Informing a Potential CBDC Pilot Study in New Zealand: Uncovering Public Perspectives

Connor Chartier, Michaela Cluett, Sukriti Kushwaha, Humza Qureshi

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Abstract

This project analyzes public perceptions of central bank digital currencies (CBDCs) in New Zealand, a country researching CBDCs alongside 93% of central banks worldwide. We conducted five interviews with scholars and banking experts, 25 ad-hoc interviews with business employees, 50 public interviews, and field-tested an online survey. We found that digital currency awareness, cybersecurity concerns, and government distrust may impact public CBDC adoption. We identified opportunities for public CBDC usage and recommended strategies to further increase and evaluate CBDC awareness.

Executive Summary

Central Bank Digital Currencies

Central Bank Digital Currencies (CBDCs) are being researched worldwide (Figure A). CBDCs are digital currency managed, regulated, and audited by a central bank. A central bank is an institution that provides regulations to control the supply and value of money for a given nation (*What is a central bank?*, 2021). A CBDC is a digital form of legal tender that has a value tied to the issuing nation's currency. According to a 2022 survey conducted by the Bank of International Settlements (BIS), comprised of 63 central banks, 93% of central banks worldwide are researching the possibility of central bank digital currencies (Lannquist & Tan, 2023).

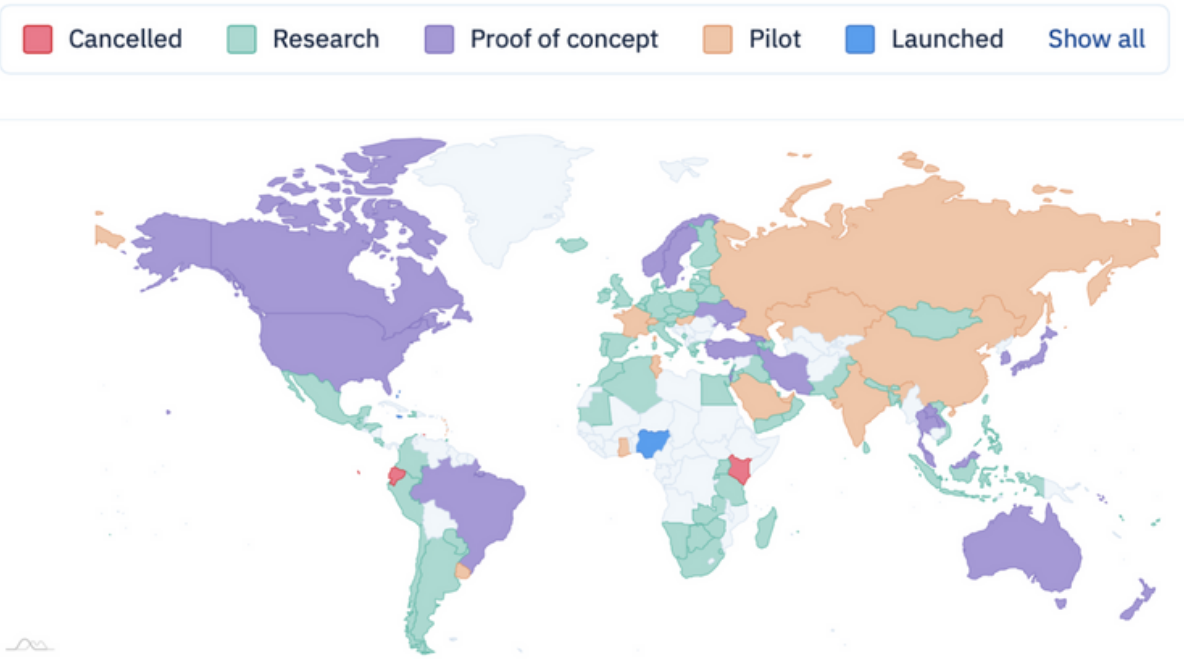

Figure A: Map outlining various countries' involvement in CBDC implementations (Central Bank Digital Currency Tracker, 2024).

CBDC Pilot Studies

Pilot studies are often performed to gauge the feasibility of a full-scale study by testing data collection strategies (Connelly, 2008). As of February 2024, 20 CBDC pilot studies are being conducted worldwide, including the E-cedi in Ghana, the mBridge in Thailand, and the Digital Won in South Korea (*Central Bank Digital Currency Tracker*, 2024).

Launched CBDCs

As of February 2024, only three countries have a launched central bank digital currency as an official means of payment for the public (*Central Bank Digital Currency Tracker*, 2024). The Central Bank of The Bahamas conducted a CBDC pilot study in 2019 after three years of research (*Digital Bahamian Dollar Sand Dollar*, 2024). The Central Bank of Nigeria similarly launched the "e-Naira" in 2021 after three years of research. The Bank of Jamaica recently launched the "JAM-DEX" in 2023 after conducting a successful pilot from May 2021 through the end of the year (*Jamaica's Central Bank Digital Currency*, 2023). All three central banks cited financial inclusion, reduced financial costs, and increased transaction efficiency as a motivation for CBDC rollout (Central Bank Digital Currency Tracker, 2024).

Canceled CBDCs

The Central Bank of Kenya (CBK) canceled the research phase of its CBDC in 2023 after five years of research that culminated in the publication of a discussion paper on central bank digital currency. The findings from this paper, which included 100 responses from the public, experts, and financial institutions around the world, led the CBK to believe that a CBDC is not a reliable means of payment for their country's citizens (*Issuance of Discussion Paper*, 2023). The Banco Central del Ecuador (BCE) also canceled its fully launched CBDC, The Dinero Electrónico (DE), in 2017 due to 71% of the user accounts being inactive (Arauz et al., 2021).

Potential CBDC Designs

Typically, the process of distributing physical money begins with the central bank and then moves through intermediaries, such as commercial banks (Figure B). Commercial banks then supply different services, such as deposits, loans, and withdrawals, which allow the public access to money. With a CBDC, this process can be streamlined (Figure C). Benefits of a CBDC include potentially decreasing the cost of transactions for both businesses and users, allowing for offline payments, and speeding up transaction settling time. One potential risk is financial disintermediation, which is when commercial banks are removed from the transaction process (Hayes, 2022). Other risks may include reduced data privacy in transactions and more technological dependence.

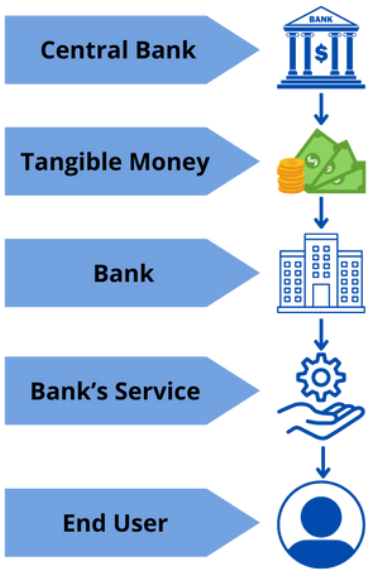

*Figure B: The current distribution of cash **with** intermediaries involved (Pilav, 2020).*

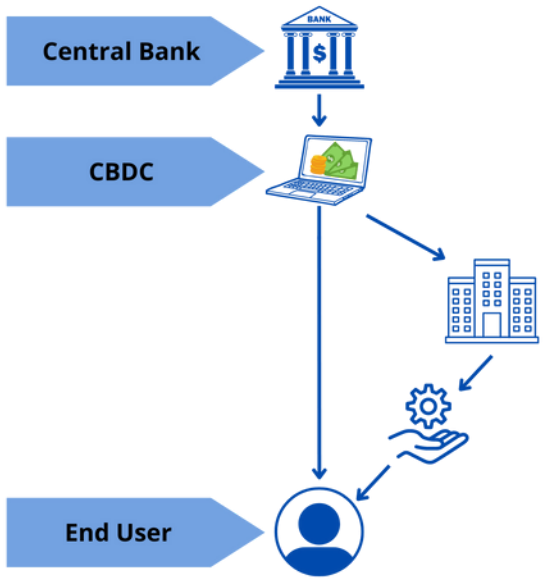

*Figure C: A CBDC distribution **with** and **without** intermediaries involved (Pilav, 2020).*

A 2019 Reserve Bank of New Zealand (RBNZ) survey showed that only 6% of the New Zealand population uses cash as a main payment method. Since cash circulation requires physical maintenance, such as storing, transporting, and processing, the RBNZ has identified the creation of a central bank digital currency as a potential opportunity to reduce costs. In September 2021, the RBNZ began looking into the feasibility of establishing a retail CBDC and is currently in a proof-of-concept phase (Figure D).

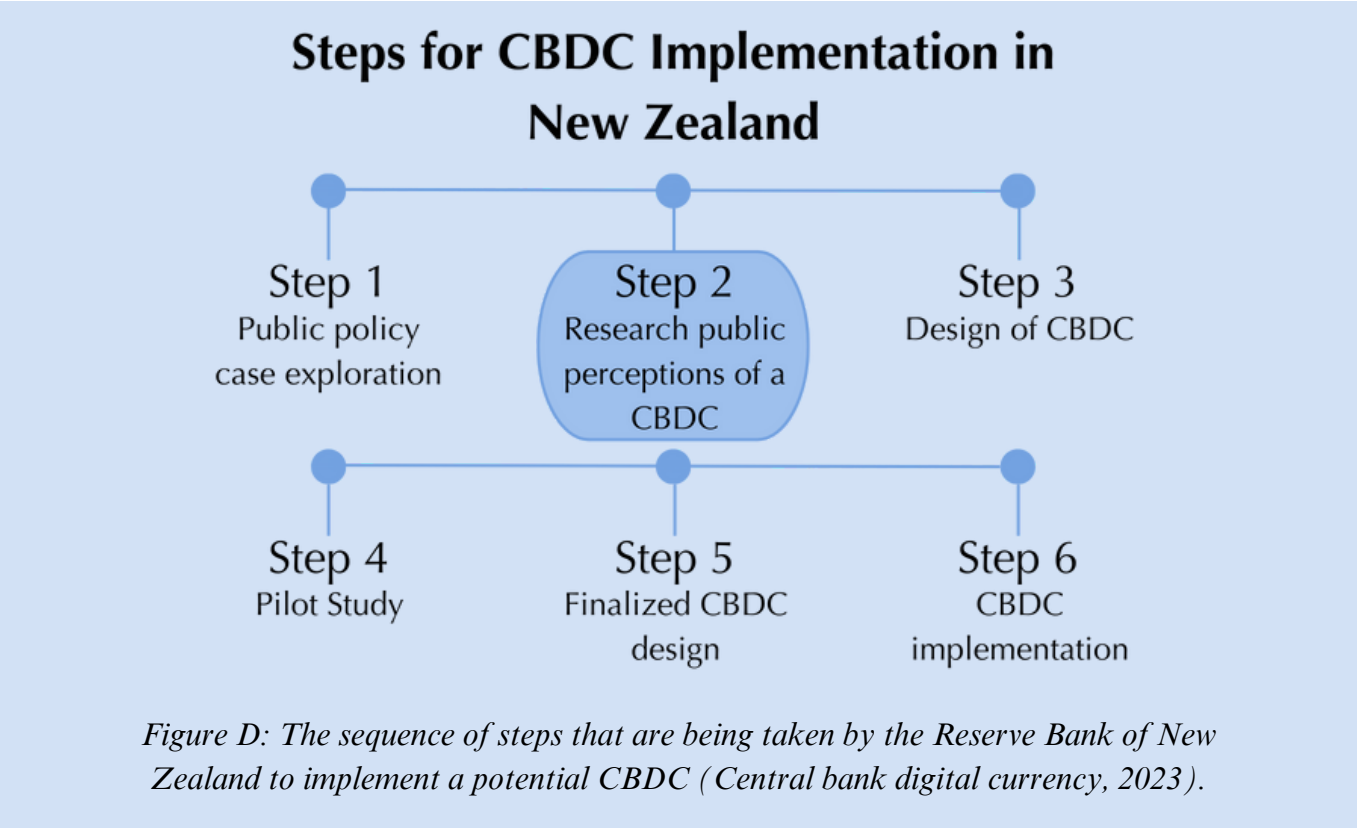

Figure D: The sequence of steps that are being taken by the Reserve Bank of New Zealand to implement a potential CBDC (Central bank digital currency, 2023).

Rogers' Diffusion of Innovation Theory

Rogers' Diffusion of Innovation Theory is a theoretical framework to model the dissemination of innovations by a given population and their willingness to adopt that innovation, which in this case is a CBDC (Rogers, 1983). Adopters often fit into one of five categories: *Innovators, Early Adopters, Early Majority, Late Majority, and Laggards* (Figure E) (Rogers, 1983).

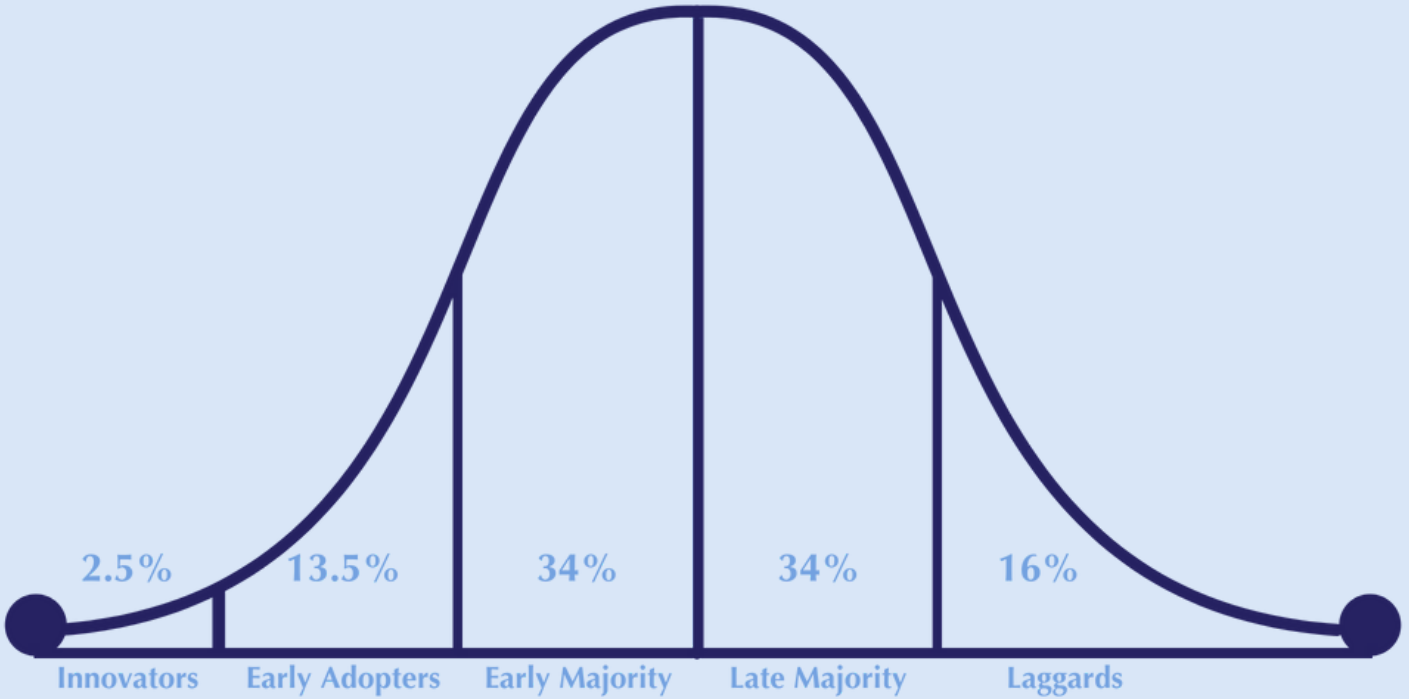

Figure E: The model of adoption based on the Diffusion of Innovation Theory (Rogers, 1983).

Research Opportunity

The sponsor for this project, Dr. Jennifer Ferreira, is a researcher and Senior Lecturer of Computer Science at Victoria University of Wellington. Dr. Ferreira has identified a lack of research on public awareness and perceptions of CBDCs in New Zealand.

Our goal was to gauge public perceptions and awareness of central bank digital currencies to help inform a potential pilot study for a CBDC in New Zealand. To meet this goal, we drafted three objectives. Our first objective was to evaluate the public's usage of existing digital transaction methods and banking preferences. Our second objective was to identify features of a CBDC design that might motivate the public to adopt this potential new payment method. Our final objective consisted of identifying barriers and opportunities for public participation in a CBDC. This research could support the design of a potential pilot study, which would be necessary to assess the feasibility of a CBDC before fully investing resources to establish it as an official means of payment in New Zealand.

Methods

We conducted 25 in-person ad-hoc interviews with local business employees to assess if they accepted cash. We interviewed five financial experts from the Reserve Bank of New Zealand and scholars in fields such as computer science and economics. We asked key informants to define digital currency terminology, New Zealand's current efforts in implementing a CBDC, and the social implications of a CBDC. We conducted 50 in-person public interviews with New Zealand residents in public areas around Wellington. We asked interviewees about their prior knowledge of digital currency topics, risks or concerns, enthusiasm towards digital currency and CBDC, and willingness to adopt a CBDC. We placed public interview participants into categories on a distribution curve based on Rogers' Diffusion of Innovation Model (Figure F). We also created a Digital Currency Familiarity Survey on Qualtrics to collect quantitative data online on questions regarding familiarity with digital technology, personal use of digital payment methods, and banking preferences, which only 11 participants filled out.

