



كلية محمد بن راشد
للإدارة الحكومية
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Blockchain Technology Adoption in Non-profit Organizations in the UAE: A Study on Enhancing Transparency and Accountability

by

Alaa Raslan

This dissertation report is submitted in partial fulfillment of the Master of Public Administration award.



Declaration

I, the undersigned, Alaa Raslan, declare that this Dissertation is my original work, that all material presented to Mohammed Bin Rashid School of Government is my own, and was not submitted to any other university for a higher degree. I also declare that the publications cited in this work were personally consulted. I understand that if it shows that I have significantly misrepresented material presented to the Mohammed Bin Rashid School of Government, any degree or credits awarded to me based on that material may be revoked.

Signed: Alaa Raslan

Date: 28.6.2024

Student ID: 267082

Supervisor: Prof. Mohammad Habibur Rahman

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Abstract

The swift advancement of recent technologies has motivated non-profit organizations (NPOs) in different countries to adopt such technologies to provide better services and develop donation processes. NPOs depend on fundraising involving opaque operations, which may cause concerns that donations may not reach deserving people or be used for illegal purposes. The charity donations traceability scheme is necessary to overcome these concerns, which affect donors' trust, and ensure the transparency and accountability of donation processes. This qualitative study used exploratory research design to determine how NPOs can use blockchain technology to enhance transparency and accountability and how its adoption further advances these initiatives in the UAE NPOs. It studied international best practices and the UAE private and public sector cases to propose a policy and strategy to encourage the UAE charities to adopt such technology. It suggested a blockchain-based policy for donation traceability to allow stakeholders to track the progress of donations. The policy states facilitating all stakeholder collaboration, enhancing IT integration and expertise, developing governance architecture, and addressing NPOs' blockchain standards, regulations, and policies. In addition, the proposed strategy encourages the UAE NPOs to determine their current stage, recognize the challenges, and try to overcome them to adopt this technology. The main challenges that may cause NPOs to become stuck in the middle are cultural barriers, regulatory uncertainty, and stakeholder alignment. The strategy leads the UAE NPOs to build a blockchain on a particular platform, where every transaction is recorded as a block of information in the chain. The blocks are accessible to all parties and immutable, enabling traceable and timely transactions.

Keywords: *Blockchain Technology, Non-profit Organizations, Transparency, Accountability, International best practices*

ملخص البحث

شجع النمو السريع للتقنيات الحديثة المنظمات غير الربحية في مختلف البلدان اعتمادها، لتقديم أفضل الخدمات وتطوير عمليات التبرع، وربما انطوت عملية جمع الأموال في المنظمات غير الربحية على إجراءات غير واضحة بشكل كامل، مما يتسبب في عدم وصول التبرعات لمستحقيها، أو استخدام التبرعات لأغراض غير قانونية، وبالتالي فإنه من المهم تتبع التبرعات، للتغلب على هذا القلق، حفاظاً على ثقة المانحين، وضمان الشفافية والمساءلة في عمليات التبرع، تم استخدام تصميم البحث الاستكشافي في هذه الدراسة النوعية، لتحديد كيفية استخدام المنظمات غير الربحية لتقنية البلوكتشين، لتعزيز الشفافية والمساءلة، وكيف يؤدي اعتماد هذه التقنية لتعزيز المبادرات في المنظمات غير الربحية في دولة الإمارات العربية المتحدة، تم تسليط الضوء على أفضل الممارسات الدولية ودراسة الحالة في القطاعين العام والخاص في الدولة، لاقتراح سياسة واستراتيجية تشجع المنظمات غير الربحية في الدولة على تبني هذه التقنية لتتبع التبرعات وتمكين جميع الأطراف من تتبع تقدم التبرعات، تنص السياسة على تسهيل التعاون بين جميع أصحاب المصلحة، وتعزيز تكامل تكنولوجيا المعلومات والخبرة، وتطوير بنية الحوكمة، ومعالجة معايير ولوائح وسياسات البلوكتشين الخاصة بالمنظمات غير الربحية، وتشجع الاستراتيجية المقترحة على تحديد المرحلة الحالية للمنظمات غير الربحية في الدولة، والتعرف على التحديات، والتغلب عليها لتبني هذه التقنية، حيث تمثلت التحديات الأساسية التي جعلت المنظمات المعنية عالقة في الوسط في الحواجز الثقافية، والريبة في تبني التقنية، والصعوبة في المواءمة بين أصحاب المصلحة، وتقود هذه الاستراتيجية المنظمات المعنية لبناء سلسلة بلوكتشين على منصة معينة، حيث يتم تسجيل كل معاملة ككتلة من المعلومات في السلسلة، وتكون الكتل مرئية لجميع الأطراف وغير قابلة للتغيير، مما يتيح إمكانية تتبع المعاملات أي وقت.

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Abbreviations

NPOs	Non-profit Organizations
INGO	The International Non-Governmental Organizations Accountability Charter
AI	Artificial Intelligence
4IR	Fourth Industrial Revolution
STI	Science, Technology, and Innovation Technology
DLT	Distributed Ledger Technology
GDP	Gross Domestic Product
TCA	Transaction Cost Analysis
PAT	Principal Agent Theory
RBV	Resource-Based View
NT	Network Theory
LCs	Land Cadastres
LRs	Land Registries
LA	Land Administration
LM	Land Management
SDGs	Sustainable Development Goals
UNHCR	United Nations High Commission for Refugees
WFP	The World Food Program
WHO	World Health Organization
NHS	National Health Service
UK	United Kingdom
JRC	Joint Research Centre
GCC	Gulf Cooperation Council
ICT	The information and communication technology
EGDI	United Nations E-government Index
TII	Telecommunication Infrastructure Index
OSI	Online Services Index
HCI	Human Capital Index HCI
LOSI	Local Online Service Index
IMD	World Institute for Management Development
DIFC	Dubai Internal Financial Centre
DFSA	Dubai Financial Service Authority
SCA	Securities and Commodities Authority
VARA	Virtual Asset Regulatory Authority
SDO	Smart Dubai City Office
DESC	Dubai Electronic Security Centre
DDE	Dubai Data Establishment
DED	Dubai Economic Department
IEEE Access	Institute of Electrical and Electronics Engineers access journal
FATF	Financial Action Task Force
DP World	Dubai Port Authority
Emirates NBD	Emirates National Bank of Dubai
ADDA	Abu Dhabi Digital Authority
DGE	Department of Government Enablement
MOHAP	The Ministry of Health and Prevention
RTA	Roads and Transportation Authority
UTC	Etisalat Digital UAE Trade Connect
UNOS	United Network for Organ Sharing
MVP	Minimal Viable Product

Chapter 1 Introduction

1.1 Research Background

Blockchain technology is a valuable invention; it provides value to users without the need for a central authority or trust (Habib, et al., 2022). Digital signatures, established in 1991 to protect document integrity, form the foundation of blockchain technology, which is not new (Rehman, et al., 2021). Blockchain, the innovative data management technology created by Nakamoto in 2008 as Bitcoin, the first decentralized cryptocurrency (Lopez-Sorribes, et al., 2023). After exploring the benefits of blockchain for a few years, industries and governments began to use it in different domains such as recordkeeping, education, supply chain, and identity management (Irshad, et al., 2020). It became famous when it was associated with cryptocurrency in exchange for services, which is Bitcoin. (Weichbroth, et al., 2023). Bitcoin is supposed to be like the Euro, US dollar, Chinese yuan, and others in exchanging services and products (Weichbroth, et al., 2023). That could be done through blockchain technology, which transfers the currency securely (Habib, et al., 2022).

Blockchain technology is being explored by different researchers worldwide (Khan, et al., 2022). The UAE government introduced numerous strategies and policies that include integrating high technology into the non-governmental sector, such as the Artificial Intelligence (AI) strategy (U.AE, 2017), the Fourth Industrial Revolution (4IR) strategy (U.AE, 2017), the Emirates blockchain strategy (U.AE, 2018), and the Science, Technology, and Innovation Technology (STI) policy (U.AE, 2015). The study focuses on the Blockchain methodology and the typical addition it can establish in the field of non-profit management, financing, or investing in optimal ways, especially if it was realized that there are clear connections in how to benefit from this methodology more effectively and accurately (Rehman, et al., 2021). Awareness and adoption of blockchain in developing and developed nations is essential. Consequently, the study emphasizes addressing the following main and sub-questions.

NPOs accomplish functions to fundraise, distribute donations for beneficiaries, and strengthen the ecological and social dimensions of sustainable growth (Moreno-Albarracin, et al., 2020). They meet collective demands that the public sector cannot cover (Moreno-Albarracin, et al., 2020). One of the most significant challenges NPOs face is demonstrating that they distribute resources with the utmost accountability and transparency, which are crucial for survival (Moreno-Albarracin et al., 2020). In 2013, BitGive was the first NPO to host a donation project through Bitcoin in the United States (Shin, et al., 2020). It accomplishes philanthropic projects

globally in the public health and environment sectors, including supporting electronic devices for Nepal's medical services and constructing toilets in Kenyan schools (Shin, et al., 2020). The study suggests a blockchain-based solution to guarantee that no duplication of aid is provided to a beneficiary by the same or different NPOs, ensuring transparency and accountability.

1.2 Statement of the Problem

A significant area of focus throughout the study is how the blockchain application has advanced the global transparency processes of NPOs in the UAE. The impact is positive, and this study explores the outcomes.

In 2022, The UAE was ranked 8th in government efficiency, 4th in economic performance, 16th in business efficiency, and 26th in infrastructure, which reflects that public organizations in the UAE attain productive and competitive performances with the help of policies (IMD, 2022). Major problems depicted in the performance of organizations in the UAE were mainly due to a lack of knowledge on strategic, operational, and controlling concepts of blockchain technology implementation (Forum, 2020). The non-technical challenges mentioned are the simplicity of gathering all necessary stakeholders, the ambiguity of regulatory implications, and the level of awareness among the stakeholders involved (Forum, 2020). The technical challenges are addressing interoperability, managing security standards, guaranteeing the data integrity entering the chain, and harmonizing blockchain standards (Forum, 2020).

There have been several cases for private and public organizations in the UAE where, for various reasons, they faced different challenges implementing blockchain technology such as DP World, Etisalat Digital, Emirates NBD, Emirates Airlines, Abu Dhabi Digital Authority, Ministry of Health, RTA, and Prevention and Smart Dubai (Forum, 2020). One of the promising ranges of blockchain technology is the record-keeping of NPOs' actions (Rehman, et al., 2021).

Different attempts were made to find a proper non-profit platform using blockchain technology (Zwitter & Boisse-Despiaux, 2018). Adnan, Misbah, and Muhammad argued that the current systems are not structured well, vague, and absent in donors' confidence (Farooq, et al., 2020).

1.3 Study Aim and Objectives

This study investigates how NPOs in the UAE can use blockchain technology to be more open and trustworthy and enhance transparency and accountability. This study aims to develop an efficient response to the challenges currently faced by NPOs in adopting blockchain technology to ensure transparency and accountability.

However, study objectives have been set to achieve the above aim. These objectives can be highlighted as follows:

1. To identify the aspects of transparency and accountability required by the UAE government, the Ministry of Community Development, and the Ministry of Foreign Affairs that NPOs currently find challenging to meet.
2. To propose adopting blockchain technology to address and enhance transparency and accountability.
3. To support non-profit policymakers and other relevant stakeholders in the UAE in providing practical recommendations to develop effective and responsible adoption of blockchain technology.

1.4 Main Research Question

How do NPOs use blockchain technology to enhance transparency and accountability, and how can its adoption advance these initiatives in the UAE NPOs?

1.5 Sub-Questions

a) How may blockchain technology adoption in NPOs enhance transparency in the UAE NPOs?

b) How may blockchain technology adoption in NPOs enhance accountability in the UAE NPOs?

1.6 Significance of Study

Conducting this study is fundamental, as it is considered one of the UAE's first efforts to explore blockchain technology's significance in NPOs to provide a secure, transparent, auditable, and efficient system (Farooq, et al., 2020). The UAE government has released various policies and strategies regarding advanced technologies to become a leader in generating innovative technologies and enhancing the advancement of non-profit services. These advanced strategies involve the Emirates blockchain strategy (U.AE, 2018). The strategy aims to unite advanced technologies to change 50% of federal government transactions to blockchain by 2021 (U.AE, 2018). As a result, people can save time, resources, and effort by conducting transactions at their convenience, which fits into their work and lifestyle (U.AE, 2018). The strategy saves eleven billion dirhams annually to document transactions, 389 million documents, 1.6 billion kilometres of driving, and seventy-seven million working hours

(U.AE, 2018). The study findings align with strategies that optimize technology integration and reshape the system of NPOs. In addition, they add new knowledge on the results of using blockchain technology in UAE NPOs.

1.7 Expected Contributions

The findings contribute to the existing knowledge on blockchain adoption in NPOs, particularly within the context of the UAE. It is helpful for researchers, academics, and practitioners to understand the dynamics of such technology adoption in NPOs. It analyses and identifies various methods of adopting blockchain technology in NPOs. Besides, the study focuses on the challenges, benefits, and open issues of blockchain adoption in NPOs in the UAE. Furthermore, the study adds a new correlation between blockchain adoption, transparency, and accountability for NPOs. It analyses how the technology methodology works, the characteristics of blockchain, methodological applications, and the most prominent observations on NPOs' adoption.

1.8 Report Outline

The report consists of six chapters, which are written as follows:

- Chapter 1 is the introductory chapter and an overview of the dissertation, including objectives, research problem, and research significance.
- Chapter 2 presents a literature review on blockchain adoption in NPOs to enhance transparency and accountability within the UAE context. This review systematically examines existing research, theories, and frameworks relevant to blockchain technology's application in the non-profit sector, highlighting the unique challenges and opportunities that NPOs encounter in adopting such innovative solutions.
- Chapter 3 explains the study design and methodology adopted for this secondary data-based work, including the epistemological position and data collection process.
- Chapter 4 presents study results and analyses of findings derived from secondary data, discussing how these findings clarify the adoption of blockchain to enhance transparency and accountability. This chapter concludes with the study findings and discussions based on thematic analysis and other appropriate information derived from the data.
- Chapter 5 presents recommendations and an overview of how the findings address the study's aim, considering the existing theories. This chapter also includes a summary and the main contributions, followed by future study avenues

Chapter 2 Literature Review

2.1 Introduction

Blockchain technology is a mechanism that allows transactions to be verified and provides an immutable, distributed, secure, transparent, and auditable ledger (Reyna et al., 2018). This technology is an accounting ledger or a digital file that tracks transactions (Abad-Segura, et al., 2021). It became well known due to sending encrypted money smoothly at a lower cost (Abad-Segura, et al., 2021). Recently, blockchain has brought significant advantages to financial transactions due to its contribution to streamlining and automating financial organizations, enhancing businesses' transparency, and developing trustworthy schemes (Ali, et al., 2020). Significantly, blockchain technology is well-known in the financial sector because it is secure and well-tested in financial applications (Almaghrabi & Alhogail, 2022). As a result, this technology continues to have a positive impact on financial transactions globally (Almaghrabi & Alhogail, 2022). For instance, it simplifies the worldwide transfer of funds, ignoring the additional costs like currency change charges (Trautman, 2016). McKinsey estimates that the transaction cost could potentially decrease from \$26 to \$15 with the implementation of blockchain technology (Guo & Liang, 2016). Blockchain facilitates security and transparency by allowing for traceable, irreversible, and immutable transactions, which increases people's trust in such systems (Ali, et al., 2020). Blockchain is distinct because it is a foundational platform that integrates and supports other technologies like digitization, AI, internet security, big data, and cryptocurrencies (Almaghrabi & Alhogail, 2022) (Ali, et al., 2020). Unlike these tools and media, blockchain's decentralized ledger ensures enhanced transparency, security, and transaction accountability (Almaghrabi & Alhogail, 2022) (Ali, et al., 2020).

