytime, anywhere and it is not confined by the denominations of cash.

Additionally, there is the cost benefit involved – cash is expensive to mint and distribute for central banks, expensive to hold and distribute for commercial banks and expensive for merchants to accept, store and transport. Cash security alone in the United States costs \$600 billion USD a year to run and employs almost a third of all truck drivers in the country, which for context is 80% of what United States households spend on food across the same period.<sup>63</sup> The cost of maintaining a cash system in India, for example too, is 1.7% of Gross Domestic Product and that excludes the environmental costs of printing. Obviously a CBDC has costs associated with digital security, however this is deemed “*a tiny fraction of the cost of printing and distributing cash.*”<sup>64</sup>

A CBDC could therefore be a time and cost-efficient digital tool for the RBNZ that provides New Zealanders with greater choice and freedom to pay and save.

b. Supporting wider financial inclusion to bank the unbanked

As a digital form of money, a CBDC also presents a gateway opportunity for the unbanked (either because commercial banks will not bank them, or these people do not trust commercial banks) to become comfortable with the banking sector, particularly as access to electronic payments is cited as an important first step towards financial inclusion.<sup>65</sup> Evidence of this has been seen in the Bahamas, where a CBDC was successfully issued to encourage cash-reliant communities in the nation to switch to

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<sup>62</sup> Anneke Kosse et al, above n 35. At 9.

<sup>63</sup> Mookerjee, above n 29. At 7.

<sup>64</sup> Bloomberg TV - Richard Byles.

<sup>65</sup> CPMI and World Bank (2020) ‘Payment aspects of financial inclusion in the fintech era’ April.

digital saving and paying and this in turn had beneficial outcomes to economic growth.<sup>66</sup> Interestingly, even in advanced financial systems, many citizens remain unbanked (1% of adults in New Zealand, for example).<sup>67</sup> The ideal is a future where central bank money, whether it be in physical or digital form, is available and convenient to access, regardless of who you are, where you are, or what kind of technology you use.

A potential ancillary benefit, with everyone included in the financial sector, might even be to use CBDCs to prove identity.<sup>68</sup> That is, to hold a CBDC it is likely that the individual must prove their identity by satisfying anti-money laundering and countering financing of terrorism ('AML / CFT') requirements. A CBDC could thus become another source of digital identity, much like RealMe.<sup>69</sup>

### *C. Other potential benefits*

#### a. Catalyst for innovation and competition in the wider payments eco-system

As previously noted by the RBNZ, there is room for improvement in New Zealand's domestic payment system, which is currently ruled by expensive incumbent players (such as Mastercard and Visa).<sup>70</sup> The introduction of a CBDC could provide a new eco-system and level the playing field with some healthy competition and the introduction of nimbler, fintech competitors focused on creating value. As noted by the RBNZ, "*choice and competition are critical underpinnings of a vibrant, stable and resilient financial system.*"<sup>71</sup>

#### b. Resilience to the New Zealand financial system

Finally, a CBDC provides an opportunity to improve payment resilience and thereby financial stability in New Zealand, by allowing New Zealanders another option to conduct transactions free from private sector credit risk or disruption.<sup>72</sup> One associated concern however is offline functionality. Ideally the CBDC would have robust and secure offline functionality that allows it to mimic the back-up payment role that cash provides.<sup>73</sup>

<sup>66</sup> Central Bank of The Bahamas (2021) 'Objectives' July.

<sup>67</sup> [World's Most Unbanked Countries 2021 | Global Finance Magazine \(gfmag.com\)](#)

<sup>68</sup> RBNZ (December 2021), above n 51. At 21.

<sup>69</sup> [Realme.govt.nz](https://realme.govt.nz)

<sup>70</sup> RBNZ (December 2021), above n 51. At 24.

<sup>71</sup> RBNZ (February 2022), above n 6. At 10.

<sup>72</sup> RBNZ (December 2021), above n 51. At 25.

<sup>73</sup> At 22.

All considered, there are plenty of opportunities for a CBDC, however, introducing a CBDC is not without its challenges, which the next section will now explore.

## *VII Issues and risks with a CBDC*

### *A. Marginalisation of those who use cash*

As mentioned earlier, it is not the intention of the RBNZ to marginalise those who use cash with the introduction of a CBDC. Cash provides choice, reliance, and autonomy to many people and “*remains a vital tool for many New Zealanders.*”<sup>74</sup>

Cash provides a sense of security and for varying reasons. In Germany, for example, cash is still deemed king, because of the historic surveillance state. In New Zealand, access to cash is particularly important to some of the most vulnerable people, such as the elderly, those of lower socio-economic standing and even those in rural remote places around the country. Many deem the right to physical cash a basic human right and in response to the RBNZ Consultation Paper one person even noted cash is “*as important to the whole population as access to clean water.*”<sup>75</sup> Additionally, cash also has a significant non-economic role in the cultural life of New Zealanders and is a fabric of society – parents use it to teach children lifelong skills, arithmetic and learn money habits, it assists with donations to charities, fundraising, birthday gifts, and even cultural ceremonies.

Physical cash allows people to engage in both the financial system and every-day social activities without any technology and with the security and tangibility of knowing that the cash in their hand is exactly what it says it is. The RBNZ is rightfully not looking to withdraw cash from circulation – a CBDC would exist as a complementary form of central bank money, rather than a substitute.

