A Study on Public Perception on the Adoption of Central Bank Digital Currency (CBDC) in Ireland

MSc Research Project

MSc Fintech

Damilola Abass

X20255802@student.ncirl.ie

School of Computing

National College of Ireland

Supervisor: Noel Cosgrave

National College of Ireland

Project Submission Sheet – 2021/2022

Student Name:	……Damilola Abass Lawrence ……..……
Student ID:	……x20255802……...……
Programme:	……MSc Fintech…… **Year:** …2021/2022……..
Module:	……Research Project……..……
Lecturer:	……Noel Cosgrave.……
Submission Due Date:	……..……
Project Title:	…… A Study on Public Perception on the Adoption of Central Bank Digital Currency (CBDC) in Ireland…….…….
Word Count:	…… Page Count…….

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature:	……Damilola Abass……
Date:	……18/09/2022…….

PLEASE READ THE FOLLOWING INSTRUCTIONS:

1. Please attach a completed copy of this sheet to each project (including multiple copies).
2. Projects should be submitted to your Programme Coordinator.
3. **You must ensure that you retain a HARD COPY of ALL projects**, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer. Please do not bind projects or place in covers unless specifically requested.
4. You must ensure that all projects are submitted to your Programme Coordinator on or before the required submission date. **Late submissions will incur penalties.**
5. All projects must be submitted and passed in order to successfully complete the year. **Any project/assignment not submitted will be marked as a fail.**

Office Use Only	
Signature:	
Date:	
Penalty Applied (if applicable):	

***ABSTRACT*:** The advent of blockchain technology and its application within the financial system has spurred debates, especially with regards to the implication of digital currencies. As a reactive response to the effects of privately issued digital currencies and the absence of regulatory implications and government power/control, researchers have proposed justifications for the issuance of central bank digital currencies as well as suggestions regarding its design. However, there is the absence of sufficient study regarding public perception and adoption of CBDCs and their willingness to trade-off financial freedom and privacy for national and economic benefits. The study focused on Ireland and sought to identify trust drivers and determine the public's perception of CBDC. It adopted a quantitative analysis using the Unified Theory of Acceptance and Use of Technology (UTAUT) model and obtained responses via a survey. The paper adopted statistical approaches such as Descriptive Statistics, Frequency, Chi-Square Test, Cronbach's Alpha Test and Factor Analysis. The results showed that individuals are knowledgeable about digital currencies and that higher education and employment status influence the decision to adopt the CBDC. Also, the study hints that anonymity, reversibility, security and privacy are trust drivers for CBDC adoption.

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The rapid development in Fintech is causing a shift in the digital financial landscape and payments system (Ozili, 2022). This shift may be justified by the introduction of a digital currency that opens the doors of the central bank to the general public and reshapes the role of government in developing monetary and financial institutions (Fernández-Villaverde et al., 2021).

Digital currencies are becoming more popular among world countries, of which many researchers have debated its relevance and qualification as money. Money is often referred to as anything that is generally acceptable as a medium of exchange, irrespective of its form. A digital currency has no physical feature, rather it imitates the concept of money in a virtual state with the ability of being exchanged for cash and other financial or transferable products. It is referred to as a digital asset, adopting the capability of the blockchain and distributed ledger technology (DLT). In recent years, people have held cryptocurrencies as a medium of exchange and/or as an investment asset subset even though it is characterised by high volatility due to its limited supply (Ozili, 2022). Koziuk (2021) argues that cryptocurrencies may not be able to imitate all relevant characteristics of money. The features of cryptocurrencies threaten market stability and government actions as well as regulatory policies intended to potentially protect users/consumers or a nation at large.

Central bank digital currencies pose as a significant development in the history of banking and payments (Bhawana and Kumar, 2021). Ozili (2022) explains that a CBDC is simply the digital equivalent of a fiat currency. Bitter (2020) opines that a CBDC is a central bank liability that could be interest bearing. Unlike privately issued digital currencies, it acts as a means by which government can assert control over the level of transparency, illicit activities, financial inclusiveness, and fiscal/monetary policies (Solberg Söilen and Benhayoun, 2022). However, this would increase competitiveness for bank deposits, which may ultimately affect the operations of commercial banks operating under the purview of the central bank (Fernández-Villaverde et al, 2021). Research has proven that the continued decrease in the use of paper currencies globally (Zhang, 2020) is attributable to the emergence of digital currencies and assets (Viñuela, Sapena and Wandosell, 2020). As such, CBDC is seen as a means of reshaping the minds of consumers and maintaining a balance within the financial system.

Over the last few years, some countries have banned the usage of private digital currencies (such as China) while others have warned against the risk it poses (including Ireland). Central banks around the world have considered the issuance of central bank digital currency as a reactive measure. Several countries including the United Kingdom, Nigeria, France, Sweden, and the European union have/are investigating the potential introduction of a central bank digital currency as well as its relative impact and importance. Recently, the United States president office issued an executive order asking the relevant authorities to investigate the impact of digital assets/currencies and the effects/benefits of deploying a central bank digital currency – Digital Dollar (Whitehouse, 2022). While others such as the

United Kingdom and Sweden have hinted the future introduction of the BritCoin and Krona respectively. Both China and Nigeria have deployed versions of their respective central bank issued digital currency named the Digital Yuan and the eNaira. Also, the central bank of Ireland is working closely with the European Central Bank to research the relevance of a Digital Euro as well as user behaviours in relation to innovation, digitization, and other developments in the financial system. The debate for the introduction of a central bank digital currency was further ignited by the 'Great Lockdown' caused by the Covid-19 pandemic due to its non-physical technological architecture when compared to paper money and debit/credit cards; in preventing the further transmission of the virus (Viñuela et al., 2020). The International Monetary Fund (2020) confirmed that countries which were digitally inclined recorded lower impact of the pandemic compared to those which are not. Boar, Holden and Waddsworth (2020) asserted that about 10% of the central banks plan to issue implement a CBDC system in the nearest future.

The introduction of any innovation is linked to demand requirements. Ozili (2022) argues that digital currencies are not free of consumer/user bias, hence it is crucial to investigate their perception about the proposed digital currency to foster its implementation, adoption, and continuous use. According to the development and history of payment instruments and technology adoption, trust and confidence are hinted to be essential, it is the most relevant factor in triggering the acceptance and use of any payment system or technology (Solberg Söilen and Benhayoun, 2022; Koziuk, 2021).

The emergence of the Covid-19 pandemic and the increasing public adoption of digital currencies has raised questions on the role of government and monetary authorities, thus there has been a reasonable level of consideration and recommendations for the introduction of a Central Bank Digital Currency ("CBDC"), deployed on a national scale. The blockchain technology which acts as a powerhouse for digital currencies is widely appreciated and given credit for its anonymity, speed, and absence of intermediation. A central bank digital currency may not possess all these attributes, thus limiting consumer's preference and freedom. Consumers may consider the central bank digital currency as an impediment of financial freedom and privacy while others may deem it an essential product which qualifies as money and an instrument for monetary policy. However, the benefits and costs of implementing a CBDC should be examined as it may cause some structural changes in the reserve banking system. Viñuela et al. (2020) argues that the impact of CBDC on a financial system is not fully known, hence there are questions left unanswered. For instance, there is not enough empirical evidence on the adoption of CBDCs.

Past literature mostly focused on CBDC design. Only a few of them consider public perception regarding the CBDC. As such, this research builds on existing literature with a focus on Ireland. Also, it seeks to identify the factors which may promote public trust and adoption. The research further examines how users are likely to behave in advent of adopting the CBDC and the implication for policymakers.

1.2 RESEARCH QUESTION AND OBJECTIVES

This research intends to answer the following research question:

"To what extent does trust influence the likelihood of adoption of Central Bank Digital Currencies by the public?"