This section provides a detailed literature review on blockchain adoption to develop transparency and accountability in NPOs globally and in the UAE. The chapter begins with definitions of Bitcoin, blockchain, smart contracts, transparency, accountability, and NPOs. This is followed by a detailed discussion of blockchain adoption enhances transparency and accountability within the non-profit sector. The subsequent section of this chapter discusses the proposed theoretical framework, which aligns with all the concepts discussed in the literature review. The last section concluded with the rationale for adopting a qualitative methodology for the objective of this study.

2.2 Blockchain Background

Recently, blockchain has been the subject of significant study interest due to its application in financial and non-financial schemes, including healthcare, insurance, and supply chain schemes (Almaghrabi & Alhogail, 2022). The Distributed Ledger Technology (DLT) database contains a list of records (AbdelMonem, 2019). Blockchain exemplifies DLT, wherein transactions are grouped in blocks and sequentially recorded in a chain of blocks (AbdelMonem, 2019).

Even though blockchain is a recent technology, it has an extensive history (Habib, et al., 2022). Blockchain dates to 1991, when Wakefield and Stuart introduced the idea of a cryptographically protected chain of records (Habib, et al., 2022). When Satoshi Nakamoto created a model and application, the technology entered a pivotal year in 2008. As a result of the first cryptocurrency launched in 2009, the blockchain impact of technology began to expand. It was the first generation and was called Grandpa Bitcoin (Habib, et al., 2022). In 2013, Vitalik Buterin, a Russian Canadian programmer, developed an open-source computing platform built on blockchain technology through smart contracts, and that was the second generation of child prodigy Ethereum (AbdelMonem, 2019). The third generation seeks to develop security, shorten transaction time, and reduce transaction costs (AbdelMonem, 2019). Different organizations are working on developing infrastructure such as EOS, Dfinity, NEO, and Ethereum itself. The intelligent art below summarizes the progress of blockchain generations.

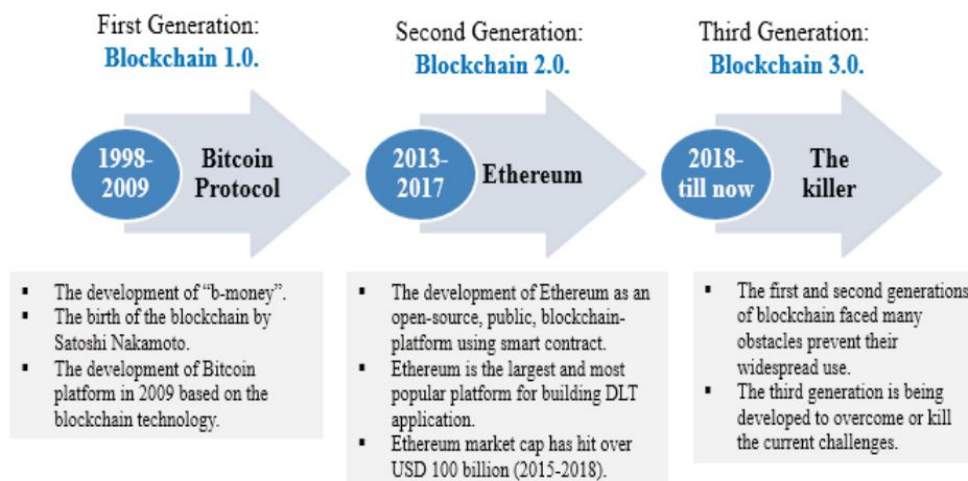


Figure 1: The Uprising of Blockchain Technology, (AbdelMonem, 2019)

Bitcoin cryptocurrency was the first use of this technology, which was known as a virtual cryptocurrency that keeps its value without support from any financial entity or centralized

authority (Reyna, et al., 2018). Blockchain technology utilizes distributed ledger knowledge, intelligent contracts, and agreement mechanisms to ensure a more secure system (Vionis & Kotsilieris, 2023). A smart contract is an automated transaction protocol that executes the conditions of a contract and has a method for automatically fulfilling or self-executing the contractual clauses (Reyna, et al., 2018). It facilitates the agreement regardless of the needs of the third party (Vionis & Kotsilieris, 2023). Verified or valid transactions are stored as linked transactions, either associated with the preceding transaction or as blocks. Once a new block is created, it incorporates the value of the prior block, as shown in the figure below (Vionis & Kotsilieris, 2023).

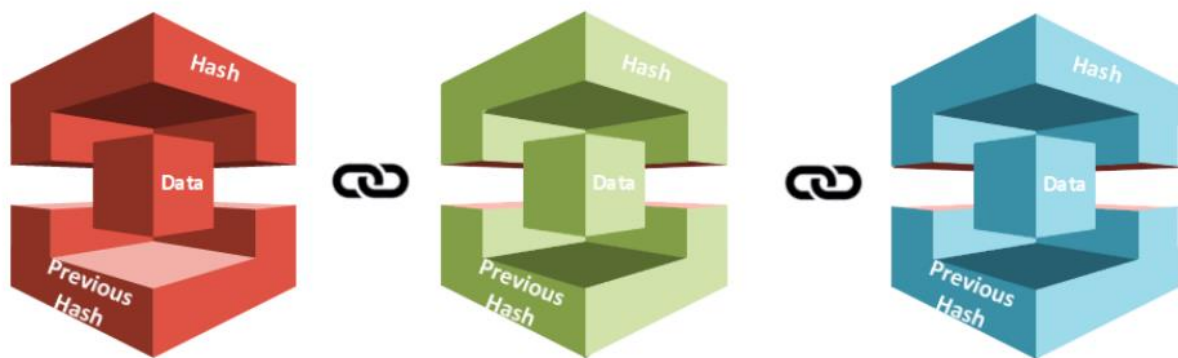


Figure 2 A Random Number of Blocks (Vionis & Kotsilieris, 2023)

As a result, each change to the previous block is immediately added to the associated blocks and is visible to all the chain's participants (Vionis & Kotsilieris, 2023). This term refers to the immutability of data files, where records cannot be adapted once they are accepted in the chain (Vionis & Kotsilieris, 2023). Based on these characteristics, this technology was used for digital transactions and smart contracts (Vionis & Kotsilieris, 2023). Nineteen leading blockchain platforms have different technical provisions that define the capabilities of the systems and business use, like Bitcoin, Ripple, Corda R3, Ethereum, IOTA, MultiChain, and NEM (Keresztes, et al., 2022).

2.2.1 The Market Value

Among 8,000 global blockchain businesses, 114 are based in Dubai, accounting for 1.4% of the total global blockchain businesses (Dubai, 2018). The market capitalization of cryptocurrencies soared in 2017 to hit USD 300 billion. One percent of the global market value is in Dubai (Dubai, 2018). While some industries anticipated that the market capitalization might reach USD 1 trillion by the end of 2018, it dropped to USD 105 billion in the same year,

indicating the market's volatile nature (AbdelMonem, 2019). The chart below presents the top cryptocurrencies' market capitalization in billion USD in 2018.

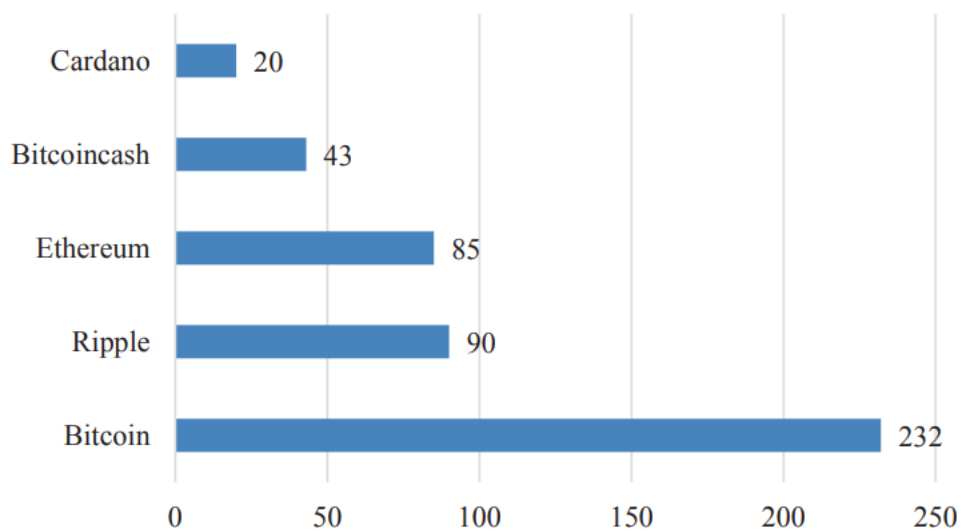


Figure 3: Top Cryptocurrencies' Market Capitalization Billion USD (AbdelMonem, 2019)

Khan et al. (2022) stated that the world is experiencing a swift adoption of blockchain technology, with a projected market value of USD 176 billion by 2025 (Khan, et al., 2022). AbdulMomen (2019) highlighted a growing global interest in blockchain due to the global economic profits of USD 3.1 trillion by 2030, and 10% of the world gross domestic product (GDP) will be kept on blockchain platforms in 2025. The global market is expected to be worth USD 20 billion by 2024 (AbdelMonem, 2019). Moreover, USD 1.4 billion has been invested over the past three years, the Ethereum market hit USD 100 billion between 2015-2018, and 24 countries are involved in the global blockchain technology race (AbdelMonem, 2019).

Cryptocurrency's money supply cannot trigger inflation pressure. It can be a source of deflationary pressure and can be used by the central bank to support the monetary policy and curb inflation (AbdelMonem, 2019). Despite that, if the monetary policy aims to contain deflationary pressures, cryptocurrencies do not make it easier. The chart below shows the creation of Bitcoin money and the inflation rate.

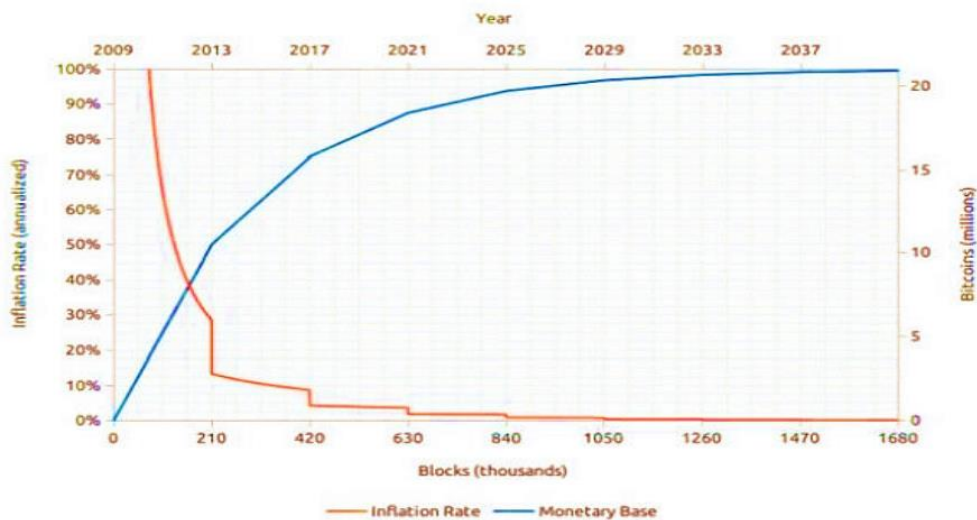


Figure 4: Bitcoin Money Creation and Inflation Rate (AbdelMonem, 2019)

Furthermore, cryptocurrencies should reach a competitive stage with fiat currency to have a noteworthy effect on the monetary policy, and that is not the case now (AbdelMonem, 2019). For example, the global money supply of Bitcoin was USD 105 billion, while the US dollar money supply was trillion dollars in 2018. Eventually, it will not affect the monetary policy without tangible technological advances (AbdelMonem, 2019).

2.2.2 Main Theories

Six theories provide essential frameworks for computing and tracing transactions, offering valuable insights into various aspects of transactional processes. The following paragraphs explain the logic of transactional dynamics. These include the theory of computation, which depends on algorithms and computing to clarify the limitations and capabilities of computers. The intelligent contract application platforms and privacy theories facilitate automated and secure transactions. Furthermore, the game theory investigates the probability of an attacker who may exploit the system. Supply chain management theories provide an integrated framework for designing supply chain management, and the stakeholder theory highlights the importance of considering the interests of all stakeholders. These theories offer a comprehensive understanding of computing nature and tracing transactions.

2.2.2.1 The Theory of Computation

The theory of computation, a segment of theoretical computer science and mathematics, concerns itself with various problems that could be solved using the computing model and algorithm to what degree they could be solved (Burgin & Dodig-Crnkovic, 2020). It is divided

into formal languages and automata theory, computational complexity theory, and computability theory, which encompass the limitations and capabilities of computers (Burgin & Dodig-Crnkovic, 2020).

2.2.2.2 The Game Theory

Another study by Dong et al. (2017) proposed a solution using game theory and smart contracts, which let the client ask two cloud servers to operate the same task (Dong, et al., 2017). Based on this process, the intelligent contract stimulates betrayal, tension, and distrust between clouds. As a result, users regulate the reasonable clouds that will not cheat or collude. Experiments are conducted based on the contract written in solidity using the official Ethereum network to ensure this proposal's effectiveness. Taherdoost (2023) stated that game theory, developed by Piasecki, investigated the dynamics among players (Taherdoost, 2013). Smart contracts and the game of theory were used to examine the probability of an attacker who may exploit the system by buying more computing resources (Taherdoost, 2013).

2.2.2.3 Smart Contract Application Platforms

Buterin (2014) published a white paper explaining the usage of the next generation of innovative contract application platforms (Buterin, 2016). He presented the restrictions and advantages of blockchain technology and suggested the Ethereum blockchain with a programming language that makes it easier for everyone to generate a smart contract (Buterin, 2016). He developed three applications: (1) semi-financial applications to involve both nonmaterial assets and money; (2) financial applications to help manage assets and generate contracts; (3) non-financial applications like decentralized management and online voting (Burgin & Dodig-Crnkovic, 2020). This new Ethereum blockchain is a platform to simplify this technology and a reason for interest among startups and leading software developers (Buterin, 2016).

2.2.2.4 Smart Contract Privacy

In 2015, Kosba et al. (2016) suggested a solution for intelligent contract privacy (Kosba, et al., 2016). The solution established the foundation for intelligent contracts by incorporating software compiler usage to generate code for the smart contract with a cryptographic protocol (Kosba, et al., 2016). The software contains a private portion, where data are protected using cryptographic methods, and a public portion not related to money or private data (Kosba, et al., 2016). From a security viewpoint, on-chain contractual security protects parties from each other, and privacy protects contractual parties against the public (Kosba, et al., 2016).