### *B. Operational resilience to outages and cyber security*

An additional concern of a CBDC is that much like other electronic payment methods, it can be compromised operationally by events such as cyber security threats, operational outages, and data privacy breaches.<sup>76</sup>

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<sup>74</sup> RBNZ (February 2022), above n 6. At 1.

<sup>75</sup> RBNZ (April 2022), above n 3. At 6.

<sup>76</sup> RBNZ (December 2021), above n 51. At 26.



Critics of CBDCs might argue that exposure to systemic banking security breaches keeps the risk localised by commercial banks, whereas a central bank hack might cause the entire system to be fatally compromised.<sup>77</sup> In some sense, this is a trade-off between the recurring but manageable breaches of commercial banks against a highly infrequent, but catastrophic central bank failure.

To mitigate this risk, a CBDC should, by design, be operationally resistant to outages and cyber security risk and comply with all applicable regulation, notably in respect of data protection, and AML / CFT to alleviate potential hacks.<sup>78</sup> That said, it is worth noting as a comparison, that cash too has its own security issues - in Sweden for example, it was bank robberies that led to their nearly cash-less society and in New Zealand there are issues even to this day with ram-raids for cash.<sup>79</sup>

### *C. Competition for commercial banks*

Much like cryptocurrencies, a CBDC would represent another form of competition in deposit funding. As a refresher on the typical model of banking, banks make profit from fees and net-interest margin, which is the difference between the interest paid to depositors and the interest received by extending loans. As part of that model, banks are required to hold certain reserves – typically around 10% (as capital) in case depositors wish to withdraw their money as cash. The more deposits, the greater a bank can lend and make profit, albeit in the confines of their appropriate capital ratios. The obvious risk with this model is if all depositors try withdrawing their cash at the same time – known as a ‘run on the bank’.

The difference with a CBDC, as alluded to earlier, is that it represents a direct liability on the central bank, just as cash does.<sup>80</sup> That is, the “*central bank is sovereign credit, backed, at the end of the day, by the government’s ability to tax, not on a cushion of reserves and capital equity ... where there are no runs.*”<sup>81</sup> Today’s digital currency however is a liability of the issuing bank and not necessarily in reserve, or government backed, which is the underlying reason why the commercial banks feel so threatened by a CBDC. In other words, if there is no incentive otherwise (such as higher interest), then a rational investor is likely to keep their money with the safer provider.

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<sup>77</sup> Mookerjee, above n 29. At 9.

<sup>78</sup> Privacy Act 2020, AML / CFT Act 2009.

<sup>79</sup> The final straw for Sweden was a bank robbery in 2009 where a helicopter was stolen from a local airport.

<sup>80</sup> Mookerjee, above n 29. At 3.

<sup>81</sup> At 5.

As to the degree of threat and the competition in deposits, depends on the demand a CBDC would generate.<sup>82</sup> As noted by the RBNZ, the likely scenario is moderate demand for a CBDC, meaning that New Zealanders will use a CBDC as a safety net to their other accounts at commercial banks which are generally considered safe and reliable and can be used for investments, or even leveraged for credit. However, if demand for a CBDC was high, then commercial bank runs would be immanent, with New Zealanders transferring their commercial bank deposits into a CBDC. The threat of such runs would be even greater during times of financial uncertainty, given the low-risk nature of the CBDC. Such a risk is not new to banks, as depositors can already run to cash, however a CBDC could very well increase that run risk, notably because; (i) it is likely to be easier to obtain than other safe bonds and assets such as cash from an ATM; and (ii) there are likely to be no costs for, or limits to, holding large sums of CBDC.<sup>83</sup> Having said that, the introduction of the Deposit Takers Act and associated Depositors Compensation Scheme, are likely to mitigate New Zealander deposit concerns at commercial banks, well at least for the first \$100,000 NZD.<sup>84</sup>

If such a high-demand scenario were to occur, then commercial banks would lose a significant portion of their lowest cost form of funding (transaction accounts), and they would likely have to seek funding from other, more expensive, means (such as offshore wholesale markets). Such a reduction in deposits in banks will affect their ability to create credit (a key function of commercial banks),<sup>85</sup> and when coupled with the increase in cost of funding, would in turn lead to banks becoming less profitable and would likely result in higher costs in lending for New Zealanders – *“if households and firms find it difficult to borrow it could ultimately lead to a credit crunch and a reduction in real economic activity.”*<sup>86</sup>

The implementation of a CBDC therefore faces two converging risks on commercial banks – being “too popular” and crowding out the private financial sector (shifting deposits away from the banking system and reducing bank lending) or being “too unpopular” and generating insufficient demand to be of any effect.<sup>87</sup> Both risks need to be taken seriously to ensure minimal disruption to the banking sector and continued stability.

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<sup>82</sup> RBNZ (December 2021), above n 51. At 27.

<sup>83</sup> At 28.

<sup>84</sup> Deposit Takers Act Bill

<sup>85</sup> Deloitte, above n 44. At 31.

<sup>86</sup> RBNZ (December 2021), above n 51. At 28.

<sup>87</sup> Adina Popescu ‘Cross-border central bank digital currencies, bank runs and capital flows volatility’ International Money Fund (2022).