Also, the research objective is not limited to:

- To ascertain the level of acceptability of CBDC in Ireland.
- To understand the public's perception of CBDC in Ireland.
- To identify trust drivers for the adoption of CBDC.
- To highlight the architecture and operational design of CBDC.
- To contribute to the existing literature on the adoption of CBDC.

The study is structured as follows: section 2 examines the existing literature; section 3 discusses the research methodology; Section 4 analyses the results and discusses the findings; and Section 5 identifies the limitations of the study, recommends future works, and concludes the study.

LITERATURE REVIEW

2.1 BACKGROUND: DIGITAL CURRENCIES

The nascence of digital currencies is popularly linked to Bitcoin, which was introduced in 2008 by Satoshi Nakamoto. Users could create Bitcoins through a mining process and the bits of Bitcoin were transferable from one user to another. Following the introduction of Bitcoin, other alternative coins (such as Ethereum) became popular. The difference between the Bitcoin and Ethereum framework is that Ethereum does not only act as a digital currency but could be adopted for other use-cases.

Stable Coins are cryptocurrencies which are backed by a reserve asset such as national currencies or gold. The rationale behind a stable coin is to provide value stability to investors unlike other cryptocurrencies which alter market philosophies. Examples include Tether and Dai. A stable coin is different from a central bank issued digital currency and should not be regarded as the same.

The dynamics of these private digital currencies threatened the stability of the financial market and successful implementation of monetary policy. To alleviate the burden imposed by these digital currencies' central banks across the world research the importance of introducing a central bank digital currency (Opare and Kim, 2020). The development of a CBDC started with an investigative study by China in 2014 with the intention of ultimately issuing a national digital currency based on Digital Currency Electronic Payment (DCEP) – Digital Yuan. In 2015, the bank of England introduced the first CBDC – RSCoin using the Unspent Transaction Output (UTXO) mechanism as embedded in Bitcoin (Tsai et al., 2018) but was not issued for general use (Zhang et al., 2021). In 2017, Canada, the Monetary Authority of Singapore, and the European Central Bank in collaboration with the Bank of Japan ventured into project Jasper, Ubin and STELLA respectively to study the possibility of a national digital currency issuance.

Opare and Kim (2020) thoroughly examined globally existing DLT-based CBDC and their respective proof-of-concept prototypes by dividing them into three basic groups, namely; early adopters, followers and new entrants.

Table 1: DLT Based CBDC Adoption (Opare and Kim, 2020)

Early Adopters (2015 – 2016)	Followers (2017 – 2018)	New Entrants (2019)
• Bank of England • People's Bank of China, Bank of Canada • Banque de France • US Federal Reserve Bank.	• Hong Kong Monetary Authority. • Bank of Finland Bank of Israel • Reserve Bank of New Zealand • Swiss National Bank.	• Bank of Korea, • Bank of Japan • European Central Bank

2.2 CENTRAL BANK DIGITAL CURRENCY: BENEFITS AND CHALLENGES

Private digital currencies threaten successful monetary policy implementation (Lee, Yan, and Wang, 2021). Digital currencies are simply money existing in a virtual form, whereas a central bank digital currency (CBDC) is a virtual form of a nation's fiat currency holding the same properties (Zhang, 2020). The emergence of a central bank digital currency (CBDC) marks a significant advancement in the evolution of both the financial and payment systems, thus redefining the global financial system and the role of the government (Fernández-Villaverde et al, 2021). In comparison with other digital currencies, the CBDC would be implemented in association with monetary policies (Bhawana & Kumar, 2021).

Central bank digital currencies possess the similarities of cash (Ozili, 2022). Typically, CBDC should fulfil the following functions of money: store of value, unit of account, medium of exchange, and standard for postponed payments (Lee et al., 2021). Based on the changing developments in the financial scene and the definition of money, one could argue that the future of money is unpredictable

and cannot be easily ascertained by relying on existing literature as the formation of money of could be linked to several factors. Tsai et al. (2018) argue the following as the main justifications for the formation of a central bank digital currency - possession of central bank reputation, execution of agreements, costs elimination and transparency enhancement. However, it is generally agreeable that CBDCs act as a central bank liability (Ozili, 2022).

The benefits of CBDC include financial integration, security, cheaper transaction fees, promotion of virtual payments and enhancement of monetary policy (Ozili, 2022; Lee et al., 2021; Zhang (2020). By making digital finance platforms more accessible and reducing existing transaction fees, CBDC advances the idea of financial inclusion (Sethaput and Innet, 2021). CBDC may be an actionable monetary policy instrument for achieving macroeconomic objectives as it would ensure that the public focus less attention on private digital currencies; and will facilitate cross-border payments as well as promote financial inclusion especially among the unbanked (Lee et al., 2021). The emergence of CBDC will foster competition among central banks and commercial banks for deposits. Fernández-Villaverde et al. (2021) explained an equivalency result identifying the impact of the financial intermediation competition between commercial and central banks, when consumers behaviour do not change. They suggest that central banks must be subtle and active in their approach in maintaining maturity transformation stability. Eventually, the central bank becomes a monopolist, channelling bank deposits from commercial banks to itself, which would take out the elements supporting optimal maturity transformation. Lee et al. (2021) opined that interest-bearing CBDCs can be employed for increased control over the amount of money in circulation in an economy, while non-interest bearing CBDCs will assist in curbing the friction within a country's financial hub.

The issuance of a CBDC has its perks. Its implementation may involve risk factors relating to economics, technology, and legal issues (Lee et al., 2021). Economically, widespread unrestricted public access to digital money might limit banking activity as the need for deposits or reserves held by commercial banks will drastically decline and perhaps trigger a contagion. With respect to technology, although CBDC eliminates the problem of ledger tampering and transaction reversibility, the blockchain technology which acts as the bedrock of CBDC has technical scaling challenges and is vulnerable to cybersecurity risk. Legally, the central bank digital money may not have a solid legislative-backed regulation depending on the relevant country. This is supported by Zhang (2020) who emphasized on aggravated risks in payment systems and the absence of regulations. Successful CBDC implementation may be significantly affected by available internet infrastructures and existing low levels of digital awareness (Lee et al., 2021).

The agenda for financial inclusion may backfire and become leverage inclusion. Developing countries are most liable for CBDC based leverage inclusion as evident during the Asian crises. As such, it is expected that the impact of introducing CBDC would be more evident within undeveloped economies (with heightened inflation) and would benefit significantly from the adoption of CBDC. However, due to the uniqueness of the CBDC design and individual countries, policymakers are advised to be cautious against over-optimism (Ozili, 2022). Regulations, data governance structures, continuous learning and international collaboration can lessen the adverse effects of issuing the currency (Zhang,2020).

2.3 BLOCKCHAIN AND CENTRAL BANK DIGITAL CURRENCY DESIGN

Blockchain is a decentralized and unalterable digital footprint of activities that may be used to record several transactions (Sun et al., 2018). It is largely recognised for deploying digital currencies and person-to-person transaction resolution. The features of Blockchain technology have designed a trust system that attracts public cooperation (Zhang, 2020). Blockchain possesses the feature of tamper-resistance, and traceability (Sun et al., (2018); and can be adopted in various industries such as law, finance, healthcare, and energy.

With advancements in financial solutions, blockchain technology and digital currencies have developed conjointly. Blockchain technology is used in designing a CBDC since it offers excellent security, and each node will be tasked with data management (Yang and Li, 2020). The essential question in the creation of a central bank digital currency is whether it should be distributed or centrally controlled. The centralised CBDC would foster accountability of the relevant monetary authority (central bank).

The blockchain's irreversibility characteristic is designed to address the issue of deploying digital currency in an environment devoid of trust. Although distributed ledger technology is vulnerable to cybersecurity risks, these risks can be limited based on personal security awareness (Sethaput et al., 2021).