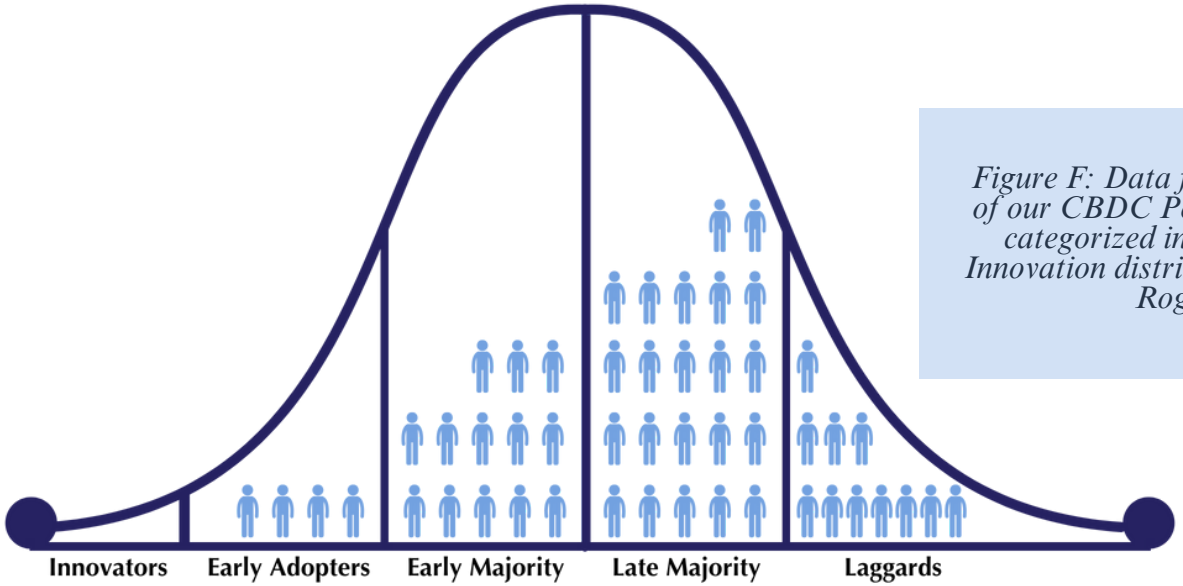

Figure F: Data from the 50 participants of our CBDC Perception Questionnaire categorized in Rogers' Diffusion of Innovation distribution (LaMorte, 2022; Rogers, 1983).

Findings

The Public's Awareness of a CBDC May Impact Its Adoption

New Zealand residents had limited awareness of digital currency and CBDC, as only 9 of 50 participants knew what a CBDC was, with even fewer knowing about the RBNZ efforts. Out of 32 interviewees who were unsure of adopting a CBDC, 11 had limited knowledge of a CBDC. A lack of CBDC knowledge may lead to uncertainty about adopting a CBDC. Since a CBDC is a form of digital currency, a lack of digital currency awareness may also impact one's decision to use a CBDC. Fourteen participants mentioned cryptocurrency in their definition of digital currency, "like bitcoins," "like crypto," "All currency is digital nowadays and like cryptocurrency," and "Like cryptocurrencies, no banks are involved and there is lots of speculation."

CBDCs Raise Cybersecurity and Data Privacy Concerns

A common concern was that large-scale use of CBDCs may lead to cybersecurity and data privacy threats. Individuals classified as laggards and late adopters on the Diffusion of Innovation model were worried that the government could track their spending, they could face digital currency scams, and their financial data could be made public. Cybersecurity was addressed by 14 participants when asked about their CBDC concerns.

The Public's Opinion of the Government May Impact CBDC Adoption

A negative perception of the government may negatively impact willingness to adopt a CBDC. Three individuals who agreed to participate in our interview later declined once they learned that the RBNZ was involved. Additionally, four participants stated that they did not trust the government because they believed that communication with the government was poor or that the government was untrustworthy. These participants stated they would not use a CBDC. On the other hand, one participant said they would be more likely to adopt the CBDC since they believed that central banks are less profit-driven compared to commercial banks.

There are Potential Opportunities to Support CBDC Adoption

Although some participants highlighted concerns with a central bank digital currency, interviewees listed incentives that could motivate them to use a CBDC. These included financial incentives, such as lower transaction fees, and an accessible platform to conduct payments. We also found that access to relevant technology for CBDCs could support financial inclusion and bridge the digital divide. One of our key informants stated, "If central banking systems want to have a currency that is accessible for everyone, it needs to be simple and easy for them to use" (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024). Overall, a theme gathered from our public interviews with New Zealand residents and online surveys is that a CBDC would more likely be adopted if it were easy to use and understand.

Cash Remains a Relevant Payment Method

Access to cash is important during times of natural disaster in New Zealand, for financially excluded populations, and for those who prefer cash. Three interviewees expressed concern about cash being the only viable payment method during a natural disaster. In New Zealand, some individuals may be unable to use a CBDC due to the digital divide. For those who rely on cash due to a lack of technology, a CBDC that is not implemented alongside cash usage may not be accessible to them. Cash is also more than just a means of payment, it holds a sentimental value besides its monetary value.

Recommendations

Adapting Our Data Collection Methodologies May Diversify and Capture More Public Awareness, Perceptions, Barriers, and Opportunities for CBDCs

Our online Digital Currency Familiarity Survey could be adapted to shorten the length of the survey, add an in-person format, and provide an incentive for filling it out. Our In-Person CBDC Perceptions Questionnaire could be adapted to increase interview locations for financially excluded populations, add questions about potential government mistrust, and gather more demographic data.

Increasing Central Bank Communication of CBDC Use Cases and Motivations May Help Convince the Public to Adopt a CBDC

A central bank may find it beneficial to increase public communication and education on the definition of a CBDC, the differences between a CBDC and cryptocurrency, the motivations of the central bank, and the potential risks and benefits of a CBDC through both online and in-person platforms. Some participants had hesitations about the government's involvement with a CBDC, so it may be helpful for a central bank to communicate its motivations for developing a CBDC. This could be conducted by the central bank's communication team. Channels such as email, newsletters, and social media could serve as useful means to increase CBDC knowledge. The central bank could post advertisements on billboards, bus stops, and other public areas to support this initiative.

Conclusion

Our sponsor, Dr. Jennifer Ferreira, had identified the lack of awareness and understanding of public perceptions of central bank digital currencies (CBDCs) in New Zealand as a research opportunity for our project. Our team gathered public perceptions to develop recommendations for a central bank to further increase and evaluate public CBDC awareness. Although it is still uncertain whether a CBDC will be implemented in New Zealand, our recommendations may be able to support the research and development of a potential CBDC pilot study for a country interested in its potential benefits.

Acknowledgements

We would like to extend our sincere gratitude to the following who made this project possible:

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- Scholars and financial experts in New Zealand who were generous with their time and insights
- Professor Leslie Dodson, Project Advisor
- Professor Ken Stafford, Project Advisor
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- Professor Michael Elmes, Co-Director of the Wellington IQP Project Center
- Professor Kwamie Dunbar, WPI Associate Professor of Finance
- Mr. Philip Waterman, WPI Research & Instruction Librarian

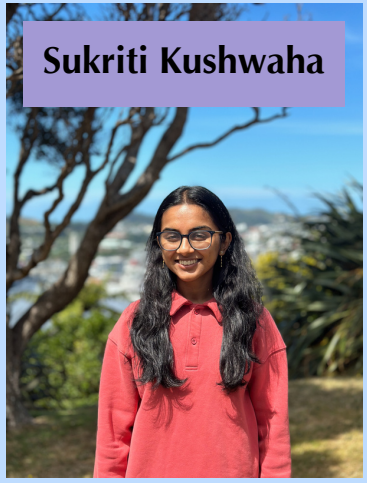
Meet the Team

Connor Chartier

I am a junior at Worcester Polytechnic Institute from Uxbridge, Massachusetts studying Computer Science with a minor in Interactive Media and Game Development. I am currently the Chairman of the Student Government Association on campus. This project allowed me to explore my personal interests and curiosities about digital currency and global economics.

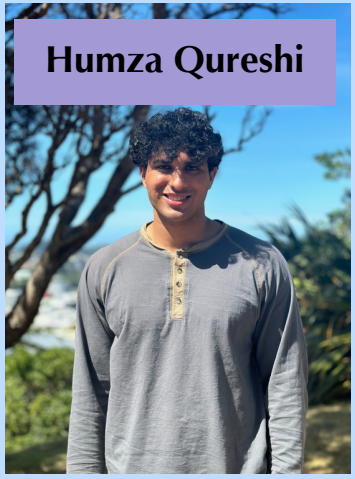
Michaela Cluett

I am a junior at Worcester Polytechnic Institute pursuing a bachelor's degree in Business. On campus, I am the President of the Student Government Association, a Senior Community Advisor for the Insight Program, and I work as an Admissions Associate. This project served as a chance for me to combine social sciences with business-related topics as this is the career path I look forward to taking.



Sukriti Kushwaha

I am a junior at Worcester Polytechnic Institute studying Robotics Engineering and Computer Science. On campus, I am the president of the Society of Women Engineers and work as an Engineering Ambassador. Before this project, I had limited knowledge of digital currency topics. This experience gave me insight into the rising development of central bank digital currencies worldwide and provided me with a newfound appreciation for both finance and economics.



Humza Qureshi

I am a student at WPI from Bolton, Massachusetts currently studying Data Science. This project fascinates me as I am already keen on learning more about financial technology and social science. Furthermore, I believe the skills I have developed from this project will contribute to my professional life in the future.

Authorship

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Glossary

Account-based CBDC: The person initiating the transaction must validate the receiver's identity before transferring the money (Ozili, 2023).

Central bank: A central bank is a financial institution that regulates a nation's money supply (*What is a central bank?*, 2015).

Central bank digital currency (CBDC): Central bank digital currency is a digital currency distributed by a central bank (Pilav, 2020).

Commercial bank: A financial institution that offers services such as deposits, loans, and investments to the public and businesses (*What is Commercial Bank?*, 2024).

Cryptocurrency: Cryptocurrency is a digital currency that has a value that is determined by users in the free market (*Digital Currencies*, n.d.).

Digital currency: "Digital currency is any currency that's available exclusively in electronic form" (*What is Digital Currency?*, 2023, What Is Digital Currency?, para. 1).

Digital divide: The gap between those who have access to technology and the Internet versus those without access (Kloza, 2022).

Digital wallet: A virtual wallet that stores credentials and identity information (Hassan A. & Shukur Z., 2020).

Distributed ledger: Refers to a record of financial data shared on a peer-to-peer network (Natarajan, H., et al., 2017).

Dollarization: When a nation uses the U.S. Dollar rather than its own domestic currency (*Dollarization Definition, Impact, Example*, 2022).

Early Adopters: A category of Rogers' Diffusion of Innovation Theory that represents those who are comfortable with change and are aware of the need for a given technological innovation (LaMorte, 2022; Rogers, 1983).

Early Majority: A category of Rogers' Diffusion of Innovation Theory that consists of those who may need evidence that a given innovation works before accepting it (LaMorte, 2022; Rogers 1983).

EFTPOS: "Electronic Funds Transfer at Point Of Sale" provides a service that directly transfers money from a customer's bank account to a business's bank account (*What is EFTPOS?*, n.d.).

Fiat Money: "Government-issued currency not backed by a physical commodity such as gold" (*Fiat Money vs Legal Tender*, 2023, Fiat Money section, para. 1).

Financial disintermediation: The process of removing commercial banks as the intermediary between the individual and the central bank is called financial disintermediation (Wadsworth, 2018).

Financial inclusion: The ability of people to satisfactorily conduct their financial affairs and manage their finances (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024).

Innovators: "An innovator must be able to conceptualize relatively abstract information about innovations and apply this new information to his or her own situation" (Rogers, 1983).

Innovation process: The innovation process outlines the developmental stages for a given innovation (Rogers, 1983).

Kaitiaki o te toto: Māori term for "steward of money and cash" (*Future of Money - Central Bank Digital Currency*, 2021).

Koha: Māori term for "A gift, present, offering, donation, contribution – especially one maintaining social relationships and has connotations of reciprocity" (*koha - Māori Dictionary*, n.d., koha, para. 1).

Laggards: A category of Rogers' Diffusion of Innovation Theory that typically has the most conservative and the most difficult group of individuals to convince to use a given innovation (LaMorte, 2022; Rogers, 1983).

Late Majority: A category of Rogers' Diffusion of Innovation Theory that has those who are typically convinced to adopt a given innovation when it has been used and tested by the majority (LaMorte, 2022; Rogers, 1983)

Legal tender: A legally recognized currency by a central bank (Potter & Jackson, 2021).

Pilot study: A pilot study is a small-scale study conducted to justify and inform a large-scale study (Connelly, 2008).

Reserve Bank of New Zealand (RBNZ): New Zealand's central bank (*About us*, 2024).

Retail CBDC: CBDC used by the public and businesses (Infante, S., et al., 2023).

Rogers' Diffusion of Innovation Theory: A theoretical framework to interpret the dissemination of innovations by a given population (Rogers, 1983).

Settlement: The exchange of money between banks (Wadsworth, 2018).

Token: "a representation of a digital asset" (Natarajan, H., et al., 2017, p. 13).

Token-based CBDC: Users involved in money transactions must validate the token associated with the transaction (Richards, 2020).

USD Denominated Assets: Assets and securities that are valued in U.S. Dollar (Snider, 2022).

Wholesale CBDCs: CBDCs exclusively used by financial institutions (Seth, 2021).

Introduction to the Context of Central Bank Digital Currency in New Zealand

The implementation of *Central Bank Digital Currencies* (CBDCs) is rising among countries across the world (*Central Bank Digital Currency Tracker*, 2024). CBDCs are managed, regulated, and audited by a *central bank*, which is an institution that regulates the money supply and its related policies of a nation (Pilav 2020; Seth, 2021; *What is a central bank?*, 2015). The value of a CBDC is tied to its nation's currency and is different from *cryptocurrencies* which are not regulated by a nation's central bank and have market-driven values (Seth, 2021). A survey conducted in 2022 by the Bank of International Settlements, comprised of 63 central banks worldwide, found that 93% of central banks, which are the institutions that control the money supply and its related policies, are researching the possibility of central bank digital currencies (*About BIS*, 2024; Lannquist & Tan, 2023).

Some governments have introduced CBDC *pilot studies*, which are small-scale studies conducted to justify and inform a large-scale study (Connelly, 2008). In these pilot studies, central bank digital currencies have been integrated alongside *fiat money,* which is "government-issued currency that is not backed by a physical commodity such as gold" (*Fiat Money vs. Legal Tender*, 2023, Fiat Money section, para. 1). Countries such as China, Uruguay, and Russia have deployed pilots of CBDCs which include the e-CNY, e-Peso, and the Digital Ruble (*Central Bank Digital Currency Tracker*, 2024). Potential concerns regarding CBDCs include increased control given to central banks and the government, a lack of an individual's payment privacy resulting from the government's potential ability to

Central Bank Digital Currency	Digital Currency distributed by a central bank (Pilav, 2020).
Central Bank	A financial institution that regulates a nation's money supply (*What is a central bank?*, 2015).
Cryptocurrency	A digital currency not regulated by a central bank whose values are market-driven (*Digital Currencies*, n.d.).
Pilot Study	A small-scale study conducted to justify and inform a large-scale study (Connelly, 2008).
Fiat Money	"Government-issued currency not backed by a physical commodity such as gold" (*Fiat Money vs Legal Tender*, 2023, Fiat Money section, para. 1).

Table 1: Definitions of currency terms in Introduction to the Context of Central Bank Digital Currency in New Zealand.

directly track payments, and uncertainty over how CBDCs would benefit the current financial infrastructure (Michel, 2023).

The *Reserve Bank of New Zealand* (RBNZ), New Zealand's central bank, and is currently researching a retail CBDC (*About us*, 2024; *Central bank digital currency*, 2023). A *retail CBDC* specifically allows transactions for the public and businesses (Kasemrat & Kraiwanit, 2022). In contrast, *wholesale CBDCs* are exclusively used by financial institutions (Seth, 2021). The motivations behind introducing a CBDC include potentially offering reduced transaction costs, financial services to populations who otherwise would not have them, and an alternative, fixed-value digital payment form of the New Zealand Dollar (Wadsworth 2018). It is uncertain whether implementing a CBDC in New Zealand would remove inefficiencies and financial inequities (Wadsworth, 2018). This includes potentially decreasing the cost of transactions for both businesses and users, allowing for offline payments, and speeding up transaction settling time (Kiff, 2022). The benefits and risks of a CBDC depend both on the implementation strategies and its technological design.

The sponsor for this project, Dr. Jennifer Ferreira, is a researcher and Senior Lecturer of Computer Science at Victoria University of Wellington. Dr. Ferreira has identified a lack of research on public awareness and perceptions of CBDCs in New Zealand. Our team collaborated with our sponsor to gauge public knowledge, preferences, and interest in CBDCs to outline recommendations for a potential pilot study conducted by the RBNZ.