#### D. Privacy

The final challenge of a CBDC, is that issuance and use cannot be completely anonymous, as (unlike cash) digital transactions leave a record. While privacy can be managed and better protected depending on the design of the CBDC, the difficulty, however, is the balancing act between those of the public who may wish to retain privacy on transactions for either legitimate or unlawful purposes and the Government, whom on the other hand, may wish to monitor traceability for illegal activities, such as tax evasion or AML / CFT reasons.

For many, anonymity is seen as the key benefit of cash, with no trail of what or where someone has been and what they have purchased. In the European Central Bank public consultation on the digital Euro, 43% of respondents ranked privacy as the most important concern of a CBDC.<sup>88</sup> Closer to home, in response to the RBNZ Consultation Paper, one of the respondents wrote; *“the more I am pushed onto CBDC the less privacy I have.”*<sup>89</sup> The Privacy Commissioner even responded, noting that *“officials need to be wary of placing disproportionate weight on merely desirable design features that may derogate from the features that are crucial to maintaining privacy.”*<sup>90</sup>

In absence of appropriate privacy in a CBDC, the risk is excessive government control and domestic surveillance, or as Congressman Tom Emmer in the United States notes; *“central banks increase control over money issuance and gain insight into how people spend their money but deprive users of their privacy.”*<sup>91</sup> A counterargument, however, might be that such control already exists on commercial bank money with court orders anyway and if a CBDC were offered by a central bank, which remains independent as a public institution with no interest in exploiting individual payment data for any purpose then: *“it could enhance, not reduce, the confidentiality of electronic payments.”*<sup>92</sup> Either way, this trade-off between privacy and freedom and comfort and convenience is not to be underestimated.

#### VIII Weighing opportunities against challenges

As a recap, a CBDC brings various opportunities as another choice of central bank money that is *“fair and equal for all New Zealanders, supports financial and social inclusion, and enables further innovation.”*<sup>93</sup> Significant challenges also face the CBDC concept, including marginalising those who

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<sup>88</sup> Fabio Panetta ‘A Digital Euro to Meet the Expectations of Europeans’ (2021).

<sup>89</sup> RBNZ (April 2022), above n 3. At 8.

<sup>90</sup> At 10.

<sup>91</sup> Economics Observatory, above n 33.

<sup>92</sup> Fabio Panetta, above n 7. At 3.

<sup>93</sup> RBNZ (February 2022), above n 6. At 8.

use cash, operational resilience, impact on commercial banks and privacy. On the balance, however, the opportunities for a CBDC, if implemented appropriately and with suitable regulatory parameters, seemingly outweigh the challenges and the digitalisation of central bank money should not be ignored by the RBNZ.

In light of the green light above for the RBNZ to continue their endeavours to implement a CBDC for retail application, the next natural step is to consider design. It is noted that a CBDC should be “*well designed and thought through*,”<sup>94</sup> reflecting a strong value proposition.<sup>95</sup> A group of central banks within the Bank of International Settlements (BIS) have released three foundational principles to help guide CBDC design considerations.<sup>96</sup> These are summarised as; do no harm to wider policy objectives, ensure coexistence and complementarity of public and private forms of money; and promote innovation and efficiency. Additionally, the RBNZ has their own CBDC design motivations, that it be “*user-friendly, bulletproof to cyber and operational risk, with privacy and other controls that ensure and promote widespread trust and use*.”<sup>97</sup> It is this collective framework of principles that will underpin the next section on design considerations.

## *IX Design considerations of a CBDC*

### *A. Wholesale or retail*

Generally, the first design consideration for a CBDC is whether access would be confined to financial institutions (wholesale CBDC – generally used for large-value payments)<sup>98</sup> or available to everyone (retail CBDC).

The RBNZ has only explored a retail CBDC to date and for that reason this paper will focus solely on that option. Of significance instead, however, is that the retail model of issuing CBDCs can be either direct or indirect. Under the indirect (two-tier) scenario, the central bank uses commercial banks as intermediaries to circulate, as the CBDCs sit within the walls of the commercial banks. Conversely, with direct retail (one-tier) CBDCs, the households hold private accounts at a central bank.<sup>99</sup> A direct retail CBDC, where banks become unprecedentedly close to customers, is more likely to threaten the

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<sup>94</sup> At 2.

<sup>95</sup> [When it comes to Central Bank Digital Currencies, we need public-private cooperation | World Economic Forum \(weforum.org\)](#)

<sup>96</sup> Bank for International Settlements (2020) ‘Central bank digital currencies: Foundational principals and core features’ October.

<sup>97</sup> RBNZ (February 2022), above n 6. At 2.

<sup>98</sup> Anneke Kosse et al, above n 35. At 2.

<sup>99</sup> Deloitte, above n 44. At 23.

status quo and structure of the current financial system and increase the roles and responsibilities of the central bank,<sup>100</sup> with enhanced stability risk and potential customer-facing infrastructure.<sup>101</sup> For that reason and with commercial bank networks already existing, an indirect model system is recommended, whereby the private sector provides *“the majority of the operational tasks and consumer-facing activities and the central bank retains its role operating the core of the CBDC system and focuses on traditional mandates.”*<sup>102</sup> That said, with this model, regulatory mandates should be considered in respect of commercial banks holding CBDCs for the previously ‘unbanked’.

### *B. Account-based or token-based*

Broadly speaking, digital currency can fall into two categories: *“currency that relies on existing technologies and conventional account-based structures, and currency that employs new or different technologies such as distributed ledger technology and public-private key cryptography.”*<sup>103</sup> These two groupings have been classified as account-based and token-based money respectively, due to the different verification processes used in making payments and this is one of the fundamental CBDC design considerations.

