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Trials and Tribulations of Financial Inclusion: Integrating the Unbanked with the World by Means of Central Bank Digital Currencies

Kee Hung Giam

Research Scholars Program, Harvard Student Agencies, In collaboration with Learn with Leaders

ABSTRACT

Central Bank Digital Currencies, or CBDCs, are digital currencies issued by a country's central bank and are pegged to the value of the respective country's fiat currency. In many developing countries, CBDCs have been hailed to be the silver bullet to finally tackle the issue of financial exclusion; in others, policymakers are realising its potential in addressing large-scale, transnational illegal financial activity. The purpose of this research is to understand crucial prerequisite factors behind the successful implementation of CBDCs in developing countries. For analysis, this research will use historical qualitative methods and utilise various historical examples as case studies. The conclusion of this thesis will lay out the various vital factors needed for a successful CBDC implementation and will provide recommendations for countries with similar socio-economic structures.

Key Words: digital currencies, financial inclusion.

INTRODUCTION

Financial Exclusion

FINCA International (2020) defines financial exclusion as 'individuals and populations without access to common financial services', including 'saving accounts, cashless transactions, credit, and other traditional banking services'. There are several root causes of financial exclusion. Primarily, low income is believed to be the main contributing factor (Choudhury, 2016), as the lack of assets possessed by low-income individuals leads to banks not being able to request collateral. This lack of security discourages financial institutions from providing access to products and services. As a result, these low-income individuals not only find themselves in the low-income bracket, they are unable to even get themselves out of the poorest echelons of society.

Central Bank Digital Currencies

The Fourth Industrial Revolution brought unprecedented changes to how the global economy functions, two byproducts being the emergence of the *digital economy* and *digital currencies*. Shortly after the rise of crypto, governments around the world started pilot research into implementing national CBDCs (Rathburn, 2022). Unlike base money, with which commercial banks can engage in commercial transactions, CBDCs are solely controlled by the central bank and are pegged to the value of the country's fiat currency.

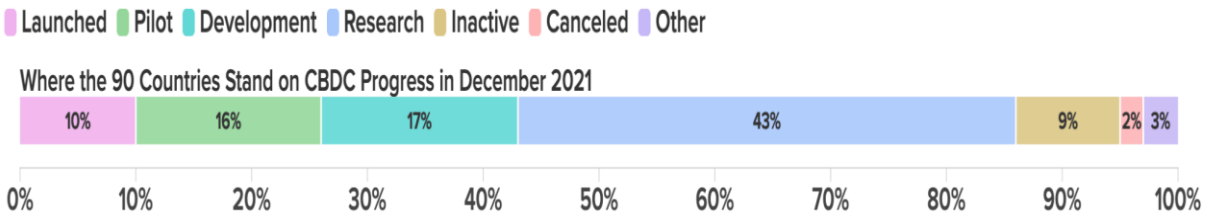

Figure 1: Race of the future of money - CBDC progress amongst 90 countries.
Source: Atlantic Council (2022).

As of March 2022, 87 countries are considering the issuing of a CBDC, and 9 of them, including Nigeria, the Bahamas, and Grenada, amongst others, have already commenced CBDC operations (Atlantic Council, 2022).

The Role of CBDCs in Accelerating Financial Inclusion

Intuitively, financial inclusion is the desired opposite of financial exclusion - the ability of 'individuals and businesses to have access to useful and affordable financial products and services that meet their needs…'. (World Bank, n.d.). A catalyst for 7 of the 17 Sustainable Development Goals, it's no surprise that financial inclusion has been the focus point for countless economic initiatives around the world.

Today's increasingly interconnected global economy has resulted in economically disadvantaged citizens worldwide becoming increasingly disenfranchised from the digital economy as they lack the necessary resources to integrate themselves. Thus, many countries have looked at CBDCs as a financial inclusion strategy to integrate these underbanked citizens into the modern economy (Atlantic Council, 2022).

Research Question

Whilst the benefits of implementing a CBDC are more or less consistent across all economies, it's important to emphasise that the different social, economic, and financial features of respective countries dissimilarly affect the success of said implementation. Therefore, this paper wishes to see:

What are the crucial economic, social, and financial features that can maximise the success of CBDC implementation in the Chilean economy?

Research Purposes

The main purpose of this research is to identify the crucial factors needed to complete this piece of the financial inclusion puzzle. This paper aims to provide an insight into the key structures of a nation that may provide the best opportunities for a CBDC to succeed and accelerate financial inclusion.

Main objectives of this paper:

1. To examine previous attempts at a CBDC implementation, and to understand the underlying reasons for failure or success,
2. To investigate key features of the Chilean economy, society, and financial sector that may prove it a benchmark for success,
3. To identify crucial prerequisites for CBDC implementation success in a developing country.

Research Outline

This paper consists of 5 chapters. **Chapter 1** will introduce and organize the direction of this paper. **Chapter 2** will conduct a holistic, characteristics-focused case study of Chile. **Chapter 3** will examine previous implementations of a CBDC, using Ecuador and the Bahamas as case studies. **Chapter 4** will link conclusions derived from **Chapter 2** and **3**, and evaluate the likelihood of CBDC success in the Chilean economy whilst identifying key catalysts for success. **Chapter 5** will conclude this paper and provide recommendations for further research.