CBDC can be examined based on its business design and structure or ledger design (Lee, et al., 2021; Bhawana and Kumar 2021; Pocher and Veneris, 2021; Gopane 2019). In terms of ledger design, CBDC may be categorised into token-based and account-based ledger designs. Token-based CBDCs employ centralized or decentralized settlement mechanisms which facilitate token-based transactions among virtual wallets. Advantages of the token based CBDC include its capability for offline transactions and anonymity. Under the account based CBDC system, the customer operates a bank account with a central bank approved entity, which is responsible for account management including know-your-customer (KYC), identification and transaction approval. Here, the CBDC design is linked to a network and a permission blockchain which is centrally managed by the central bank.

With respect to business design, CBDC can be divided into retail and wholesale (Lee, et al., 2021; Bhawana and Kumar, 2021). Only recognised financial institutions which hold statutory deposits with the central bank have access to the wholesale CBDC. The wholesale CBDC is implemented by the central bank, or a designated entity as appointed by the central bank. The anonymity of the designated entities is not prioritised since they operate within the purview of the central bank in the normal course of their business, to engage in interbank payment settlements. The wholesale CBDC provides real-time monitoring and increased security. According to Lee et al. (2021), wholesale CBDCs facilitate the exchange of financial assets within a network of financial institutions, thus fostering efficiency (an example is the digital Singapore dollar – project Ubin); whereas the retail CBDC focuses on improving social welfare by facilitating payments and remittance (e.g., Digital Yuan). However, there is the possibility of a hybrid design for wholesale and retail CBDC's.

In comparison to other cryptocurrencies, CBDC requires more focused monitoring and a more manageable level of decentralization. Zhang et al. (2021) suggests a hybrid blockchain system for CBDC with the inclusion of a modularity network to improve the speed of consensus and transactions. This suggestion employs the structure of Unspent Transaction Output (UTXO) scheme for recording properties of digital assets, especially those of immense volatility and low liquidity. Three simulation experiments were conducted to verify the appropriateness of the proposal. Additionally, the model offers a high degree of anonymity and security. However, the UTXO model is unable to confirm the validity of the immutable flow and is therefore unable to support a large volume of smalls transactions.

Tsai et al., (2018) suggested the use of a panda model as opposed to the Unspent Transaction Output (UTXO) due to its ability to hold account balances like traditional banking systems while adopting working consensus mechanisms. Also, it is capable of being simultaneously used by many financial institutions or people, hence, enforcing scalability. The proposed CBDC model qualifies the several network nodes to have an account balance and consists of two blockchains namely; Account Blockchain (ABC) and Trading Blockchain (TBC). The introduction of this two blockchain model fosters scalability as both blockchains have separate functions - ABC is oversees account information related activities while TBC manages transaction details. Series of simulations were conducted using the TaiShan Sandbox to ascertain the model viability and scalability. The suggested model considered the direct and indirect distribution models. The direct model depicts a situation where central bank creates the digital currency and individuals or entities own accounts with the central bank for savings or payments, while the indirect model illustrates a scenario where the central bank create the digital currency, but all customer services (such as payments) are handled by another organisation which could be a commercial bank. Sethaput and Innet (2021) explains that there is a decision to make regarding the distribution of CBDC. They justified three distribution models as opposed to the two recognised by Tsai et al (2018), which include: Direct, Indirect and Hybrid. They confirm that under the direct model, central banks are solely responsible for the distribution of the CBD, hence they might need to consider expanding technological and operational capability and capacity; indirect model allocates the burden of distribution on the private sector whereby the liabilities of the users fall solely on the private entity; while the hybrid model considers an interdependent approach between the private and public sector

such that the central bank is charged with the authority to create and destroy tokens in the master ledger; and the private sector is responsible for account management such as verification and KYC.

A central bank digital currency's architecture could be structured to be one-layered or multi-layered (Pocher and Veneris, 2021). Lee et al. (2021) focused on the design elements of CBDC for societal betterment and the risks inherent within its core to recommend the most suitable and adoptable CBDC design for countries of the world. They studied the Digital Yuan (CBDC) with respect to a multiple ledger design and suggested factors for the widespread adoption of the CBDC. The first layer promotes the choice of a distributed or centralized technology, with the central bank retaining the authority to create digital money. The second layer makes it easier for both the central bank and commercial banks to control the system's core node. The tokenization feature of the digital currency are all included in the third layer. With this suggested architecture, central banks may oversee the overall process and concentrate on monitoring and control without shouldering all the burden or being exposed to dangers associated with over-centralization. It is conclusive that CBDC will be the key tool in the digitally enabled economy, giving technologically advanced nations a competitive edge. Sun et al. (2018) established a multi-blockchain model focused on using permission blockchain as the bedrock of the CBDC design where the blockchain is created and maintained by the central bank, rather than institutions such as commercial banks. User privacy is protected, and it prevents the issue of double spending. Also, the proposed multi-blockchain architecture uses a chainID to improve scalability and transaction speed. The researcher proposes a blockchain system that is distinct from the Hyperledger and Ethereum. They further suggest that future research should investigate the technologies for transaction execution, block establishment, and consensus protocol.

International payments were utilised by Han, Yuan and Wang (2019) to describe a three-layered structure where a sender generates a special ID for each transaction and sends it to the relevant bank; which confirms the transaction's legality, approves the use of the currency, and commences an international payment smart contract with the receiver's bank operator. The success of the transaction and the allocation of the digital currency to the receiver is dependent on whether the smart contract is successful. Both the sender and the recipient receive a failure message if the transaction fails.

The argument over the best central bank digital money design is still up for dispute. CBDC design is largely subjective to a nation and its monetary authorities. A suitable CBDC design should rely on regulation, education, regional collaboration, and a comprehensive strategy (Lee et al., 2021) and should be able to fulfil the various aims of CBDC that is applicable in multiple locations (Ozili, 2022). Hence, important elements of a successful implementation include learning from the process and regularly analysing current legislations.

2.4 CENTRAL BANK DIGITAL CURRENCY: ACCEPTANCE AND ADOPTION

The survey by the Bank for international Settlements (BIS) revealed that over 60% of central banks are investigating the issuance of a CBDC, with about 25% planning to issue a CBDC in the long run (Barontini and Holden, 2019). Freedom of choice is essential in the adoption of new technology as it considers the desire and intention of users. The theory of planned behaviour assists in ascertaining the behavioural characteristics of individuals and emphasises that a person's behavioural intentions are linked to their attitude, personal ideologies, and subjective norms (Schaupp & Festa, 2018). Technology usage by an individual is influenced by attitude, perceived ease of use, perceived risk, and trust, (Schaupp et al., 2022). Consumers are more likely to adopt the digital currency if it is less difficult to use and it possesses less risk and vice versa.

Koroma et al. (2022) explain that business owners consciously seek consumer trust before using new technology; this is applicable to digital currencies as well. The success of disruptive technologies and innovation is largely attributable to the level of trust expressed by users (Schaupp et al., 2018) in the technology and the product itself . E-commerce for example is regarded to be one of the most significant endeavours for establishing confidence in digital currencies (Shalini and Santhi, 2019). Koroma et al. (2022) argue that confidence in digital currency is increased and is most beneficial in a technology-friendly environment. Speed and confidence in a sovereign body both affect customer trust (Arli et al., 2021).

The success of a central bank digital currency is affected by several factors. Söilen and Benhayoun (2022) employed the Unified Theory of Acceptance and Use of Technology (UTAUT) to determine the extent of the possible adoption of CBDCs among households. The research focused on six conjectures, which were analysed using the Partial Least Squares Structural Equation Modelling (PLS-SEM). An importance-performance map analysis was employed to complement the results of the UTAUT to emphasize the importance of each variable relative to the research objective. Results revealed that the probable expectation of high performance of the CBDC, influence from societal groups and factors which support the use of the digital currency may foster the adoption of CBDC; however, institutions might need to focus effort on constructing a trust system.