With account-based, CBDCs are deposits that are held either in a central bank account directly (or commercial bank indirectly), to be used either for payment, or store of value purposes. Account-based CBDCs require user identification verification, which makes them advantageous in terms of monitoring illicit activity in the payments system – a key concern for all central banks.<sup>104</sup> In addition to facilitating payments, CBDC accounts reduce systemic risk by providing a safe place for investors to park their money during times of market stress.

On the other hand, with token-based CBDCs, digital wallets store CBDC tokens (much like cryptocurrencies) for individuals, who use them predominantly as a means of payment to make purchases (either from merchants or peer-to-peer). Token-based CBDCs work on distributed ledger technology, that can be either centralised or decentralised. If centralised, transactions are approved by the originator of the currency (the central bank) and the beneficiary via public and private key pairs and digital signatures.<sup>105</sup> Whereas decentralised allows users to store and transact directly with one another,

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<sup>100</sup> Anneke Kosse et al, above n 35. At 10.

<sup>101</sup> Deloitte, above n 44. At 23.

<sup>102</sup> Anneke Kosse et al, above n 35. At 10.

<sup>103</sup> RBNZ (December 2021), above n 51. At 43.

<sup>104</sup> Anneke Kosse et al, above n 35. At 9.

<sup>105</sup> Deloitte, above n 44. At 21.

without the need for an intermediary (central bank) - blockchain, for example, is decentralised and enables BTC with a shared, undisputable ledger using time-stamped, encrypted blocks (chained together by hashes).<sup>106</sup> A discussion around centralised versus decentralised distributed ledger technology of a token-based currency could warrant a separate paper in of itself – blockchain architecture, for example, has challenges with speed and inability to support large scale applications (one of the prime reasons BTC is yet to take-off as a payments currency). Both models use anonymous keys, which provides a high degree of privacy, however the distinguishment of note with decentralised, is that central bank sovereignty is impinged. Vitalik Buterin, co-founder of Ethereum uses a taxi analogy to articulate this difference, noting; *“whereas most technologies tend to automate workers on the periphery doing menial tasks, blockchains [decentralised distributed ledger technology] automate away the center. Instead of putting the taxi driver out of a job, blockchain puts Uber out of a job and lets the taxi drivers work with the customer directly.”* Given the motivations of the RBNZ and the obvious contradictions of a decentralised token-based model, this paper rules out the likelihood of that approach, at this stage.

The question then is what is the preferred option between an account-based or centralised token-based CBDC, which warrants a quick refresher of the differences. With account-based CBDCs, ownership is proven by identity (I am therefore I own), transactions are transparent (but only to the central bank) and risks are borne by the central government (hacks or identity theft). Whereas, with token-based CBDCs, ownership is proven by possession (‘I know therefore I own’), transactions are transparent (though, pseudonymous, as not linked to personal identities), and the risks are borne by the individual (lost or stolen private keys). While a token-based approach closer resembles cash, the obvious concern is the inability to trace money laundering. Given the robustness, integrity and reliability of the RBNZ, this paper argues that while the loss of anonymity via an account-based model is unfortunate in some aspects, the ability for the RBNZ to securely monitor transactions and stay more involved in the end-to-end payment process overrides this loss.<sup>107</sup> Additionally an account-based model better facilitates the option to make a CBDC interest bearing, which CBDC proponents argue is a desirable feature.

### *C. Interest bearing or not?*

The desirability of making a CBDC interest bearing, is that interest rates can be consistent with the monetary policy of the central bank, in turn, facilitating price and cycle stability in the economy (and

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<sup>106</sup> [What is Blockchain Technology? - IBM Blockchain | IBM](#)

<sup>107</sup> Deloitte, above n 44. At 22.

more directly, than comparatively having to wait for commercial banks to pass on rate changes).<sup>108</sup> Included is the option to implement negative rates, or helicopter money if needed.<sup>109</sup> The obvious risk with interest bearing CBDCs are that they are likely to compete directly with bank deposits, whereas a non-interest bearing CBDC would simply be the digital version of cash. This impact on the commercial banks and the central bank's liquidity and balance sheet needs to be carefully considered.

#### *D. Domestic-only or cross-border?*

The final design question is whether the CBDC is made available cross-border. That is, would it allow for the access of non-residents abroad. Such a consideration is likely to require significant international cooperation (with standards, oversight frameworks, and aligned AML / CFT for example).<sup>110</sup> However, there is no denying that there is scope for improved accessibility and pricing in respect of international payment systems and cross border functionality, which are currently fraught with complexity.<sup>111</sup> Any CBDC should at the very minimum consider interoperability with other countries.

#### *X Recommended design summary*

As previously mentioned, a CBDC should be designed to enhance and leverage the opportunities of the digital tool, while mitigating the associated challenges and drawbacks wherever possible. The design features most consistent with the foundational principles of CBDC are that it is indirectly retail issued, account-based, interest-bearing and internationally made available to non-residents and this paper, along with the RBNZ motivations complement that recommended design matrix.<sup>112</sup> Design components aside, a CBDC should offer everyone closer access to the safety of the central bank's balance sheet, with “*digital features, ease of access*” and “*superior safety features.*”<sup>113</sup>

With the opportunity of a New Zealand CBDC now firmly established, along with some suggested design features, it is important to address next steps towards implementation. To do so, it is pertinent to scan the international CBDC horizon and uncover some lessons from those ahead of New Zealand in their respective CBDC journeys.