OVERVIEW

One of South America's most prosperous nations, Chile is considered a developing country with a high-income economy. This chapter will explore in further detail some development indicators, and will also look at Chile's current quest in implementing a CBDC and explore the concept of a CBDC.

Economic Characteristics

Leading South America in terms of global competitiveness, income per capita, and free trade, Chile has one of the continent's fastest-growing economies (WEF, n.d.). It's characterized by consistently high levels of foreign trade, natural resource exports, and a strong global reputation for the strength and stability of its financial institutions (CIA Factbook, n.d.).

In 2018, Chile was ranked first in South America by GDP per capita based on purchasing power parity (IMF, 2018). Chile's rapid economic growth in recent decades has allowed it to take large steps in reducing poverty - the percentage of the population living in poverty fell from 36% (2000) to 11.7% (2015). In 2017, only 8.6% of the population was considered impoverished (World Bank, n.d.).

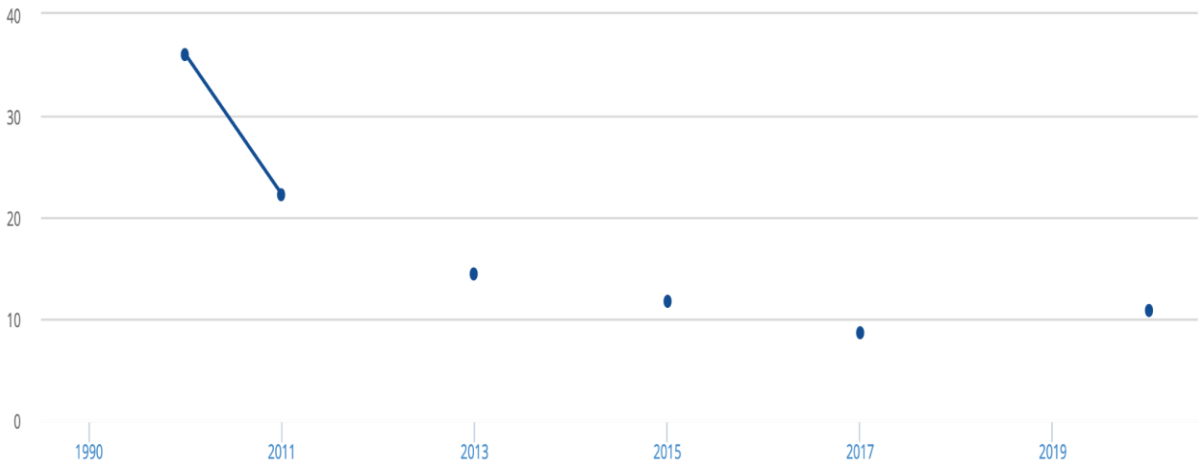

Figure 2: Poverty headcount ratio at national poverty lines (% of population). Source: World Bank Data Bank (n.d.)

In 2020, Chile's Gross Domestic Product sector composition stood at 3.86%, 31.43%, and 56.48% for agriculture, industry, and services respectively (Statista, 2022). Since 2000, Chile has enjoyed relatively stable economic growth, and its key industries include mining, agriculture, and financial services (Mahmoud, 2019).