Reserve Bank of New Zealand	New Zealand's central bank (*Reserve Bank of New Zealand*, 2024)
Retail CBDC	CBDCs that are used by the public and businesses (Infante, S., et al., 2023)
Wholesale CBDC	CBDCs that are exclusively used by financial institutions (Seth, 2021)

Table 2: Definitions of terms in Introduction to the Context of Central Bank Digital Currency in New Zealand.

A major success factor of a CBDC depends upon the public's motivation to adopt a new payment form into their daily lives (Bindseil, U., et al., 2021). It is not yet clear if New Zealand residents perceive a potential CBDC to be a viable or trustworthy system of exchange. Our team collected and evaluated the potential factors that may encourage or discourage consumers from using centralized digital money. This research could

support the design of a potential pilot study, which would be necessary to assess the feasibility of a CBDC before fully investing resources to establish it as an official means of payment in New Zealand.

Project Goal

The goal of this project is to gauge public awareness and perceptions of a central bank digital currency (CBDC) in Wellington, New Zealand.

Objectives

We identified three objectives for this goal: evaluate New Zealand residents' usage of digital transaction methods and banking preferences, determine CBDC design features important to New Zealand residents, and identify key barriers and opportunities for public participation in a CBDC.

Background of CBDC Designs and Motivations Worldwide

The following chapter describes the purpose of both digital currency and central bank digital currency (CBDC). We identify and explore the potential risks and benefits of different CBDC designs. Then we discuss global CBDC pilot studies and insights that could be applied to a potential CBDC in New Zealand. After examining the existing financial systems in New Zealand, we identify key stakeholders in the implementation of a CBDC. We conclude by exploring Rogers' Diffusion of Innovation Theory.

What is Central Bank Digital Currency?

A "digital currency is any currency that's available exclusively in electronic form" (*What is Digital Currency?*, 2023, What Is Digital Currency?, para. 1). A central bank digital currency is a form of digital currency distributed by a central bank (Pilav, 2020). Both CBDCs and cryptocurrencies are forms of digital currency, however, a CBDC is a form of legal tender while cryptocurrency is not regulated by central banks and has market-driven value (Shkliar, 2020; *Digital Currencies*, n.d.). Legal tender is a legally recognized currency by a central bank (Potter & Jackson, 2021). Financial institutions around the world have turned to the possibility of incorporating CBDCs as a potentially safer and more reliable alternative to cryptocurrency (Ozili, 2023).

Digital Currency	"Any currency that's available exclusively in electronic form" (*What is Digital Currency?*, 2023, What Is Digital Currency?, para. 1).
Legal Tender	Legal tender is a legally recognized currency by a central bank (Potter, 2021; Jackson 2021).

Table 3: Definitions of terms in What is Central Bank Digital Currency?

Global Pilot Studies

Pilot studies are often performed to gauge the feasibility of a full-scale study by testing data collection strategies. The results from a pilot study are important because they can be used to inform the design and methodologies of the main study (*Pilot Studies*, n.d.). As of February 2024, there are 20 CBDC pilot studies conducted worldwide, including the E-cedi in Ghana, the mBridge in Thailand, and the Digital Won in South Korea (Figure 1) (*Central Bank Digital Currency Tracker*, 2024).

Before pilot studies, research and proof-of-concept phases are conducted to propose potential central bank digital currency designs (*Central Bank Digital Currency Tracker*, 2024). If the findings from a nation's pilot CBDC launch show promise in meeting its goals for developing a CBDC, it may be launched as an official means of payment in that country (*Digital Dollar Project*, 2023).

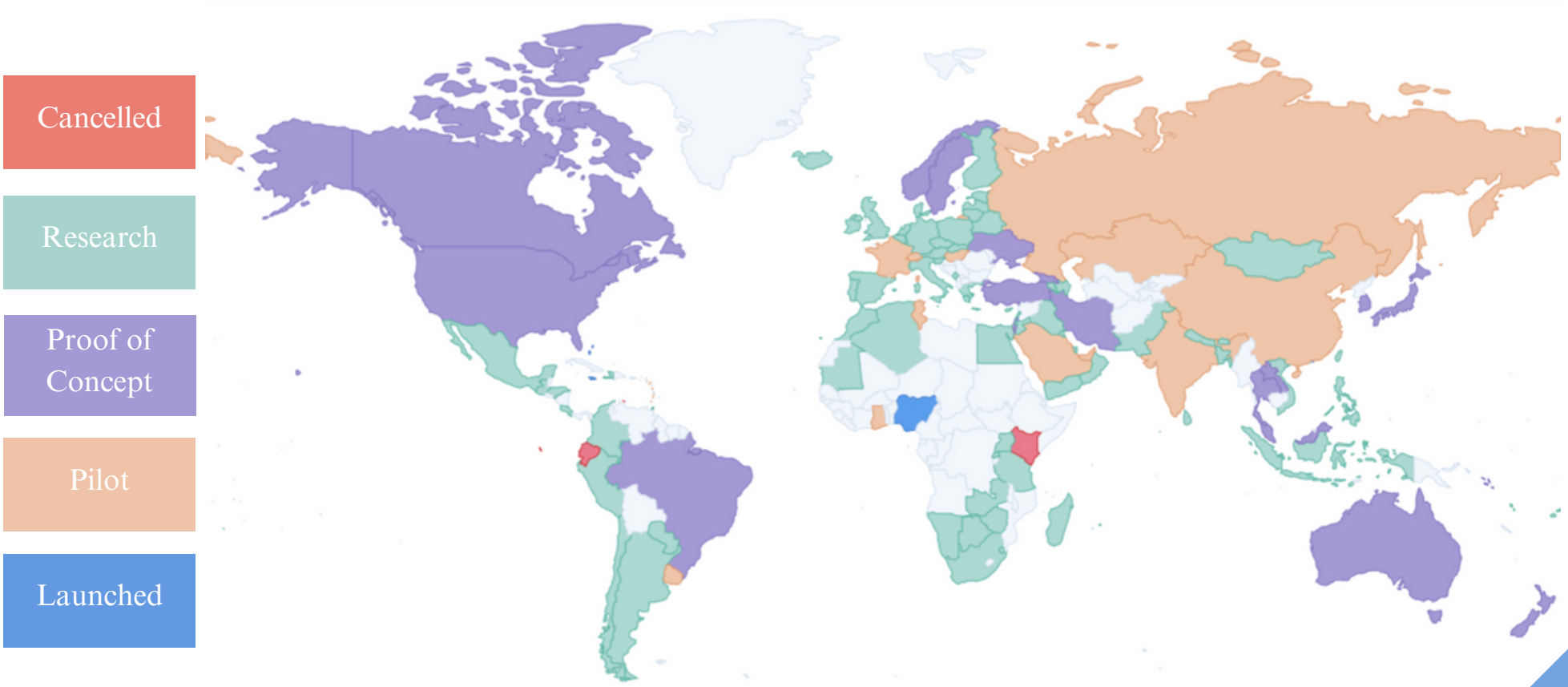

Figure 1: Map outlining various countries' involvement in CBDC implementations as of February, 2024 (Central Bank Digital Currency Tracker, 2024).

Any of these phases may be canceled if the risks of a CBDC in a nation do not outweigh its benefits (*Discussion Paper on Central Bank Digital Currency*, 2022). Examples of canceled CBDC developments include the Kenya CBDC in Kenya, the Dinero Electrónico (DE) in Ecuador, and the Avant in Finland (*Central Bank Digital Currency Tracker*, 2024).

e-Peso Pilot in Uruguay

The "e-Peso" pilot, consisting of 10,000 users, was implemented from November 2017 to April 2018 in Uruguay by the Central Bank of Uruguay (CBU) (Sarmiento, 2022). The CBU's main motivation behind the pilot launch was to explore new and developing technologies and "boost the country's image as a financial leader and innovator" (Nambiampurath, 2020, The Birth of the e-Peso, para. 1). The e-Peso pilot aimed to link the *token-based* CBDC to telephone numbers, allowing anonymous but traceable transactions (Sarmiento, 2022). The system also allowed for instant *settlements*, which is the exchange of money between banks, and the most active CBDC users were given prizes of up to 2,000 Uruguayan Pesos (worth $83 NZD) (Bergara & Ponce, 2018). The total maximum issuance was 20 million Uruguayan Pesos with individual and business wallets capping at 30,000 Pesos and 200,000 Pesos, respectively (Bergara & Ponce, 2018). *Commercial banks* were not involved in the distribution of the e-Peso (Bergara & Ponce, 2018). Commercial banks are financial institutions that offer services such as deposits, loans, and investments to the public (*What is Commercial Bank?*, 2024).

Commercial Bank	A financial institution that offers services such as deposits, loans, and investments to the public and businesses (*What is currency?*, 2024).
Settlement	The exchange of money between banks (Wadsworth, 2018).

Table 4: Definitions of terms in e-Peso Pilot in Uruguay.

After the conclusion of the pilot study, all the e-Pesos in circulation were destroyed (Sarmiento, 2022). The International Monetary Fund (IMF), an organization of 190 countries that monitors economic developments and international trade (*IMF Country Information*, 2022), called the e-Peso "one of the pioneers in the world in taking a proactive approach in evaluating the case for the CBDC" in their annual report in 2019 (*Central Bank Digital Currency Tracker*, 2024, e-Peso section, para. 11). The Central Bank of Uruguay similarly declared that the pilot was a success due to its "traction among users, businesses, and

even private banks" (Nambiampurath, 2020, The Results are In, para. 1). Since the end of the pilot launch, its results are being evaluated by the CBU before potentially conducting further pilot launches (Náñez, 2021). As of 2021, the CBU has still not concluded whether to launch a CBDC and its future in Uruguay remains unclear (Náñez, 2021).

e-CNY Pilot in China

The CBDC from the People's Bank of China called "e-CNY," is a token-based retail CBDC piloted in 2020 (Ekberg & Ho, 2021; Xu, 2022) and is currently in circulation. China's central bank established a CBDC pilot study to have greater control over monetary policy in the country and "reduce dependence on the U.S. dollar-denominated financial system" (Subrahmanyam, 2023, What is China's Motivation to Take the Lead?, para. 2). One unique feature derived from this study is the idea of multiple *digital wallets* for CBDCs (Pocher & Veneris, 2021). A digital wallet is a virtual wallet that stores credentials and identity information (Hassan A. & Shukur Z., 2020). The e-CNY offers three kinds of wallets, with each wallet holding a different level of connection to a bank (Pocher & Veneris, 2021). One requires a connection to an existing bank account for the owner to disclose personal information along with account-specific information to open the wallet (Subrahmanyam, 2023). Another is entirely account-free and accessed through a multi-step verification process to access the user's funds (Huang & Li, 2023). The last is a mixture of the first two (Huang & Li, 2023). This method allows individuals to choose how to use the CBDC based on their financial situation, bank relations, and comfortability with sharing information. In 2022, the People's Bank of China began to use seven private and two state-owned banks to distribute the e-CNY (Xu, J. 2022).

Digital Wallet	A virtual wallet that stores credentials and identity information (Hassan A. & Shukur Z., 2020).

Table 5: Definitions of terms in e-CNY Pilot in China.

Although over 260 million digital wallets worth $1.9 billion USD have been issued in China, the CBDC accounts for only 0.13% of the money in circulation (Orcutt, 2023). This data shows that the CBDC has gotten off to a slow start considering the pilot has been distributed in several districts across China in the past four years (Orcutt, 2023). The adoption of e-CNY has been low due to the existing prevalent use of mobile payment systems in China, such as WeChat Pay and Alipay.

Central Bank Digital Currencies in the Research Phase

e-AUD Research in Australia

The Reserve Bank of Australia (RBA) is currently conducting research for a potential pilot of a retail CBDC (*Central Bank Digital Currency Tracker*, 2024). Their research has shown that diminishing cash use, the introduction of cryptocurrency, and the development of new technological innovations could serve as a motivation for CBDCs (Richards, T., et al. 2020). They have also noted that the relationship between third-party intermediaries such as commercial banks and the central bank is important to consider for a CBDC. The RBA found that an offline application for a CBDC may be easier to implement with a token-based design (Richards, T., et al. 2020).

Digital Canadian Dollar Research in Canada

The Central Bank of Canada is also currently researching a CBDC (*Central Bank Digital Currency Tracker*, 2024). There are many motivations for Canada's research, some of which include: maintaining a sufficient supply of central bank money for the public, sustaining revenue from the central bank issuing currency, and increasing *financial inclusion* (Engert & Fung, 2017; Fung B. S., et al., 2017). Financial inclusion refers to the ability of people to satisfactorily conduct their financial affairs and manage their finances (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024). However, it has been identified that the Bank of Canada (BOC) is unlikely to cease creating and distributing physical currency in Canada (Engert & Huynh, 2022). Their website states that the CBDC would be implemented alongside cash, as their responsibility "is to provide Canadians with bank notes they can trust" (*Digital Canadian Dollar*, 2023, What is a Digital Canadian Dollar? section, para. 3). The BOC acknowledges the anonymity of cash transactions and is looking to design a CBDC similarly. The BOC states, "Canadians shouldn't need identification, a bank

account, or disclose private information" to use a CBDC (*Digital Canadian Dollar*, 2023, How we're approaching our work on a Digital Dollar section, para 1). The BOC's plans include engaging with stakeholders, including civil society groups and Canadian residents to understand their views on a CBDC.

Financial Inclusion	The ability of people to satisfactorily conduct their financial affairs to sort of look after and manage their finances (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024)

Table 6: Definitions of terms in Digital Canadian Dollar Research in Canada.

Launched Central Bank Digital Currencies

As of February 2024, only three countries have a central bank digital currency as an official means of payment for the public (*Central Bank Digital Currency Tracker*, 2024). The Central Bank of Bahamas conducted a CBDC pilot study in 2019 after three years of research (*Digital Bahamian Dollar Sand Dollar*, 2024). The pilot study was successful with approximately 2,000 wallets, and the Bahamas became the first central bank to fully launch a CBDC with the "Sand Dollar" in 2020 (*Central Bank Digital Currency Tracker*, 2024). The Central Bank of Nigeria similarly launched the "e-Naira" in 2021 after three years of research. The e-Naira is an account-based CBDC that can be accessed through mobile wallets on a smartphone (Figure 2) (*eNaira*, 2024). Both the Sand Dollar and e-Naira use *distributed ledger technology* to carry out transactions (*Digital Bahamian Dollar Sand Dollar*, 2024; *eNaira*, 2024). The Bank of Jamaica recently launched the "JAM-DEX" in 2023 after conducting a successful pilot from May 2021 through the end of the year (*Jamaica's Central Bank Digital Currency*, 2023). All three central banks cited financial inclusion, reduced financial costs, and increased transaction efficiency as a motivation for CBDC rollout (*Central Bank Digital Currency Tracker*, 2024).

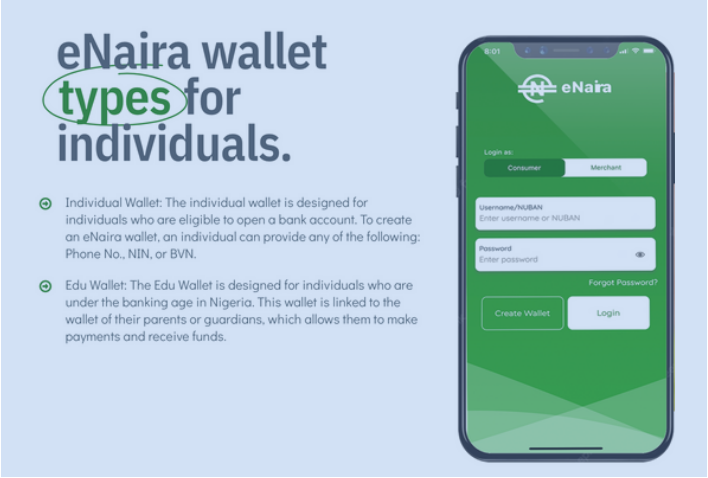

Figure 2: A webpage on the e-Naira website outlining the different types of CBDC wallets (eNaira, 2024).

Distributed Ledger	A fixed electronic record of financial data shared on a peer-to-peer user network (Natarajan, H., et al., 2017)

Table 7: Definitions of terms in Launched Central Bank Digital Currencies.

Canceled Central Bank Digital Currencies

Canceled CBDC Research in Kenya

The Central Bank of Kenya has identified that a CBDC is not a reliable means of payment for their country's citizens (*Discussion Paper on Central Bank Digital Currency*, 2023). The Central Bank of Kenya (CBK) canceled the research phase of its CBDC in 2023 after five years of research that culminated in the publication of a discussion paper on central bank digital currency. This discussion paper included 100 responses from the public, experts, and financial institutions around the world to assess if a CBDC was feasible (*Issuance of Discussion Paper*, 2023). The Central Bank of Kenya ultimately released a statement based on the findings from the discussion paper: "Implementation of a CBDC in Kenya may not be a compelling priority in the short to medium term. Kenya's pain points in payments could potentially continue to be addressed by other innovative solutions around the existing ecosystem" (*Issuance of Discussion Paper*, 2023, p. 1).