The essence of trust in the adoption of any technology is crucial, hence it is important to ascertain the extent to which CBDC and cryptocurrencies follow the same or distinct trend. Koziuk (2021) adopted a general regression method to examine the correlation between trust considering the various range of digital currencies and relevant features for trust generation. It used data from the Official Monetary and Financial Institutions Forum specific to over ten countries including India, Malaysia, Brazil, and South Africa. The results showed that age is a determinant trust driver in the adoption of any digital money, hence societies with multitudes of younger generations have greater confidence in digital currency systems. The researcher opines that the credibility of the central bank should be added to the appeal for CBDC adoption. However, once trust is generated without concern for institutional factors relating to digital currency, then there could be a gap between monetary quality of the currency, its functions, and monetary authorities. Arli et al. (2021) argue that CBDC would improve the payment efficiency and flexibility; and it is acceptable by all, not only the younger generations. They considered the variation in consumer perception on private cryptocurrencies with a conjecture that trust is contributed via - the basic understanding of the digital currency, confidence in government to act in the best interest of its people and the extent of speed at which transactions can be completed.

Besides trust, digital inequality affects the adoption and acceptance of a digital currency. The unbanked populace before the introduction of a CBDC may be significantly higher than those who have access to traditional banking services, ultimately leading to the failure of a CBDC. Gopane (2019) argues that digital access fosters financial inclusion, only that, disparities relating to age exist as the younger generations are more technology-savvy than the older generation. Also, the study postulates financial inclusion is adversely affected by significant income gaps and uneven distribution of resources. The researcher proposes that CBDC can improve financial inclusion if and only if the digital access disparity among the age group is resolved to alleviate the inherent inequality.

The issuance of a centralised digital currency by the central bank reduces the anonymity and transaction privacy expected by users and thus may be less attractive to them. In a time where this challenge is coupled with economic factors (such as recession) affecting demand for money, CBDC becomes even more less attractive. Selim (2020) considered the effect of Covid-19 on CBDC implementation and explained an incentive based countercyclical monetary policy to alleviate the impact on market forces. The researcher makes the case that discounts should be introduced to promote economic expansion. The researcher proposed a collaboration between central bank, company owners and vendors to implement a system where consumers are provided with a 10% discount on 100 bank deposits equalling 110 units of CBDC but equals 100 units when deposited by vendors as bank deposits in their respective accounts. However, real life conditions were not considered in the study.

Digital currencies have been rapidly gaining popularity because of the distinctive advantages offered by blockchain technology, but little is still known about the essential features of the technologies that support digital currency adoption. Therefore, additional study is needed to ascertain the relationship between evidenced trust drivers and the extent of trust (Koziuk, 2021), and the significance of and justification for acceptance and adoption of central bank digital currencies.

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the strategy and methods utilised for data collection and analysis, including the application of statistical analysis techniques employed and the methods that will be used to evaluate the results.

3.2 DATA COLLECTION, PREPARATION AND ANALYSIS

The research adopts a quantitative and descriptive design using primary data. An electronic survey was used for data collection. As shown in other studies (Söilen and Benhayoun, 2022; Arli et al., 2021), surveys are a common tool for evaluating this type of research and can be trusted for the purpose of this study. It was divided into two parts based on demographics and central bank digital currency awareness/acceptability levels. The survey relied on existing literature evidencing the success of the proposed research model. The survey was made available online via Google Forms and made accessible to respondents without interference or bias. Most of the responses were obtained via LinkedIn connections but other social media platforms such as Twitter, WhatsApp and Instagram were utilised.

Data preparation involved checking for missing values and renaming columns for visualisation purposes.

Sampling Size and Technique

Target Population

The target population for the survey are residents of Ireland. Considering the use of an electronic survey, the study focuses on respondents who have access to the internet and are technology-savvy. The age group ranges from 18-65 years as they are expected to be expressive of their opinions regarding the subject of the survey. Also, it considers the different genders with the motive of promoting diversity and inclusion.

Sample Size

The analysis of consumer perception and adoption of CBDC employed the use of 144 responses. Solberg Söilen and Benhayoun (2022) employed an a priori power test which resulted in a minimum of 267 responses for a study that covered over three regions, hence the sample size adopted for his study is reasonable. A pre-test was conducted on a sample of the first 30 responses to confirm the adoptability of the preferred and selected analysis techniques. Also, the Snowball Sampling Technique was used for data collection.

Scales and Measurements

The study adopts a seven-point Likert scale in the questionnaire with questions ranging from – 'Strongly Disagree' to 'Strongly Agree' (Solberg Söilen and Benhayoun, 2022); 'Very unlikely' to 'Very Likely'; 'Very poor' to 'Excellent'; and 'Very Unimportant' to 'Very Important'. This decision was taken to reflect the most accurate expression of respondents and to assist in understanding their reaction as well as their perception. The questionnaire was divided into different sections to obtain data regarding the demography of the respondents and their opinion on the possible adoption of CBDC and their intended use for the product. The questions were coined in such a way that promotes neutrality and avoids bias, in order not to lead the respondents towards a particular direction.

Validating the Questionnaire

The questionnaire was validated to verify its suitability for the purpose of the research. It relied heavily on existing literature and its validity was corroborated by a qualified educational/research official.

3.3 TECHNIQUES AND ANALYSIS METHODS

- **Descriptive Analysis:** this method assists in explaining the data collected by referencing frequencies, percentages, mean standard deviation. It employs numerical and graphical approaches to analyse information (Fisher and Marshal, 2009) and effective in summarizing data (Marshall and Jonker, 2010). It is frequently used to comprehend data distribution and provide data insight. Measurements of central tendency and measures of dispersion are the two main categories. However, this research focused on mean and standard deviation for the purpose of this study.

- **Chi-square Test:** this examines the relationship between two categorical variables and establishes a structural model's quality of fit (Ugoni and Walker, 1995). It was utilized to ascertain whether the respondents' demographic characteristics have any impact on trust, knowledge, and behavioural intention to use the CBDC.

- **Cronbach's Alpha Test:** is a measure of how closely connected a group of items are to one another, or internal consistency. It is regarded as an indicator for scale dependability. It is employed to check the accuracy of the data. It looks at how well a group of indicators captures a latent single-dimensional idea (Vinzi et al, 2010). Additionally, it has a range of 0 to 1, with lower values denoting low validity and higher values denoting substantial accuracy and acceptability (Habidin et al., 2015). It was utilized to determine the reliability of the data.

- **Exploratory Factor Analysis:** assists in ascertaining the degree of influence posed by each factor and the existing relationship among them. The foundation of factor analysis is the idea that all variables are somewhat correlated (Noora, 2021). The correlation between a variable and a certain principal dimension (PD) is described by the factor loading of the variable. Also, this research obtained the squared loading for a variable by squaring the factor loading for it (also called squared cosine or $\cos^2$). This gives a measurement of the percentage of variance in a variable that a certain PD can account for. Each variable has a total squared loading over all PDs of 1, which adds up to 1.

3.4 MODEL SPECIFICATION

The research model is based on the 'Unified Theory of Acceptance and Use of Technology (UTAUT)' which is well-known in the field of information systems and has been used in studies on the adoption of new technologies. It was developed by Solberg-Söilen and Benhayoun (2022). Individual expectations and intended behaviours are explained and simplified by UTAUT.