2.2.2.5 Supply Chain Management Theories

Treiblmaier (2018) published a paper that presented a starting point for developing theories using the four well-integrated theories: principal-agent theory (PAT), transaction cost analysis (TCA), network theory (NT), and resource-based view (RBV) (Treiblmaier, 2018). These four theories cover managerial NT, RBV, and structural TCA and PAT aspects, providing an integrated framework for designing supply chain management (Treiblmaier, 2018). He mentioned the possible implications of blockchain technology for supply chain management using PAT, TCA, RBV, and NT theories (Treiblmaier, 2018). The RBV theory clarifies that only a subgroup of resources creates a company's competitive advantage (Treiblmaier, 2018). In addition, a smaller subgroup creates superior performance (Treiblmaier, 2018). The scarce resources allow the company to survive as long as no substitutes emerge (Treiblmaier, 2018). Network theory seeks to understand the dynamics of relations among parties and create trust through exchange processes and corporative relations (Treiblmaier, 2018). To access external resources, companies need to establish relations and stable and changing networks (Treiblmaier, 2018). Agency costs within PAT are tracking expenses by the principal, bonding spending by the agent, and remaining losses (Treiblmaier, 2018). The principal has imperfect information regarding the agent's practices, so they must trust him to a certain extent (Treiblmaier, 2018). The TCA theory suggests that the collection of the most systematic types of inter- and intra-organizational structures affects the competence of different kinds of governance appliances regarding transaction costs and production (Treiblmaier, 2018). The most important findings were that smart contracts can solve or alleviate the problem of information asymmetry from a PAT perspective (Treiblmaier, 2018). Transaction Cost Analysis (TCA) assists in elucidating how the costs of transactions within and between organizations are altered by blockchain technology and its influence on organizational boundaries (Cocco, et al., 2017). RBV helps allocate resources to obtain a competitive advantage (Treiblmaier, 2018). While the blockchain's specific characteristics are predictable in rendering certain benefits, they might deliver planned chances for fast adopters (Treiblmaier, 2018). Finally, the blockchains guarantee the creation of a trust, which can be methodically inspected by applying NT (Werbach, 2018).

2.2.2.6 The Stakeholder Theory

According to the stakeholders' theory, studied by Freeman (1984), any group that impacts an organization's achievements is called a stakeholder (Ortega-Rodriguez, et al., 2020). The theory attracted expanded interest from non-profit researchers (Wellens & Jegers, 2014)

because it creates value given that it meets the requirements and exceeds the prospects of stakeholders in terms of data transparency (Ortega-Rodriguez, et al., 2020). NPOs must clarify the critical information for each stakeholder and improve specific tools that allow the company to meet the stakeholders' reporting demands (Ortega-Rodriguez, et al., 2020). Stakeholders' accessibility to organization information concerning the processes of NPOs is vital for donation decisions (Ortega-Rodriguez, et al., 2020). Examining the disclosure patterns of NPOs is significant because current and potential stakeholders invest their money and time. So, the organization wants to know if they are used efficiently (Ortega-Rodriguez, et al., 2020).

2.2.3 Trust Between Donor Agencies and NPOs

NPOs receive funds from donor organizations or individuals to address various needs and issues in improving countries, like education, earthquake relief, medicine, health, and more (Rehman, et al., 2021). Beneficiaries depend on donors or NPOs due to financial issues (Rehman, et al., 2021). For example, Education International, the Association of Childhood Education International, UNESCO, UNICEF, and Save Children are working worldwide to guarantee that every child obtains a high-quality education (Rehman, et al., 2021). Some donor agencies have lost trust in non-governmental organizations in underdeveloped countries due to the misuse of funds, as evidenced by the irregularities in the records (Rehman, et al., 2021). Then, the number of actual receivers is smaller than the claimed beneficiaries because the same individuals benefit from multiple non-governmental organizations simultaneously (Rehman, et al., 2021).

Several efforts exist to find a solution for a more developed and integrated charity platform (Farooq, et al., 2020). The charity sector, of which 18% of activities are religious, plays a vital role in the public good and is a significant driver in providing open benefits to the community (Farooq, et al., 2020). Donors' trust is required to ensure long-term sustainability for NPOs (Moreno-Albarracin, et al., 2020). Farooq, Khan, and Abid (2020) claimed that donations are frequently reported due to misuse as they are non-profit, affecting the detailed wealth audit (Farooq, et al., 2020). According to Khan and Abid (2020), 38% of charities were investigated due to poor bookkeeping and carelessness associated with religion-based charities (Farooq, et al., 2020). Unfortunately, responsibility assessment and transparency between NPOs are long overdue (Farooq, et al., 2020).

Farooq, Khan, and Abid (2020) claimed that due to the decreasing trust factor, a declining pattern of individual giving existed, and prosocial conduct among people dropped by 11%. The

main reason for these problems was a need for more transparency in fundraising (Farooq, et al., 2020). Transparency refers to information disclosed to the audience by NPOs (Ortega-Rodriguez, et al., 2020). Accountability includes disclosing information, responding to stakeholder concerns, enabling participation, and evaluating performance (Ortega-Rodriguez, et al., 2020). The study focuses on objective sixteen of the SDGs, which includes 16.6: Develop accountable, effective, and transparent institutions at all levels (Ortega-Rodriguez, et al., 2020). The SDGs aim to develop the environment worldwide, eradicate poverty, and enjoy prosperity and peace for all people. However, fighting against corruption and bribery is a priority, as is improving transparent and efficient accountability for different entities (Ortega-Rodriguez, et al., 2020). Ortega-Rodriguez (2020) stated that the International Non-Governmental Organizations Accountability Charter is a global regulatory effort that spans various sectors (Ortega-Rodriguez, et al., 2020). It details ten commitments to accountability and transparency essential for NPOs' governance (Ortega-Rodriguez, et al., 2020). The multiple commitments to accountability are fundamental to what the INGO considers effective practices in third-sector accountability (Ortega-Rodriguez, et al., 2020). Donors, including individuals, local bodies, international aid organizations, and foreign funding sources, contribute their money to NPOs such as religious charity collection bodies, NPOs, or hospitals. This is particularly relevant in Islam, where contributing zakat is required (Farooq, et al., 2020). Farooq, Khan, and Abid (2020) also claimed that the issue with the current donation system is that donors do not have direct contact with the beneficiary, leading to inefficient subsystems and vague claims of distributing the donations to beneficiaries (Farooq, et al., 2020).

2.2.4 Charity Donation Traceability

Different systems were developed to trace, collect, and allocate donations (Almaghrabi & Alhogail, 2022). Various studies focused on integrating the parties in the donation process to simplify the donations' traceability (Almaghrabi & Alhogail, 2022). For example, Thoutam et al. (2022) offered an application to gather donors and volunteers who seek to donate books, clothes, and food to beneficiaries (Thoutam, et al., 2022). Sai, Elapanti, and Pinthepu (2018); Pribadi et al. (2021) recommended the provision of a list stipulating the stuff needed by NPOs to simplify the reach and collect the second-hand stuff that is still usable (Sai, et al., 2018), (Pribadi, et al., 2021). Many mobile-based platforms were developed due to the accessibility of inexpensive devices like mobile phones and tablets for fundraising (Almaghrabi & Alhogail, 2022). Mon, Cheng, and Shibghatullah (2019) developed a prototype mobile application allowing donors to donate to charities directly (Mon, et al., 2019). Shelar, Salve, and Kedari (2020) developed an intelligent system using distributed server-client computing technology to

facilitate donations of money, food, clothes, and amenities (Shelar, et al., 2020). The system reduces scams and allows donors to trace their contributions and donations (Shelar, et al., 2020).

2.3 International Best Practices

Reviewing the literature indicated that best practices in blockchain technology vary across countries, sectors, industries, and projects. The international best practices research for blockchain technology included empirical and conceptual work.

2.3.1 Blockchain-based Land Ownership and Management

Racetin et al. (2022) stated that some papers contextualize blockchain technology within the framework of land cadastres (LCs), land registries (LRs), land administration (LA), land registration and land management (LM), and its application benefits (Racetin, et al., 2022). Racetin et al. (2022) used good governance as a vital term that everything else regarding land relies on (Racetin, et al., 2022). By analyzing its eight main points (accountability, transparency, law, responsiveness, participation, equity and completeness, consensus orientation, and efficiency and effectiveness), it can be stated that it is the basis by which blockchain easily fits in (Racetin, et al., 2022). One of the main issues in the modern world is the existing land registries and the development of LM. In different countries, existing land systems are not trusted, and corruption, fraud, and issues related to quality deficiencies can be addressed through blockchain technology (Lemmen, et al., 2017). Ghana, an African state, is relatively open to using blockchain technology since it obtains 80% of landowners in nonregistered countries. Using blockchain solves the issue by registering ownership electronically. The experimental project started in 2017, but no concrete results emerged (Rodima-Taylor, 2016). Some experimental projects were conducted in Brazil and Honduras, but no official outcomes were achieved due to obstacles to the implementation method. Dubai, however, successfully implemented blockchain technology. (Racetin, et al., 2022). All contracts are recorded in a secure database, including real estate rights and lease agreements. According to Dubai's plan, they will finish the digitalization soon (Racetin, et al., 2022). Dubai Land Department adopted blockchain technology, cooperating with Smart Dubai (Department, 2017). Furthering the Dubai Blockchain Strategy, the Dubai Land Department launched the new technology at the GITEX exhibition to be the first government entity to carry out its transactions using blockchain worldwide (Department, 2017).

2.3.2 Blockchain-based Supply Chain Management

Blockchain technology is also used in supply chain management to track the goods' journey and verify authenticity and origin (Zwitter & Boisse-Despiaux, 2018). For example, the Provenance company used blockchain to track products and materials securely and transparently (Team, 2015). De Beers, a diamond company in London, used Tracr and Ethereum blockchain platforms to prove the diamonds are conflict-free, tracking the diamond color, cut, carat, and its location in the supply chain (Keresztes, et al., 2022). That made scanning any stage of cutting, mining, polishing, or selling operations easier, eliminating the need for mail-in verifications, which take time and cost a lot (Keresztes, et al., 2022). Walmart, a food retail company in Bentonville, USA, used the Hyperledger Fabric blockchain's platform to monitor several risky foods (Keresztes, et al., 2022). It tracked 1500 products using blockchain, triple that last year, and its food safety initiative became more visible to customers (Keresztes, et al., 2022). Tech Mahindra, Unicef, and Gavi collaborated in the technology arm: media and entertainment, telecom, retail, manufacturing, and energy, and used Hyperledger blockchain's platform. Gavi, the vaccine alliance, dealt with the World Health Organization (WHO) to develop the COVID-19 vaccine database (Keresztes, et al., 2022). It allowed the trace of vaccines from the factory to recipients, so counterfeiting was forbidden, and vaccines were not wasted (Keresztes, et al., 2022). The largest bank in the world, the Industrial and Commercial Bank of China, has 40 blockchain applications. It used Emperor Seal Chain as a blockchain platform to access government transportation data through ICBC customers' wallets (Keresztes, et al., 2022).

2.3.3 Blockchain-based Digital Identity

Among other initiatives, the Estonian government applied an e-residency scheme using blockchain to electronically record marriage, business contracts, and birth certificates and check residency status (Sullivan & Burger, 2017). The Korean government used blockchain for identity management (Khan, et al., 2022).

2.3.4 Blockchain and Digital Governments

The outbreak of the COVID-19 pandemic stimulates blockchain technology usage investigation to answer the needs arising from the pandemic, like trackable, safe, cost-effective, successful decision-making, and faster intervention (Capece & Passiatore, 2021). Consequently, every organization should provide more efficient, transparent, and effective services to citizens (Khan, et al., 2022). Through this approach, organizations can generate

fresh public value for businesses and citizens, enhance performance, and ensure effectiveness, efficiency, and transparency in the management of public institutions (Mensah & Piankova, 2018). Blockchain application has become essential for governments to innovate the digital service landscape and technology (Khan, et al., 2022). Consequently, governments like Denmark, the Netherlands (Ebbbers, et al., 2016), Saudi Arabia (Alkrajji, 2020), and the UAE made e-government services obligatory (Rodriguez-Hevia, et al., 2020). Governments are moving towards evidence-based decisions and data-driven policymaking by implementing blockchain big data and artificial intelligence in their processes (Khan, et al., 2022). That helps support sustainable development and promote resilient societies (Joia & Vieira, 2021).

However, gaps in this technology adoption in the context of e-government are not found in the theoretical literature (Kassen, 2022). A lack of study focuses on understanding how government operations and services might be improved using blockchain technology (Khan, et al., 2022). In addition, researchers identified the absence of policy frameworks to implement blockchain technology worldwide (Khan, et al., 2022). A significant gap exists between the social and cultural features of developing countries like Arab nations compared to Western nations (Al-Hujran, et al., 2015). Previously, e-government adoption primarily focused on developed countries, with limited studies conducted in the Arab region (Allessie, et al., 2019).

Multitude motivations encourage organizations to adopt blockchain technology compared to traditional databases (Khan, et al., 2022). Centralized databases are housed in centralized servers within organizations, making them vulnerable to unauthorized access by malicious operators who could potentially compromise or destroy the information (Khan, et al., 2022). Eventually, that leads to breaches (Khan, et al., 2022). For example, in 2018, the National Health Service (NHS) encountered coding errors affecting 150,000 patients in England during a data breach, resulting in the exposure of sensitive data without the patients' knowledge (Sütterlin, et al., 2022). The issue with the software utilized for recording medical treatments was identified (Sütterlin, et al., 2022). Patients agreed for data to be utilized for individual care, but it was exposed to external auditors (Sütterlin, et al., 2022). Over the last two decades, a persistent positive trend has existed towards better e-government improvements globally (Khan, et al., 2022). Governments realized digital transformations' far-reaching potential for ensuring accountability, inclusion, and participation and for greater effectiveness and efficacy (Khan, et al., 2022). Figure 1 presents the usage of blockchain for the government sector worldwide (Khan, et al., 2022).

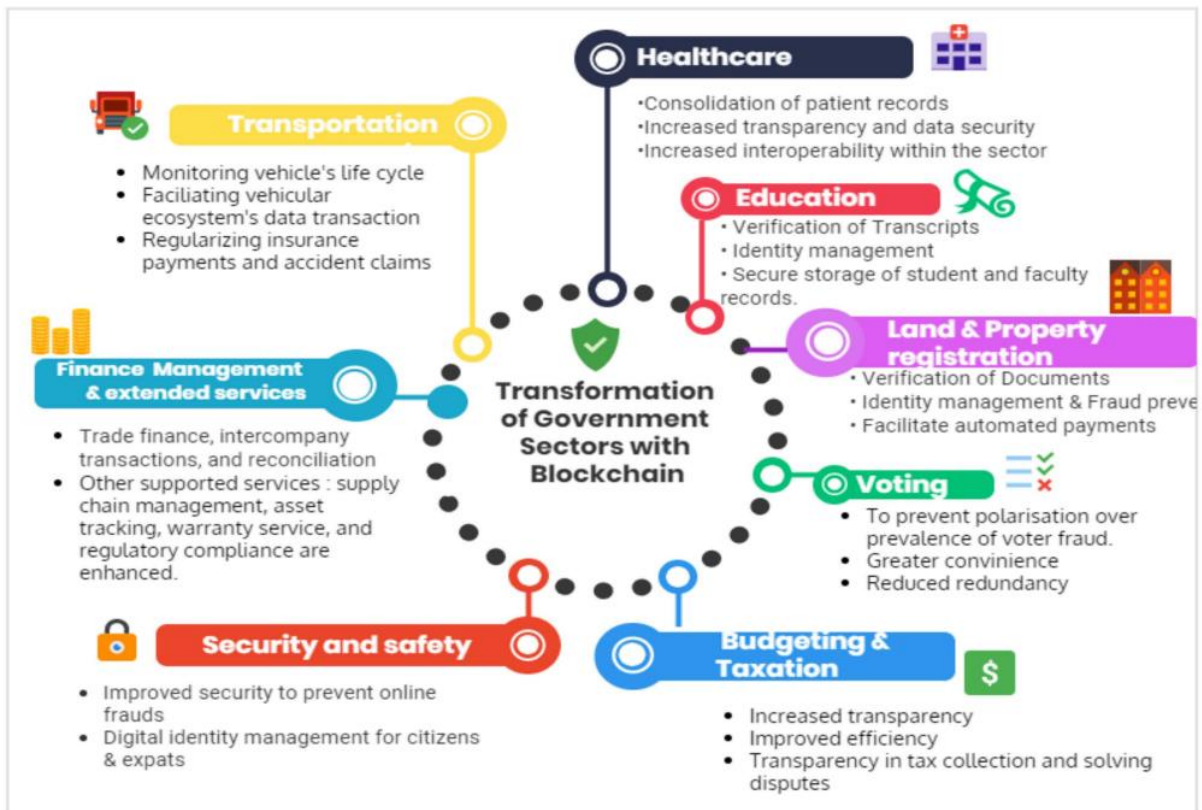


Figure 5: Usage Blockchain for the Government Sector (Khan, et al., 2022)

The Central Bank of India showed interest in improving digital rupees and applied blockchain for land registry systems (Perera, et al., 2021). Canadian government experimented with blockchain to provide venture-based representatives with an advanced resume, delivering a secure, changeless, and self-possessed record of their experience and abilities (Wolfond, 2017). Malta established three blockchain-related and cryptocurrency laws. It also created a Digital Innovation Authority to enable blockchain approval operation certifying platform to ensure trust (MDIA, 2022). Liechtenstein proposed a blockchain act for the token economy (Congress, 2019). The United Kingdom (UK) is automating regulatory reports through blockchain (Gozman, et al., 2020). There is no federal legislation in the USA, but some states have passed legislation enabling blockchain (Busch, 2018). E-Estonia developed an application for healthcare innovation using blockchain (Heston, 2017). Kwok and Koh (2018) noted that the Caribbean government used blockchain technology in tourism to develop the economy (Kwok & Koh, 2017). Allessie, Sobolewski, and Vaccari (2019) discussed a few cases, including taxation reporting, citizen's identity management, easing new decentralized business without mediators, development, and e-voting, where blockchain technology can be used to assist governmental decisions (Allessie, et al., 2019) The European Commission submitted the report prepared by the Joint Research Centre (JRC) where the blockchain implementations

were divided into two governmental levels: local and national. As mentioned in the report, the proposed projects for blockchain implementation for service models are presented in the table below.