Cancellation of Dinero Electrónico in Ecuador

The Banco Central del Ecuador (BCE) also canceled its fully launched CBDC, the Dinero Electrónico (DE), in 2017. The Dinero Electrónico was canceled due to 71% of the user accounts being inactive (Arauz et al., 2021). Ecuador was *dollarized* in 2000, meaning that the country uses the U.S. Dollar as its official currency (Arauz et al., 2021). There were several concerns associated with Dinero Electrónico once it was implemented. Firstly, it was not fully backed by the U.S. Dollar (USD) but rather *USD denominated assets* (Arauz et al., 2021). USD denominated assets are assets and securities that are valued in USD (Snider, 2022). This led consumers and analysts to view the Dinero Electrónico as riskier than other means of payment due to it being susceptible to credit risk (Arauz et al., 2021). Consumers also viewed it as an inferior form of payment since it could also not be used to make international payments (Arauz et al., 2021). The Dinero Electrónico was also designed to reduce crime as the currency was easily

traceable (Arauz et al., 2021). This traceability led to additional criticism that DE could be used to track the payments of citizens (Arauz et al., 2021). Public mistrust with the government issued CBDC was also heightened after El Comercio, a news outlet in Ecuador, highlighted the fact that the DE would not succeed due to public mistrust in the system. They noted that the central bank had the flexibility to behave irrationally with little to no consequences unlike commercial banks who have their personal wealth at stake (White, 2018).

Dollarization	When a nation uses the U.S Dollar rather than its own domestic currency (*Dollarization Definition, Impact, Example*, 2022)
USD Dominated Assets	Assets and securities that are valued in U.S. Dollar (Snider, 2022)

Table 8: Definitions of terms in Cancellation of Dinero Electrónico in Ecuador

Impacts of CBDC Design

CBDCs are a relatively new concept with only a limited number of launched implementations (*Central Bank Digital Currency Tracker*, 2024). There are risks and benefits related to design choices when developing and deploying a CBDC (Bilotta & Botti, 2021).

Exploring Financial Disintermediation

One way to structure a CBDC involves removing commercial banks from the transaction process (Senior Lecturer of Economics, personal communication, January 18, 2024). *Financial disintermediation* is the process of removing commercial banks as the intermediary between the individual and the central bank (Wadsworth, 2018). For financial disintermediation to occur, the central bank would likely need to invest in a customer service framework (Figure 1). Further research can help determine if the cost of investing and maintaining a secure form of a CBDC is more expensive than maintaining the cash flow (Wadsworth, 2018). This could lead to greater government control over the CBDC which may pose a barrier to public participation (Bijlsma,

M., et al., 2021). The public may factor in their opinions of the government when deciding to use a CBDC as government involvement increases (Bijlsma, M., et al., 2021).

Financial disintermediation	The process of removing commercial banks as the intermediary between the individual and the central bank is called financial disintermediation (Wadsworth, 2018)

Table 9: Definitions of terms in Exploring Financial Disintermediation.

Another potential CBDC design, instead, gives distribution responsibility to commercial banks similar to the current distribution of cash (Figure 3; Figure 4). Commercial banks would serve as an intermediary between the CBDC, and the public as opposed to the central bank taking on all the distribution and infrastructure responsibility (*Future of money*, 2021). This approach could mitigate the risk of financial disintermediation and would be like the current function of the central bank with physical money except in digital form (Senior Lecturer of Economics, personal communication, January 18, 2024).

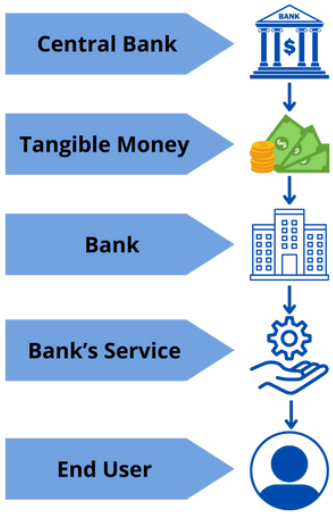

*Figure 3: The current distribution of cash **with** intermediaries involved (Pilav, 2020).*

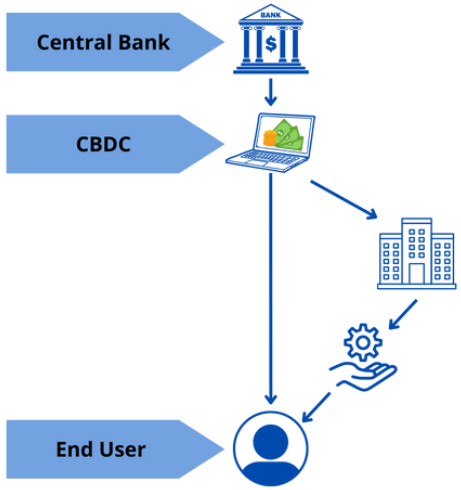

*Figure 4: A CBDC distribution **with** and **without** intermediaries involved (Pilav, 2020).*

Comparing Account-Based vs Token-Based CBDC

There are two ways of verifying CBDC transactions: account-based and token-based. In an *account-based CBDC*, the person initiating the transaction must validate the receiver's identity before transferring the money (Ozili, 2023). This means it cannot be exchanged offline because verification of the receiver's identity needs to occur (Ozili, 2023). In a *token-based CBDC*, users involved in money transactions must validate the *token* associated with the transaction (Richards, 2020). Token-based CBDCs may be founded on distributed ledger technology, meaning all transactions have a record stored on the ledger (Richards, 2020). These tokens are "a representation of a digital asset" (Natarajan, H., et al., 2017, p. 13). Countries already familiar with cryptocurrencies may have an advantage in establishing token-based CBDCs since it is based on similar technologies (Ozili, 2023). This design aspect of the CBDC is crucial since it could determine the level of anonymity provided to the user and can help the government track illegal financial activities (Didenko & Buckley, 2022).

Account-based CBDC	The user initiating the transaction must validate the receiver's identity before transferring the money (Ozili, 2023)
Token-based CBDC	Users involved in money transactions must validate the token associated with the transaction (Richards, 2020)
Token	"a representation of a digital asset" (Natarajan, H., et al., 2017, p. 13)

Table 10: Definitions of terms in Comparing Account-Based vs Token-Based CBDC.

Designing a CBDC for New Zealand

Many countries around the world are seeing a decrease in the use of cash, which is a motivating factor for central banks to implement a CBDC (Humphrey & Khiaonarong, 2023). An employee at the Reserve Bank of New Zealand (RBNZ) noted that the use of physical currency has been declining across New Zealand (Reserve Bank of New Zealand Employee 1, personal

communication, January 15, 2024). A survey conducted by the RBNZ in 2019 showed that only 6% of the New Zealand population uses cash as a main method of payment (Hawkesby, 2020). Since cash circulation requires physical maintenance, such as storing, transporting, and processing, the Reserve Bank of New Zealand has identified the creation of central bank digital currency as a potential opportunity to reduce costs (*Banknote life cycle*, 2022). An RBNZ employee explained that the infrastructure of cash and its circulation throughout New Zealand is unsustainably large in proportion to the use of cash (Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024). This infrastructure can include the manufacturing and maintenance of cash alongside supplying ATMs and other cash distribution locations (*The Access to Cash Review*, 2019). The cost of maintaining a cash system costs the Reserve Bank approximately 20 million New Zealand Dollars (*Future of Cash*, 2019). However, if more people were to use cash, the marginal cost of maintaining the system would decrease. Also, the dissemination of cash may work more effectively as a CBDC could be distributed directly from the central bank to the end user (Hawkesby, 2020; Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024).

The Reserve Bank of New Zealand's Role in a CBDC Pilot Study

The Reserve Bank of New Zealand was founded in 1934 when a British senior official from the Bank of England, Otto Niemeyer, suggested establishing a central bank to enable New Zealand to remain sustainable and practice monetary policy (Figure 5) (*The history of the Reserve Bank of New Zealand*, 2009). The Reserve Bank of New Zealand is the *kaitiaki o te toto*, which is Māori for the "steward of all money in the country" (*Future of Money*, 2021, Executive Summary, para. 2). As the caretaker of all money, it is the RBNZ's goal to maintain the stability of the economy and enable an efficient and reliable currency in New Zealand (*Our Purpose Vision and Values*, 2022). In September 2021, the RBNZ began looking into the feasibility of adopting a retail CBDC (*Future of Money*, 2021).

Kaitiaki o te toto	Māori term for "steward of money and cash" (*Future of Money - Central Bank Digital Currency*, 2021)

Table 11: Definitions of terms in The Reserve Bank of New Zealand's Role in a CBDC Pilot Study.

Figure 5: The Reserve Bank of New Zealand logo (Our Purpose Vision and Values, 2022).

An article was posted on the RBNZ website in 2023 to launch public outreach about the potential use cases and benefits of a CBDC in New Zealand (*Central bank digital currency*, 2023). The website states that "you would be able to use [CBDC] in-store or online to make payments, in the same way, you can use cash to pay for things" (*Central bank digital currency*, 2023, What is a CBDC? section, para. 1). The listed benefits of CBDC include: "maintaining New Zealanders' trust in money, protecting the financial system, and improving payments by increasing efficiency and enabling innovation" (*Central Bank Digital Currency*, 2023, Why we're looking at a CBDC section, para. 1). The RBNZ also claims that a user's CBDC would be safer than money in their commercial banks (*Central bank digital currency*, 2023). These potential benefits provide an incentive for the RBNZ to research a CBDC for New Zealand. However, a key informant explained, that the design of a CBDC in New Zealand has yet to be finalized (Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024). The reported news on the subject shows considerable uncertainty about a central bank digital currency in New Zealand between 2021 and 2023 (Figure 6).

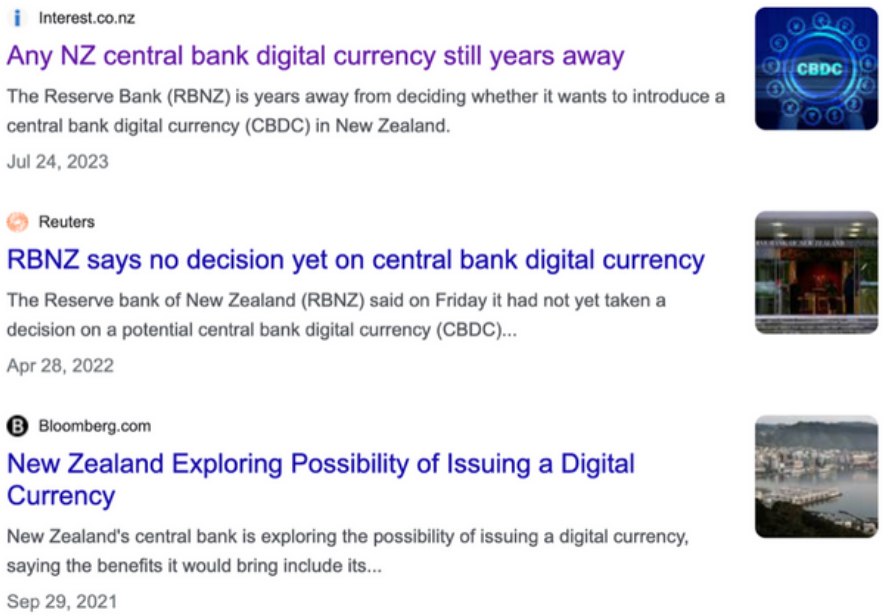

Figure 6: Various news articles describe the Reserve Bank of New Zealand's uncertain timeline for a CBDC implementation.

The Digital Divide in New Zealand

Financial inclusion refers to one's ability to use financial services such as deposits, withdrawals, loans, and insurance (Lannquist & Tan, 2023). As payment services have increasingly become digitalized, an individual's access to technologies such as a mobile phone may impact their ability to be financially included in society (Lannquist & Tan, 2023). One scholar stated, "We do have a digital divide in New Zealand, we have people who have no stable Internet connectivity at home, who don't have independent devices" (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024). The digital divide refers to the unequal access people have to technology, which is affected by factors such as socioeconomic status, education level, geographic restrictions, and digital literacy (*Examples of Digital Divide*, 2020). In New Zealand, individuals with disabilities, senior citizens, people living in multi-person households with low economic status, and people living in rural areas are at higher risk of not having access to the technologies needed for digital payments (*Addressing the digital divide*, 2022).

A public survey conducted by the New Zealand Government in 2021 found that 91% of total respondents reported having access to the Internet, while only 69% of those living in state-funded housing had access (Elers P., et al., 2022).

As of 2023, the RBNZ website stated, "CBDC could be accessed and viewed digitally. For example, it might be accessed using a phone app" (*What is a CBDC?*, 2023, What is central bank digital currency? section, para. 3). A reliable method of storing money can help individuals manage long-term savings, take out loans, and reduce risks of cash theft (*The Westpac NZ Access*, 2023). The United Nations has also identified financial inclusion as a target that can help meet eight of their 17 Sustainable Goals to decrease global poverty (*The Westpac NZ Access*, 2023).

Digital divide	The gap between those who have access to technology and the Internet versus those without access (Kloza, 2022)

Table 12: Definitions of terms italicized in The Digital Divide in New Zealand.

Research Opportunity for Our Sponsor

The sponsor for this project is Dr. Jennifer Ferreira, a researcher, and Senior Lecturer of Computer Science at Victoria University (Figure 7). Her research includes software development strategies, the integration of technology to build communal resilience, and designing digital currency based on users' knowledge of financial transaction systems. The lack of knowledge of the public's awareness and perceptions of central bank digital currencies in New Zealand presents a research opportunity for Dr. Ferreira.

Figure 7: Dr. Jennifer Ferreira, a Senior Lecturer in the department of Computer Science and Engineering at Victoria University of Wellington. (Photo credit: Connor Chartier).

A Potential CBDC Pilot Study in New Zealand

A retail CBDC is specifically used for public and business transactions, whereas wholesale CBDCs are used for transactions between financial institutions (Seth, 2021). The Reserve Bank of New Zealand is currently in the *proof-of-concept* phase of retail CBDC development (*Central Bank Digital Currency Tracker*, 2024). This phase is an advanced research phase that is used to evaluate the feasibility and justification for a CBDC to be piloted (*Central Bank Digital Currency Tracker*, 2024). If justified, the Reserve Bank of New Zealand has already forecasted the steps (Figure 8) in which a CBDC could be piloted and implemented (*Central bank digital currency*, 2023).

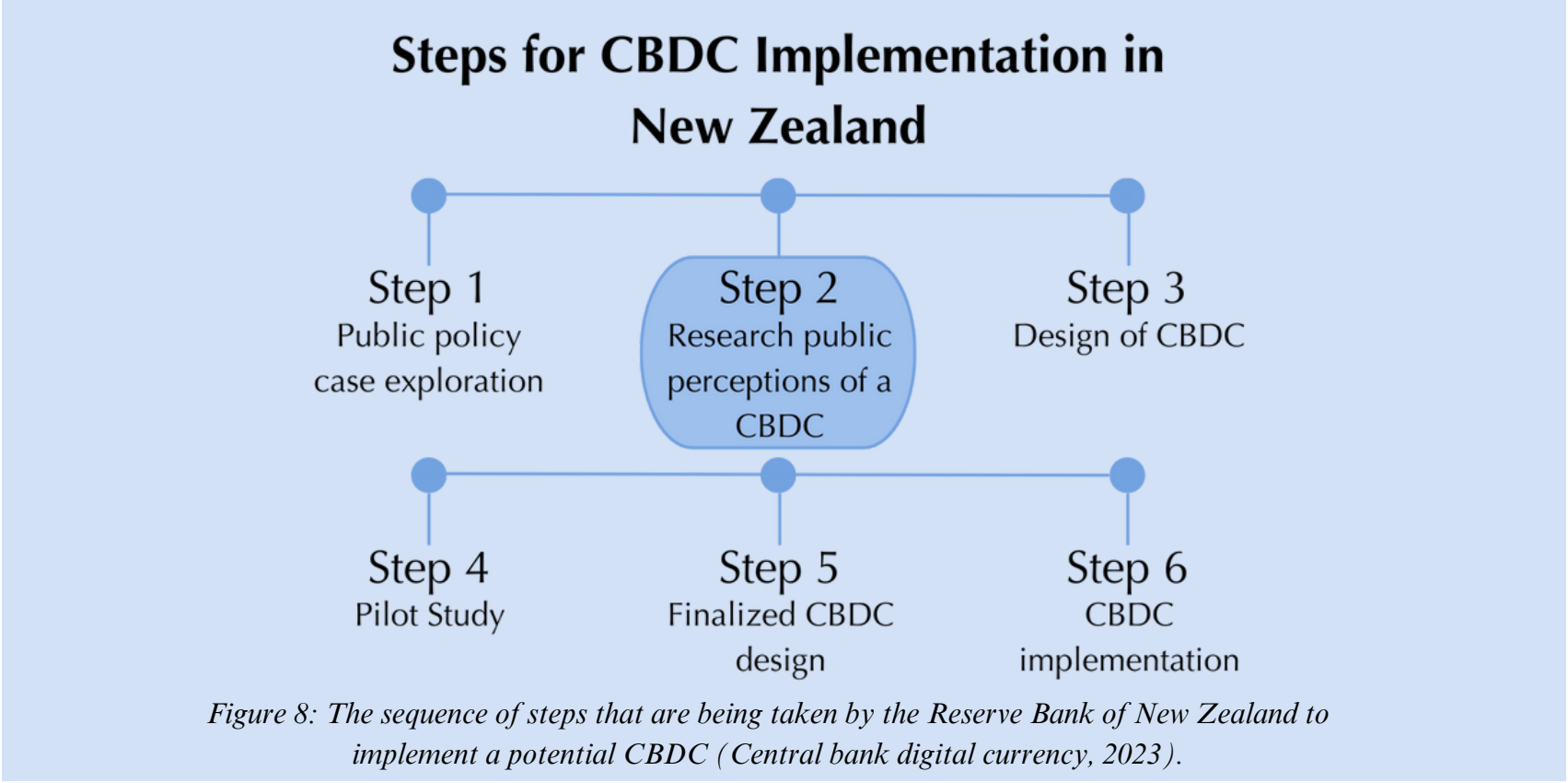

Figure 8: The sequence of steps that are being taken by the Reserve Bank of New Zealand to implement a potential CBDC (Central bank digital currency, 2023).