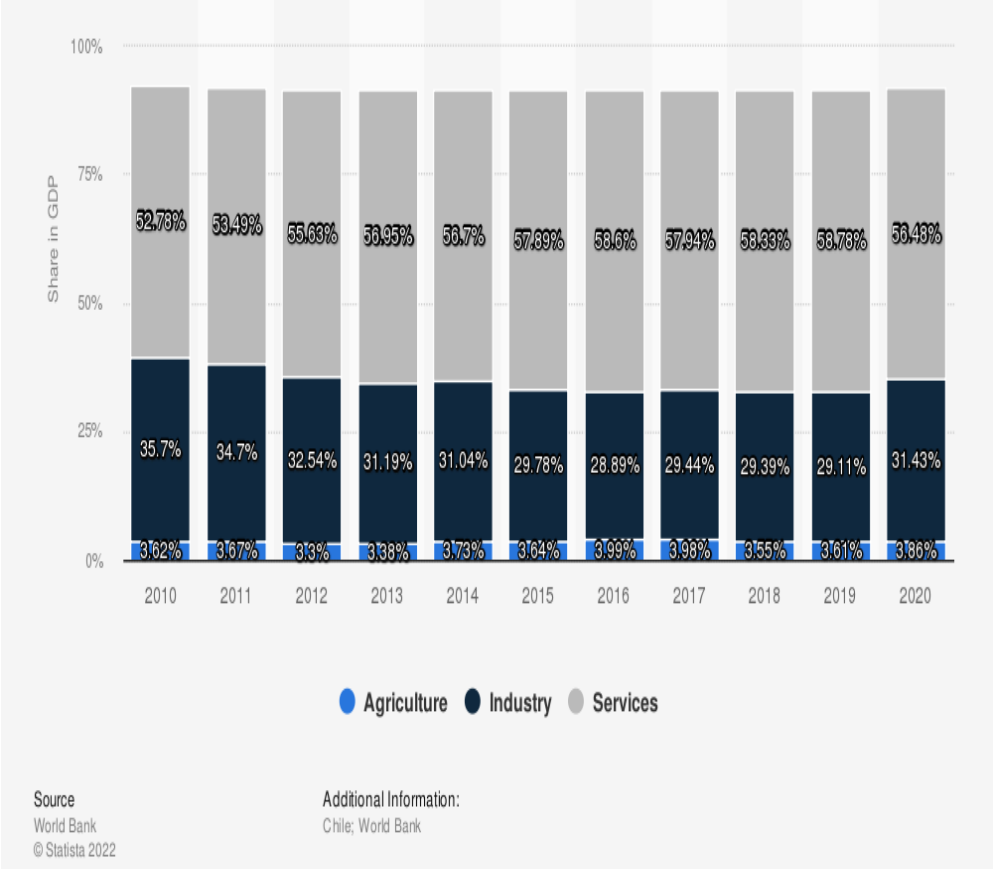

Figure 3: Chile: Distribution of GDP across economic sectors from 2010-2020. Source: Statista (2022)

Despite strong economic growth in the past decades, unemployment remains a persistent problem within the country. Unemployment rates have increased from 6.21% (2013) to 11.51% (2020) (Statista, 2022). Looking at Figure 4 below, it can be concluded that whilst unemployment prevails in Chile, it fluctuates regularly and does not stay at a consistent level for a long period of time. This might be attributed to frictional unemployment or changes in the structure of the Chilean economy.

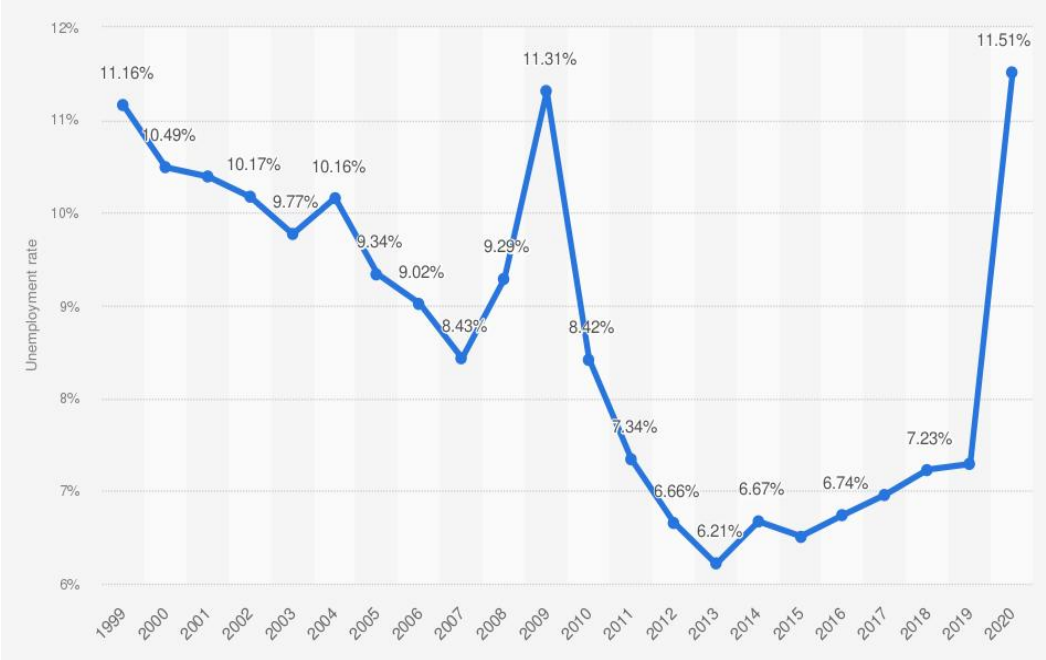

Figure 4: Chile: Unemployment rate from 1999 to 2020.
Source: Statista (2022)

In 2017, Chile's Gini coefficient value of income inequality (0.46) was the third-worst of all OECD member states (OECD, n.d.). Considering that the advanced and emerging economies of the OECD have a Gini coefficient median of 30.3 and 45.9 respectively, Chile should be considered an emerging economy in terms of inclusive development. This is wholly unrepresentative of the strides the country has taken to alleviate poverty.