Project name	Field of Implementation	Country of Implementation	Level of government
Exonum land title registry	Property transactions; land tile registry	Georgia	National
Chromaway property transactions	Transfer of land title; property transactions	Sweden	National
Blockcerts academic credentials	Personal documents sharing and storage; academic certificate verification	Malta	National
Infrachian governance framework	Blockchain governance	Luxemburg	National
Blockchain-city-Melaka Straits City	Tourism	Malaysia	National
Pension infrastructure	Pension system management	The Netherlands	National
Tradelens	Logistics and supply chain	KSA	National
Fourth industrial revolution and smart customs	Import and Export Clearance; Maritime Export Logistics; Cross-Border Data Exchange	South Korea	National and international
uPort decentralized identity	e-voting, payments for parking and bike rental, and digital identity for proof of residency	Switzerland	Local
Stadjerspas smart vouchers	Benefit management for beneficiaries	The Netherlands	Local

Table 1: Proposed blockchain-based projects, (Alessie, et al., 2019)

2.3.5 Blockchain-based Development Aid

In real-world implementation within the humanitarian sectors, blockchain eliminates corruption and creates secure digital identities (Zwitter & Boisse-Despiaux, 2018). Blockchain is used to trace aid funding to stem corruption (Zwitter & Boisse-Despiaux, 2018). The Start Network, a united international aid agency in England, implemented blockchain to deliver effective aid to beneficiaries affected by crises (Network, 2017). In 2015, AID: Tech applied blockchain technology to provide refugees living in a camp in Lebanon with online identities linked to vouchers for purchasing goods (Thompson, 2018). This initiative contributed to two Sustainable Development Goals), including (SDG 10): reducing inequalities, and SDG 16, achieving peace, justice, and strong institutions (Thompson, 2018). Blockchain and iris recognition (EyePay) were used at Jordan's Zaatari and Azraq refugee camps (Shin, et al., 2020). The United Nations High Commission for Refugees (UNHCR) explained that beneficiaries were identified through iris scanning, allowing them to purchase only their daily

food requirements via a straightforward payment system based on the Jordanian dinar. This replaced the inconvenience of losing food coupons (Shin, et al., 2020). Combined with the biometric authentication of the UNHCR, it is probable to scan the iris, identify people, and establish an Ethereum-based private blockchain to register all transactions (Shin, et al., 2020). The UNHCR uses Icrowd, a crowded server, to store primary personal information that is secured. Besides, building blocks are established through the authority agreement algorithm created by Parity, one of Etheremu’s customers (Shin, et al., 2020). The World Food Program (WFP) spends 1.5% of the transaction amount for financial institutions charge as a commission (Shin, et al., 2020). Using EyePay with blockchain technology reduced the costs, and WFP did not need to pay the commission (Shin, et al., 2020). In addition, the WFP minimized the number of transactions to sending money once a week and reconciling bank accounts once a month, achieved through the utilization of blockchain technology as a ledger, which resulted in a 98% reduction of costs and 95% in funding was used in the right way (Shin, et al., 2020). Sales books cannot be manipulated and 106,000 people used the platform to receive support, saving around \$40,000 monthly in fees (Shin, et al., 2020). Figure 1 clarifies the reduction of costs and operations before and after blockchain implementation (Shin, et al., 2020).

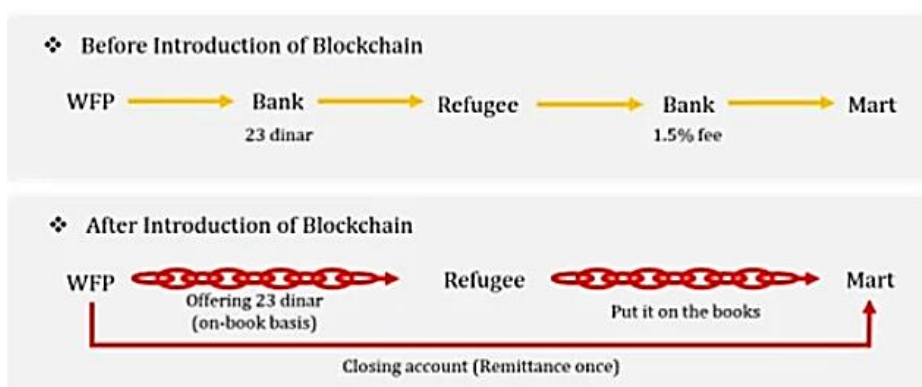


Figure 6: Cashflow Before and After Blockchain (Shin, et al., 2020)

2.4 The UAE Context

The following paragraphs highlight the UAE's central blockchain policies, strategies, and practices. Chapter 4 investigates different case studies. The upcoming paragraphs highlight the challenges and opportunities the UAE government and entities face.

2.4.1 The UAE Ranking and Practices

The Gulf Cooperation Council (GCC)’s ranking on eGovernment Readiness replicates the primary efforts that Gulf states’ governments made to develop the information and

communication technology (ICT) infrastructure across government agencies and ministries (Nations, 2020). The United Nations E-government Survey launched by the UN’s Department of Economic and Social Affairs measures the improvement of the digital conversion of 193 United Nations members (U.AE, 2024). It measures the effectiveness of e-governments in delivering public services (U.AE, 2024). In addition, it tracks the progress via the United Nations E-government Index (EGDI), which has three sub-indices: the Telecommunication Infrastructure Index (TII), the Online Services Index (OSI), and the Human Capital Index (HCI) (U.AE, 2024). Among the Gulf States, the UAE has the highest EGDI, followed by Saudi Arabia, Oman, Bahrain, Kuwait, and Qatar, as shown in Table 2 below. It received an extremely high (VH) rating, which is the highest score for enhancing digital governments worldwide (U.AE, 2024).







Country	Group	Rating Class	Rank-2022	EGDI 2022
 United Arab Emirates	VHEGDI	VH	13	0.9010
 Saudi Arabia	VHEGDI	V2	31	0.8539
 Oman	VHEGDI	V1	50	0.7834
 Bahrain	VHEGDI	V1	54	0.7707
 Kuwait	HEGDI	HV	61	0.7484
 Qatar	HEGDI	HV	78	0.7149

Table 2: 2022 E-Government Development Index (Nations, 2020)

The UAE is leading the way with robust data classification standards and protection laws (Khan, et al., 2022). It was ranked first in the Arab world and eighth globally in the OSI issued by the United Nations (TDRA, 2020). According to the same survey, the UN E-Government Survey, it was ranked seventh in the TII (TDRA, 2020). For the first time, the survey evaluated the e-Government in the most known cities. To that end, Dubai was ranked 1st in the Arab region, fifth internationally, and first globally in the sub-indices Content Provision, Service Provision, and Institutional Framework in the Local Online Service Index (LOSI) (U.AE, 2024).

The UAE was ranked 10th globally and first in the Middle East and North Africa in the World Institute for Management Development (IMD) (IMD, 2022). The UAE was ranked 8th in government efficiency, 4th in economic performance, 16th in business efficiency, and 26th in infrastructure, which reflects that public organizations in the UAE attain productive and competitive performances with the help of policies (IMD, 2022).

The Dubai government launched a program called Connected Dubai in a constant endeavour for development in 2015 (Khan, et al., 2022). It created a framework to enhance services across

government entities. Technology was utilized to build a block towards innovative digital transformation procedures at the government level (Khan, et al., 2022). Dubai Future Foundation established the worldwide Blockchain Council as part of its efforts to implement the latest technologies (U.AE, 2018). The council facilitates transactions within different sectors and increases reliability and efficiency (U.AE, 2018). It includes forty-six members, such as government entities, leading UAE banks, international companies, international blockchain technology firms, and free zones (U.AE, 2018). Dubai's government established a blockchain center to foster innovation across different industries, and it seeks to drive the adoption of the technology through collaborations and partnerships (Center, 2018). Moreover, the UAE Central Bank launched the strategy of the Digital Dirham on 23 March 2023 (Sheffield, 2023). The strategy contains three pillars: proof-of-concept work for bilateral cooperation with India, the soft launch of mBridge to enable real value cross-border transactions for global trade settlement, and proof-of-concept work for local Central Bank Digital Currency, which covers wholesale and retail utilization (Sheffield, 2023).

2.4.2 The UAE Strategies

The UAE government introduced different strategies that include integrating high technology into the non-governmental sector, such as the Dubai Blockchain Strategy (Dubai, 2018), the National Innovation Strategy (U.AE, 2014), the AI strategy (U.AE, 2017), the 4IR strategy (U.AE, 2017), the Emirates Blockchain Strategy (U.AE, 2018), and the Dubai Paperless Strategy (Dubai, 2017).

Dubai launched a blockchain strategy to provide citizens with safer, seamless, and impactful city experiences. It plans to develop efficiency by implementing blockchain in 100% of applicable government services (Dubai, 2018). The strategy comprised three strategic pillars: fostering industry creation, enhancing government efficiency, and asserting international leadership (Dubai, 2018). It was launched by His Highness Sheikh Hamdan, and it resulted from a collaboration between the Dubai Future Foundation and the Digital Dubai Office (Dubai, 2018). Figure 4 presents the roll-out plan for adopting blockchain technology in Dubai government entities.

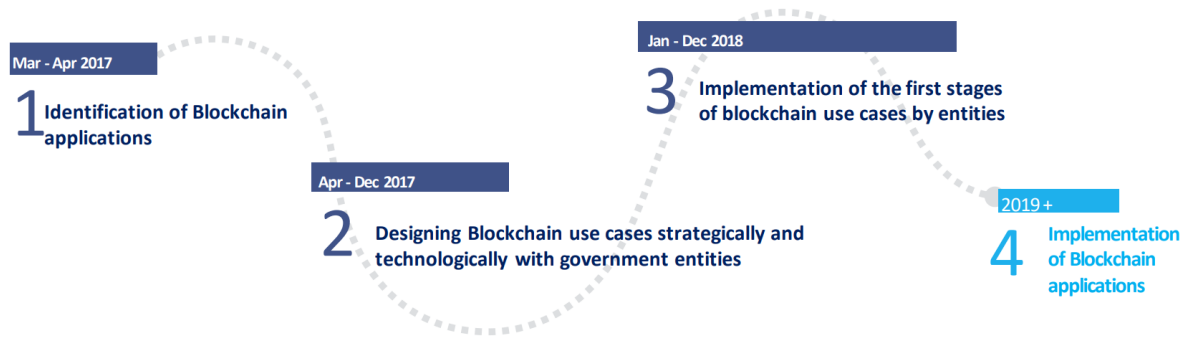


Figure 7: Blockchain Use Cases Roll-Out Plan (Dubai, 2018)

Dubai Ministry of Economy announced that asset tokenization and crypto were the fundamental support for the economy in the following decades (Avan-Nomayo, 2021). The government of Dubai is taking steps to become a leader in blockchain, cryptocurrency, artificial intelligence, digital assets, and metaverse (Economy, 2022). It plans to grow a digital economy worth US \$140 billion by 2031 (Economy, 2022).

From 2022 onward, Dubai and the Dubai International Financial Centre (DIFC)'s Dubai Financial Service Authority (DFSA) are regulating virtual currency by developing cryptocurrency laws and crypto regulations (Sheffield, 2023). According to Sheffield (2023), no one was allowed to engage in virtual asset activities in the UAE without approval and license from the Securities and Commodities Authority (SCA) since the issuance of Federal Cabinet Decision No. 111 of 2022 (Sheffield, 2023). It regulates the virtual assets and the service providers (Sheffield, 2023). On 9 March 2022, Dubai Law No. 4 of 2022 Concerning the Regulation of Virtual Assets the Virtual Asset law launched the Dubai Virtual Asset Regulatory Authority (VARA) (DLP, 2022). VARA incorporates exchanges, licensing and regulating issuers, and custodial and management service providers (DLP, 2022).

In 2014, the UAE government launched the National Innovation Strategy to make the UAE one of the most innovative countries worldwide within seven years (U.AE, 2014). The strategy has four tracks: a stimulating environment for innovation, institutionalizing innovative practices, establishing scientific research centers, and preparing people with high skills (U.AE, 2014). In 2017, the UAE government launched the AI strategy, which is the first of its kind in the region and the world and aims to boost government performance and achieve the goals of the UAE Centennial 2071 (U.AE, 2017). It also intends to implement an integrated intelligent digital system that offers rapid and efficient solutions, positioning the UAE as a leader in AI

investments and generating a new, high-value economic market (U.AE, 2017). The UAE government also launched the 4IR to accelerate the integration of solutions and applications across the industrial sector and boost its productivity by 30% (U.AE, 2017). Its objectives are to develop industrial competitiveness by increasing productivity, reducing expenses, enhancing safety and quality, and delivering employment chances (U.AE, 2017). The government initiated the Emirates Blockchain Strategy 2021 to transition 50% of government transactions onto a blockchain platform by 2021 (U.AE, 2018). The technology saves time, resources, and effort and facilitates transactions at the place and time that suits their lifestyle (U.AE, 2018). The UAE government expects to save seventy-seven million work hours, 398 million printed documents, and AED 11 billion in transactions annually (U.AE, 2018). Dubai aims to go wholly paper-free and eliminate more than 336 million sheets, so it launched the Dubai Paperless strategy (Dubai, 2017). As an entirely paperless government, all customer-facing services are digitized, and thirteen million hours are saved.

2.4.3 The UAE Policies

The UAE government also introduced different policies like the STI policy (U.AE, 2015) and the Dubai blockchain policy (Digital, 2019). The STI Policy is a strategic conclusion for the UAE that seeks to change the national economy equation and drive it away from depending on specific resources (U.AE, 2015). It was announced in the Year of Innovation, aiming to make the UAE the most innovative country worldwide (U.AE, 2015). Governments around the world realize the importance of investing in technology, science, and innovation to achieve socio-economic improvement (U.AE, 2015). The STI creates suitable wealth which depends on both natural and non-renewable resources (U.AE, 2015). Furthermore, it fosters investment in human capital and talent required for improvements and finding solutions for challenges in security, health, environment, and society (U.AE, 2015). The UAE determined twenty-four focus areas for technology and science-based innovation, as shown in Figure 8 below.