Rogers' Diffusion of Innovation Theory

Rogers' Diffusion of Innovation Theory is a theoretical framework to model the dissemination of innovations by a given population and their willingness to adopt that innovation (Rogers, 1983). In this case, the innovation is a central bank digital currency. The *innovation process* outlines the six key steps that an innovation takes (Figure 9) (Rogers, 1983).

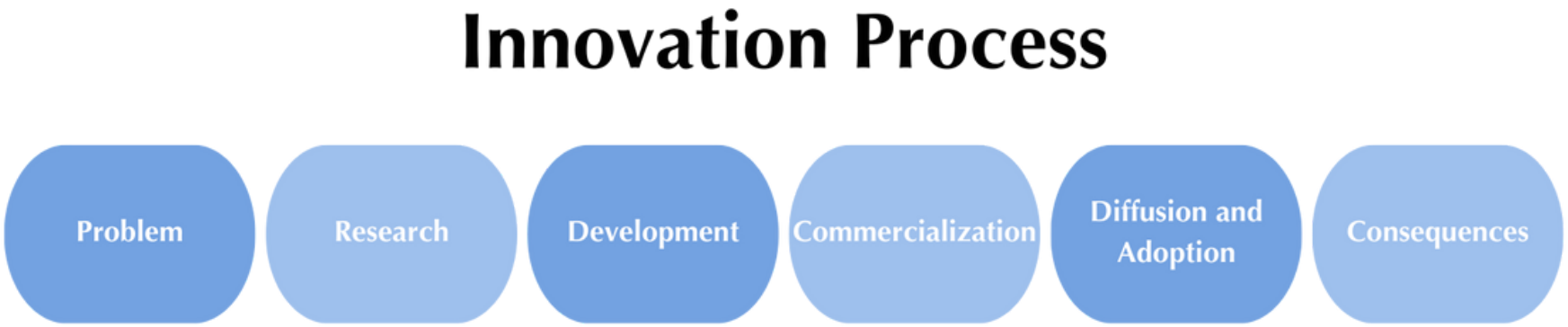

Figure 9: The six stages of the innovation process for any given innovation (Rogers, 1983).

Any given population can be divided into subpopulations with unique tendencies when potentially adopting an innovation (Rogers, 1983). This model can be used to visualize the proportions and categorization of a given population's willingness to adopt an innovation, which in this case is a CBDC (Figure 10) (Rogers, 1983). Each prospective adopter ideally fits into one of five groupings: *Innovators, Early Adopters, Early Majority, Late Majority, and Laggards* (Rogers, 1983). "An *Innovator* must be able to conceptualize relatively abstract information about innovations and apply this new information to his or her own situation" (Rogers, 1983, Length of the Period by adopter Category, p. 206). The *Early Adopters* category represents those who are comfortable with change and are aware of the need for a given technological innovation (LaMorte, 2022; Rogers, 1983). The *Early Majority* category consists of those who may need evidence that a given innovation works before accepting it (LaMorte, 2022; Rogers 1983). The *Late Majority* category has those who are typically convinced to adopt a given innovation when it has been used and tested by the majority (LaMorte, 2022; Rogers, 1983). The *Laggards* typically have the most conservative and the most difficult group of individuals to convince to use a given innovation (LaMorte, 2022; Rogers, 1983). This spectrum of adoption ranges from the soonest to adopt, the innovators, to the latest to adopt, the laggards (Rogers, 1983; Singer, n.d.).

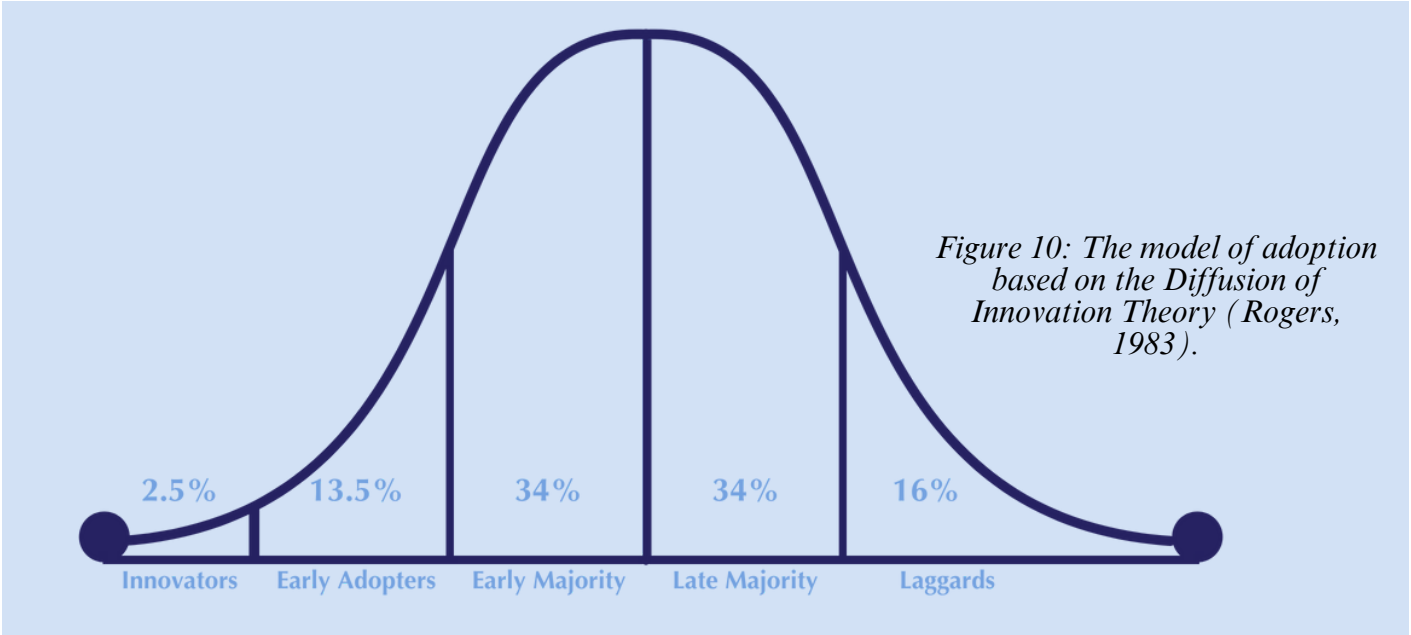

Figure 10: The model of adoption based on the Diffusion of Innovation Theory (Rogers, 1983).

Early Adopters	A category of Roger's Diffusion of Innovation Theory that represents those who are comfortable with change and are aware of the need for a given technological innovation (LaMorte, 2022; Rogers, 1983).
Early Majority	A category of Roger's Diffusion of Innovation Theory that consists of those who may need evidence that a given innovation works before accepting it (LaMorte, 2022; Rogers 1983).
Innovators	"An innovator must be able to conceptualize relatively abstract information about innovations and apply this new information to his or her own situation" (Rogers, 1983).
Innovation Process	The innovation process outlines the developmental stages for a given innovation (Rogers, 1983).
Laggards	A category of Roger's Diffusion of Innovation Theory that typically has the most conservative and the most difficult group of individuals to convince to use a given innovation (LaMorte, 2022; Rogers, 1983).
Late Majority	A category of Roger's Diffusion of Innovation Theory that has those who are typically convinced to adopt a given innovation when it has been used and tested by the majority (LaMorte, 2022; Rogers, 1983)
Rogers' Diffusion of Innovation Theory	A theoretical framework to interpret the dissemination of innovations by a given population (Rogers, 1983).

Table 13: Definitions of terms italicized in Rogers' Diffusion of Innovation Theory.

Methodologies to Understand Public Perceptions and CBDCs in New Zealand

Goal and Objectives

The goal of this project is to gauge public awareness and perceptions of a central bank digital currency (CBDC) in Wellington, New Zealand. We identified three objectives to achieve this goal: (1) evaluate the public's usage of digital transaction methods and banking preferences, (2) identify key barriers and opportunities for public participation in a CBDC, and (3) determine CBDC design features important to the public.

Semi-Structured Interviews with Financial Experts

We captured valuable information from financial experts from the Reserve Bank of New Zealand and scholars in fields such as computer science and economics. These key informants collectively requested to remain anonymous by name. Throughout this research some will be addressed by their job title and place of work, while others will be referred to as "key informants." We used a semi-structured interview with a set of pre-written questions for these key informants who were references from our sponsor, Dr. Jennifer Ferreira. This allowed us to ask follow-up questions based on the interviewee's responses (Ward, 2014). Some interviews were hosted in person and others remotely via Zoom. We requested the interviewees' permission to record the audio of our conversations via Apple Voice Memos, to be transcribed digitally.

Our questions included defining digital currency terminology, New Zealand's current efforts in implementing a CBDC, the social implications of a CBDC, and additional prompts that utilized their expertise (Appendix A). These questions also helped inform the key term definitions for our Digital Currency Familiarity Survey (Appendix B). We tailored the interview questions for our two employees at the Reserve Bank of New Zealand (RBNZ). We asked questions about the motivations behind a CBDC development and the status of a CBDC in New Zealand. This interview strategy gave us a wide range of information on various CBDC designs. These interviews were also used to capture the knowledge of CBDCs from these experts and compare it with the public. This method provided insight into CBDC efforts and identified potential barriers and opportunities for public uptake from an expert's perspective.

In-Person CBDC Perception Questionnaire

We approached willing New Zealand residents in public areas around Wellington to participate in an in-person questionnaires (Appendix C). These areas included outside of the Museum of New Zealand - Te Papa Tongarewa New World Supermarket (68/70 Willis Street, Wellington 6011), the Reserve Bank of New Zealand (2 The Terrace, Wellington 6140), Cuba Street (Wellington 6011), Willis Street (Wellington 6011), Wellington Waterfront, Midland Park (157 Lambton Quay, Wellington 6011), Glover Park (Te Aro, Wellington 6011) and Waitangi Park (Herd Street, Te Aro, Wellington 6011) (Figure 11). These locations were chosen due to the high-density and open areas allowing us to request interviews from as many prospective participants as possible.

Figure 11: A map of our interview locations in Wellington, New Zealand. Each red circle represents a public interview location (Apple Maps, 2024).

Our In-Person CBDC Perception Questionnaire consisted of both quantitative and qualitative questions. The quantitative questions evaluated the interviewee's knowledge of digital currency, CBDCs, and the RBNZ's research on a pilot study (Appendix C). The qualitative questions were designed to elicit a response on common knowledge, concerns, interests, and barriers from the public regarding CBDCs (Appendix C). Based on an individual's responses, we crafted follow-up questions to gather as much relevant data as possible (Figure 12) .

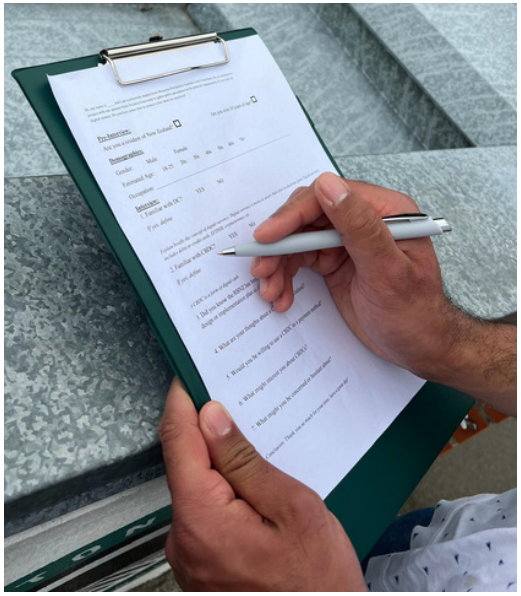

Figure 12: IQP team member, Humza Qureshi, recording responses during a public interview on Willis Street, Wellington 6011.

The information collected from these semi-structured interviews provided our team with qualitative data about public interest in CBDCs.

Online Digital Currency Familiarity Survey

We created an online Digital Currency Familiarity Survey on Qualtrics to collect quantitative data online from New Zealand residents. We adopted this method because "web-based surveys are a low-cost method for collecting responses to straightforward questions. They allowed respondents to complete the survey in their own time, at their own pace, and in a location of their choosing" (Ward, 2014, p. 75). This survey served as a supplement to the CBDC Perception Questionnaire. We measured the quantitative answers by utilizing multiple-choice and rank-choice questions. Our online survey also employed a larger and broader pool of questions covering more topics than the public interviews (Appendix D). The survey allowed for more questions as it utilized multiple-choice and rank-choice answers as opposed to open-ended responses.

The Digital Currency Familiarity Survey included questions covering demographics, familiarity with digital technology, personal use of digital payment methods, banking preferences, and CBDC design-related questions (Figure 13). This survey identified participants' awareness of the RBNZ's research on a CBDC pilot study and willingness to adopt CBDC as a payment method. Some questions evaluated participants' usage, trust, and comfortability with various digital payment technologies. The combination of these questions helped us identify which payment platforms and technologies were most familiar and commonly used by the public. These questions were inspired by information gathered from our key informant interviews and ad-hoc interviews with retail employees.

Figure 13: A screenshot of the introductory page of the anonymous Qualtrics survey field-tested with the public to gather quantitative data.

We distributed this survey in two ways: (1) Posting a paper flyer in public areas and (2) sending the survey link through a university research mailing list.

Firstly, we created a digital flyer on Canva which we printed onto paper at a public library. It included a QR code for users to scan and fill out our survey. The QR code was placed on an eye-catching poster that we hoped would produce a visual incentive for prospective participants (Figure 14). A sample of convenience was used to post this survey in various locations throughout the Victoria University of Wellington campus along with high-traffic public areas locally in Wellington.

Our survey was also distributed through a research email mailing list at Victoria University in Wellington provided by our sponsor. Since the mailing list was comprised of fellow researchers, we hoped they would be willing to provide us with data for our research. There were approximately 100 scholars subscribed to the mailing list that were directly contacted with a link to our online survey.

Our digital survey allowed the public to provide quantitative data about their comfort with digital technologies, awareness about CBDCs, and willingness to participate in a CBDC. This survey was designed to expose technologies that the public is already familiar with. Their responses could inspire CBDC design choices.

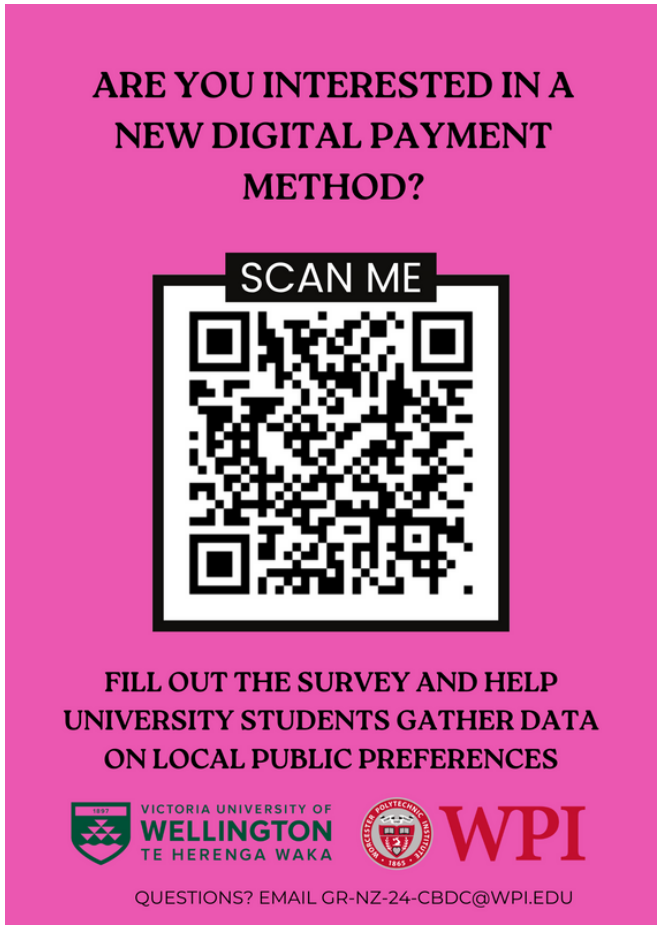

Figure 14: A flyer inviting the public to take our online Digital Currency Familiarity Survey posted around Victoria University, grocery stores, and other public areas around Wellington, New Zealand.