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<sup>108</sup> RBNZ (December 2021), above n 51. At 21.

<sup>109</sup> Anneke Kosse et al, above n 35. At 10.

<sup>110</sup> Raphael Auer et al. ‘Central bank digital currencies: Motives, economic implications and the research frontier’ Annual Review of Economics (2021).

<sup>111</sup> RBNZ (December 2021), above n 51. At 25.

<sup>112</sup> BIS, above n 96.

<sup>113</sup> Anneke Kosse et al, above n 35. At 10.

### *XI CBDC offerings overseas*

The RBNZ is not alone in its investigations into a CBDC. In May 2020, the Atlantic Council ('AC') began a CBDC tracker project, whereby all countries were tracked on their way to exploring a CBDC. At that time, 35 countries had begun the journey, whereas now, 105 countries, representing more than 95% of global GDP, are exploring a CBDC.<sup>114</sup>

One of those in the exploratory phase (like New Zealand) is the United States, and in late May of 2021, Lael Brainard of the Federal Reserve testified before Congress that the country was at risk of falling behind in the future of money race, particularly with the threat of foreign CBDCs emerging as the global reserve currency, supplanting the USD.<sup>115</sup> Consequently, they have stepped up their public engagements and research on CBDCs.<sup>116</sup> Much the same, the Bank of England have established a CBDC Taskforce, who are looking ahead and thinking carefully about the benefits and risks of a CBDC for the United Kingdom.<sup>117</sup> Finally, in October 2021, a two-year investigation phase was launched to define the design features of a digital Euro currency – where, in respect of the European Central Bank, Ander Hauser noted; *"the dog may be old, but it can still perform new tricks."*<sup>118</sup> Countries are moving fast and the AC reporting notes that of those investing a CBDC exploration, 68% will likely issue or test pilots for a retail CBDC in the short to medium term.<sup>119</sup>

Beyond the exploration phase, 10 countries have already launched CBDCs to citizens.<sup>120</sup> Of those countries the motivations have broadly been to strengthen their digital payments and banking infrastructure<sup>121</sup> alongside some bespoke country specific nuances - the Bahamas, for example, recently launched the Sand Dollar to increase interoperability of payments, whereas Cambodia launched Project Bakong, with the goal to reach the nation's rural unbanked population and reduce dependency on the USD.<sup>122</sup> Perhaps the best implementation lessons however, come from China (first to the race) and Nigeria, which this section will now explore.

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<sup>114</sup> Coindesk, above n 2.

<sup>115</sup> Mookerjee, above n 29. At 2.

<sup>116</sup> Federal Reserve (2021) 'Private money and central bank money as payments go digital: An update on CBDCs' a speech by Brainard in May.

<sup>117</sup> Bank of England, above n 59. At 2.

<sup>118</sup> [No 'red line' against central bank digital currency, BoE's Hauser says | Reuters](#)

<sup>119</sup> Anneke Kosse et al, above n 35. At 9.

<sup>120</sup> [Central banks are embracing digital currencies. Will the US lead or follow? - Atlantic Council](#)

<sup>121</sup> Coindesk, above n 2.

<sup>122</sup> Deloitte, above n 44. At 7.



### A. China

The China CBDC project was initiated in 2014 with the intention of enhancing the retail payment system. In 2016, the Central Bank had established a prototype for digital currency, however it wasn't until 2021 that China's indirect retail, account-based CBDC (the e-CNY, also known as the digital Yuan or Renminbi) was first piloted.

Part of the motivation to pilot a CBDC was that the Chinese financial sector had seen significant disruption in recent years, with the emergence of private currencies such as Alipay and WeChat which have leveraged smart data analytics to dominate the consumer payments market in China. It is estimated that these two platforms account for 94% of online transactions in China (with over a billion users each), which is a significant threat on the Chinese government's ability to manage their economy.<sup>123</sup>

However, despite a significant roll-out period, the e-CNY system is deemed technologically inferior to the private currency alternatives available in China, in terms of capacity and scalability. As an example, the e-CNY current capability is 10,000 transactions per second (with a future projected capability of 300,000), compared to 500,000 at Alipay.<sup>124</sup> Although, perhaps the main problem facing the e-CNY is a lack of demand. Average user balances are incredibly low at less than \$1USD, as most of the 261 million e-CNY wallets in China are empty.<sup>125</sup> This lack of demand is again driven by an inferior product in comparison to convenient alternatives but there are additional privacy and state control concerns, as the Chinese central bank maintains control over the use of CBDCs, with the ability to trace and freeze assets.<sup>126</sup> As it stands there appear more downsides than upsides with the e-CNY, so any shift in demand seems unlikely in absence of any government mandate for use.

### B. Nigeria

In October 2021, Nigeria launched a direct retail CBDC (the eNaira) which the central bank of Nigeria (CBN) said is a *“major step forward in the evolution of money”* in Africa's most populated country.<sup>127</sup> At that time, Nigeria's president Muhammadu Buhari said that the CBDC and the distributed ledger

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<sup>123</sup> Mookerjee, above n 29. At 2.