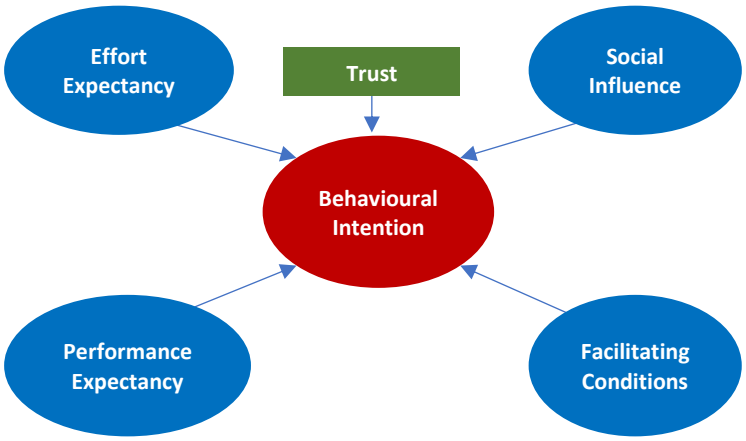

Figure 1: Proposed Unified Theory of Acceptance and Use of Technology.

Venkatesh et al. (2003) suggested UTAUT to investigate users' behavioural intention to embrace technology. The Technology Acceptance Model (TAM), for example, is one of the pre-existing information system models that it incorporates (Yohanes et al., 2020). Its foundation is made up of four key ideas (Yohanes et al., 2020; Ahmad, 2014):

- Effort Expectancy: this term describes how simple it is to use the suggested technology.
- Social Influence: this concept describes how social perceptions affect how technology is used.
- Facilitating Conditions: this examines how the mechanisms in place give users faith in the technology.
- Performance expectancy: this measures how people believe the proposed technology will function.

Studies have proven that the UTAUT is more reliable than other theories, such as the Technology Acceptance Model (TAM) and Theory of Planned Behaviour, since it has been able to explain more user variations (Susanto et al., 2020). The UTAUT model was effectively employed in similar study by Söilen and Benhayoun (2022), which examined the household adoption of central bank digital currency.

Venkatesh, Thong and Xu (2012) considered additional variables - hedonic motivation, price value and habit. However, because it places more focus on consumer costs, this analysis did not take the expanded UTAUT model into account (Söilen and Benhayoun, 2022). This study draws on the Unified Theory of Acceptance and Use of Technology in order to assess public opinion on central bank digital currency and provide guidance for the bank on the essential implementation procedures.

3.5 ETHICAL CONSIDERATIONS

Participants were informed of the study's objectives as well as details on how data will be handled and protected, prior to taking the survey. The choice to provide their responses to the survey was fully theirs and theirs alone. No compulsion was employed, and participants could decline to participate in the survey at their own discretion.

RESULTS AND DISCUSSIONS

Existing literature revealed that there are several factors that affect the possible adoption of a technology, in this case – a central bank digital currency. This section describes the implementation of the analysis methods, interpretation and evaluation of results derived.

Analysis and Interpretation of Consumer's Perception and Adoption of CBDC:

4.1 Descriptive Statistics

Table 2: Demography of Respondents

Criterion	Response	Count	%	Criterion	Response	Count	%
Age	18 - 25	72	49.7	Gender	Male	74	51
	26 - 30	49	34.5		Female	70	49
	31 - 40	19	13.1	County	Dublin	85	59.3
	41 - 50	3	2.1		Cork	5	3.6
	51 - 60	1	0.7		Limerick	6	4.3
Marital Status	Single	121	84.1		Waterford	2	1.4
	Married	20	13.8		Portlaoise	13	8.7
	Divorced	1	0.7		Kildare	5	3.6
	Prefer not to say	2	1.4		Kerry	2	1.4
Occupation	Employed	81	56.6		Kilkenny	1	0.7
	Self-employed	16	11		Clare	7	5
	Student	46	31.7		Carlow	5	3.6
	Graduate	1	0.7		Wexford	2	1.4
Education	Primary	3	2.1		Longford	1	0.7
	Secondary	13	9		Louth	1	0.7
	Tertiary	122	84.1		Galway	8	5.7
	Prefer not to say	6	4.8				

Table 2 revealed an almost even representation of both genders representing 51% males and 49% females. A larger proportion of the population have undergone tertiary education and are single. Also, most of the respondents claim to reside in Dublin; based on findings, it was revealed that this is mostly attributable to the location of their respective schools and workplace. Table 1 further indicates that majority of the respondents' range between the ages of 18 to 40.

4.1.1 Mean and standard deviation

Table 3: Mean and Standard Deviation (Std.) of Responses

Questions	Abbr.	Mean	Std.
Rate your understanding of the term digital currency.	KWL1	5.11	1.43
Rate your knowledge of how a digital currency works.	KWL2	4.78	1.47
Rate your understanding of what a central bank digital currency is.	KWL3	4.50	1.51
Please rate the importance of being able to learn and understand the central bank digital currency (CBDC) system.	EE1	5.66	1.32
Please rate the importance of ease of use of a CBDC system.	EE2	5.58	1.43
To what extent do you think using a CBDC will require access to the Internet.	FC1	5.73	1.44
Please rate the importance of accessing help with using the CBDC.	FC2	5.68	1.27

Questions	Abbr.	Mean	Std.
I will use the CBDC if those in a position of influence suggest that it should be done	SI1	5.19	1.33
I will use the central bank digital currency system if my family and close friends suggest that I do.	SI2	5.04	1.50
To what extent is ease of performing transactions important in the uptake of CBDC.	PE1	5.69	1.23
To what extent is the speed of transactions important in the uptake of CBDC.	PE2	5.92	1.16
To what extent is trustworthiness important in the adoption of a CBDC.	TR1	6.09	1.26
To what extent is security important in the adoption of a CBDC.	TR2	6.24	1.16
To what extent is transaction reversibility important in the adoption of a CBDC.	TR3	5.90	1.36
To what extent is anonymity important in the adoption of a CBDC.	TR4	5.36	1.40
To what extent is privacy important in the adoption of a CBDC.	TR5	6.06	1.17
To what extent would you use CBDC compared to an unregulated currency such as Ethereum or Bitcoin.	IB1	4.95	1.53
Once the central bank digital currency is launched, I will always use it	IB2	4.67	1.45
I will convert most of my bank deposits into the central bank digital currency when it becomes available.	IB3	4.24	1.61
I intend to use the central bank digital currency system for cross-border payments.	IB4	4.76	1.41
I will use the central bank digital currency system for person-to-person transactions.	IB5	4.88	1.39
I will use the central bank digital currency system for my shopping.	IB6	4.74	1.52
I intend to use the central bank digital currency system to receive my salary.	IB7	4.41	1.65
I prefer to be paid for my personal services via the central bank digital currency system.	IB8	4.33	1.61

Further descriptive analysis considering the mean and standard deviation of the data as depicted in table 3, shows that most of the respondents have some knowledge of digital currencies, CBDC and they consider ease of use of a CBDC system to be important for adoption. Also, trustworthiness, security and privacy were deemed to be quite important if they were to adopt the CBDC with mean values above 6. Compared to private digital currencies, respondents seem to have some level of preference for CBDC; thus, depicting trust in the system and a future intention to use. The standard deviation estimates the degree of divergence from the mean values.

4.1.2 FREQUENCY

Frequency assists in understanding the intention and perception of the respondents. Table 1 in the configuration manual provides a clear picture of the total responses based on the chosen Likert rating. Results showed that 67% (96 out of 144) of the total respondents responded between four (4) and (7) on the Likert scale questions. Majority consider ease of use, transaction, privacy, reversibility, trust to be important in the adoption of CBDC.

4.2 CHI-SQUARE TEST

To ascertain the relationship between the variables, the p-values are compared to the significance level (α). Alpha is set at 0.05 for this study, implying that there is a 5% chance of concluding that there is a connection between the variables when there is not. Where p-value is less than alpha, then there exists a statistically significant relationship between the variables; and vice versa.