Ad-Hoc Interviews with Business Employees

While we conducted our personal business in Wellington, we asked retailers if they accepted cash. We noted these responses in a digital spreadsheet with the store name and whether cash is accepted. Examples of businesses we approached were local supermarkets (Figure 15), coffee shops, and restaurants. This data was used as a metric to observe if businesses were switching exclusively to digital payment forms. These ad-hoc interviews identified key barriers and opportunities for public participation.

Figure 15: An example of digital payment at the New World Metro Willis Street grocery store.

Findings of Public Perceptions on CBDCs

Through a combination of methods including five key informant interviews, 50 CBDC Perception Questionnaires, 11 Digital Currency Familiarity Survey responses, and 25 Ad-hoc public interviews with retail employees we developed a list of five themes and associated findings that support our project goal and help justify recommendations.

Modeling Our Data Using the Diffusion of Innovation (DOI)

We placed our 50 In-Person CBDC Perception Questionnaire participants into categories on Rogers' DOI model based on their responses to our qualitative interview questions (Figure 16). Grouping criteria included prior knowledge of digital currency topics, risks or concerns, enthusiasm towards digital currency and CBDC, and willingness to adopt CBDC. We synthesized definitions for both "digital currency" and "central bank digital currency" for each grouping based on the definitions provided by its individuals.

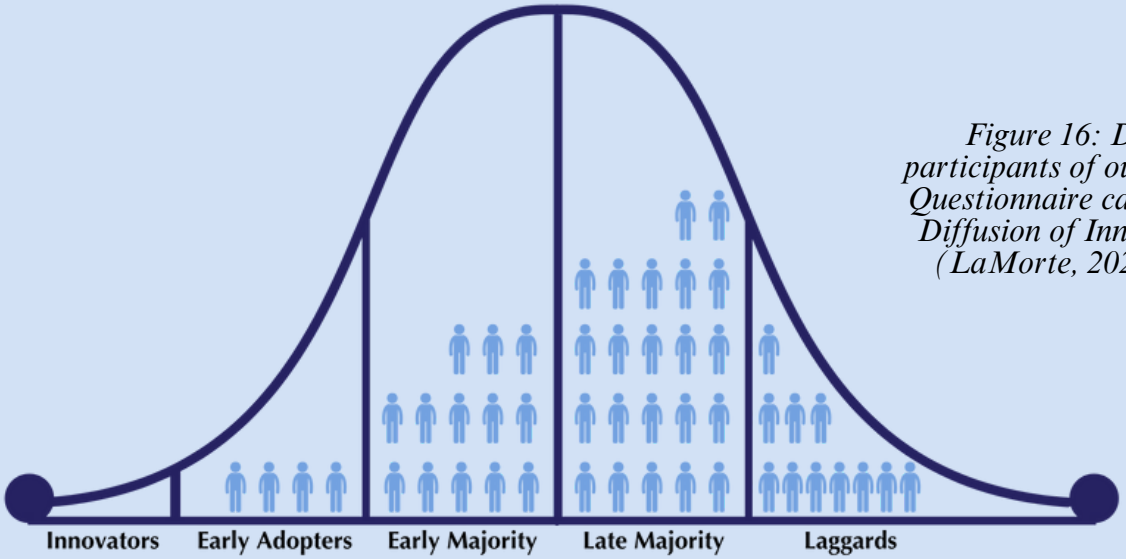

Figure 16: Data from the 50 participants of our CBDC Perception Questionnaire categorized in Rogers' Diffusion of Innovation distribution (LaMorte, 2022; Rogers, 1983).

Early Adopters

Only four participants were classified as Early Adopters, making it the second smallest category, ahead of Innovators. All four respondents understood digital currency and three provided an accurate definition of central bank digital currency (Figure 17). Half of the individuals in this group said they would be willing to adopt a CBDC, the other half still needed more information. In general, they had concerns over data privacy and the potential phasing out of cash. However, most believe CBDC to be an overall good initiative and hold a positive outlook and willingness to learn more.

What is Digital Currency?
"Online currency that you can trade with."
What is Central Bank Digital Currency?
"Currency that is managed and implemented by the central bank."

Figure 17: Common Definitions of Digital Currency and Central Bank Digital Currency from the Participants labeled as Early Adopters from the In-Person CBDC Perception Questionnaire.

Early Majority

This category consisted of 13 interviewees. Only five participants in the Early Majority category provided an accurate definition of digital currency, with one providing an accurate definition for central bank digital currency (Figure 18). Out of the 13 respondents, 11 answered that they might use a CBDC but would need more information. The remaining two respondents said they would use a CBDC. This group appeared to be mainly motivated to use a CBDC because of the potential for lower transaction fares. However, some were concerned about cybersecurity and were wary about government involvement in the creation and distribution of CBDC.

What is Digital Currency?
"It's like cryptocurrency."
"A digital way to buy things online."
What is Central Bank Digital Currency?
"A government-managed digital currency."

Figure 18: Common Definitions of Digital Currency and Central Bank Digital Currency from the Participants labeled as Early Majority from the In-Person CBDC Perception Questionnaire.

Late Majority

The Late Majority category had 22 participants, which was the highest out of all groupings. When asked about familiarity with digital currency, 14 participants said they had heard of it. Out of the 14 participants who said they were aware of digital currency, five heavily associated cryptocurrency with digital currency (Figure 19). Out of the 22 participants in this category, 18 were not familiar with central bank digital currencies. Regarding adopting a CBDC, one participant outwardly stated that they would not use a CBDC, while the other 21 said they might use it. Out of the 21 who were unsure, three participants said they would use central bank digital currency if it were widely accepted in society. Similarly to the Early Majority, the Late Majority participants seemed to be motivated by the prospect of lower fares and fees; though many were unsure of other incentives they would like to see. This group was also concerned about the cybersecurity concerns associated with CBDCs and the potential technological barriers associated with this modern technology.

What is Digital Currency?
"It is similar to Bitcoin."
"Digital banking and not physical money."
What is Central Bank Digital Currency?
"Online transactions." (No accurate definitions)

Figure 19: Common Definitions of Digital Currency and Central Bank Digital Currency from the Participants labeled as Late Majority from the In-Person CBDC Perception Questionnaire.

Laggards

Out of the 11 individuals classified as Laggards, 10 were mostly unaware of digital currency and CBDCs. Out of the four individuals that said they were aware of digital currency, three said that it was "like cryptocurrency" (Figure 20). None of these people knew about the RBNZ efforts to research a CBDC. All 11 stated that they would not use a CBDC. Out of the 11 total participants, eight did not provide any incentives that would encourage them to adopt a CBDC, and three stated that they would need more information to know what they would want. Also, two participants stated explicitly that they did not trust the government. Five participants stated that they were hesitant to switch to a CBDC because they prefer to use cash.

What is Digital Currency?
"Like cryptocurrency" (No accurate definitions)
What is Central Bank Digital Currency?
There were no attempts to define CBDC.

Figure 20: Common Definitions of Digital Currency and Central Bank Digital Currency from the Participants labeled as Laggards from the In-Person CBDC Perception Questionnaire.

The Public's Awareness of a CBDC May Impact its Adoption

New Zealand Residents Had Limited Awareness of Digital Currency and CBDC

Since CBDC is a form of digital currency, digital currency awareness may impact an individual's decision to use CBDC as well. Out of our 50 public interview participants, 33 stated they were familiar with digital currency. Out of these 33, 11 interviewees provided an accurate definition of digital currency. A common and accurate definition of digital currency our group identified was "something tradeable that is not physical."

We also found that 14 participants mentioned only cryptocurrency or Bitcoin in their definition of digital currency. Specific responses to this question included, "like Bitcoins," "like crypto," "All currency is digital nowadays and like cryptocurrency," and "[CBDCs are] like cryptocurrencies, no banks are involved and there is lots of speculation." These responses highlight how some interview participants incorrectly defined digital currency as cryptocurrency.

Also, a lack of CBDC knowledge may lead to uncertainty about adopting a CBDC. Of the 50 public interviewees, 37 respondents had never heard of a CBDC, and only five had an accurate definition of a CBDC. A common and accurate definition for CBDC was, "currency managed by the central bank [or government]."

Our Digital Currency Familiarity Survey also highlighted varying levels of CBDC knowledge, with two respondents selecting "basic knowledge" (third highest rating out of five), two respondents selecting "some knowledge" (fourth highest rating out of five), and two respondents selecting "no knowledge" (lowest rating out of five). Although the number of online survey participants is relatively low, our limited data suggests varying CBDC knowledge levels within the public.

When asked about the concerns they had about adopting a CBDC, 11 participants from our face-to-face interviews explicitly stated they were unsure because they had limited knowledge of CBDC. Some of these responses included, "lack of knowledge of

CBDC," "I'm not sure because I don't know much," and "I don't know too much, not sure, I'm concerned it might not be the same convenience as payWave." Although the RBNZ has not finalized a CBDC design, our public interviews suggest that an individual's uncertainty about CBDC concepts may be reflected in their decision to use this potential new currency.

CBDCs Raise Cybersecurity and Data Privacy Concerns

Large-scale use of CBDCs may lead to cybersecurity and data privacy threats. Data privacy was a concern expressed through many of our data collection methods.

Cybersecurity is a Source of Public Hesitation to Adopt a CBDC

A Senior Lecturer of Economics at the Victoria University of Wellington stated, "Obviously, a big issue with any digital currency is going to be cybersecurity" (Senior Lecturer of Economics, personal communication, January 18, 2024). Another key informant validated these concerns and stated, "Potential cybersecurity risks are one of the concerns of a CBDC, but there are also significant cybersecurity risks with existing bank accounts. However, the cybersecurity risks of a CBDC can be reduced if the relevant Central Bank (in New Zealand's case, the Reserve Bank of New Zealand), can control the CBDC" (Key Informant 1, personal communication, January 18, 2024). For example, "in the case of a hack, the Central Bank can identify the "stolen" CBDC tokens and render them worthless. The ability of a Central Bank to control individual CBDC tokens, however, raises other concerns such as data privacy" (Key Informant 1, personal communication, January 18, 2024). If a CBDC transaction is hacked it could potentially jeopardize a user's financial data. Along with this testimony, 14 public interviewees addressed cybersecurity on their own when asked about their CBDC concerns. Another respondent explained their CBDC concerns more specifically as, "[concern about] digital currency scams" (Participant 2, personal communication, January 30, 2024). It has been identified by both experts and the public that cyber security measures are a major consideration in the implementation and adoption of a CBDC, to protect the users and ensure that a CBDC functions effectively.

The Public is Cautious about Data Privacy

Besides the potential cybersecurity issues, some participants shared skepticism about potentially relinquishing data privacy. One public interview participant mentioned that they were concerned about their digital purchases being tracked, as they explained, "nobody tracks cash spending" (Participant 15, personal communication, February 1, 2024). This interviewee uses *EFTPOS* exclusively to get cash and uses it as their main form of payment. EFTPOS is an acronym for "Electronic Funds Transfer at Point Of Sale" and it provides a service that directly transfers money from a customer's bank account to a business's bank account (*What is EFTPOS?*, n.d.). Another public interviewee was suspicious of a CBDC because of surveillance implications and privacy concerns (Participant 10, personal communication, February 1, 2024). They stated, "The Reserve Bank [of New Zealand] will take advantage of people" (Participant 10, personal communication, February 1, 2024).

These worries were addressed in one key informant interview in which an employee of the RBNZ stated, "there's a lot of suspicion about how the government issuing digital money will enable the use of data to track all the payments. But that's a fantasy because, for a start, we [the RBNZ] don't have enough staff to deal with all the data generated, as you can imagine. In any event, we aim to minimize the collection of user data to mitigate any risks of a data breach, etc." (Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024). The statements from the key informants and the public interview participants highlight the differences in opinions on how a central bank could potentially interact with a user's data.

EFTPOS	"Electronic Funds Transfer at Point Of Sale" provides a service that directly transfers money from a customer's bank account to a business's bank account (*What is EFTPOS?*, n.d.).

Table 14: Definitions of terms in The Public is Cautious About Data Privacy.

The Public's Opinion on the Government May Impact CBDC Adoption

The public's perception of the government may impact their willingness to adopt a CBDC. A key informant describes hesitation due to government mistrust, "there are people who are resistant because they're suspicious the government's watching everything [they] do" (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024). One public interviewee stated, "The communication from the government was poor in New Zealand" and said, "[they] do not trust the government" (Participant 5, personal communication, January 31, 2024). In addition, when asked if they would adopt a CBDC, they responded "no." Another public interaction involved three individuals who agreed to participate in our interview, and then later declined when they learned that the RBNZ was involved. This interaction highlighted their distrust of the government.

One participant stated that they were interested in adopting a CBDC because the government is directly involved in the distribution. This participant highlighted their trust in the government, stating she thinks "Payments would be more transparent with CBDC. I feel better with my money in the Reserve Bank of New Zealand." She further went on to say, "Other banks maximize their profits, but the RBNZ would set it up in a way so that it's better for their economy" (Participant 35, personal communication, February 8, 2024). Overall, this data suggests the idea that there may be a correlation between government trust and willingness to adopt a CBDC.

There are Potential Opportunities to Support CBDC Adoption

Our research highlighted some potential opportunities and incentives that could encourage the public to use a CBDC.

Lower Transaction Fees are an Incentive for CBDC Adoption

Citizens may be more likely to adopt a CBDC if incentives are utilized to make it attractive. When asked if there are any specific features a CBDC might have in New Zealand, a Senior Lecturer of Economics at Victoria University stated that, unlike PayWave which applies on average a two percent surcharge, "a CBDC would attempt to get those transaction costs down to a fraction of a fraction of a percent" (Senior Lecturer of Economics, personal communication, January 18, 2024). This could be possible due to the potential reduction of intermediaries applying fees in CBDC transactions, such as commercial banks, and payment processors such as Visa or Mastercard (Lannquist & Tan, 2023). Additionally, 16 out of the 50 public interview participants mentioned they would be interested in using CBDC if it meant lower transaction charges. In one of these interviews, one resident mentioned that they are paid a salary in U.S. Dollars which means they deal with "high foreign transaction fees" (Participant 41, personal communication, February 8, 2024). This interviewee explained that lower transaction fares would be a source of motivation for adopting a CBDC. Another resident said that "with the current inflation in the New Zealand economy, financial benefits would be incentivizing" (Participant 32, personal communication, February 2, 2024). Financial incentives can serve as strong motivators for prospective CBDC users to participate in this new transaction method.

Access to Technology is Important to the Public

We also found that access to relevant technology for CBDCs could support financial inclusion and bridge the digital divide. Within New Zealand, some individuals may be unable to partake in CBDC usage due to the existing digital divide. One public interviewee who preferred cash did not view a CBDC as being accessible to everyone, specifically older generations who may not have the existing technology to use CBDC (Participant 12, personal communication, February 1, 2024). Another public interviewee noted their concerns with new payment methods saying, "With every new technology, there will be a lot of change and people will have to adapt to change" (Participant 7, personal communication, February 1, 2024). This is significant to note as a CBDC could worsen the existing technology gap depending on the way it is designed.

The Public Values User-Friendly Technologies

User-friendliness can also help increase the widespread use of CBDCs. One of our key informants stated, “If central banking systems want to have a currency that is accessible for everyone, it needs to be simple and easy for them to use” (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024). Another key informant echoed this sentiment by noting that the “public would be more likely to use CBDC if it were convenient and accessible – for example, if it could be stored in a mobile wallet” (Reserve Bank of New Zealand Employee 2, personal communication, January 15, 2024). A New Zealand resident mentioned that “if [a CBDC] was convenient to use like paying with a phone” they would be more likely to use one (Participant 29, personal communication, February 7, 2024). Additionally, four online survey participants identified user-friendliness as a key factor in digital financial transactions. Overall, a theme gathered from interviews and online surveys is that a CBDC would more likely be adopted if it were easy to use and understand.

Cash Remains a Relevant Payment Method

Our data indicated that access to cash is important for financially excluded populations and during times of natural disaster in New Zealand such as tsunamis, earthquakes, floods, etc. (Figure 21) (*Learn about hazards*, n.d.).

Figure 21: Physical currency is valued as more than a means of payment by New Zealanders (Chant, 2023).

Cash is Reliable During Natural Disasters

In our public interviews, three participants expressed concern about cash being the only viable payment method during a natural disaster. For instance, during Cyclone Gabrielle on the North Island in 2023, thousands of residents in Auckland, New Zealand were without power for a week or longer (*Pockets of Auckland*, 2023). When asked why they were hesitant about using a CBDC, one participant stated, “If all else fails during disasters, it's important to have cash in case of a network outage” (Participant 1, personal communication, January 30, 2024). They were concerned that using only a CBDC would jeopardize the cash option that many rely on during times of crisis. Another resident explained they would, “still like to have cash if electricity fails cash still works” (Participant 6, personal communication, February 1, 2024). This resident stated that they always carry cash. An employee from the Reserve Bank of New Zealand similarly noted, “not many people use physical cash anymore. Until something [like a disaster] happens” (Reserve Bank New Zealand Employee 1, personal communication, January 15, 2024). This finding is significant because cash availability is important to consider when designing a CBDC, as natural disasters are a major source of concern in New Zealand.