<sup>124</sup> [China's Progress Towards a Central Bank Digital Currency | Center for Strategic and International Studies \(csis.org\)](#)

<sup>125</sup> IBID.

<sup>126</sup> Deloitte, above n 44. At 17.

<sup>127</sup> [How has Nigeria's digital currency fared since its launch? | Crypto News | Al Jazeera](#)

technology it uses; *“can foster economic growth and increase the GDP of Africa’s biggest economy by US\$29 billion over the next 10 years.”*<sup>128</sup>

The CBDC was introduced as part of the nation’s desires to; go cashless, deter the acquisition of cryptocurrencies (which had just been prohibited, as they were commonly being used for illegal activities – including tax evasion and the financing of terrorism), and ultimately boost the country’s economy.<sup>129</sup> Additionally, at the time of introduction, half the population of Nigeria (nearly 200 million people) had no access to bank accounts, so of primary interest was the notion of access to financial services, allowing for; *“day-to-day transactions between business owners and their producers and customers across the country.”*<sup>130</sup> Six months on, however, question marks remain as to whether this new digital platform has fulfilled its intended purpose.

James Ndubuisi, a Nigerian lawyer, for example, is certain he has no need for the eNaira, nor the app it runs on (with no offline capability), stating – *“it needs to be entirely binned.”*<sup>131</sup> The major concern with the eNaira is that despite its introduction, the currency it aligns with, the Naira, continues to fluctuate, in particular with the USD, which in turn has caused frustration and a general sense of distaste in the currency. As Jennifer Echenim of Nigeria states, as *“Naira keeps devaluing ... adoption of the eNaira looked like a failure before it even started.”* She goes on; *“it appears to me as a follow-up on restrictions placed on other digital currencies ... proper research wasn’t done before its launch.”*<sup>132</sup>

To substantiate this, well under 1% (700,000) of the population of Nigeria have downloaded the eNaira application since inception, and more than 10% of Nigerians (33 million) still own and trade cryptocurrencies, despite restrictions imposed not to do so. By comparison, when El Salvador launched its own CBDC, the Chivo (underpinned by Bitcoin, rather than fiat), almost half the population had downloaded it within one month, in fact, as of October 2021 – *“there were more Salvadorans with bitcoin wallets than traditional bank accounts.”*<sup>133</sup> Instead in Nigeria, particularly among those living below the poverty line, cash remains king and e-payment channels are not a priority.

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<sup>128</sup> IBID.

<sup>129</sup> Deloitte, above n 44. At 14.

<sup>130</sup> Al Jazeera, above n 127.

<sup>131</sup> IBID.

<sup>132</sup> IBID.

<sup>133</sup> [In El Salvador, More People Have Bitcoin Wallets Than Traditional Bank Accounts \(forbes.com\)](https://www.forbes.com)

### *C. Lessons from overseas*

The key lesson from the Chinese e-CNY is the challenge highlighted by implementing a CBDC to a country where existing private alternatives are superior. In application to New Zealand, no such private alternatives have taken off just yet, however it serves as a cautionary tale to get moving before they become a fabric in society. Meanwhile the Nigerian eNaira exemplifies the importance of not moving too quickly. Part of the issue in Nigeria was that a significant proportion of society does not own smartphones, which puts the eNaira out of reach for many. Again, this is not too applicable to New Zealand, however it is certainly a warning to ensure relevant infrastructure is in place before implementing a CBDC, particularly if one of the primary levers for implementing the CBDC in the first place is to enhance access to financial services.

As noted recently by the Central Bank of Chile (who announced on 11 May that they are looking into a CBDC in the form of a digital Peso – for a more “*competitive, integrated, inclusive and resilient payment system*”),<sup>134</sup> research and study into the issuing of CBDCs is a time-consuming and drawn-out process, for which there are still no clear international best standards.<sup>135</sup> To that end, they recommend that the design, technological and institutional challenges of introducing a CBDC must be carefully considered, in order to prevent negative impacts on an already functioning financial system. As proven from lessons overseas, this view is lauded, and the next section provides a recommendation as to the next steps for the RBNZ in relation to New Zealand’s CBDC journey.

### *XII Recommendation of next steps*

A multi-stage approach to implementation of a CBDC by the RBNZ is recommended, with next steps likely to be as follows; (i) formalise a CBDC project – with the twin goals of proving the CBDC concept and performing a cost benefit analysis; (ii) stakeholder consultation; (iii) formal legal approval and implementation, and (iv) regular reviews.

- (i) First the RBNZ need to formalise a CBDC project – including funding and resource. The first goal of the project would be to seek proof of concept, as while the RBNZ states; “*many of the raw ingredients of a CBDC are already familiar to central banks: individuals can already hold our liabilities, in the form of physical banknotes; and we already provide*

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<sup>134</sup> Central Bank of Chile studies how to issue its central bank digital currency - Times of India ([indiatimes.com](https://www.indiatimes.com))

<sup>135</sup> IBID.