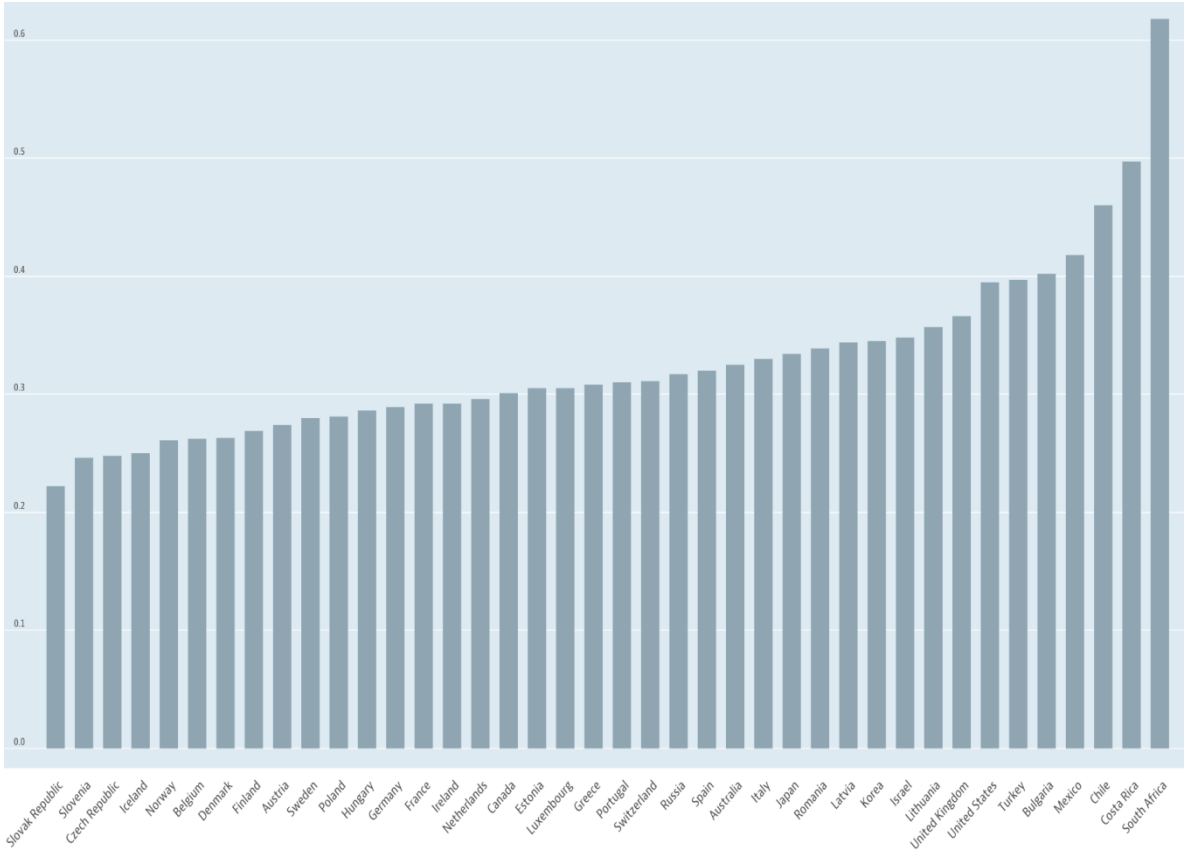

Figure 6: Income inequality. Source: OECD (2021)

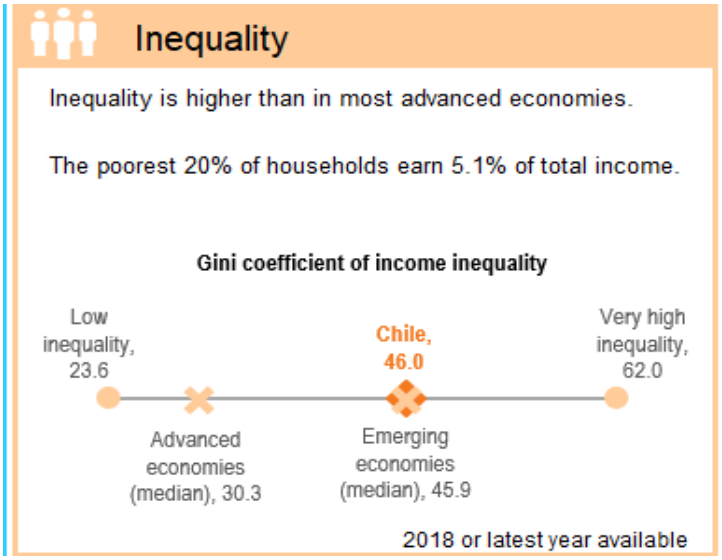

Figure 7: Inequality in Chile. Source: OECD (n.d.)

Social and Demographic Characteristics

Chile's literacy rate was reported to be 96.4% in 2017 (CIA Factbook, n.d.) - well above the global average of 86.3%. However, Chile scores below the OECD average for financial literacy, which is defined as 'the ability to use one's knowledge and skills to effectively manage financial resources, ideally for a lifetime of financial well-being' (World Bank, 2018).

According to a 2018 OECD Programme for International Student Assessment survey, the country scored an average of 451 points, less than the OECD average of 505 (The News 24, 2021).