Figure 8: Focus Areas of The STI Policy (U.AE, 2015)

The Smart Dubai City Office (SDO) developed the Dubai Blockchain Policy to set out the direction, applicable rules, guidelines, and standards that govern the blockchain implementation in Dubai (Digital, 2019). The SDO realized the possible benefits of adopting blockchain include transparency, efficiency, integrity, trust, and support for the Emirate to be a paperless government, aligning that to the Dubai paperless strategy (Digital, 2019). Blockchain's network operators develop a transparent operating model and share it with SDO (Digital, 2019). The model should contain roles and responsibilities of members such as auditor nodes, transaction validator nodes, consensus mechanisms for validating data, and voting mechanisms for reaching an agreement (Digital, 2019). Under article (15), blockchain networks should comply with the relevant guidelines, reference architectures, and standards of SDO and stakeholders (Digital, 2019). That includes Dubai Information security regulations announced by the Dubai Electronic Security Centre (DESC), Dubai Data Standards published by the Dubai Data Establishment (DDE), and any regulations that will be imposed in the future by SDO (Digital, 2019). Under article (21), SDO, all Dubai government entities, and stakeholders are directed to consider the public interest by promoting transparency and accountability, protecting consumers, and fostering the provision of better services (Digital, 2019).

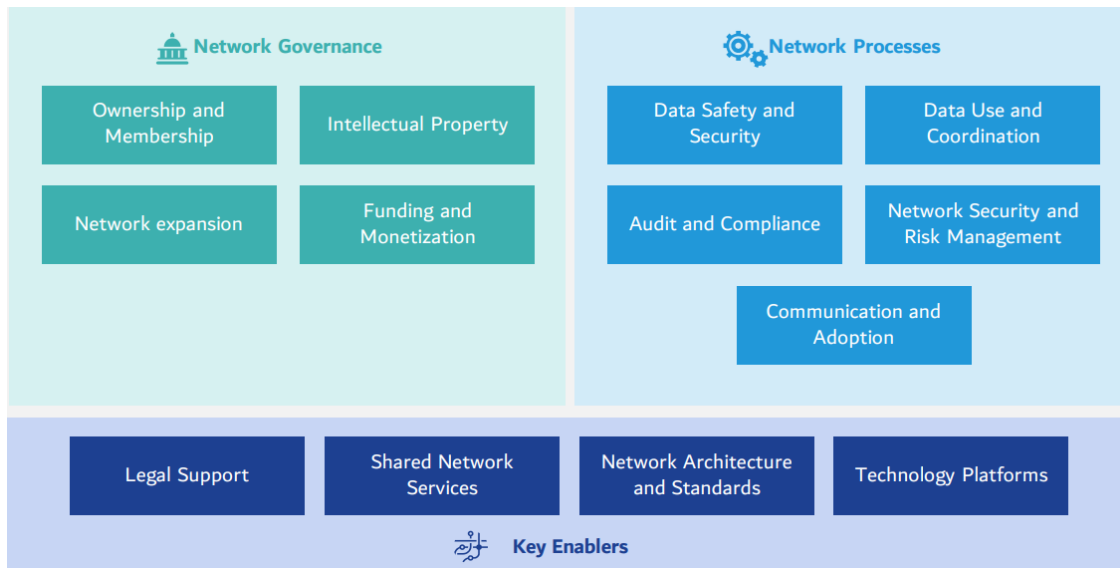


Figure 9: Key Pillars of The Dubai Blockchain Application Policy (Dubai, 2018)

2.4.4 Case Studies from the UAE

There have been several cases for private and public organizations in the UAE where for various reasons, they faced different challenges implementing blockchain technology such as Emirates NBD, DP World, Etisalat Digital, Emirates Airlines, Abu Dhabi Digital Authority, Ministry of Health and Prevention, RTA, and Smart Dubai (Forum, 2020). Smart Dubai developed a shared blockchain platform allowing all government entities to apply use cases without investing in private platforms (Dubai, 2018). The Dubai Economic Department (DED) also employed blockchain-based applications to develop digital services (Khan, et al., 2022). The main challenges of such cases are discussed in Chapter 4.

2.5 A Table of Literature Sources

Type of Resources	The Number of References
Journal articles	59
Website	32
Report	11
Conference Proceedings	4
Total	106

Figure 10: A Table of Literature Sources (own elaboration).

These secondary sources helped address the study objectives and answer research questions. They helped identify the transparency and accountability required for NPOs to maintain donors' trust. They also helped propose adopting blockchain technology, in which aspects of

transparency and accountability may be addressed. They include the latest knowledge to support non-profit policymakers and other relevant stakeholders in the UAE in providing practical recommendations to develop the effective and responsible adoption of blockchain technology. Furthermore, the sources contained best practices that explain how NPOs use blockchain technology to enhance transparency and accountability. The secondary data reflected how blockchain technology adoption in NPOs enhances transparency and accountability. The study focused on blockchain adoption in NPOs and other best practices to ensure transparency and accountability toward clients. The secondary data facilitated an in-depth understanding of the study and presented an up-to-date and international view of literature progress advancements. The following chart shows the trend of used publications per year.

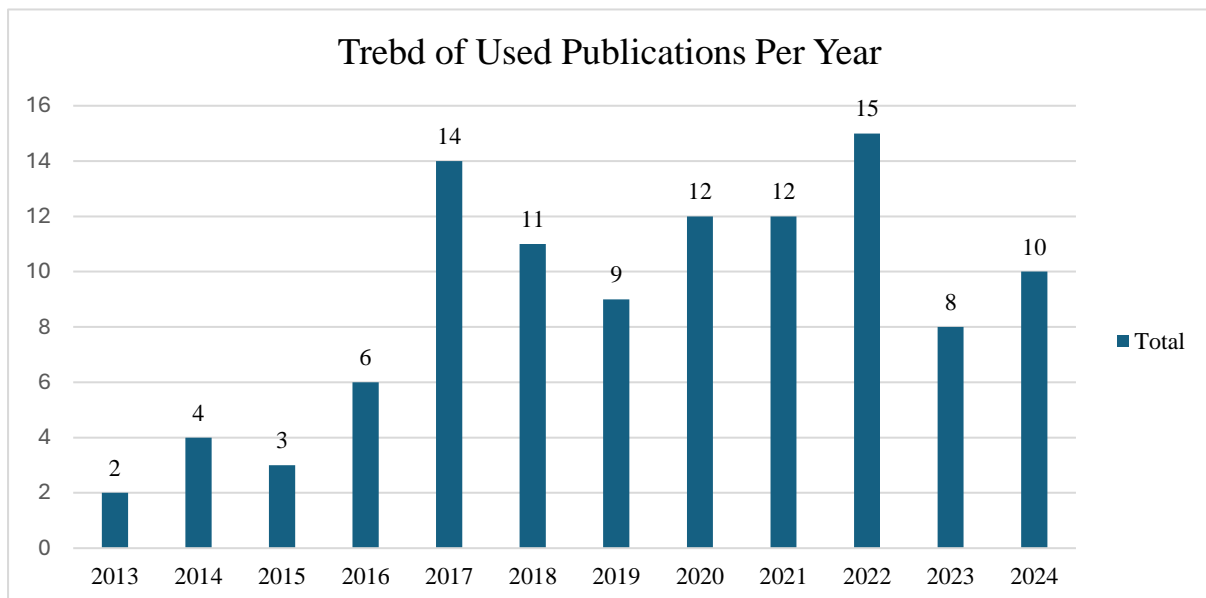


Figure 11: Trend of Used Publications Per Year (own elaboration)

The sources used in this thesis were published between 2013 and 2024, and publications with recent data were used to ensure that the information is up to date and keeps pace with rapid changes in the world of technology.

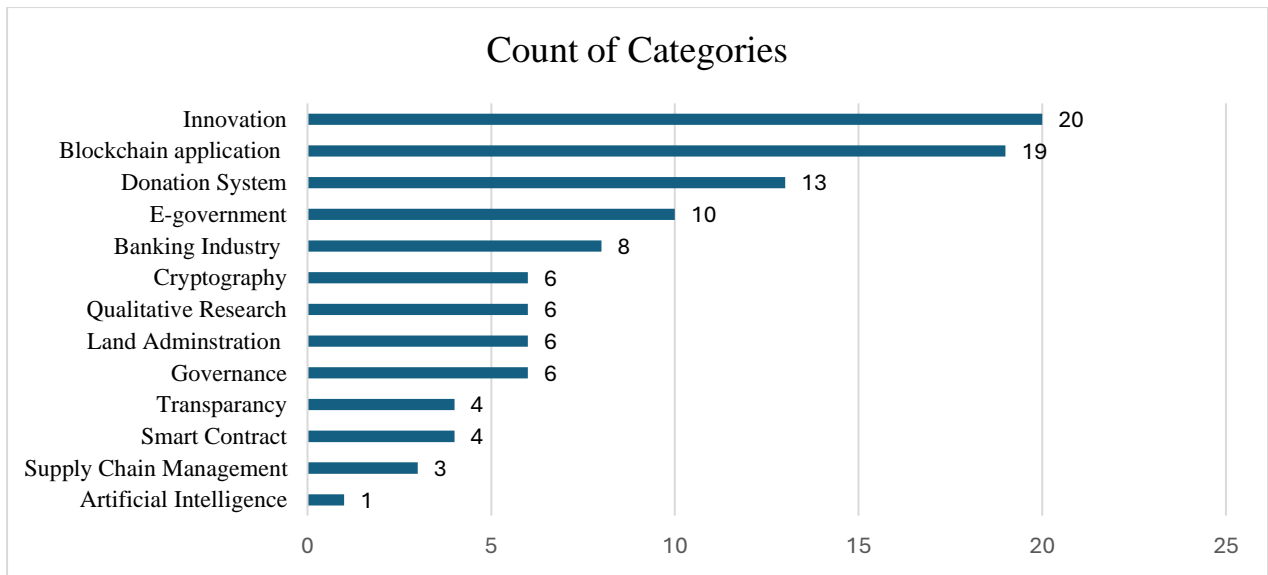


Figure 12: Count of Categories (own elaboration)

The figure above shows the main categories mentioned in secondary data. The main keywords were used to classify the papers. Thirteen categories summarize the main ideas discussed in secondary data. Most references discussed blockchain applications in different sectors and focused on innovation, donation systems, blockchain applications, and e-government.

2.6 Summary of Chapter 2

A review of several studies ((Alkrajji, 2020), (Almaghrabi & Alhogail, 2022), (Cocco, et al., 2017), (Farooq, et al., 2020), (Moreno-Albarracin, et al., 2020)) indicated that blockchain ensures transparency and accountability. The previous section detailed blockchain adoption, providing innovation, transparency, accountability, governance, and high-quality services. All international best practices discussed in sections are drawn to conceptualize the recommended study model for this dissertation. Due to the diverse nature of the discussed studies across Asia, Europe, Africa, and the Americas, and considering the proposed nature of relationships, a qualitative methodological approach was adopted. This could be attributed to the fact that the UAE, particularly Dubai, has lead experience with blockchain technology but does not have enough experience with blockchain adoption in charities in other Emirates. Given Dubai's reputation as one of the most innovative cities, this study aimed to contribute to blockchain adoption in non-profits in all Emirates by comparing that to best practices and highlighting future avenues of study appropriate to the GCC region.

Furthermore, the findings from the detailed literature review indicated that bringing together the required stakeholders' interests, having clear regulatory implications, addressing governance, aligning on blockchain standards, and implementing compliance and security

standards are likely to impact transparency and accountability in entities. Based on the above discussion, a theoretical framework for this study is presented below in Figure 13.

2.7 Proposed Theoretical Framework

It is hoped that the proposed theoretical framework can serve as a reference for NPOs in the UAE to adopt blockchain. The results are supportive, so a similar study can be conducted on specific NPOs in the UAE to improve a more comprehensive model for NPOs.

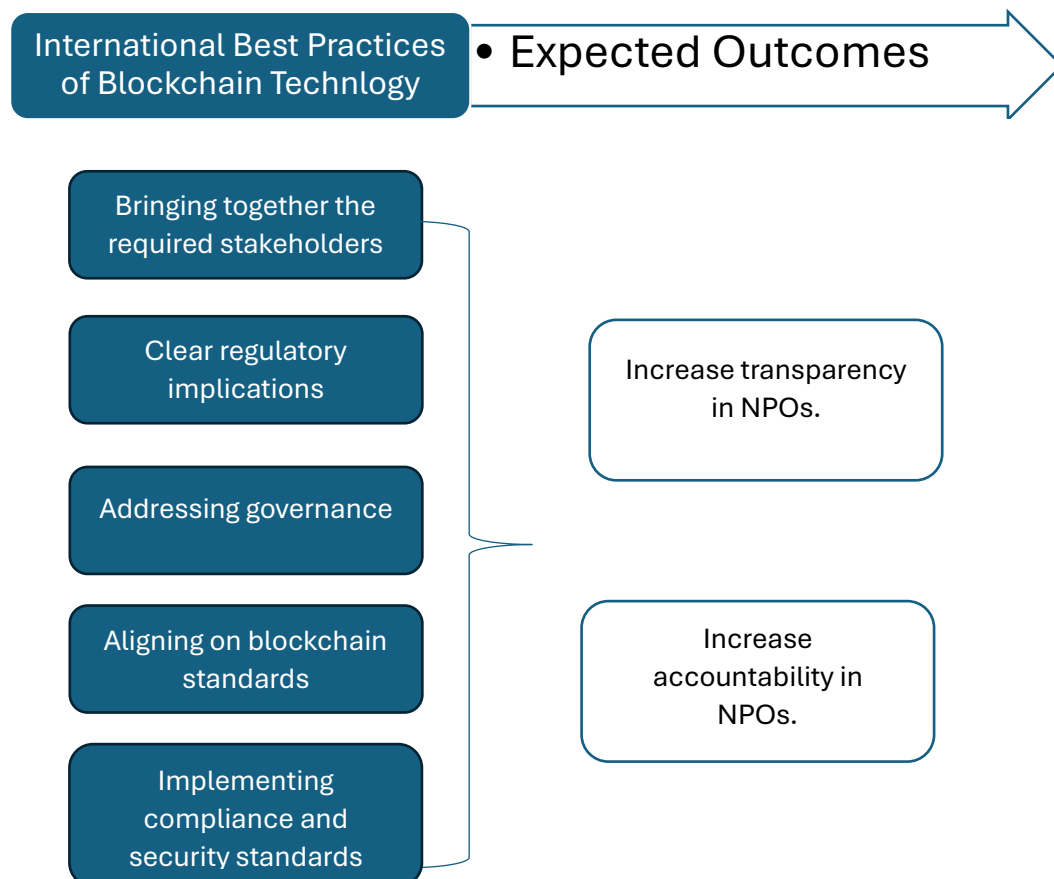


Figure 13: Theoretical Framework (own elaboration)

2.7 Conclusion

This chapter encompassed an extensive literature review on the adoption of blockchain technology within the framework of the UAE. The literature review indicated that despite the differences in sectors, there were marked preferences by entities in adopting blockchain, as evidenced by existing studies that covered several domains such as supply chain management, land ownership and management, banking, development aids, e-government, digital identity, Import and export, and logistics clearance. The next chapter presents the methodology used to collect data for this study.

Chapter 3 Methodology

3.1 Introduction

This chapter explains the nature of the information and the data collection methodology required to address the research questions and objectives. Secondary data helped validate the best practices mentioned in the previous literature review chapter.

3.2 Research Design

Following the recommendations of various scholars (Johnston, 2014), (Akcamlar, et al., 2019), (Ruggiano & Perry, 2019), (Kıřı, 2022), the qualitative approach was selected for this study. Technological advances led to a massive amount of data that was collected, archived, compiled, and archived and that is now easier to access for research (Johnston, 2014). Eventually, using existing data for study became more prevalent (Johnston, 2014). Secondary data analysis is the analysis of data that was gathered by someone else for a primary objective (Johnston, 2014). Furthermore, using this existing data delivers a viable option for researchers who have limited resources and time (Johnston, 2014).