*digital liabilities, albeit to only a few depositors (predominantly banks),*<sup>136</sup> the key question is whether these ingredients can be combined at scale. If such scalability is proven, then the next task is a cost benefit analysis – part of this process, as noted by SIFMA CEO, Kenneth E. Bentsen Jr is to; *“evaluate whether the costs of this significant change to [the] existing system of money would outweigh the benefits, particularly given the high degree of efficiency and reliability of existing payments systems for both institutional actors and consumers.”*<sup>137</sup>

- (ii) It has been said, that *“to accurately anticipate the future of currency, it is crucial to have a nuanced understanding of society’s relationship with money.”*<sup>138</sup> Post proof of concept and confirmation that the benefits outweigh the costs of implementation, the next step then is to consult and ideally have workshops with key stakeholders (both from the public (ensuring a diverse reflection of all demographics of New Zealand) and commercial banks). This step toward mutual alignment is critical to delivering on the opportunities of a CBDC and managing key risks.
- (iii) Post consultations, an official policy recommendation for the RBNZ to provide a central bank currency on digital rails can be finalised for parliamentary consideration, with any associated regulatory change proposals highlighted. To that end, the policy paper would grant legal authority for the RBNZ to launch a CBDC in New Zealand with equivalent legal status as existing fiat currency (being notes and coins). History then suggests that the development and implementation of a sound CBDC will likely take a few years and appropriate RBNZ management to ensure a cautious, seamless transition to adoption will be paramount.<sup>139</sup>
- (iv) Lastly, given the dynamic nature of CBDCs, regular review mechanisms post implementation will also be crucial to ensure success and efficacy moving forward.

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<sup>136</sup> Old dogs, new tricks: adapting central bank balance sheets to a world of digital currencies - remarks by Andrew Hauser (bankofengland.co.uk)

<sup>137</sup> SIFMA Responds to Federal Reserve Paper on Central Bank Digital Currencies

<sup>138</sup> History of money, above n 10.

<sup>139</sup> RBNZ (December 2021), above n 51. At 4.

### *XIII Additional considerations moving forward*

This final section of the paper highlights some additional key concerns for the RBNZ to consider in their CBDC implementation journey, which were not previously mentioned above.

#### *A. Demand uptake*

The first additional consideration is the speed and extent of adoption of a CBDC in New Zealand. History has shown that the current state of financial infrastructure in any given country that introduces a new form of currency will play an important role in demand uptake - leapfrog events, for example, are more likely to occur in countries where limited present day banking capabilities exist, such as the rapid emergence of M-Pesa in the Sub-Saharan Africa. Likewise, the stability of an existing sovereign currency will be a key determinant in the demand for an alternative currency option – as seen with the national acceptance of Bitcoin in El Salvador.<sup>140</sup>

Speed in demand uptake, however, is not necessarily always a good outcome. As was highlighted by Zimbabwe in 2016, where an economy that relied entirely on cash, transitioned almost instantly to cashless – driven largely by the need to dollarize to the stability of the USD post rapid inflation. The trouble was, given the inability to print USD and an economy that was not set up for the digital transition, there was a crisis of faith in money itself, as untenable.

So, while the incremental near-term benefits of a CBDC may be less obvious to New Zealanders (given already existing real-time payment rails and a stable sovereign currency), compared to citizens of developing nations,<sup>141</sup> this stability also allows for predictability and hopefully a more gradual and manageable demand uptake. Thereby further strengthening the case for a CBDC in New Zealand.

#### *B. Indirect social & sustainability benefits*

While not direct opportunities, there are perhaps two further ancillary benefits of a CBDC that have not already been mentioned above – social and sustainability harm could be reduced, as investors transfer demand from private currencies to a CBDC.

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<sup>140</sup> McKinsey, above n 28.

<sup>141</sup> RBNZ (December 2021), above n 51. At 15.

In respect of social harm, the recent falls in the value of cryptocurrencies (some of which have been labelled ‘black winters’) have really showcased the social harm that investors / speculators in these volatile private coins can get themselves into. A recent, somewhat unexpected collapse, in May of 2022, of one of the most popular United States dollar-pegged stablecoin projects (Terra or UST) cost investors *“tens of billions of dollars as they pulled out in a panic that some have compared to a bank run.”*<sup>142</sup> Despite being labelled a stablecoin, this coin depended on a computer code to self-stabilise its value by *“creating and destroying UST in a sort of supply-and-demand seesaw effect”*<sup>143</sup> and is now essentially worthless, despite nearing a value of \$50 billion at its height. On Reddit one person noted that they did not think they would have enough money to pay for their next semester at school after losing money on the UST collapse, while another said her, and her husband had lost their house on the UST bet and that they were *“still trying to digest whether it was actually happening or just a nightmare.”*<sup>144</sup> Additionally, social media is full of suicide attempts and financial ruin and while UST is just one example, there are plenty of others – including the all-out scams (given the regulatory protection vacuum and the opaque nature of the products), which are believed to have cost victims \$14bn globally in 2021.<sup>145</sup> Indeed the cryptocurrency market is a third of what it was valued in 2021, paying homage to Warren Buffet’s 2018 prediction on the market; *“stay away from it. It’s a mirage, basically ... I can say almost with certainty that [it] will come to a bad ending.”*<sup>146</sup>

For those after a digital currency, a CBDC would allow for a safer, less volatile alternative, and for the avoidance of doubt (as highlighted by UST), the notion that stablecoins, if properly regulated, could make CBDCs superfluous is a complete misnomer, as the currency is not fiat and there is no guarantee of 1:1 convertibility with the currency that it is supposedly backed by.<sup>147</sup>

The second ancillary benefit relates to the environmental harm of private digital currencies, such as BTC. Shockingly, the carbon footprint produced by executing BTC transactions (known as mining) on blockchain, comprises 0.5% of the world’s electricity.<sup>148</sup> Additionally, there is the e-waste problem, where every BTC transaction (of which there are 300,000 a day) is believed to have the equivalent waste of two iPhones, due to the sort lifespans of mining hardware. Any CBDC should exist on a sustainable platform and ideally have less of a carbon footprint than printing and transporting cash.