	Variation in financial literacy performance associated with mathematics and reading performance									
	Total explained variation[1]		Variation uniquely associated[2] with mathematics performance		Variation uniquely associated with reading performance		Variation associated with more than one domain		Residual (unexplained) variation[3]	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
OECD										
Australia	79,4	(1,1)	11,8	(0,6)	4,5	(0,3)	63,1	(1,1)	20,6	(1,1)
Canadian provinces	77,7	(1,0)	11,3	(0,9)	5,9	(0,7)	60,5	(1,2)	22,3	(1,0)
Chile	84,2	(0,9)	12,0	(0,8)	4,7	(0,6)	67,5	(1,2)	15,8	(0,9)
Estonia	78,6	(1,0)	9,1	(0,7)	6,0	(0,6)	63,4	(1,3)	21,4	(1,0)
Finland	81,0	(0,9)	9,7	(0,7)	5,2	(0,6)	66,2	(1,2)	19,0	(0,9)
Italy	73,2	(1,2)	14,2	(1,1)	3,3	(0,6)	55,8	(1,5)	26,8	(1,2)
Latvia	80,6	(1,1)	16,0	(1,2)	2,7	(0,4)	61,9	(1,2)	19,4	(1,1)
Lithuania	80,9	(1,0)	7,3	(0,8)	5,4	(0,6)	68,1	(1,1)	19,1	(1,0)
Poland	77,3	(1,0)	13,4	(0,9)	3,2	(0,5)	60,7	(1,3)	22,7	(1,0)
Portugal*	81,9	(0,9)	9,9	(0,9)	3,9	(0,5)	68,1	(1,0)	18,1	(0,9)
Slovak Republic	79,7	(1,1)	11,5	(1,1)	4,4	(0,6)	63,9	(1,3)	20,3	(1,1)
Spain	m	m	m	m	m	m	m	m	m	m
United States*	84,0	(0,8)	11,3	(0,9)	2,4	(0,3)	70,3	(1,1)	16,0	(0,8)
OECD average	79,9	(0,3)	11,4	(0,3)	4,3	(0,2)	64,1	(0,4)	20,1	(0,3)
Partners										
Brazil	80,5	(0,7)	7,2	(0,6)	5,7	(0,6)	67,6	(1,0)	19,5	(0,7)
Bulgaria	79,0	(1,1)	8,2	(0,6)	7,2	(0,6)	63,6	(1,4)	21,0	(1,1)
Georgia	77,8	(1,0)	11,4	(0,8)	5,0	(0,5)	61,3	(1,1)	22,2	(1,0)
Indonesia	77,4	(1,6)	6,6	(1,1)	7,0	(1,1)	63,8	(1,8)	22,6	(1,6)
Peru	82,9	(0,7)	8,6	(0,7)	4,8	(0,5)	69,5	(1,0)	17,1	(0,7)
Russia	77,5	(1,1)	14,0	(0,8)	3,6	(0,5)	59,9	(1,4)	22,5	(1,1)
Serbia	79,7	(0,9)	11,9	(0,9)	3,9	(0,5)	63,9	(1,2)	20,3	(0,9)
Average all countries/economies	79,7	(0,2)	10,8	(0,2)	4,7	(0,1)	64,2	(0,3)	20,3	(0,2)
Netherlands**	84,3	(0,8)	11,2	(0,9)	4,1	(0,5)	68,9	(1,1)	15,7	(0,8)

Table 1: Variation in financial literacy performance associated with mathematics and reading performance. Source: OECD PISA, 2020

Total Chilean Internet penetration stood at 61.11% (2014) of the population, then rose to 83.559% (2016) (World Bank, n.d.). Latest estimates place that figure as high as 92% at the start of 2022 (Data Reportal, 2022). This increase greatly enhances the utility of a CBDC implementation in the country - as a greater proportion of the country can access the digital economy, consumer activity can be more inclusive as rural communities gain access to previously unreachable markets.

2019 smartphone penetration levels in Chile (62%) were lower than the regional average (66%). Despite this, due to numerous ongoing infrastructure initiatives, that figure is estimated to rise to around 81% by 2025 (GSMA, 2019

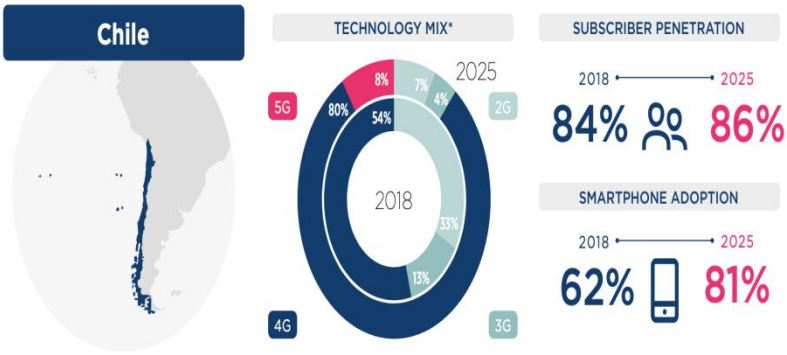

Figure 9: Mobile Economy Latin America, Chile.
Source: GSMA, 2019

Financial Characteristics

Chile has a worldwide reputation for strong, well-diversified financial institutions, and has one of the strongest sovereign bond ratings on the continent (CIA Factbook, n.d.). In recent years, the banking system has faced increased competition from microfinance institutions, credit unions, and *cajas de compensación*, which refer to private non-profit institutions with the primary objective of distributing social welfare benefits (Santander, n.d.).