Table 4: Association between Trust and selected categorical variables using Pearson Chi Square

	P-value	Degree of Freedom
Gender	0.2462	5
Age	0.2441	20
Education	0.212	15
Occupation	0.4922	15

Table 5: Association between Ease of Use and selected Categorical Variables using Pearson Chi Square

	P-value	Degree of Freedom
Gender	0.3677	6
Age	0.1628	24
Education	0.5866	18
Occupation	0.1467	18

The Chi-Square test was adopted to examine the degree of association between variables. Table 4 shows that there is no statistically significant relationship between the categorical variables (Gender, Age, Education and Occupation) and Trust, while table 5 shows that there is no significant association between the categorical variables (Gender, Age, Education and Occupation) and Ease of Use with respect to CBDC. The p-values noted were all greater than alpha.

Table 6: Association between Knowledge of CBDC and selected Categorical Variables using Pearson Chi Square

	P-value	Degree of Freedom
Gender	0.1562	6
Age	0.1741	24
Education	0.05996	18
Occupation	0.5839	18

Table 7: Association between Intention to Use and selected Categorical Variables using Pearson Chi Square

	P-value	Degree of Freedom
Gender	0.6109	6
Age	0.7797	24
Education	0.1555	18
Occupation	0.772	18

Both table 6 and table 7 depict no feature of association between the tested variables since the p-values were greater than 0.05. This implies that the tested categorical variables (Gender, Age, Education and Occupation) have no impact on Knowledge of CBDC and future Intention to Use the CBDC system.

Table 8: Association between Knowledge of CBDC and Trust using Pearson Chi Square

P-value	Degree of Freedom
0.005433	30

Table 9: Association between Intention to Use and Trust using Pearson Chi Square

P-value	Degree of Freedom
0.000001145	30

The p-values noted in table 8 and table 9 show that there is a statistically significant relationship between Trust and Knowledge of CBDC as well as Trust and future Intention to Use. The p values obtained were lower than 0.05 (alpha). The lower the p-value compared to alpha, the greater the significance of the relationship between them. The p-value of 0.000001145 for Intention to Use and Trust suggests a higher degree of statistical significance compared to Knowledge of CBDC and Trust which stood at 0.00543. This implies that Trust is closely associated with Knowledge of CBDC but has a more significant relationship with Intention to Use.

4.3 Cronbach's Alpha Test

Table 10: Cronbach's Alpha Reliability Test on 7 factors			
Factors	**Cronbach's Alpha**	**Number of Items**	**Combined Reliability of All Factors**
Knowledge	0.89	3	0.93
Effort Expectancy	0.78	2	
Facilitating Condition	0.71	2	
Social Influence	0.71	2	
Performance Expectancy	0.79	2	
Trust	0.87	5	
Behavioural Intention	0.93	8	

This reliability test was conducted the predefined factors as identified above in table 10. The factor loadings proved to be quite reliable with Behavioural Intention having the highest result of 0.93. Also, the sufficiency of the loadings is backed by the combined reliability of the factors in the study with a value of 0.93. Thus, it is highly consistent.

4.4 Factor Analysis

This study adopted both exploratory factor analysis which assists in identifying the relationship between variables. It describes data interdependency without the burden of designating dependent and independent variables.

Table 11: Results of KMO and Bartlett's Test of Sphericity	
Kaiser-Meyer-Olkin measure of sampling adequacy	0.89
Bartlett's test of sphericity (BTS) approx. Chi-Square	2427.912
BTS df.	276
BTS P-value	0

However, before conducting the factor analysis, the suitability of the data for factor analysis using the KMO Test and Bartlett's Test of Sphericity was verified. Table 11 results showed acceptable levels as the BTS p-value is below alpha (0.05) and KMOis greater than 0.60 (Kaiser, 1974).

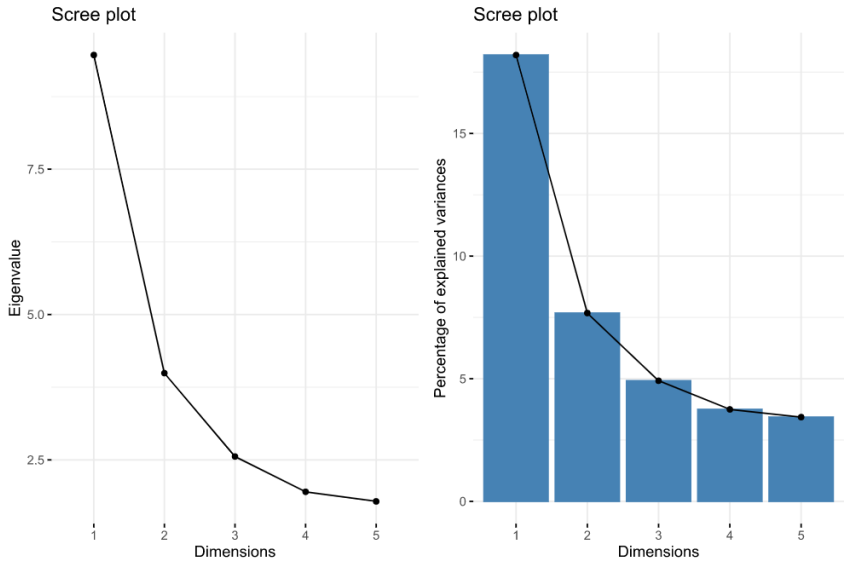

Fig. 1: Scree plot showing the eigenvalues and principal dimensions (PD)

Fig. 1 shows the level of eigen values accounted for by the variables in each dimension, as well as the percentage of explained variance for the respective dimensions. According to Kaiser's Criterion, only eigen values greater than one is acceptable. The dataset appears to be complex as the scree plot on the left reveals that the five principal dimensions account for more variance than each of the original variables while the other plot shows that they account for combined total variance of 37.98%. This result is further broken down in table 12 below. However, observing the scree plot, it is arguable that only the first three dimensions account for a greater percentage of the variance since the plot curve flattens out after Dim3.

Table 12: Summary of Variances

	Eigenvalue	Variance Percent	Cumulative Variance Percent
Dim.1	9.462745	18.197586	18.19759
Dim.2	3.991756	7.676454	25.87404
Dim.3	2.557678	4.918612	30.79265
Dim.4	1.95038	3.750731	34.54338
Dim.5	1.786482	3.435542	37.9789

Table 12 simplifies the results of the scree plot by highlighting the respective values for eigen, variance and cumulative variance, for each dimension.

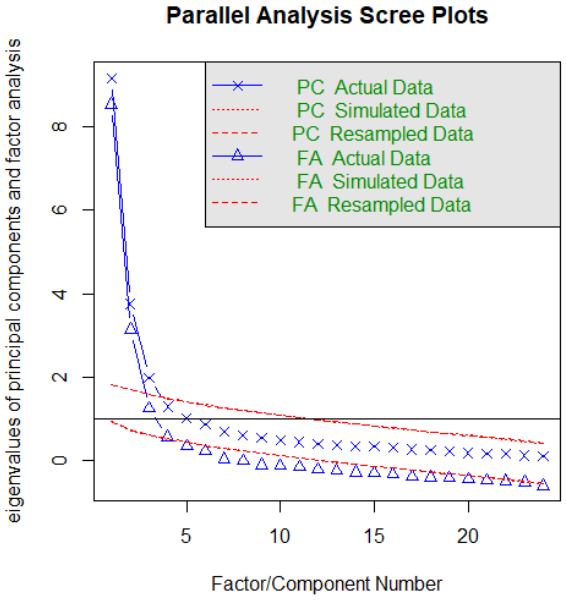

Fig. 2: Parallel Analysis

Fig. 2 above was plotted to justify the use of three (3) factors in this research (Raiche and Magis, 2020). The factor analysis test was initially conducted using the mixed data, but the results deemed to be difficult to interpret as visualised in Fig. 1 in the configuration manual.