Capturing information while investigating qualitative work with secondary data is challenging (Akcamlar, et al., 2019). Challenges include limited access to subjects, the complexity of written records, unclear objectives within the records, and the significant effort required for record analysis (Akcamlar, et al., 2019). While interacting with secondary data, the researcher cannot access the subjects to ask questions (Akcamlar, et al., 2019). Lack of conversations with the subjective, due to their unavailability, limits the researcher in understanding their mental types (Akcamlar, et al., 2019). Despite the challenges, the availability of secondary data provides chances for a researcher (Akcamlar, et al., 2019). Secondary data analysis may be the only option when direct access to the mental database may not be available (Akcamlar, et al., 2019).

While secondary data analysis is encouraged across disciplines, it meets more concerns and criticism regarding potential ethical and methodological problems (Ruggiano & Perry, 2019). One criticism relates to the socio-political-cultural context under which qualitative research was implemented (Ruggiano & Perry, 2019). Secondary data is often shaped by the cultural, social, and political realities evident at that time (Ruggiano & Perry, 2019). When researchers re-investigate data during another period, results may be inappropriate (Ruggiano & Perry, 2019). Eventually, this study investigated secondary data published between 2013 and 2024 to ensure the freshness of the data and its compatibility with current social, cultural, and political changes.

Apart from reviewing a series of literature for conceptual clarity on blockchain technology adoption, the international best practices were examined to create a proposed theoretical framework for discussion. For analytical purposes, two primary case studies, the UAE's public and private entities adopting blockchain, were thoroughly studied to obtain practical insights into the possibilities and benefits of and challenges of blockchain implementation in the UAE NPOs.

3.3 Data Collection and Analysis

As mentioned in the literature review, the international best practices and cases were thematically presented and investigated. Reports and Journals from international organizations like the UN, World Economic Forum, Arab Monetary Fund, Library of Congress, the World Institute for Management Development, the official portal of the UAE government, the Institute of Electrical and Electronics Engineers access journal (IEEE access), publications office of the European Union and MPDI company were used to address research questions.

Following the recommendations of various scholars (Venable, et al., 2017), (Kişi, 2022), an exploratory research design was chosen to determine the research objectives by defining the challenges, opportunities, and deployment success factors for blockchain-based NPOs in a structured manner using a content analysis procedure. The study employs an exploratory approach as it is a suitable method to discover new patterns, relationships, ideas, and themes (Kişi, 2022).

To ensure data collection adhered to the requirements of this qualitative study, we adopted a case study approach. The next chapter delves deeper into the best practices that address everyday experiences, success factors, and challenges associated with blockchain deployment in both public and private sector entities in the UAE. Following the recommendations (Starman, 2013), (Baskarada, 2014), several documents, journals, and reports related to the eight selected case studies, including entities' websites, official portals, and publications, were reviewed in detail. Furthermore, the UAE federal laws, federal decree laws, and cabinet decisions related to the NPOs are presented and aligned with implementing blockchain technology. These laws reflect the UAE's readiness to organize NPOs, which can be done through blockchain technology as an integrated platform for all NPOs.

Starman (2013) explained that the case study as a type of qualitative research is a ticket to enter the study field in which the researcher discovers the well-known and well-known borders while continually monitoring scalability as well as general and existing knowledge (Starman, 2013).

Baskarada (2014) clarified that case studies offer the opportunity for the researcher to gain a deep holistic view of the problem and facilitate understanding, describing, and explaining a study situation or problem (Baskarada, 2014).

The international and the UAE policy and case studies have helped compare and contrast different approaches to blockchain adoption, construct the literature review, and present cases in Chapter 4. The adoption of blockchain technology in NPOs is a relatively new yet rapidly evolving area, drawing on a broad spectrum of sources and experiences to build a comprehensive understanding.

International case studies provide a global perspective on blockchain adoption, challenges, and implementation in NPOs. So, common themes and unique innovations relevant to the UAE context are highlighted. This comparative approach highlights the potential benefits and addresses specific regulatory, cultural, and organizational factors influencing NPOs' adoption in the UAE.

3.4 Justification for The Methodology

The reasons behind selecting this methodological approach are generalizing to theories, the novelty, and the uniqueness of the topic.

Case studies do not generalize to populations; instead, they generalize to theories through a process known as analytical generalization. (Baskarada, 2014). Why and how questions are better answered using case studies to deal with operational links should be traced over time (Baskarada, 2014). The main research question investigated how Blockchain technology adoption in NPOs enhances transparency and accountability in the UAE's NPOs. In addition, the sub-questions investigate how Blockchain technology adoption in NPOs enhances transparency and accountability in the UAE's NPOs.

The last twenty years have seen a speedy and notable blockchain revolution (AbdelMonem, 2019). Because of global technology trends and the UAE's government initiatives, blockchain technology has swept the UAE as one of the optimizing technologies for digital transformation (Forum, 2020). The UAE's government entities, telecommunications, banks, and academia started to explore blockchain technology at an unprecedented rate (Forum, 2020). Eventually, since the emergence of blockchain is new, this study employs an exploratory model applicable to discover new themes and ideas (Kişi, 2022). The case study methodology was selected because of the limited research on emerging blockchain (Khan, et al., 2022). Furthermore, a

case study for qualitative research is preferable when the topic is exploratory (Khan, et al., 2022).

Employing a case study methodology, the researchers investigate the challenges and benefits through the viewpoints of IT practitioners (Khan, et al., 2022). That led the researcher to use a qualitative approach to determine the challenges and benefits of adopting blockchain in the UAE's NPOs (Khan, et al., 2022).

3.5 Chapter Summary

This chapter provided a detailed overview of the proposed methodology. An exploratory research design was chosen, and case studies, a type of qualitative research, were used to collect the data. The next chapter includes case presentations and analysis.

Chapter 4 Case Studies and Analysis

4.1 Introduction

The initial section of this chapter mentioned relevant international and UAE case studies not presented in the previous chapter. This was followed by clarifying the findings from the literature review and lessons from case studies. Then, data analysis identified the critical deployment success factors and challenges the public and private sectors face while adopting blockchain. Four key deployment success factors and challenges were determined based on related reports, news, and journals. The analysis was developed by adopting the proposed framework, Figure 13, derived from a review of the existing literature and international best practices.

4.2 Empowering NPOs in the UAE

NPOs accelerate the process of sustainable development in the UAE. They also contribute to providing benefits, services, and programs aimed at residents and citizens of the UAE (U.AE, 2021). The Ministry of Community Development empowers the NPO sector by enhancing its services and cooperating with partners. It is also keen to create an integrated regulatory and legislative environment that enables entities to perform their roles in line with the “We the UAE 2031” Vision and the “UAE Centennial 2071” plan for the UAE community to be the growing community by 2071 (U.AE, 2021). The Ministry supervised the amendment of legislation and laws and the enhancement of systems to facilitate the pace of service provision (U.AE, 2021).

4.2.1 The UAE 2031 Vision

“We the UAE 2031” Vision is the novel plan launched by the UAE government to complete the nation’s journey towards improvement and focus on its economic, social, and investment aspects (U.AE, 2023). The most important national indicators in the vision that are relevant to the study are the UAE being among the world’s top three countries in the Cybersecurity Readiness Index and among the world’s top 10 nations in the Human Development Index (U.AE, 2023).

4.2.2 The UAE Centenary 2071 Vision

The “UAE Centennial 2071” plan is a clear road map for long-term government efforts to develop the country’s soft power and reputation (U.AE, 2017). It aims to accomplish comprehensive qualitative achievements in different sectors that create the country’s prosperity and ensure a solid future for generations away from being liable for oil resources (U.AE, 2017).

4.2.3 Federal Decree Law of Combating Money Laundering Crimes

The UAE government launched Federal Decree Law No. (26) of 2021, which amends specific provisions of the previous Federal Decree Law No. (20) of 2018 concerning the combating of money laundering, the financing of illegal entities, and terrorism financing (CBUAE, 2021). Article (9) stipulates that an independent Financial Information Unit is to be established at the Central Bank, which will receive transaction reports from all financial and non-financial entities, professions, and businesses (CBUAE, 2021). This unit is responsible for investigating these reports and referring them to the appropriate authorities (CBUAE, 2021). It will create a particular record or database of information and protect it by establishing rules governing data confidentiality and security (CBUAE, 2021). These rules include storing, processing, and transmitting information to ensure limited access to technical systems, information, and facilities (CBUAE, 2021).

4.2.4 The UAE Soft Power Strategy

His Excellency Hessa, Undersecretary of the Ministry, confirmed that the importance of NPOs increases with the development of the UAE and its competitiveness in all sectors compared to other GCC (WAM, 2024). The UAE ranked tenth in the Global Soft Power Index for 2024, owing to its application of the soft power strategy, which includes humanitarian aid as a central pillar that the Ministry of Foreign Affairs focuses on (Krzymowski, 2022). The Financial Action Task Force (FATF), the international organization responsible for monitoring cases of money laundering, also announced that the UAE had implemented the 15 recommendations contained in the action plan (WAM, 2024).

4.2.5 Federal Decree Law of Organizing NPOs

The UAE government launched Federal Decree Law No. (50) of 2023, which amends specific provisions of the previous Federal Decree Law No. (2) of 2018 regarding the organization of NPOs (U.AE, 2023). NPOs face administrative challenges at various stages, such as lengthy registration procedures, rejections without clear reasons, and requests to prepare dual financial and administrative reports (WAM, 2024). The Ministry of Community Development clarified that the period for registering institutions is up to one year, and an association license may be refused due to the lack of clarity of a unified mechanism for measuring the need for an association (WAM, 2024). The lack of unified coordination on requirements between the Ministry and local authorities hinders the work of associations (WAM, 2024).

4.2.6 The UAE NPOs' National Register

Eventually, the Federal Decree-Law includes the establishment of a register in the Ministry of Community Development to record NPOs (U.AE, 2023). This is the National Register of NPOs, which is a unified digital platform that provides a database of NPOs in the country (WAM, 2024). The competent entity should register all information and data related to NPOs required by the Ministry of Community Development (U.AE, 2023). It should also register all details related to the activities of these associations and all updates regarding controls, mechanisms, and procedures required by the executive regulations (U.AE, 2023). The register includes information about board members, licensing, employees, donors, branches, beneficiaries, events, and bank accounts of all NPOs in the UAE (U.AE, 2023). It serves the UAE government's directions that aim to enhance the tools of the knowledge economy and integrate and share government data at the national level (WAM, 2024). It also aims to make data available and enhance the business, research, and data science environment by providing comprehensive data about the public benefit sector in the UAE (WAM, 2024).

4.2.7 Federal Decree Law of the UAE Eligible Public Welfare Associations

Cabinet Resolution No. (37) of 2023, according to NPOs eligible for Federal Decree Law (47) of 2022 regarding corporate tax clarified the number of NPOs in the UAE as follows: (Finance, 2023)

No.	Type / Emirate's entities	No. of NPOs
1	Federal Entities	198
2	Abu Dhabi Entities	95
3	Dubai Entities	53
4	Sharjah Entities	94
5	Ajman Entities	25
6	Umm Al Quwain Entities	15
7	Ras Al Khaimah Entities	11
8	Fujairah Entities	30
	Total	521

Table 3: Number of NPOs in Each Emirate (Finance, 2023)

An integrated platform is needed to manage this enormous number of entities, streamline processes, and ensure transparency and accountability.

4.2.8 CharityGPT, the First-Ever AI-Driven Platform

Regarding relevant international cases, the Authority of Social Contribution and Astra Tech, the leading technology holding group in the Middle East, launched Charity GPT (SandyTimes, 2024). This is the first-ever AI-driven platform to facilitate charitable contributions (SandyTimes, 2024). Botim users can support the orphan campaign (SandyTimes, 2024). As stated by Abdullah Abu-Sheikh, CEO of Botim and founder of Astra Tech, Astra is proud to collaborate with the Authority of Social Contribution to facilitate donations through the innovative CharityGPT feature (SandyTimes, 2024). According to him, this platform demonstrates how technology can be used for expanding philanthropic activities and positively impacting expand philanthropic activities and positively impact the community (SandyTimes, 2024). CharityGPT can revolutionize donations, particularly with the approximately nine million users of the Botim Ultra App (SME10X, 2024). They can effortlessly contribute to charities with these taps (SME10X, 2024). Similar to blockchain, with everything housed within a single app, the procedure becomes user-friendly and incredibly streamlined, making donations more convenient for all involved ((Almaghrabi & Alhogail, 2022), (SME10X, 2024)).

4.2.9 The World Blockchain Summit 2024

The UAE government's commitment to embracing cutting-edge technologies in the technology industry was showcased through Dubai's hosting of the World Blockchain Summit (WBS) from April 22 to 23, 2024 (WBS, 2024). The summit served as a platform for connecting participants with blockchain experts, IT leaders, developers, and tech entrepreneurs, featuring several prominent speakers such as Mohammed Al Balushi, Executive Director of DIFC Innovation Hub, and Dr. Marwan Al Zarouni, Strategic Advisor to Digital Dubai (WBS, 2024). Dubai was chosen as the location for the summit due to its business environment characterized by low taxes, access to capital, and an active crypto community, making it an ideal hub for launching and engaging with blockchain enthusiasts (WBS, 2024).

4.3 Case Studies of The UAE Private and Public Entities

Considering the limited availability of non-profit blockchain case studies in the UAE, Jalila Hospital is a notable exception (Foundation, 2022), this study draws upon a range of public and private sector cases to illustrate the broader applicability of blockchain technology. These cases offer valuable insights into the implementation, challenges, and benefits of blockchain's implementation, challenges, and benefits. By comprehensively understanding the functioning

of blockchain in various sectors, the study proposes to inform the development of policies and strategies tailored for NPOs in the UAE. The study features two primary case studies showcasing the successful implementation of blockchain technology in both private and public entities in the UAE. Notable examples from the private sector include Dubai Port Authority (DP World), Emirates Airlines, Emirates National Bank of Dubai (Emirates NBD), and Etisalat Digital. On the other hand, the public sector is represented by entities such as the Abu Dhabi Digital Authority (ADDA), a part of the Department of Government Enablement (DGE), the Ministry of Health and Prevention (MOHAP), Smart Dubai, and the Roads and Transportation Authority (RTA).

4.3.1 DP World

DP World, a leading port operator renowned for its expertise in supply chain management, leveraged blockchain technology to develop a global logistics platform aimed at automating processes and facilitating data sharing through intelligent contracts (Forum, 2020). The implementation strategy included two phases: customer registration and securing trade documentation. DP World's goals are to enable registration, membership of new traders, and licenses to be held on a single platform. It also aims to digitize entry certificates at ports, certificates of origin, and export authorization for cargo into ships (Forum, 2020).

4.3.2 Emirates Airlines

Established in 1985, Emirates Airlines is the largest international airline worldwide, serving 159 destinations with a fleet of 269 modern aircraft and a multilingual crew representing 135 nationalities (Airlines, 2021). Skywards is the award-winning fidelity system that allows members to redeem miles for flight tickets, events, and hotel stays. Emirates Airlines and Loyyal were connected via blockchain to take advantage of a shared ledger for management and reconciliation (Forum, 2020). Emirates Airlines and Loyyal were connected via blockchain to take advantage of a shared ledger for management and shared reconciliation (Forum, 2020). It led to transparency, security and decreased fraud. The Skywards develops reporting capabilities and traceability and reduces the processes needed for reconciliation (Forum, 2020).