In 2017, the penetration rate of various financial products in Chile stood at 77% for a cash management product, and 69% of the population had a financial savings account (Statista, 2022). In the same time period, the percentage of banked adults stood at 73.84%, an increase of 31.66% from 2011 (the Global Economy, n.d.). This means that, in 2017, approximately 4.8 million adults in Chile did not have access to any provided financial service.

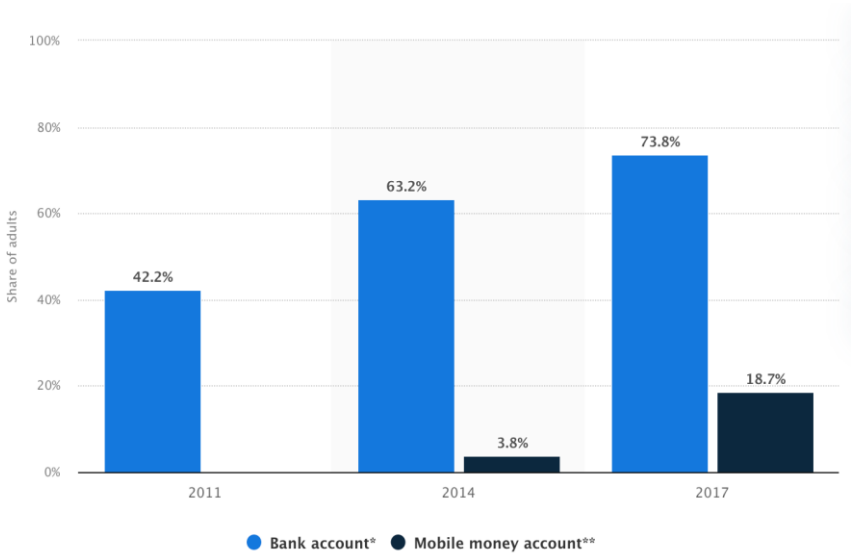

Figure 10: Chile: People with banked accounts, percent of the population over 14 years of age, 2011-2017.
Source: Statista, 2022

Central Bank Digital Currencies - A Conceptual Exploration

CBDCs are issued by the central bank, and are very similar to physical forms of money in use today, except that they are a digital representation of that monetary value. However, it is crucial to note that a CBDC is not the same thing as an electronic form of your money. Typically, deposits are not considered as legal tender - money that institutions are legally required to accept as a payment for debt. This is dangerous as the security of your money depends on the institution's solvency, making consumer trust important for this model to work (Schmid, 2020). This paper will explore this aspect later, as it can significantly influence a CBDC's success in Chile.

On the contrary, CBDCs are granted legal tender status by the central bank, meaning that it would not be the bank's liability to fulfill your transaction requests. Therefore, your money would be safe regardless of any extenuating circumstances. This is expected to be the main reason behind why people would prefer using a CBDC over a bank account.

ECUADOR

In 2014, the Ecuadorian Central Bank (BCE) launched its iteration of a retail CBDC, the Sistema de Dinero Eléctronico (SDE). Despite initial government optimism, President Lenin Monero decommissioned the system in December 2017. Ecuador's failed venture is widely considered the first-ever implementation of a CBDC, and this section will seek to highlight the factors the Chilean government must address to avoid similar consequences.

In December 2014, local newspaper *El Comercio* reported that the authorities expect some 500,000 people to use electronic money in 2015 (El Comercio, 2014). The actual number stood around 5000. In all currency in circulation in 2016, the *dinero electronico* accounted for less than 0.003%. At the end of 2017, less than 11% of all accounts were ever used to make payments (El Universo, 2017). This drastic failure can mainly be attributed to the 2 following reasons:

Public Mistrust in the Government and Institution

Given the way the government had previously abused its financial powers, by 2014, Ecuador citizens had little to no trust in both their government and the central bank. Additionally, as the central bank held sovereign immunity, meaning that it could not be taken to court if it failed to pay, the BCE could behave irresponsibly (El Universo, 2016).

Confidence in Alternatives

Citizens also had no confidence in the digital currency, and since Ecuadorian politicians cannot control or devalue the US dollar, it 'generates much more confidence than any alternative that can occur to our politicians' (El Universo, 2017). Given a long history of corruption by the Ecuadorian government, it is unsurprising that citizens would continue to keep their money in private institutions.

The Bahamas

The Sand Dollar was implemented in response to two challenges arising from the country's archipelagic nature: firstly, a common geographical barrier. The archipelago stretches more than 1200 kilometers, and just over 70% of the population lives in Nassau (Andy, 2021), the capital city. Using cash to connect the country is an immense challenge, and therefore, it is in all parties' interests to implement a nationwide payment system.

Secondly, unlike Ecuador's comparatively stable economy, the Bahamas is vulnerable to the effects of both hurricanes and climate change. Hurricane Dorian in September 2019 wrecked the Abaco Islands, causing $3 billion in damages (Hyman, 2021) and devastating physical banking facilities. Moreover, as approximately 50% of GDP is accounted for by tourism (PwC, n.d.), crises like the COVID pandemic could worsen economic stagnancy. Therefore, there is a demand from both the government and citizens for a resilient and efficient relief system.