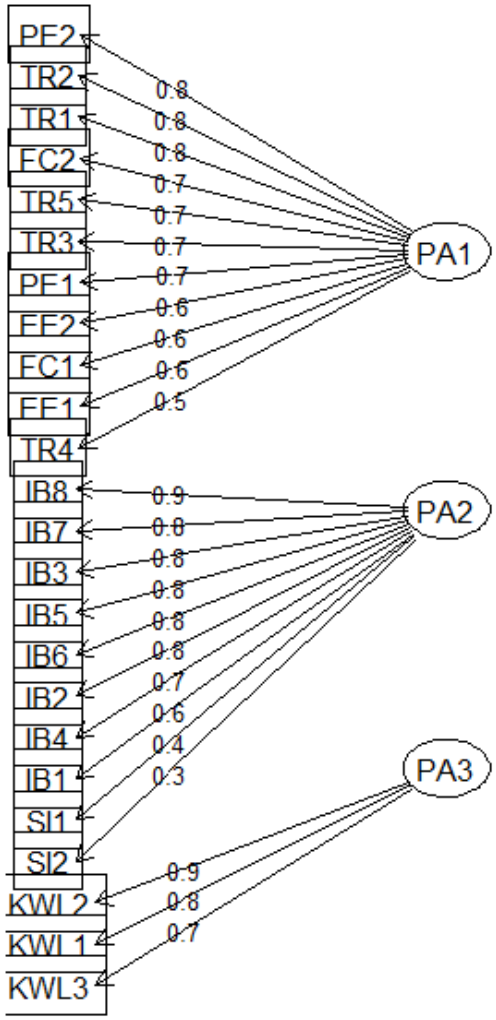

Fig. 3: Rotated Factor Analysis

Hence, the varimax rotation was conducted to further enhance the interpretability of the relationships between the variables and principal dimensions. Rotation reassigns high factor loadings to some variables and low factor loadings to others.

Fig. 3 reveals that under the rotated principal dimensions, Behaviorial Intentions (IB1-IB8) and Social Influences (SI1, SI2) are characterised by higher factor loadings in PA2. This implies that family, close friends and government can influence user intention to use the CBDC as well as how they use it, which could be for cross-border payments, peer-to-peer transactions or as interest-yielding deposits. PA1 on the other hand, expresses the relationship between performance expectation (PE1,PE2), Trust drivers (TR1:TR5) and effort expectancy (EE1, EE2). According to the descriptive analysis obtained, most users expect to be able to easily understand and use the CBDC system. Based on the loading in PA1, ease of use, speed and ease of transactions are expected to foster trust in the CBDC system. Also, the factor hints that anonymity, reversibility, security and privacy are trust drivers for CBDC adoption. PA3 establishes the relationship between knowledge of CBDC and digital currencies in general. It asserts that users who have some knowledge of how digital currencies operate tend to have an idea of what a CBDC system is and vice versa; whereas users who have little or no knowledge of digital currencies may struggle to grasp the concept of a CBDC system.

CONCLUSION, LIMITATION AND FUTURE WORK

The research proves that most individuals in Ireland are knowledgeable of CBDCs. Knowledge and awareness of digital currencies appears to be common among the younger generation compared to the older generation. This was observed to be common among individuals who are students, employed or have tertiary education, thus indicating that education and employment status influences the decision to adopt the CBDC. Other factors which may influence individual decision to adopt the CBDC include ease of use and trust drivers such as security, privacy, reversibility, and speed of transaction. These highlighted factors influence one another. Users expect that the CBDC should be easy to use for transaction purposes but also demand speed of transactions to be reliably fast to meet their needs; and that these transactions are reversible in the event of an oversight. They intend to trust the CBDC system to maintain their privacy and safeguard them from unforeseen circumstances such as scam, fraud, or personal negligence.

Trust is considered a very important factor in the adoption of Central Bank Digital Currencies. Drivers for trust demand succinct understanding by central banks. It is crucial that it is given relevance in the design and introduction of a CDBC, with a focus on developing conditions that would facilitate ease of use and speed of transactions. The findings showed that the adoption of CBDC may be facilitated by the likely expectation of excellent performance from the CBDC, influence from social groups, and elements supporting the usage of the digital currency. The implication of the findings is that CBDC design has to satisfy these user conditions to be considered effective and continuously adopted by users. Failure to meet the requirements of speed, ease of use, anonymity, privacy and security will render the implementation of a CBDC system unsuccessful. The central bank has to put these into consideration when deploying the CBDC even if it may be of high cost.

To increase the adaptability and caliber of various financial operations, central banks should realistically increase customers' understanding of CBDC's performance. Additionally, they should boost the advantages that consumers, their friends and family perceive from routinely using CBDCs. Also, there should be possibilities to modify and reform the CBDC whenever applicable to satisfy continously shifting central bank goals.

The research was conducted within a period of twelve (12) weeks and was targeted at indivduals who have internet-enabled devices since the survey was deployed using Google Forms. Also, compared to the total population of Ireland which currently stands at 5.1 million (Central Statistics Office, 2022), only one-hundred and forty-four responses (representing 0.003% of the entire population) was used for this study. In addition, not all counties were considered. Hence, the results obtained may not illustrate a clear picture of the entire population.

Considerations to improve the results of this research include a national-scale implementation of the study focusing on both the rural and urban areas. Also, variables considered should be extended to consider other factors such as the impact of trainings and awareness programmes with respect to CBDC. Another consideration is the possible establishment of a universal central bank digital currency for Europe by the European Central Bank since Ireland is an active member state with a shared currency. Thus, future work can focus on the whole region of Europe.

A central bank digital currency could pose challenges or problems within a state as identified in the case of the central bank assuming the responsibilities a commercial bank by maintaining bank deposits, thus leading bank runs. Further work should be considered in this regard to identify potential risks and advice remedies. Also, there should be considerations for determining the optimal CBDC design and investigating the balance between the units of CBDC holdings and user preference.

REFERNCES

Ahmad, M. (2014) Unified theory of acceptance and use of technology (UTAUT): a decade of validation and development.

Arli, D., van Esch, P., Bakpayev, M. and Laurence, A. 2021, 'Do consumers really trust cryptocurrencies?', *Marketing Intelligence and Planning*, 39(1), pp. 74-90.

Barontini, C. and Holden, H. (2019). Proceeding With Caution–a Survey on Central Bank Digital Currency. Bank for International Settlement. [Online]. Available: https://www.bis.org/publ/bppdf/bispap101.pdf

Bhawana and Kumar, S. (2021) 'Permission blockchain network based central bank digital currency', *2021 IEEE 4th International Conference on Computing, Power and Communication Technologies, GUCON 2021*. https://doi.org/10.1109/GUCON50781.2021.9574020

Bitter, L. (2020),"Banking crises under a central bank digital currency (CBDC)".

Boar, C., Holden, H. and Wadsworth, A. (2020), "Impending arrival–a sequel to the survey on central bank digital currency", BIS Paper, p. 107.

Central Statistics Office (2022). Press Statement Census of Population 2022 - Preliminary Results. Available at: https://www.cso.ie/en/csolatestnews/pressreleases/2022pressreleases/pressstatementcensusofpopulation2022-preliminaryresults/ (Accessed: 03 August 2022).

Fernández-Villaverde, J., Sanches, D., Schilling, L. and Uhlig, H. 2021, 'Central bank digital currency: central banking for all?', *Review of Economic Dynamics*, 41, pp. 225-242.

Fisher, M. J. and Marshall, A.P. (2009), 'Understanding descriptive statistics', Australian Critical Care, 22(2), pp. 93-97.