Cash Supports Financial Inclusion

Cash is important for those who do not have reliable access to technology and who would otherwise be financially excluded. An Associate Professor in Computer Science and Software Engineering at the University of Waikato had worries regarding lower-income individuals, saying, “we don't see them and the people building the tech don't see them because they're not the people who are living in a shared household of 15 people with no internet” (Associate Professor of Computer Science and Software Engineering, personal communication, January 19, 2024). A public interviewee was also concerned about how the lack of financial inclusion "affects people on margins. All kinds of margins, such as age, income, etc. These people usually end up being excluded and do not have the time or capacity to learn how to use it" (Participant 39, personal communication, February 8, 2024). For those that rely on cash, a CBDC that is not implemented alongside cash usage may not be inclusive.

Physical Currency is More Than Just a Means of Payment

Cash has a significance beyond monetary value. An employee at the Reserve Bank of New Zealand described its significance, "we've conducted our research and found that cash is not solely seen as a medium of exchange but also as a form of communication (e.g., *koha*)" (Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024). This describes the potential for cash to hold a sentimental value along with its monetary value.

Koha	Māori term for "A gift, present, offering, donation, contribution – especially one maintaining social relationships and has connotations of reciprocity" (*koha - Māori Dictionary*, n.d., koha, para. 1)

Table 15: Definitions of terms in Physical Currency is More Than Just a Means of Payment.

A CBDC Perceptions Questionnaire participant agreed with the sentiment and stressed the importance of having physical cash on hand as they view digital currency as not being "real" in terms of tangibility (Participant 16, personal communication, February 1, 2024). Another interviewee explained their perspective, "Credit card use became more convenient after COVID, but I like that cash is not on the record" (Participant 38, personal communication, February 8, 2024). The key informant also explained, "Just having a tangible item or asset, like cash, gives you a lot of physical comfort. If something happens you can use cash and not be reliant on some other infrastructure" (Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024).

Cash Use is Diminishing

Despite the importance of cash in New Zealand, there has been a decline in cash use and acceptance in the country. An employee from the Reserve Bank of New Zealand mentioned, "Over the last decade or two, we have observed a decline in the use of cash." They also stated, "people are not only using cash less frequently, but also more places are refusing to accept it" (Reserve Bank of New Zealand Employee 1, personal communication, January 15, 2024). When asked how often participants used cash in the Digital Currency Familiarity Survey, four respondents answered one to two times per week, three respondents did not use cash consistently, and the remaining four respondents did not answer the question. Through our ad hoc interviews with business employees, we identified that some businesses no longer accept cash. Out of 25 businesses interviewed in Wellington, 16 accepted cash and cards, while the remaining 11 only

accepted cards (cash not accepted) (Figure 22). Cash is important and relevant in New Zealand; however, its infrastructure could become more limited as cash usage continues to decline.

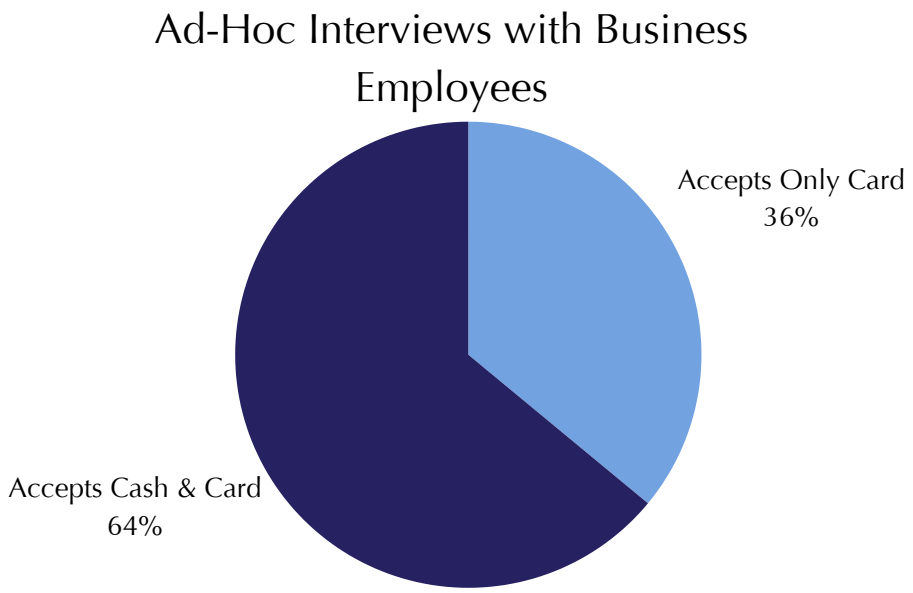

Figure 22: Results of our 25 Ad-hoc interviews with business employees.

The Online Digital Currency Familiarity Survey Had Low Participation

The online Digital Currency Familiarity survey we developed and field-tested was not as successful as originally intended, with only 11 total responses. Since respondents were not required to answer each question, certain questions had even fewer responses. Due to the specialized nature of our online survey's topic, finance knowledge may have served as a barrier to some of the questions. Although we defined the relevant financial terminology throughout our online survey, this may have served as a barrier for participants to fill out all the questions. The online survey consisted of 34 questions, which may have been too many for some individuals given that three New Zealand residents did not complete the survey to the end.

Although the online survey participation was low, we noticed several common themes across responses that supported our previous findings. A total of seven New Zealand residents answered the questions related to their cash and technology usage. Four respondents stated that they use cash once or twice a week,

while the other three said they never use cash. Payment cards were used by all seven respondents and were the most frequently used form of digital payment when asked to rank by order. Of these seven respondents, two said they had no knowledge of CBDCs, two had some knowledge, another two had basic knowledge, and one had expert knowledge. Six New Zealand residents answered the questions related to CBDCs in New Zealand (Appendix D). Only two of the six had heard about the RBNZ's research of a CBDC, with another three never having heard of it and one respondent stating that they were unsure. From the limited online survey data, although card payment was more frequent amongst respondents, cash still seemed to be a relevant payment method. Similar to the participants from our in-person interviews, our online survey respondents had limited CBDC knowledge and awareness on the RBNZ's research.

The flyer with the QR code for our online survey was posted on bulletin boards around Victoria University and New World Metro Supermarket in Wellington. In addition, our sponsor permitted our team to distribute the survey link on a research mailing list at Victoria University. Although we had originally planned on offering an incentive to complete the survey, such as being entered into a raffle for a prize, we were unable to provide an incentive due to logistical challenges. Out of the 11 total participants, seven accessed the survey through the link given to the research mailing list, while the remaining four accessed it through the QR code. Our team intended to post the flyer for the online survey in more locations around Wellington to increase its exposure, however, we decided to spend that time refining its questions. In hindsight, the Digital Currency Familiarity Survey may have had more engagement if we had spent more time on the distribution rather than the development of the survey.

Limitations

We encountered several limitations throughout our research and data collection strategies. Due to the uncertainty in the final CBDC design, it was difficult to accurately describe all the potential benefits and risks to the public as these can vary based on the design of a CBDC. Secondly, we lacked significant quantitative data about users' banking preferences and preferred technologies, as our online survey did not receive the anticipated participation. Lastly, we lacked data from financially excluded populations that could potentially benefit from a CBDC. We were unable to capture perceptions from financially excluded populations due to logistical challenges and our choice to conduct a sample of convenience for our public interviews and surveys.

Recommendations to Support a Potential CBDC Pilot Study

We proposed two recommendations for a central bank interested in implementing a central bank digital currency (CBDC) to consider when developing a pilot study. These recommendations are intended to provide effective strategies for the public uptake of a potential CBDC. Each of these recommendations is supported by the findings from our data and other CBDC implementations from central banks worldwide.

Adapting our Data Collection Methodologies May Diversify and Capture More Public Awareness, Perceptions, Barriers, and Opportunities for CBDCs

Restructuring the Online Digital Currency Familiarity Survey May Help Collect More Quantitative Data from a Variety of Demographics

Although our Online Digital Currency Familiarity Survey was not as successful at capturing the number of public perceptions we had intended, it contains meaningful questions that evaluate familiarity with digital technology, personal use of digital payment methods, banking preferences, and CBDC design-related questions.

An increased number of responses to an adapted version of our Online Digital Currency Familiarity Survey may help uncover new barriers and opportunities for public participation in a CBDC. It may also reinforce or contradict previously identified opportunities and barriers through questions about current banking preferences and digital payment methods. Increasing the number of respondents may help narrow down the common technological preferences and prior digital currency knowledge from a variety of demographics

such as age, socioeconomic status, and education level in a quantitative format. Our survey could also be adapted to assess areas with high usage of certain technologies to determine select locations to pilot a CBDC. For instance, the Central Bank of Bahamas used an online survey to determine that the Exuma District in the Southeast Bahamas had high mobile phone usage and would be an effective location to pilot a CBDC (Sun, T., et al., 2022).

There are Opportunities to Improve Our Online Digital Currency Familiarity Survey

The online survey can be improved to add questions based on our findings, remove questions that did not aid in data analysis, and provide an incentive for completing all questions in the survey.

Increasing Survey Distribution May Allow More Diverse Perspectives

Potentially collaborating with commercial banks to distribute the survey link to their customers could help in gaining a diverse range of perceptions. Posting a flyer with the QR code for the online survey in public areas such as bus stops and train stations may also help with participation. Administering the survey questions in person could reach populations that may not have reliable access to the online survey, allowing them to also provide their perceptions of CBDCs. The online survey could be conducted by a third-party surveying company at public areas such as universities, supermarkets, and public parks. In-person door-to-door surveying in neighborhoods and districts consisting of financially excluded demographics could yield information that was not captured in our Online Digital Currency Familiarity Survey.

We identified questions that could be added to guide further research on public CBDC perceptions. Since an individual's opinion on the government and central bank may impact their decision to use a CBDC, it may be helpful to add questions evaluating a participant's outlook on these entities (Figure 23). Many global CBDC pilot studies have used mobile wallets as a platform for CBDC transactions, so it also be helpful to record data on respondents who have consistent access to mobile devices (Figure 23).

Question 1: What is your opinion of the [insert specific country] government?

- Positive
- Negative
- Neutral
- Unsure

Question 2: What is your opinion of the [insert name of central bank]?

- Positive
- Negative
- Neutral
- Unsure

Question 3: Do you have consistent access to a mobile device?

- Yes
- No
- Unsure

Figure 23: Suggested questions to add to a future Digital Currency Familiarity Survey.

Questions That May Be Beneficial to Remove

As some respondents did not complete all the questions, shortening the online survey could also be helpful to reduce the length of the survey. We identified some questions that could be removed from the Digital Currency Familiarity Survey.

Questions 4 and 5 (Figure 24) were questions about the frequency of technology use, and Questions 28, 29, 30, and 31 (Figure 24) were about satisfaction and confidence with commercial banks. These questions could be deleted as they provided limited insight into digital currency familiarity and did not add value to our data analysis. Questions 33 and 34 (Figure 24), were intended to evaluate if respondents would use a CBDC either with a commercial bank or directly with the central bank. Given one of our findings that there is a lack of knowledge about CBDCs, we believe it may not be possible for every participant to make an informed preference about this specific CBDC design choice.

Question 4: Please select all of the technology that you use.
Question 5: Please rank the following technology by your frequency of use.
Question 28: Please rate your satisfaction with your bank(s).
Question 29: Do you prefer online or in-person banking?
Question 30: While in-person banking, please rate your trust in your data's privacy.
Question 31: While online banking, please rate your trust in your data's privacy.
Question 33: Would you be interested in using a Central Bank Digital Currency that would be distributed through your current commercial bank(s) and work alongside your current payment methods?
Question 34: Would you be interested in using a Central Bank Digital Currency that would be distributed through the Reserve Bank of New Zealand and work alongside your current payment methods?

Figure 24: Questions from the online Digital Currency Familiarity Survey that may be beneficial to remove (Appendix D).

Incentives May Encourage Survey Completion

Providing an incentive to fill out the survey may encourage more participants to complete the entire questionnaire. Incentives could be monetary such as cash or gift cards. Similarly, prizes such as apparel, food, or other raffles may be effective in encouraging people to take our survey. Incentives could be managed and funded by a central bank or a surveying company distributing the online survey.

There are Potential Challenges with Adapting the Online Digital Currency Familiarity Survey

There are some potential challenges with adapting the online Digital Currency Familiarity Survey. First, the distribution of the survey, especially with incentives, could prove to be costly. Whether the incentives are a monetary prize or small giveaways – both require funding. Incentives may skew the demographic data of respondents since the survey may attract participants who are more interested in receiving the incentive rather than giving thoughtful answers to the survey. Additionally, specific incentives may unintentionally appeal more to certain demographics, which could also be considered when choosing the incentive. For instance, financial incentives such as cash could attract lower income individuals. A raffle for tickets to a sports game may entice people who enjoy and have the ability to attend a sports game to complete the survey.

Another challenge is the types of questions asked in the survey. The knowledge barrier and personal topics addressed throughout the questions could make it difficult for respondents to answer. Some respondents may also feel they do not know enough about the topics covered in the online survey, as some financial terms may not be familiar to New Zealand residents. It may be difficult to create a survey that does not overwhelm the user with knowledge or pressure them to disclose personal information. Lastly, finding a balance between the number of questions to gain enough data while also keeping the participants engaged may be a challenge.

Adapting the In-Person CBDC Perceptions Questionnaire May Help Collect More In-Depth and Diverse Qualitative Data

It may be beneficial to add follow-up questions to responses to our in-person CBDC Perceptions Questionnaire to collect as much data as possible. Additionally, increasing the number of interview locations may help collect data from a variety of demographics and allow for a diversity of perspectives.

Based on the individual's responses, the survey could be adopted to garner more understanding of the participant's perceptions. For example, if the individual addresses that they would not use a CBDC due to government involvement, they could be further assessed on their perception of the government to gather more understanding. This could be valuable information for a pilot study as it could allow it to gather a range of information on reasons a participant may or may not use a CBDC. Interviewers may also find it beneficial to be prepared with questions beyond the seven-question survey to assess individuals thoroughly in a short time. We have outlined three groups of questions based on the themes within the individuals' responses: government trust, cash preferences, and cybersecurity concerns. If any of these themes are mentioned, we recommend it may be helpful for the interviewer to ask additional questions (Figure 25) in tandem with the base questionnaire (Appendix C).

Follow-up questions if the interviewee mentions government distrust:

1. Why do you mistrust the government?
2. Does this impact your willingness to use a CBDC?

Follow-up questions if the interviewee mentions cash is their preferred method of payment:

1. Why do you prefer cash?
2. How often do you use cash?

Follow-up questions if the interviewee mentions cybersecurity and/or data privacy concerns with a CBDC:

1. Do you have confidence that your current digital payment methods are secure?
2. What cybersecurity risks are you concerned about in relation to a CBDC?

Figure 25: Suggested questions to add to a future CBDC Perception Questionnaire.

A Variety of Interview Locations May Diversify Public Perceptions

Increasing the number of areas in which the survey is conducted could allow for a diverse range of perspectives. For instance, interviewing regions which have high numbers of financially excluded populations could allow the collection of public perspectives that our team was unable to record. Additionally, as we conducted 50 interviews, increasing the number of interviews could potentially yield more findings and provide further recommendations. It may be beneficial for a central bank to partner with a third-party to help increase the number and locations of public interviews. For instance, the Eastern Caribbean Central Bank partnered with "market research agencies" to receive public feedback on their CBDC pilot study through surveys and consumer research (Sun, T., et al., 2022, p. 23).

Challenges Adapting the In-Person CBDC Perceptions Questionnaire

Adding questions to the interview may make it too long and lead respondents potentially not wanting to complete the interview. They also may not answer questions with their full attention as they may be tired by the breadth of topics covered and length of the interview. Furthermore, some respondents may view certain topics as too personal and be uncomfortable answering related questions.

Increasing Central Bank Communication of a CBDC's Use Cases and Motivations May Help Convince the Public to Adopt a CBDC

Many shared concerns about a lack of knowledge on CBDCs. Relevant CBDC knowledge may include financial definitions, differences between central bank digital currency and cryptocurrency, the role of cash alongside a CBDC, use cases of a CBDC, and the risks and benefits of a CBDC.

What is a CBDC?

Most of our respondents had not heard of a central bank digital currency. It may be beneficial for a central bank to provide a clear definition, such as "a digital currency that is issued and regulated by the central bank." It may also be helpful for a central bank to provide examples of other countries that are in a similar development phase a CBDC. For instance, the Reserve Bank of New Zealand could share that United States, Japan, Thailand, and Australia are also in the proof-of-concept phase to help alleviate concerns about the potential integration of a digital form of cash in the New Zealand economy (*Central Bank Digital Currency Tracker*, 2024). Providing these examples could help show that New Zealand is joined by other countries in its research of a CBDC and that CBDC research is a worldwide initiative.