As the Bahamas possesses a strong Internet and mobile phone penetration rate, which improved from 43% (2010) to 85% (2017) (Statista, 2022), and from approximately 300,000 (2012) to 430,000 (2019), respectively, this digital connectivity has proven to be instrumental in the implementation of the Sand Dollar.

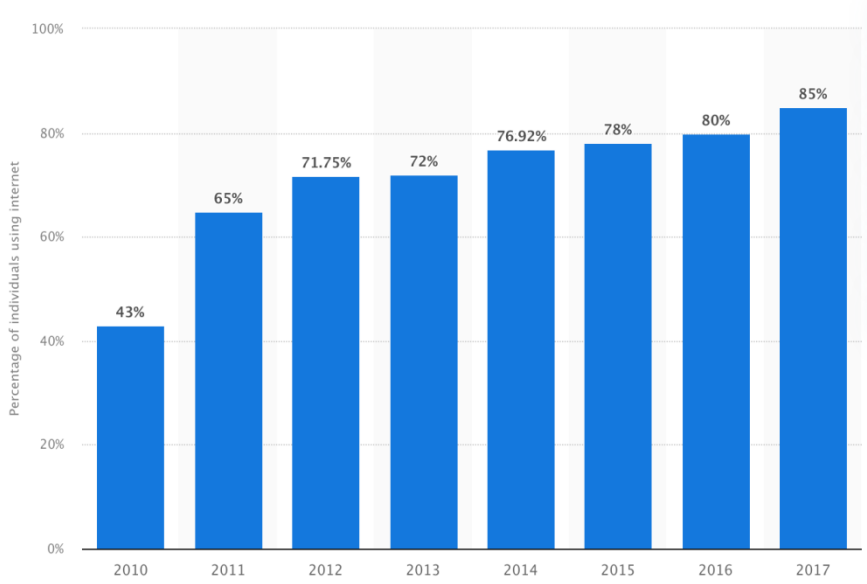

Figure 12: Percentage of population using the Internet in the Bahamas from 2010 to 2017. Source: Statista, 2022

Comparing the above benefits to Chile is relatively straightforward. Firstly, Chile's territory stretches 4270km, with the poles of the country being sparsely populated. Thus, there would still be an incentive for the government to financially connect the most rural communities, particularly those in the south who specialize in agricultural production.

Figure 13: Population Density Map of Chile, 2020.
Source: Maps on the Web, 2021

Secondly, Chile lies directly on the Pacific Ring of Fire, a long seismically active belt where many volcanic eruptions and earthquakes occur. As most earthquakes take place in parts of the country where most of the population is located, their effects are more profound and long-lasting (Özbek, 2020). As a result, implementing a CBDC would support the government's aim of expanding financial infrastructure, a goal even more important in a natural disaster-prone country.

Chile has lagged the Bahamas in regards to phone and Internet infrastructure. 82% of individuals in Chile used the Internet in 2017, and has marginally risen to 88% (2020) (World Bank, n.d.). This is because 30% of all mobile phones in the country are cellular phones, rather than smartphones (IDB Invest, 2022). This therefore leaves a large proportion of the rural population without Internet connectivity. As CBDC usage wholly relies on having Internet access, the Chilean government should focus on rectifying this shortcoming.

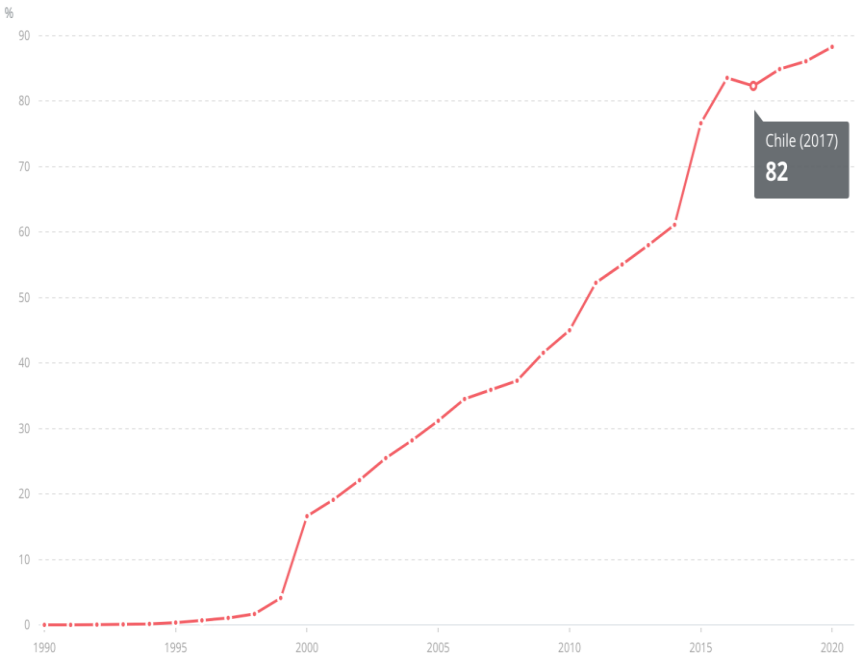

Figure 14: Individuals using the Internet (% of population) - Chile.
Source: World Bank, n.d.