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<sup>142</sup> [Who got rich before Terra stablecoin collapsed? \(cnbc.com\)](#)

<sup>143</sup> [IBID](#)

<sup>144</sup> [IBID](#)

<sup>145</sup> [How blockchain analytics can help stamp out cryptocurrency crime in the UAE \(xn--kryptobrsen-xfb.se\)](#)

<sup>146</sup> [Buffett says cryptocurrencies will almost certainly end badly \(cnbc.com\)](#)

<sup>147</sup> Bank of England, above n 136.

<sup>148</sup> [There is a moral case against crypto | Financial Times \(ft.com\)](#)

### C. Global currency

As cross-country wholesale CBDC initiatives such as ‘Project Dunbar’ continue to gain traction,<sup>149</sup> and in turn, enhance global payments interoperability and disintermediate existing costly international payment systems such as SWIFT,<sup>150</sup> it begs the question whether a widely adopted foreign CBDC could one day take over as the currency of New Zealand. Obviously the weaker the stability in the home currency the stronger the threat of such an occurrence, however it may not take long before such a currency could infiltrate currencies such as the NZD. As noted by Fabio Panetta, Board member of the ECB; *“such risks should not be underestimated,”* adding *“just as the US dollar overtook the pound sterling as the leading reserve currency within only a decade of the end of the First World War, digital innovation may give rise to powerful new foreign contenders, with disruptive consequences for those markets that are not prepared to face the digital challenge.”*<sup>151</sup> Such risk is exacerbated in times of potential war, as we are in now, as people tend to gravitate to the most reliable currency (traditionally the USD).

Much like private currencies, the widespread adoption of a foreign CBDC would limit oversight and control of the RBNZ and encroach the traceability of criminal activities. Yet another consideration for implementing a domestic CBDC to stay relevant.

### D. Sputnik moment

In 1957, the Russians were seen to capture the high ground of space, launching ‘Sputnik’ (the first artificial satellite), catching the United States unprepared. A ‘sputnik moment’ was later coined, as this event by the Russians triggered the United States to join the space race, with the premise being “if they’ve got one, why don’t we?”<sup>152</sup>

For some, the analogy is applicable to CBDCs. Chris Hughes, co-chair of the Economic Security Project, for example, says that although he was initially very excited by the CBDC concept, after spending a year discussing it with experts and thinking about the political dynamics of it all, he came to the determination that a CBDC is really a solution in search of a problem – that is, the problems that it is trying to fix can be solved with policy interventions and creating a CBDC is *“mostly just hype.”*<sup>153</sup>

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<sup>149</sup> Deloitte, above n 44. At 18.

<sup>150</sup> Atlantic Council, above n 120.

<sup>151</sup> Fabio Panetta, above n 7. At 2.

<sup>152</sup> [What Exactly Is a 'Sputnik Moment?' | Space](#)

<sup>153</sup> [The argument against the Fed creating a central bank digital currency - Marketplace](#)

The digital finance industry is full of such hype – take instances such as non-fungible tokens (‘NFTs’) which have plummeted in value in what Bill Gates describes as *"greater fool theory"*<sup>154</sup> and the soft drink company ‘Long Island Iced Tea Corp’ changing their name to ‘Long Blockchain’ resulting in an almost instant 400% share price increase.<sup>155</sup> While this paper does not share the view of Chris Hughes on CBDC, it does resonate with the notion of not investing in something for the wrong reasons (such as hype or fear of missing out). To that end, any future CBDC implementation and investment by the RBNZ should always be mindful of the goal and value proposition.

#### *XIV Closing Remarks*

The preceding paper has argued that on the balance of the opportunities and challenges posed by CBDCs, the RBNZ, should continue their endeavours to implement a CBDC for retail application, which will (amongst other benefits) preserve the integrity of the NZD in the digital age and present another option for New Zealanders as a fair and equal way to pay and save. Additionally, this paper has outlined some desirable design features of a New Zealand CBDC and a high-level process plan towards implementation.

With that in mind, this paper ends with an anecdote of the first block encoded on the BTC blockchain, noting *"The Times 03/Jan/2009 Chancellor on brink of second bailout for banks"* - a direct reference to the failings of the world’s economy to recover from the 2008 global financial crisis.<sup>156</sup> With this message embedded forever, it is hard to imagine that the creator of BTC one day envisaged that most central banks worldwide would consider using aspects of the BTC concept, which was designed to fundamentally disrupt central bank reliance – a full circle that reflects the growing need for central banks to provide the public with digital currencies that carry the legitimate benefits of private alternatives, while not carrying the same economic risks or consequences.

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<sup>154</sup> [Gates blasts NFTs as 'greater fool theory', mocks Bored Apes \(msn.com\)](#)

<sup>155</sup> [Tiny US soft drinks firm changes name to cash in on bitcoin mania | Bitcoin | The Guardian](#)

<sup>156</sup> [Are cryptocurrencies, CBDC and Stablecoins the future of New Zealand's financial sector? | Grant Thornton New Zealand](#)



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