4.3.3 Emirates NBD

Emirates NBD, a leading bank categorized as one of the largest by assets, applied blockchain technology for trade finance documentation and cross-border transactions in 2018 (Forum, 2020). It also used blockchain technology to prevent cheque fraud caused by fraudsters illegally using printing technologies to simulate cheques. By doing so, it secured over ten million

cheques, saved 1.2 billion pages, and digitized more than 1.2 million official letters annually (Forum, 2020).

4.3.4 Etisalat Digital

Etisalat Digital, a part of Etisalat, drives digital transformation and supports entities to be more innovative by leveraging the latest technology (Forum, 2020). To avoid financing the same invoice, the Etisalat Digital UAE Trade Connect (UTC) platform brought together eight banks (Forum, 2020). Blockchain technology was applied as a verification layer to prevent invoice fraud. This tackled approximately 3.75 million deceitful transactions, amounting to \$435 million in losses (Forum, 2020).

4.3.5 Abu Dhabi Digital Authority

ADDA, a part of DGE, delivers personalized, initiative-taking, and collaborative digital government through innovation programs (Enablement, 2023). ADDA developed a government blockchain platform to support secure data exchange between Abu Dhabi organizations and other external organizations (Foundation, 2023). The platform delivers transactions in various government domains, such as education, health, and social support. ADDA realized that blockchain technology improves service efficiency, quality, economic incentives, and data-driven policies, enabling growth in the data marketplace (Foundation, 2023).

4.3.6 Ministry of Health and Prevention

MOHAP develops society's health by delivering innovative, comprehensive, and fair healthcare according to global standards. As a part of its innovation strategy for 2019-2021, it is applying innovative healthcare developments (MOHAP, 2021). It defined organ donation allocation and aimed to prevent illegal organ trading. It chose Dhonor Healthtech to develop the Hayat donor registry to document people's legal status as donors through blockchain as a secured platform. The project was divided into three phases: developing the Hayat donor registry, creating patients' national waiting lists, and using an AI allocation calculator to align time to delivery with the United Network for Organ Sharing (UNOS) (Forum, 2020). The project was launched in 2019, and thousands of donors registered to donate their organs. All hospitals were allowed to participate and registered on the national waiting list (Forum, 2020). It was predicted to save \$20 million in expected dialysis costs annually (Forum, 2020). Furthermore, online registration saves the economic cost and time of driving to the registry center (Forum, 2020).

4.2.10.7 Smart Dubai

Smart Dubai, launched in 2003, is the government office that facilitates brilliant transformations to deliver a safe, seamless, and efficient city experience for visitors (Dubai, 2018). It managed Dubai Pay, a centralized payment method for payment collection with more than forty private and public entities (Dubai, 2018). In 2018, the gateway performed more than 10.4 million transactions, equalling sixteen billion dirhams (Forum, 2020). Each entity maintains its records and books, leading to increased time and costs when the process is manual (Forum, 2020). The costly and lengthy manual settlement and reconciliation process took 45 days and forced Smart Dubai to apply blockchain (Forum, 2020). The Department of Finance and stakeholders have limited visibility of collections, funds, and transactions using the current platform (Forum, 2020). The blockchain payment settlement and reconciliation technology created a compelling layer to address the limitations (Forum, 2020). The platform aims to ensure the immutability and transparency of financial records and automate financial processes for operational efficiency (Forum, 2020). In 2019, most organizations in the Dubai Pay gateway joined blockchain, and reconciliation took less than 45 days (Forum, 2020).

4.3.8 Roads and Transportation Authority

RTA, an independent agency, is responsible for intra-urban transport services in Dubai (Khan, et al., 2017). RTA used blockchain to develop a vehicle lifecycle management system to give all stakeholders a transparent record of the car's history (U.AE, 2018). This system supports trust and transparency in vehicle transactions, lowers the cost of services, and prevents disputes (U.AE, 2018). The system tracks sales accident history and ownership to create efficient techniques for supply chains (U.AE, 2018).

4.4 Results and Findings

4.4.1 Findings from The Literature Review

Farooq, Khan, and Abid (2020) explained that ineffective serving trust in charity collection systems, no direct association with beneficiaries, and vague claims of delivering the donations can be fulfilled by a blockchain system that eliminates middlemen (Farooq, et al., 2020). The paper also clarified that this decentralized platform makes the charity collection and donations distribution process transparent, prevents disruption of all fields of transactional data, and asks for digital authenticity of data, making it suitable for donations

(Farooq, et al., 2020). Blockchain ensures security and allows double-checking of transactions' security, increasing donors' trust (Farooq, et al., 2020); (Khan, et al., 2022).

Almaghrabi and Alhogail (2022) suggested that blockchain is a suitable solution for ensuring trust and enhancing the efficiency of transactions concerning charity donations (Almaghrabi & Alhogail, 2022). Eventually, all charity donations are managed in a high transparency manner and traced in real-time, which enhances all stakeholders' trust in the charity donation procedure (Almaghrabi & Alhogail, 2022)

Racatin et al. (2022) found that blockchain includes information about everyone owning something at a certain point, knowing when transactions took place, and ensuring the ownership in land management (Racatin, et al., 2022). It also provides additional security through decentralization, cryptography, and backups, which makes it an alternative to the traditional system (Racatin, et al., 2022). When the register is going public, blockchain ensures the transparency of data, so any unauthorized control of land information is directly recognized (Racatin, et al., 2022).

Shin, Kang, and Bae (2020) found that most blockchain experiences in NPOs are early, so it is difficult to find successful cases (Shin, et al., 2020). Based on the literature review, it was realized that applying blockchain technology in NPOs raised donations by developing operational efficiency, transparency, and accountability of the donation platform (Shin, et al., 2020); (Ortega-Rodriguez, et al., 2020). Moreover, NPOs utilize smart contracts to streamline, automate, and reduce costs by facilitating, digitizing, and validating contract performance (Shin, et al., 2020). It was realized that governance practices by NPOs affect donor decisions (Shin, et al., 2020). Trust in NPOs facilitates donations, and transparency affects donor willingness to donate (Shin, et al., 2020).

Previous secondary research found that the main benefits of using blockchain technology in supply chain management are cost reduction, trustworthy product attributes such as traceability and food security, and expedited transactions (Keresztes, et al., 2022). Challenges identified are the under-regulation of data sharing, privacy, information security, control of transactions, and lack of sufficient human resources (Keresztes, et al., 2022). Other barriers include low network readiness, technology cost, low prevalence, limited experience, and lack of sharing best practices (Keresztes, et al., 2022).

According to Khan et al. (2022), researchers and practitioners debated privacy in blockchain (Khan, et al., 2022). Blockchain system ensures that data on the system are obtainable by

authorized users only (Khan, et al., 2022). Government institutions face a lack of regulation and standards when it comes to blockchain implementation (Ortega-Rodriguez, et al., 2020); (Almaghrabi & Alhogail, 2022); (Khan, et al., 2022); (Shin, et al., 2020)). Launching new services, products, and applications based on a decentralized blockchain should be governed by regulations that are currently lacking. Laws should govern the smart contract and facilitate the interaction among system contributors (Khan, et al., 2022).

However, the nature of blockchain is decentralized, and the success of the implementation is based on cooperative and cooperative governance. Governance is required to reach agreeable terms, and since blockchain is evolving, rules, standards, and compliances are yet to be developed for decentralized schemes (Shin, et al., 2020); (Racetin, et al., 2022); (Drljevic, et al., 2022); (Ortega-Rodriguez, et al., 2020); (Khan, et al., 2022).

Table 4 summarizes blockchain benefits and challenges of international best practices.

Blockchain implementation	
Benefits	Challenges
1- Save Costs	1- Lack of IT integration
2- Improve Transactions Efficiency	2- Governance issues
3- Improve Accountability	3- Low level of stakeholder Awareness
4- Improve Transparency	4- Lack of Expertise
5- Data Integrity	5- Lack of Standards, regulations, and policies
6- Enhance trust	
7- Ensures Security	

Table 4: Blockchain Implementation Benefits and Challenges Of International Best Practices (Own Elaboration)

4.4.2 Findings or Lessons from Case Studies

Challenges identified through the literature review were compared with critical success factors and challenges faced by the UAE public and private sector cases mentioned in Chapter 4 (Forum, 2020). While there were similarities, the UAE public and private sectors did not express challenges related to government support or IT infrastructure; instead, they were related to the regulatory and operational spheres (Forum, 2020). Other challenges surfaced through the secondary data are related to bringing stakeholders to the table, effective communication among parties, and aligning interests (Forum, 2020). The private sector saw regulatory uncertainty as a pressing challenge, whereas the public sector’s main concern

resonated with alignment with stakeholders and education (Forum, 2020). Learnings from cases in the UAE public and private sectors have shown that government entities, service providers, and corporations are unified in their concerns about ensuring the onboarding of stakeholders with a suitable model and structure.

Key deployment success factors in the early stage were planning, continuous communication, and defining the project roles, scope, and responsibilities (Forum, 2020). The UAE is blessed with assets that create a thriving environment for STI (U.AE, 2015). Infrastructure, human capital, government efficiency, and availability of capital are the most vital assets (U.AE, 2015). The UAE became the destination of choice for investment and work, attracting talents that transformed it into an international and regional hub for innovation and interaction (U.AE, 2015). Launching innovative initiatives and high quality of life should increase the number of innovators, researchers, and scientists in the UAE (U.AE, 2015). The UAE government invested heavily in developing IT infrastructure and contributed to technology-based innovations (U.AE, 2015). It is ranked high on various global indices measuring internet penetration and Networked Readiness (U.AE, 2015).

4.5 Analysis

Referring to Figure 13, the study compared UAE cases' strengths and weaknesses against international blockchain best practices. This includes stakeholder engagement, regulatory implications, governance, aligning blockchain standards, and implementing compliance and security standards. The comparison highlights areas where the UAE excels and identifies opportunities for improvement in adopting blockchain technology. The main challenges are bringing stakeholders to the table, effective communication among parties, and aligning interests. The main success factors of the UAE public and private sectors were planning, continuous communication, and defining the project roles, scope, and responsibilities.

These public and private sector cases demonstrate how blockchain enhances transparency and accountability, offering valuable insights for NPOs in the UAE. By showing successful implementations, they provide practical examples of overcoming challenges and achieving greater trust, which can be adapted to improve governance in NPOs.

The analysis below was performed according to the theoretical framework mentioned in Chapter 2, derived from international best practices. The following paragraphs provide a detailed analysis of the key challenges and success aspects in case deployments.

4.5.1 Case Study 1: The UAE Private Sector

4.5.1.1 The Key Deployment Success Factors

4.5.1.1.1 Strategic Planning and Guidance

The UAE government plays a crucial role in enhancing the environment for blockchain innovation as an early champion of this technology (Forum, 2020). It supported Emirates Airlines in its blockchain implementation journey by connecting to emerging technology teams (Forum, 2020). Malik et al. (2021) stated that government support, including policies, incentives, and initiatives, is one of the environmental factors that play a role in the effective adoption of blockchain (Malik, et al., 2021).

Emirates NBD succeeded in planning by drawing a clear roadmap from the beginning, which ensured the project's sustainability (Forum, 2020). With a long-term application with a vision for moving beyond pilots throughout the bank, the team steers the project effectively, avoiding roadblocks and minimizing confusion (Forum, 2020).

4.5.1.1.2 Comprehensive Process Integration

DP World provides a single window into all procedures, which eliminates duplication and enables trades to interact with the entity through a window underpinned by the blockchain platform (Forum, 2020).

Etisalat Digital ensured an inclusive process from the beginning and contributed to the success of attracting significant banks in the UAE (Forum, 2020). It invested resources and time to convince various banks and accommodate inputs from all participants, which reflected a transparent, integrated process and alignment with participants (Forum, 2020).

4.5.1.1.3 Stakeholder Management and Engagement

DP World maintained effective communication and positive relations with stakeholders to ensure an inclusive approach toward blockchain implementation (Forum, 2020). Handling expectations towards harmony in all aspects is a vital success factor (Forum, 2020). There is a need to design an implementation model that empowers stakeholders and utilizes blockchain for sustainable business innovation (Drljevic, et al., 2022).

Emirates NBD's project team kept contacting with all stakeholders and invested effort, resources, and time in explaining the project, technology, and developments (Forum, 2020). The bank confirmed that the implementation had the proper business return and technical architecture, ensuring that both the business and technical angles were considered (Forum, 2020). Stakeholders need to have detailed awareness of blockchain technology to be empowered to initiate an idea to manage the requirements for effective blockchain adoption in a sustainable way (Drljevic, et al., 2022).

4.5.1.1.4 Leadership and Innovation

Emirates Airlines created a suitable environment to help more accessible blockchain technology experiments and provide the best match for business requirements and challenges (Forum, 2020). It also cultivates an organizational innovation mindset and ensures early adoption of solutions that provide a competitive advantage to the entity (Forum, 2020). It is widely known that innovation is an essential source of competitive advantage in a rapidly changing environment (Drljevic, et al., 2022). Drljevic et al. (2022) claimed that until 2019, 92% of blockchain implementation failed due to absence of a model for controlling the adoption of blockchain-driven business innovation using a supportable approach (Drljevic, et al., 2022).

Etisalat Digital played a vital role as an independent third-party and nonfinancial provider, which made it easier to deal with banks and engage them in a single platform (Forum, 2020).

4.5.1.2 The Key Deployment Challenges

4.5.1.2.1 Governance and Operations Alignment

DP World faced a challenge in aligning governance and operations while implementing blockchain (Forum, 2020). It is currently in the process of learning how to structure operations in a decentralized and federal manner to align with governance and the decentralized nature of blockchain architecture (Forum, 2020). As a result, formalizing the engagement among members on a co-owned platform that requires hosting, funding, maintenance, and operation is a vital challenge (Shin, et al., 2020).

4.5.1.2.2 Project Management and Stakeholder Coordination

DP World's other key challenge was the unconventional project or initiative requirements, as project-management methods across entities differ (Forum, 2020). Given that each central entity holds partial ownership of the blockchain platform, customization of workflows, project management, and funding approval becomes necessary (Kişi, 2022).

Etisalat Digital faced a challenge in managing requirements and maintaining a clear focus to offer a solution that convinces all participants to meet security policies and information technology frameworks (Forum, 2020).

4.5.1.2.3 Technology Implementation and Finalization

For Emirates Airlines, taking a minimal viable product (MVP) and moving it into production, especially with such an emerging technology, was a challenge as the procedures include complying with internal policies, requirements, and standards (Forum, 2020). The MVP is an essential concept of the Lean Start-up methodology as it supports an entity to launch the learning process quickly and receive feedback from early adoptive parents (Dennehy, et al., 2019). It took time to ensure commercial feasibility and bridge the gap between initial validation and production rollout (Forum, 2020).

Kişi (2022) stated that blockchain technology needs consensus among members due to its distributed nature (Kişi, 2022). The Emirates NBD faced a challenge related to the finality of the data, which created an integration. Its network should ensure achieving the consensus before consuming the data (Forum, 2020).

4.5.1.2.4 Stakeholder Engagement and Human Factors

Convincing the main stakeholders that blockchain technology is the future and will add value to Emirates Airlines was a challenge (Forum, 2020). While doing so, skywards maintained a risk-based approach to prevent obstacles related to this recent technology (Forum, 2020).

The Emirates NBD adopted the technology early on and faced the challenge of convincing stakeholders of blockchain's technical feasibility and promising return on investments (Forum, 2020).

Aligning the ambitions and intentions of various parties was a challenge for Etisalat Digital, and it is time-consuming due to its large and internal governance structures (Forum, 2020).

4.5.2 Case Study 2: The UAE Public Sector

4.5.2.1 The Key Deployment Success Factors

4.5.2.1.1 Strategic Alignment and Core Benefits

ADDA understood how to apply the technology by breaking down its benefits (Forum, 2020). Elaborating on the potential benefits, such as efficiency, security, and transparency, helps in creating a clear path (Forum, 2020).