CBDC vs Cryptocurrency

There is a general misunderstanding that a central bank digital currency is cryptocurrency. This distinction is important because those who have a negative connotation toward cryptocurrency may also share that perception of CBDCs. A central bank may find it beneficial to clarify that a central bank digital currency does not have the same use cases as cryptocurrency. Unlike cryptocurrency, a central bank digital currency has a fixed value tied to the nation's legal tender. This means that the a central bank would directly monitor and be responsible for its dissemination in society, like cash.

CBDC Designs and Associated Risks and Benefits

Some residents were unsure whether they would use a CBDC due to their lack of knowledge of its functionalities. It may be helpful for a central bank to outline the potential risks and benefits of CBDCs to help inform the public and acknowledge their hesitations. Having the public's CBDC interests and concerns acknowledged may increase CBDC interaction. Benefits to outline may include lower fares, faster settlement time, and more secure transactions. Risks to highlight may include financial disintermediation, data privacy, and more technological dependence.

The Role of Cash Alongside a CBDC

Some of our participants found comfort in having cash. These respondents were concerned that the RBNZ's research of a CBDC was a step towards a cashless society. Our key informants also mentioned that some New Zealanders may not have access to the internet or electronic devices needed for digital payment methods and may rely on physical currency. If cash will remain a supported payment option alongside a CBDC, it may be beneficial for a central bank to reinforce this message. People who prefer using physical currency may feel more at ease knowing that they can use both transaction methods.

New Zealand's CBDC Motivations

Some individuals are hesitant to use a CBDC due to government involvement and their perceived lack of communication. A central bank such as the RBNZ may find it beneficial to highlight the main motivations behind introducing a CBDC in their country. For instance, the RBNZ's motivations are due to the decline in cash usage and the costs of maintaining cash circulation. This message may encourage those who are unaware of a central bank's motivations to consider adopting a CBDC and understand its specific use cases.

It May Be Beneficial for a Central Bank to Spread Awareness and Knowledge of CBDCs Both Online and In-Person

A central bank could use its preexisting social media accounts to distribute educational material that can be shared about CBDC topics. The Bahamas used this strategy when implementing the Sand Dollar through a public information campaign that stressed the convenience and safety of a CBDC (Sun, T., et al., 2022). The campaign emphasized that "each wallet provides a unique set of data encryption to ensure privacy and confidentiality" (*The Sand Dollar*, 2020, p. 2) and "all transactions are linked to an anti-money laundering engine to safeguard regulatory compliance and governance" (*The Sand Dollar*, 2020, p. 2). As of February 2024, the Sand Dollar is an example of one of the three launched CBDCs still in use (*Central Bank Digital Currency Tracker*, 2024).

Similarly, the Reserve Bank of New Zealand could use its social media accounts to market and inform the public of CBDC use cases. As of now, the RBNZ is active across five different social media sites: Twitter, LinkedIn, YouTube, Instagram, and Facebook (*Social Media Policy*, 2022). On each of these platforms, they have yet to post their research of CBDCs, or even mention CBDCs. The sole location for the RBNZ's CBDC research is their website (*Central bank digital currency*, 2023). This may not be a common platform for New Zealand residents, given only 3 out of our 50 public interviewees had heard of the RBNZ's CBDC research. Posting about CBDCs on common and popular social media platforms could help communicate and educate about a potential CBDC development.

In addition to sharing information digitally, it may be helpful for a central bank to post in-person signage and host in-person tutorials. Increasing education in an in-person manner allows for an accessible CBDC education. In-person tutorials could be hosted by a central bank's communications team separately at either the central bank or in a public setting, such as a public library. Advertisements of these tutorials and events, including time, date, and location could also be posted on signs and billboards in public areas, such as bus stops or train stations. The central bank can either host these events in-house or outsource the planning and marketing to a third party. For instance, the People's Bank of China outsources their face-to-face public CBDC data collection methods to private interviewing companies (Sun, T., et al., 2022).

Another tactic for communicating information to the public is an educational campaign. This campaign, centered around educating the public on CBDC topics, could be accessed online or in-person. It may be helpful to use diverse and popular mediums to disseminate education at a constant pace and a common place. Some events could be free in-person tutorials that teach tips and tricks on how to use CBDC features and functionalities. Another example of an event could be a community event co-partnered by a central bank. This event could showcase the ways to get involved with a CBDC, the use cases of CBDC, and the potential risks and benefits through signage, handouts, and interactive booths with tutorials. Depending on the stage of a CBDC development, a CBDC could also be accepted by local business and other vendors at the event. For instance, attendees of the 2022 Winter Olympics in Beijing could buy items at the venue using the e-CNY during its pilot phase (Ju, 2022). Accepting a CBDC as payment could demonstrate usage and further expose prospective users to the technology. Either way, creating an educational campaign could help increase the knowledge of a CBDC and increase the adoption of a potential CBDC in the issuing nation.

Conclusion

It is still uncertain whether a central bank digital currency (CBDC) will be implemented in New Zealand. New Zealand is currently researching a CBDC due to potential advantages compared with existing payment systems. Common motivations for developing a CBDC may include improved financial inclusion, a streamlined process to conduct monetary policy, and cheaper, safer, and faster transactions. Our sponsor identified the lack of awareness and understanding of public perceptions of central bank digital currencies in New Zealand as a research opportunity for our project. Our team gathered public perceptions to develop recommendations for a central bank to further increase and evaluate public CBDC awareness. These recommendations may be able to support the research and development of a potential CBDC pilot study for a country interested in its potential benefits.

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Appendix A: Interview Questions for Scholars in Economics and Computer Science

General Questions

1. Could you please define digital currency?
2. Could you please define a Central Bank Digital Currency (CBDC)?

Implications for the Public

1. What are the social implications of a potential CBDC in New Zealand?
2. Should the Reserve Bank engineer a unique solution for designing a potential CBDC specifically for New Zealand? If so, what considerations need to be made for this design?
3. Are there any incentives that could motivate consumers to use a potential CBDC in New Zealand?

Effect on Financial and Digital Inclusion

1. In your own words, what is financial and digital inclusion and why is it important?
2. How do you perceive a CBDC would impact financial and digital inclusion in New Zealand?
3. How would a CBDC increase financial inclusion?
4. Is there a possibility that a CBDC could hinder financial inclusion?

Personal Opinions

1. What are your opinions on the potential implementation of a CBDC in New Zealand?
2. What functions or features do you see the implementation having? Are they specific to New Zealand?
3. Hypothetically, would you use a CBDC? If so, for what purpose(s)? Do you see CBDC as a viable main method of transaction?
4. What direction would you like to see the RBNZ take in terms of economic policy and implementation of new technologies?

Appendix B: Interview Questions for Banking Industry Professionals

General Questions

1. Could you define a Central Bank Digital Currency (CBDC)?
2. Is the Reserve Bank of New Zealand interested in developing a CBDC?
3. What are the Reserve Bank of New Zealand's motivations behind developing a CBDC?

Implications for the Public

1. What are the social implications of a CBDC in New Zealand?
2. How would the CBDC be advertised to the public?
3. How would this CBDC be distributed?
4. How would this CBDC be funded?
5. What incentive will the RBNZ put into place to motivate consumers to use the CBDC?

Effect on Economy

1. Does a CBDC impact New Zealand's economy? If so, how? If not, why not?
2. Are there any current CBDC initiatives that New Zealand is taking inspiration from?
3. Do you believe that the main method of financial transaction be a CBDC in the future?
4. Will the implementation of a CBDC be used in international trade?
5. Beyond CBDCs, are there any new methods of financial transactions or policies that are a work in progress by the RBNZ that have a goal of increasing the economy or financial inclusion?
6. During our time here, some New Zealand citizens have seemed to be unsatisfied with the economy, will the implementation of a CBDC be a step to resolve these economic problems?
7. Could the implementation of a CBDC be used to effectively manage monetary policy?
8. Would the implementation have any consequences on the New Zealand economy since it decreases the use of financial intermediaries?

Personal Opinions

1. What are your thoughts on the implementation of a CBDC?
2. What functions or features do you see the implementation having? Are they specific to New Zealand?
3. Would you personally use a CBDC as a main method of transaction?
4. Do you think a cashless society is feasible in New Zealand?
5. What direction would you like to see the RBNZ take in terms of economic policy and implementation of new technologies?

Appendix C: In-Person CBDC Perception Questionnaire

Pre-Interview Questions:

1. Are you a resident of New Zealand?
2. Are you over 18 years of age?

Quantitative Interview Questions:

1. Are you familiar with the concept of digital currency?

If yes, could you please define it in your own words?

Explain briefly the concept of digital currency: Digital currency is money or assets that exist in electronic form. Digital currency includes debit or credit cards, EFTPOS, cryptocurrency, etc.

2. Are you familiar with the concept of a Central Bank Digital Currency, also known as CBDC?

If yes, could you please define it in your own words?

A CBDC is a form of digital cash.

3. Did you know the Reserve Bank of New Zealand has been investigating the potential pilot study of a CBDC, but there is no set design or implementation plan as of now?
4. Would you be willing to use a CBDC as a payment method?

Qualitative Interview Questions:

1. What are your thoughts about a CBDC in New Zealand?
2. Would you be willing to use a CBDC as a payment method?
3. What might interest you about CBDCs?
4. What might you be concerned or hesitant about?

Appendix D: Online Digital Currency Familiarity Survey

Description 1: Kia ora!

Thank you for taking the time to take this short anonymous survey. This survey is being conducted by university students from Worcester Polytechnic Institute in the United States to collect public perceptions on digital currency topics. This project is in collaboration with a Senior Computer Science Lecturer from Victoria University in Wellington. **This survey is intended for New Zealand residents over the age of 18 and takes approximately 5 minutes to complete.**

Please reach out to gr-nz-24-CBDC@wpi.edu if you have any questions. Ngā Mihi!

Question 1: Are you a New Zealand Resident?

- Yes (1)
- No (2)

Question 2: Please select your age range.

- under 18 (1)
- 18 - 24 (2)
- 25 - 34 (3)
- 35 - 44 (4)
- 45 - 54 (5)
- 55 - 64 (6)
- 65 - 74 (7)
- 75 or older (8)

Question 3: What is your occupation?

Description 2: The next couple of questions are related to your comfort with different types of technology.

Question 4: Please select all of the technology that you use.

- ☐ Computer (1)
- ☐ Smartphone (2)
- ☐ Tablet (3)
- ☐ Smartwatches (4)
- ☐ Other (5)

Carry Forward Selected Choices from "Please select all of the technology that you use."

X→

Question 5: Please rank the following technology by your frequency of use. (click a response and drag in order; 1 signifying most frequently used)

_____ Computer (1)
_____ Smartphone (2)
_____ Tablet (3)
_____ Smartwatches (4)
_____ Other (5)

Description 3: The next few questions are related to your personal use of currency and various payment methods.

Question 6: On average, per week, how often do you use cash?

- Never (1)
- 1-2 times a week (2)
- 3-4 times a week (3)
- 5-6 times a week (4)
- Everyday (5)

Question 7: Please rate your familiarity with digital currency*.

*Digital currency is money or assets that exist in electronic form.

- No knowledge (1)
- Some knowledge (2)
- Basic knowledge (3)
- Advanced knowledge (4)
- Expert knowledge (5)

Question 8: Please rate your familiarity with Central Bank Digital Currencies* (CBDC).

*Central Bank Digital Currency is a digital currency distributed by a central bank. Some examples include e-RMB, e-Peso, and FedNow.

- No knowledge (1)
- Some knowledge (2)
- Basic knowledge (3)
- Advanced knowledge (4)
- Expert knowledge (5)

Question 9: Please select all the digital payment tools that you use.

- ☐ Payment cards (ex: credit, debit) (1)
- ☐ Mobile payment services (ex: PayPal, Apple Pay, Google Pay) (2)
- ☐ Cryptocurrency (ex: Bitcoin, Ethereum) (4)
- ☐ Online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS) (5)
- ☐ Other (6)
- ☐ None (7)

Carry Forward Selected Choices from "Please select all the digital payment tools that you use. "

Question 10: Please rank the following digital payment systems by your frequency of use. (click a response and drag in order; 1 signifying most frequently used)

_____ Payment cards (ex: credit, debit) (1)
_____ Mobile payment services (ex: PayPal, Apple Pay, Google Pay) (2)
_____ Cryptocurrency (ex: Bitcoin, Ethereum) (3)
_____ Online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS) (4)
_____ Other (5)
_____ None (6)

Display This Question:

If Please select all the digital payment tools that you use. = Payment cards (ex: credit, debit)

Question 11: Please rate your confidence in your ability to use digital cards (ex: credit, debit).

- Unsure (1)
- Not Confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Payment cards (ex: credit, debit)

Question 12: Please rate your trust in digital card systems (ex: credit, debit).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Payment cards (ex: credit, debit)

Question 13: On average, how often do you use digital cards (ex: credit, debit)?

- Less than once a month (1)
- Once a month (2)
- Once a week (3)
- 3-4 times a week (4)
- Everyday (5)

Display This Question:

If Please select all the digital payment tools that you use. = Mobile payment services (ex: PayPal, Apple Pay, Google Pay)

Question 14: Please rate your confidence in your ability to use mobile payment services (ex: PayPal, Apple Pay, Google Pay).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Mobile payment services (ex: PayPal, Apple Pay, Google Pay)

Question 15: Please rate your trust in mobile payment services (ex: PayPal, Apple Pay, Google Pay).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Mobile payment services (ex: PayPal, Apple Pay, Google Pay)

Question 16: On average, how often do you use mobile payment services (ex: PayPal, Apple Pay, Google Pay)?

- Less than once a month (1)
- Once a month (2)
- Once a week (3)
- 3-4 times a week (4)
- Everyday (5)

Display This Question:

If Please select all the digital payment tools that you use. = Cryptocurrency (ex: Bitcoin, Ethereum)

Question 17: Please rate your confidence in your ability to use cryptocurrency (ex: Bitcoin, Ethereum).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Cryptocurrency (ex: Bitcoin, Ethereum)

Question 18: Please rate your trust in cryptocurrency systems (ex: Bitcoin, Ethereum).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Cryptocurrency (ex: Bitcoin, Ethereum)

Question 19: On average, how often do you use cryptocurrency (ex: Bitcoin, Ethereum)?

- Less than once a month (1)
- Once a month (2)
- Once a week (3)
- 3-4 times a week (4)
- Everyday (5)

Display This Question:

If Please select all the digital payment tools that you use. = Online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS)

Question 20: Please rate your confidence in your ability to use online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS)

Question 21: Please rate your trust in the infrastructure of online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS).

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)

Display This Question:

If Please select all the digital payment tools that you use. = Online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS)

Question 22: On average, how often do you use online electronic payment systems (ex: electronic bank transfers, eChecks, wire transfers, EFTPOS)

- Less than once a month (1)
- Once a month (2)
- Once a week (3)
- 3-4 times a week (4)
- Everyday (5)

Question 23: In digital financial transactions, please rate the importance of your data's privacy.

- Unsure (1)
- Not important (2)
- Neutral (3)
- Important (4)

Question 24: In digital financial transactions, please rate the importance of payment method reliability.

- Unsure (1)
- Not important (2)
- Neutral (3)
- Important (4)

Question 25: In digital financial transactions, please rate the importance of user-friendliness in your payment methods.

- Unsure (1)
- Not important (2)
- Neutral (3)
- Important (4)

Question 26: In digital financial transactions, please rate the importance of anonymity in your payment methods.

- Unsure (1)
- Not important (2)
- Neutral (3)
- Important (4)

Question 27: In digital financial transactions, please rate the importance of transaction speed in your payment methods.

- Unsure (1)
- Not important (2)
- Neutral (3)
- Important (4)

Description 4: The next few questions are related to your banking preferences.

Question 28: Please rate your satisfaction with your bank(s).

- Unsure (1)
- Not satisfied (2)
- Somewhat satisfied (3)
- Satisfied (4)

Question 29: Do you prefer online or in-person banking?

- Online (1)
- In-person (2)
- No preference (3)

Question 30: While in person-banking, please rate your trust in your data's privacy.

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)
- I do not bank in-person (5)

Question 31: While online banking, please rate your trust in your data's privacy.

- Unsure (1)
- Not confident (2)
- Somewhat confident (3)
- Confident (4)
- I do not bank online (5)

Description 5: The next few questions are related to Central Bank Digital Currency (CBDC).

Cash is a type of physical currency backed by the central bank and government. A Central Bank Digital Currency (CBDC) is a type of digital currency that is backed by the central bank and government. The Reserve Bank of New Zealand has been investigating the potential pilot study of a CBDC, but there is no set design or implementation plan as of now.

Question 32: Have you heard of the Reserve Bank of New Zealand's research on a Central Bank Digital Currency?

- Unsure (1)
- Yes (2)
- No (3)

Question 33: Would you be interested in using a Central Bank Digital Currency that would be distributed through your current commercial bank(s) and work alongside your current payment methods?

- Not interested (1)
- Somewhat interested (2)
- Interested (3)
- Other (4) _____

Question 34: Would you be interested in using a Central Bank Digital Currency that would be distributed through the Reserve Bank of New Zealand and work alongside your current payment methods?

- Not interested (1)
- Somewhat interested (2)
- Interested (3)
- Other (4) _____