CONSUMER TRUST IN THE GOVERNMENT AND INSTITUTIONS

In 1982, when Chile suffered a major economic and financial crisis, the public fostered a deep mistrust of the government. As this paper previously explored, it's crucial for Chile to garner public acceptance for the CBDC prior to implementation. Despite Chile developing into one of South America's most stable economies since, some might still be wary of the government's intentions. Despite there being a chance of some public resistance against a CBDC, it would generally be favoured. The Central Bank also implemented numerous transparency practices in recent years on its policy decisions, earning the trust of stakeholders and public alike (IMF, 2021).

Therefore, it can be said that Chilean citizens would most likely be open to the idea of this new digital form of currency, seeing as there is a high perception of transparency, confidence, and trust from both government and the central bank.

Complementary Infrastructure

Having access to a device is essential before governments can implement any digitally-based system. As previously examined, Chile has a comparatively lower mobile phone penetration rate than the Bahamas. Compounded with Chile's geographical features, it is essential that the government provides as many citizens a mobile phone as possible to allow them access to this new CBDC. Similarly, as more citizens use a smartphone with Internet connectivity, Internet penetration rates in the country would rise as well as a result of an increase in demand for both broadband and mobile data services.

Telecommunications infrastructure development is another key aspect of a CBDC implementation, and whilst geography poses a challenge for Internet providers to expand its services to the country's most rural areas, there are numerous initiatives to expand such telecommunications infrastructure. These initiatives will all aid in accelerating the implementation of a CBDC in Chile.

Financial Literacy

Financial illiteracy heavily affects the ability of users to properly use a CBDC, and it will be hard for the government to convince unable citizens to start using a CBDC in the first place. This is especially true for rural populations, most of which still use physical cash. In order to bypass this hurdle, governments can instead push for financial literacy initiatives to ensure that their citizens can be confident, both in their own abilities and the CBDC.

Financial literacy is also crucial in preventing fraud and scam attempts. As citizens slowly become acquainted with the platform, scammers and other malicious actors might take advantage of them. Therefore, having the knowledge and alertness to be able to discern scam from genuine could be important in the early stages of implementation.

CONCLUSION

The problem of financial exclusion a pressing issue that every developing nation faces. Central Bank Digital Currencies have been hailed to be the catalyst to accelerate financial inclusion, especially in rural populations, and many countries around the world have begun trials and research to evaluate its success in their respective nations, Chile being one of these countries.

By examining the case studies of the Ecuadorian *dinero electrónico* and the Bahamaian Sand Dollar, a few key factors for CBDC implementation success in Chile have been identified. Firstly, consumer trust is vital for the success of a CBDC, as there has to be strong public trust in the government to not exploit citizens. One way to gauge the public's perception of implementing a CBDC is to take public surveys, and implement policies accordingly, for example to increase public accepance. Secondly, mobile phone penetration is essential. As visualised in the Bahamas case study, a high mobile phone penetration rate translates into less time and resources being used across implementation.

Thirdly, financial literacy should be a priority for the government. The fact that Chilean citizens score a below average financial literacy score amongst OECD nations may be detrimental to CBDC implementation, as some users might simply omit from using it, whilst others may be vulnerable to malicious actors when first accessing the platform. To counter this, Chile must invest in financial literacy initiatives and ensure that risks are mitigated.

It is worth noting that the case studies in this paper are from countries in the Americas. Therefore, these case studies and drawn conclusions may have low generalizability. Despite this, and keeping in mind that developing countries around the world share similar characteristics to Chile, these three fundamental prerequisites might be transferable in implementing a CBDC, or any form of digital technology. Such developing countries might include Malaysia, Bangladesh, Ethiopia, and Ukraine, amongst others.

In conclusion, a Chilean CBDC has strong potential to be successful. However, the Chilean government must be wary of its implementation strategy. It must place strong emphasis on gaining consumer trust, establishing appropriate infrastructure, and accelerating financial literacy efforts and initiatives beforehand.

RECOMMENDATION

There are many existing pieces of research focusing on the key aspects for CBDC success, but none focusing on a specific country and none taking into consideration different national characteristics. This paper has provided an insight into the three key factors that, in the author's opinion, would greatly impact the success of implementing a CBDC, with a focus on Chile but also transferable to other developing nations around the world.

Further research should incorporate political aspects of a nation when considering CBDC implementation. Particularly, would conservative right-wing parties be generally more against the idea of a CBDC? Such research should also explore political historical resistance against technological advancements that would, in the end, benefit society.

Additionally, further research should be conducted on the practicality of the expansion and development of telecommunication infrastructure in countries with unique geographical and topological features like Chile. These features include an uneven population distribution, high natural disaster occurrence, and persistent income inequality.

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