Smart Dubai recognized the importance of clearly outlining a problem that involves associated time and high costs (Forum, 2020). It was simple to convince stakeholders to participate in the project due to clear communication with stakeholders and defining the pain points (Forum, 2020).

4.5.2.1.2 Government Strategy and Modularity

ADDA clearly defined blockchain elements and engineered new applications and policies that allow for the modular application of solutions, ensuring sustainability (Forum, 2020). This approach has proven successful by relying on a particular blockchain and reducing vendor lock-in, allowing continuous blockchain development standards (Forum, 2020).

MOHAP was allowed to adopt a culture of being encouraged to new changing and exploring innovations due to the UAE government's approach to focus on improving patient safety (Forum, 2020). Through the government's strategy to adopt emerging technologies, MOHAP continued to explore what is possible (Forum, 2020).

4.5.2.1.3 Phased Implementation

MOHAP applied a phased approach aligning with blockchain maturity (Forum, 2020). Data privacy related to donors is critical, so MOHPA had to address this accordingly (Forum, 2020). Blockchain technology keeps evolving, so the phased approach supports the security standards of data privacy possible (Forum, 2020).

4.5.2.1.4 Stakeholder Engagement

Smart Dubai succeeded in engaging stakeholders by conducting sessions and security assessments, demonstrating the value of the opportunity, and addressing open concerns (Forum, 2020). It also advanced Blockchain as a service podium to integrate all organizations (Forum, 2020).

RTA engaged all stakeholders, including dealers and car manufacturers, insurance companies, regulators, sellers, buyers, and garages, to ensure trust and transparency (U.AE, 2018).

4.5.2.2 The Key Deployment Challenges

4.5.2.2.1 Technical Complexity and Standards

The lack of clear standards, technical issues, and interoperability was the challenge that ADDA faced (Forum, 2020). ADDA was not sure about the direction of developing standards for this technology, along with regulations, interoperability, and other issues that add to the complexity of planning such projects (Forum, 2020). Malik et al. (2021) stated that standard uncertainty as

an environmental factor plays a vital role in the organizational adoption of blockchain (Malik, et al., 2021). Standards uncertainty is related to the unavailability and unpredictability of formal standards and regulations enforced by government entities for a technology (Malik, et al., 2021). The absence of relevant standards raises doubts among entities about the benefits of such recent technology (Malik, et al., 2021). The related standards for blockchain are still missing due to its nascent nature, causing entities to be doubtful about its future development (Malik, et al., 2021).

Smart Dubai also faced the challenge of earlier adoption of the technical and business (Forum, 2020). The implementation team works within an emerging blockchain as an early adopter, which made it a challenge to develop a platform within the standards and technology that progressed in the meantime (Forum, 2020).

4.5.2.2.2 Organizational Capability and Costs

The level of capabilities and awareness about blockchain was a challenge for ADDA (Forum, 2020). The project progresses at the pace of its slowest component linked to the chain due to the collaborative nature of blockchain. As a result, ensuring a constant stage of expertise, understanding, and engagement is a vital challenge (Forum, 2020). Smart Dubai also faced stakeholders' awareness as a severe challenge (Forum, 2020). Constant iteration and education play a vital role in adopting this technology (Forum, 2020). Malik et al. (2021) clarified that blockchain adoption is affected by organizational learning capability (Malik, et al., 2021). The organizational learning capability refers to the ability to store, acquire, share, and employ knowledge in the business decision-making processes (Malik, et al., 2021).

RTA also faced a challenge related to technical integration, where the lack of clear standards made it difficult to confirm seamless integration (Astarita, et al., 2019).

4.5.2.2.3 Legal and Cultural Adaptation

The MOHAP faced the adoption of smart contracts, as legal online contracts, as a primary challenge (Forum, 2020). It was a regulatory challenge to accept a person's agreement as a legally binding agreement on the registry (Forum, 2020). However, digital contracts are legal in the UAE, and by verifying the donors' identity, it was necessary to develop an identity verification system. This verification system should be integrated with the Federal Authority for Identity to gain more details (Forum, 2020). Like any software code, smart contracts may face security flaws and errors. Eventually, vulnerabilities were identified in Ethereum smart contracts (Werbach, 2018). Errors in smart contacts are dangerous because the blockchain

carriers value to basnets immediately (Werbach, 2018). There are vital limitations in replacing human administration of contracts with software running on this technology (Werbach, 2018).

The MOHAP also faced the cultural impact of smart agreements as a challenge (Forum, 2020). However, smart contracts are created to be self-executing agreements. In the case of organ donations, family members may object to this donation (Forum, 2020). The process needs multi-signature requirements, which added complexity and necessitated additional steps for verifying witnesses' identities (Forum, 2020).

4.5.2.2.4 Infrastructure Transition

Moving from centralization to a decentralization approach was a big challenge for Smart Dubai as it has a typical centralized project (Forum, 2020). Blockchain technology requires continuous engagement of various stakeholders where every corporate entity and government has its security rules and substructure team (Forum, 2020). Eventually, Smart Dubai needed to address the necessities of each participant (Forum, 2020).

4.6 Chapter Summary

This chapter focused on two selected case studies, the UAE public and private sectors, and their analyses. Four entities in each industry were chosen to highlight their experience. The detailed and empirical work on the cases indicates that adopting international best practices encouraged organizations to apply blockchain technology. Overall, the analysis's findings confirmed the theoretical framework proposed in Chapter 2. The following chapter includes recommendations driven by the analyses and how the study aim and objectives of the dissertation were addressed.

Chapter 5 Recommendations and Conclusion

5.1 Introduction

The chapter incorporates lessons from the theoretical framework (Figure 13) and the UAE public and private sector cases due to the limited availability of NPOs blockchain case studies in the UAE. NPOs can benefit from the policy and strategies drawn based on lessons from previous cases to illustrate blockchain technology's broader applicability. These insights emphasize stakeholder engagement, regulatory implications, governance, blockchain standards alignment, and compliance and security standards to enhance transparency and accountability in the UAE NPOs. It also outlines a recommended framework for blockchain implementation in the UAE NPOs in which transparency and accountability aspects may be addressed, which was one of the leading research objectives. In addition, it concludes the study by answering the research questions, discussing limitations, and providing directions for future studies.

5.2 Proposed Policy

As this dissertation aimed to support non-profit policymakers and other relevant stakeholders in the UAE in providing practical recommendations to develop the effective and responsible adoption of blockchain technology, it was considered pertinent to find common points between the proposed policies presented in the literature and compare them with the challenges facing the public and private sectors in the state to develop an appropriate policy for NPOs to adopt blockchain technology. Thus, the existing best practices' generic guidelines for adopting blockchain technology were used as a baseline for a new proposed policy for blockchain adoption in the UAE NPOs.

5.2.1 Recommended Policy Actions

To fully apply the transformative power of blockchain technology, the ecosystem and ecological maturity of distributed ledgers should be increased (Allessie, et al., 2019). The proposed policy activities below will support the exploration of the full potential of blockchain by addressing how NPOs can overcome the challenges mentioned in Table 4:

- **Facilitate all Stakeholder Collaboration:** Blockchain is a consortium, and participants should be there. The Ministry of Community Development has 521 NPOs that are recommended to increase the usage of blockchain by participating in this group to consume the data provided on the blockchain (Khan, et al., 2022). The more integration and utilization, the better benefits the organizations gain. Technology maturity improves with more participants on the platform. This helps NPOs overcome

the challenge of bringing all required stakeholders to the table (Forum, 2020). The Ministry of Community Development is recommended to define standards and reference conditions and create shared infrastructures most appropriate for specific use case types, such as NPOs' registries, smart contracts, or lists of events and initiatives (Allessie, et al., 2019).

- **Enhance IT Integration and Expertise:** Moving to the future demands NPOs to be prepared to have new systems, structures, and securities. Transitioning from the current model to the latest version involves linking two systems, updating infrastructure, mapping the data, and conducting quality checks on the data. Eventually, this will help NPOs overcome the challenges of education and awareness of the recent technology. The Ministry of Community Development can develop co-finance pilot projects like smart contracts between NPOs, donors, and external executive offices. It is recommended to experiment with blockchain in a unified registry containing all NPOs' donors, beneficiaries, events, and employee data. That allows the ministry to re-engineer administrative processes (Allessie, et al., 2019).
- **Develop governance architecture:** NPOs may face the challenge of governance architecture's changes (Khan, et al., 2022). Changing the centralization to decentralized governance involves changes in organizational structure and cross-functions (Khan, et al., 2022). It is a gradual process that begins with trust in the platform (Khan, et al., 2022). That helps to address the challenge of aligning interests. The Ministry of Community Development is recommended to share best practices on blockchain implementation among 521 NPOs.
- **Address NPOs blockchain Standards, regulations, and policies:** The Ministry of Community Development is recommended to provide standards, regulations, and policies to support the usage of blockchains in NPOs, such as data models for intelligent projects' contracts, NPOs' registries, lists of events and initiatives, and the UAE PASS for beneficiaries and suppliers (Allessie, et al., 2019). Furthermore, to meet the requirements and overcome the skills shortage, colleges are recommended to prepare a generation with back-end programming skills in Go, Java, C++, C#, and Node. JS (Khan, et al., 2022). That helps automate onboarding or building the protocol of entities in the blockchain platform (Khan, et al., 2022).

5.3 Recommended NPOs' Strategic Approach

NPOs use blockchain to enhance transparency and efficiency and increase donations. Based on best practices and case studies, the study organizes the proposed suggestions for NPOs into four stages based on the degree of governance and donations. The figure below shows the NPOs' blockchain application strategy, where the researcher added elaboration to fit the results of the challenges discussed in Chapter 4. Based on the challenges, the UAE NPOs are still stuck in the middle and must face the challenge of reaching the platform approach.

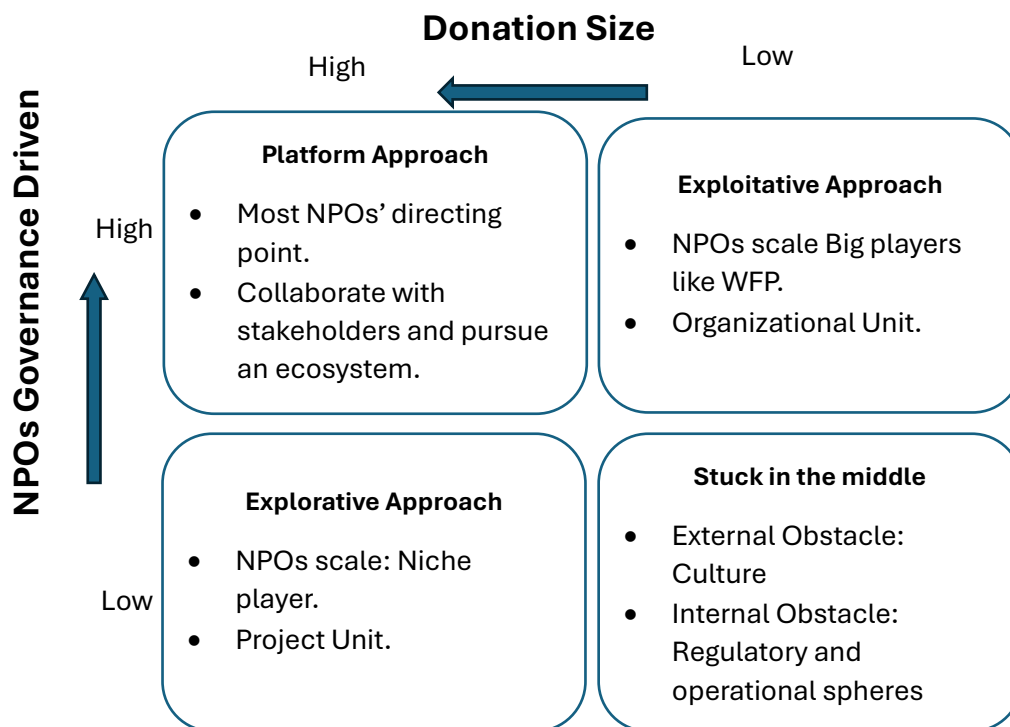


Figure 14: A NPOs' Blockchain Sustainable Development Application Strategy (Shin, et al., 2020) (Slightly Adapted to the theme of this study)

5.4.1 Stuck in the middle: Cultural impact and regulatory and operational spheres may prevent ensuring transparency and expansion of donations (Shin, et al., 2020).

5.4.2 Exploitative Approach: This strategy aims to enhance operational efficiency and transparency rather than focusing solely on contributions. For example, WFP uses smart contracts, and information is documented in a distributed ledger (Shin, et al., 2020).

5.4.3 Explorative Approach: This strategy may be pursued by small niche NPOs that plan or operate new projects to increase a business's contributions and ensure anonymity with cryptocurrencies (Shin, et al., 2020).

5.4.4 Platform Approach: This is the recommended strategy for NPOs to increase contributions and ensure transparency and accountability in their processes. It recommends building a non-profit blockchain ecosystem using smart devices, cryptocurrencies, and a distributed ledger.

5.4 Review of the Study Objectives and Research Questions

This study aimed to develop an efficient response to the challenges currently faced by NPOs in adopting blockchain technology to ensure transparency and accountability. Three objectives were identified to achieve the study's aim. The following table illustrates the tools used to meet these objectives.

Data collection tools	1. To identify the transparency and accountability required by the UAE government, Ministry of Community Development, and Ministry of Foreign Affairs that NPOs are currently trying to meet.	2. To propose adopting blockchain technology to address and enhance transparency and accountability.	3. To support non-profit policymakers and other relevant stakeholders in the UAE in providing practical recommendations to develop effective and responsible adoption of blockchain technology.
Literature review	√	√	
Results and findings	√	√	√
Case study analysis	√	√	√

Table 5: Tools Used to Achieve Research Objectives (own elaboration)

The research questions were answered using two sources: the findings of a comprehensive literature review and the comprehensive analysis of case studies.

5.5 Concluding Remarks

There were no detailed case studies of the UAE NPOs in blockchain experiments. Keeping this in mind, the researcher examined the international best practices and public and private sector case studies to highlight the main challenges that should be considered while implementing blockchain.

The intended outcome of this study was to encourage NPOs in the UAE to adopt such technologies to ensure transparency and accountability.

A significant contribution of this dissertation is the analysis of challenges, the highlighting of similar challenges, and the proposed policy and strategy to overcome these challenges while implementing blockchain. One of the prime contributions of this dissertation is the addition to

the literature gap in blockchain implementation knowledge. Given the proposed policy agenda, opportunities exist for NPOs to evaluate the policy and highlight the challenges.

5.6 Limitations of the Study

The dissertation faced certain limitations as follows:

- a) As blockchain evolves, access to NPOs' cases in the UAE is not obtained. Given the scope of the research, only published experiences of public and private organizations were investigated.
- b) Based on the findings of previous studies on blockchain adoption and the UAE cases, the recommended policy agenda was derived from the best practices and the UAE cases.
- c) Furthermore, blockchain is transformative, and much of its influence has yet to be discovered, even at the theoretical level (Capece & Passiatore, 2021).

5.7 Future Research Direction

The following suggestions are proposed for future research:

- a) This research focused on international best practices that adopted blockchain. Future researchers should explore the best practices of local NPOs relevant to the GCC, focusing more on accountability commitment.
- b) This study used a secondary data collection methodology to examine international practices and the UAE public and private case studies. Future researchers can utilize primary data using primary data collection methods, such as surveys or interviews, to gain deeper insights into ensuring transparency and accountability using blockchain in the UAE case studies.

5.8 Chapter Summary

Based on the available research on international best practices of blockchain implementation, the dissertation presented an analysis of public and private UAE cases and the proposed policy agenda and strategy; the UAE NPOs can consider all of that to implement blockchain to raise transparency and accountability.

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