Gopane, T. J. (2019) 'An enquiry into digital inequality implications for central bank digital currency', *in 2019 IST-Africa Week Conference (IST-Africa)*, 2019, pp. 1-9, doi: 10.23919/ISTAFRICA.2019.8764838.

Habidin, N. F., Zubir, A. F., Nursyazwani M. L., Nor A. and Azman, M.N.A. (2015). Sustainable Performance Measures for Malaysian Automotive Industry. 33. 1017-1024. 10.5829/idosi.wasj.2015.33.06.257.

Han, X., Yuan, Y. and Wang, F. Y. (2019) 'A blockchain-based framework for central bank digital currency', *2019 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI)*, 2019, pp. 263-268, doi: 10.1109/SOLI48380.2019.8955032.

International Monetary Fund (2020). World Economic Outlook, April 2020. Great Lockdown: International Monetary Fund (IMF).

Kaiser, H. F. (1974). An index of factorial simplicity. Psychometrika, 39, 31–36.

Koroma, J., Rongting, Z., Muhideen, S., Akintunde, T. Y., Amosun, T. S., Dauda, S. J. and Sawaneh, I. A. (2022) 'Assessing citizens' behavior towards blockchain cryptocurrency adoption in the Mano River Union States: Mediation, moderation role of trust and ethical issues', *Technology in Society*, *68*. https://doi.org/10.1016/j.techsoc.2022.101885

Koziuk, V. (2021) 'Confidence in digital money: Are central banks more trusted than age is matter?' In *Investment Management and Financial Innovations*, 18(1), pp. 12–32. https://doi.org/10.21511/imfi.18(1).2021.02

Lee, D. K. C., Yan, L. and Wang, Y. (2021) 'A global perspective on central bank digital currency' *China Economic Journal*, *14*(1), 52–66. https://doi.org/10.1080/17538963.2020.1870279

Marshall, G. and Jonker, L. (2010) 'An introduction to descriptive statistics: A review and practical guide", Radiography, 16(4), pp. 1-7.

Noora, S.(2021) "Factor Analysis as a Tool for Survey Analysis." American Journal of Applied Mathematics and Statistics, vol. 9, no. 1 (2021): 4-11. doi: 10.12691/ajams-9-1-2.

Opare, E.A. & Kim, K. 2020, "A Compendium of Practices for Central Bank Digital Currencies for Multinational Financial Infrastructures", *IEEE Access*, vol. 8, pp. 110810-110847.

Ozili, P. K. (2022) 'Central bank digital currency research around the world: a review of literature', *Journal of Money Laundering Control*. https://doi.org/10.1108/JMLC-11-2021-0126.

Pocher, N. and Veneris, A. (2021) 'Privacy and transparency in CBDCs: A regulation-by-design AML/CFT scheme', *IEEE International Conference on Blockchain and Cryptocurrency, ICBC 2021*. https://doi.org/10.1109/ICBC51069.2021.9461090

Raiche, G. and Magis, D. (2020) 'Package nFactors - Parallel Analysis and Other Non-Graphical Solutions to the Cattell Scree Test".

Schaupp, L. C. and Festa, M. (2018) 'Cryptocurrency adoption and the road to regulation', *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3209281.3209336

Schaupp, L. C., Festa, M., Knotts, K. G. and Vitullo, E. A. (2022), 'Regulation as a pathway to individual adoption of cryptocurrency'. *Digital Policy, Regulation and Governance*, *24*(2), 199–219. https://doi.org/10.1108/DPRG-08-2021-0101

Selim, M. (2020), 'Countercyclical monetary policy for overcoming COVID 19 induced recession by introducing incentive based digital currency', *in 2020 International Conference on Data Analytics for Business and Industry: Way Towards a Sustainable Economy, ICDABI 2020*. https://doi.org/10.1109/ICDABI51230.2020.9325643

Sethaput, V. and Innet, S. (2021), 'Blockchain Application for Central Bank Digital Currencies (CBDC)' *2021 3rd International Conference on Blockchain Computing and Applications, BCCA 2021*, pp. 3–10. https://doi.org/10.1109/BCCA53669.2021.9657012

Shalini, S. and Santhi, H. (2019), 'A survey on various attacks in bitcoin and cryptocurrency', *in: Proceedings of the 2019 IEEE International Conference on Communication and Signal Processing, ICCSP*, 2019, pp. 220–224, https://doi.org/10.1109/ ICCSP.2019.8697996, 2019.

Solberg Söilen, K., & Benhayoun, L. (2022) 'Household acceptance of central bank digital currency: the role of institutional trust', *International Journal of Bank Marketing*, *40*(1), pp. 172–196. https://doi.org/10.1108/IJBM-04-2021-0156

Sun, H., Mao, H., Bai, X., Chen, Z., Hu, K., & Yu, W. (2018). Multi-blockchain model for central bank digital currency. *Parallel and Distributed Computing, Applications and Technologies, PDCAT Proceedings*, *2017*, pp. 360–367. https://doi.org/10.1109/PDCAT.2017.00066

Susanto, A., Tamimi, Z., Catur Utami, M., Fitriyani, A., Sujoko I. and Asmawi, (2020) 'Examining the implications of unified theory of acceptance and use of technology for national library navigation systems', *2020 8th International Conference on Cyber and IT Service Management (CITSM)*, 2020, pp. 1-6, doi: 10.1109/CITSM50537.2020.9268885.

Tsai, W. T., Zhao, Z., Zhang, C., Yu, L. and Deng, E. (2018) 'A multi-chain model for CBDC', *in 2018 5th International Conference on Dependable Systems and Their Applications, DSA 2018*, 25–34. https://doi.org/10.1109/DSA.2018.00016

Ugoni, A and Walker, Bruce. (1995). The Chi square test: an introduction. COMSIG review / COMSIG, Chiropractors and Osteopaths Musculo-Skeletal Interest Group. 4. 61-4.

Venkatesh, V., Thong, J.Y. and Xu, X. (2012) 'Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology', *MIS Quarterly*, pp. 157-178.

Venkatesh, V., Morris, M., Davis, G. and Davis, F. (2003) 'User Acceptance of Information Technology: Toward A Unified View', *MIS Quarterly*, 27(3), pp. 425-478.

Viñuela, C., Sapena, J. and Wandosell, G. (2020) 'The future of money and the central bank digital currency dilemma', *Sustainability (Switzerland)*, *12*(22), pp. 1–21. https://doi.org/10.3390/su12229697

Vinzi, V. E., Chin, W. W., Henseler, J. and Wang, H. (2010) 'Handbook of partial least squares', *Springler Handbooks of Computational Statistics*. doi 10.1007/978-3-540-32827-8.

Yang, J. and Li, Z. (2020) 'Impact of bitcoin's distributed structure on the construction of the central bank's digital currency system', in 2020 Fourth International Conference on Inventive Systems and Control (ICISC), 2020, pp. 829-832, doi: 10.1109/ICISC47916.2020.9171195.

Yohanes, K., Junius, K., Saputra, Y., Sari, R., Lisanti, Y. and Luhukay, D. (2020) 'Unified theory of acceptance and use of technology (utaut) model perspective to enhance user acceptance of fintech application', *in 2020 International Conference on Information Management and Technology (ICIMTech)*, 2020, pp. 643-648, doi: 10.1109/ICIMTech50083.2020.9211250.

Zhang, J., Tian, R., Cao, Y., Yuan, X., Yu, Z., Yan, X., and Zhang, X. (2021) 'A hybrid model for central bank digital currency based on blockchain'. *IEEE Access*, *9*, 53589–53601. https://doi.org/10.1109/ACCESS.2021.3071033

Zhang, X. (2020) 'Opportunities, challenges and promotion countermeasures of central bank digital currency', *Proceedings - 2020 Management Science Informatization and Economic Innovation Development Conference, MSIEID 2020*, 343–346. https://doi.org/10.1109/MSIEID52046.2020.00072