Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6, 342-355
2024
Publisher: Learning Gate
DOI: 10.55214/25768484.v8i6.2069

Stakeholder perspectives on blockchain technology adoption for public governance in Nigeria - a qualitative study

Oluwasola Oni[1*]
[1]School of Management and Social Sciences Pan-Atlantic University, Lagos, Nigeria; ooni@pau.edu.ng (O.O.).

Abstract: The purpose of this paper is to investigate the perspectives and expectations of the stakeholders involved in this diffusion process, with the objective of assessing Nigeria's position along the innovation diffusion process. Although a national policy for the adoption of the technology has been published recently. There is very scant literature on the "perspectives of key stakeholders" on blockchain adoption. This paper attempts to address that gap by gathering insights through the views of various stakeholders involved in the innovation-decision process, including public officials, vendors, end users, and consultants, with the aid of interviews. With an initial exploratory study using the theoretical frameworks of Social Construction of Technology (SCOT) and Innovation Diffusion Theory, results reveal that the adoption of blockchain technology for governance is at the decision phase. Private developers exhibit enthusiasm and preparedness for blockchain integration, as against mild reservations within governmental bodies and financial institutions, primarily concerning security, scalability, and regulatory frameworks. The paper suggests that future research endeavours to embrace complementary methodologies and cross-sectoral analyses, to identify sector-specific challenges in the adoption of blockchain technology.

Keywords: *Blockchain technology, Distributed ledgers, Governance, Adoption, Innovation diffusion, Public sector.*

1. Introduction

Nigeria, with a population of over 200 million people and the largest GDP in Africa (Yeboua et al., 2022), is a nation abundant in resources. Despite its vast potential, Nigeria has struggled to achieve the expected levels of growth and development. Challenges such as insecurity, food insecurity, and a breakdown of trust between the government and citizens have hindered progress over the years. At the forefront of these challenges lies the pervasive issue of corruption, which has plagued the country for decades. For over fifty years, the country has been mired in corruption, with practices ranging from looting state funds and money laundering, to bribery and nepotism contributing to its consistent ranking among the world's most corrupt nations (Folarin, 2021). This has had a significant impact on development in many ways. For example, most infrastructural projects commissioned by the government suffer from bloated cost estimates, typically as a result of corruption (Eja & Ramegowda, 2020). This has contributed immensely to hindering infrastructural development in Nigeria (Ebekozien, 2020). Corruption has also jeopardised the rule of law by undermining public administrators and the judiciary (Folarin, 2021). Additionally, corruption has stymied the growth and development of small and medium-sized enterprises (SMEs). Funds intended to support SMEs have been mismanaged by government agencies. Civil servants, legislators, and in some cases, presidential appointees are often involved in these corrupt practices (Page & Okeke, 2022).

In addition to corruption, ineffective leadership amplifies Nigeria's challenges. This resulted into insecurity in many parts of the country, tribal and religious tensions, a lack of public accountability, diminishing human rights, and institutional weaknesses (Yagboyaju & Akinola, 2019). Despite abundant

* Correspondence: ooni@pau.edu.ng

human and material resources, the country's development has been hindered by poor governance and systemic flaws in its democratic institutions which implies that the transformation of the country remains a pipe dream (Odo, 2015) . The failure of governance is evident in leaders' inability to recognize and address the risk of state collapse, which is a harsh reality for many Nigerians. Issues such as electoral fraud, armed banditry, police brutality, and terrorism persist, emphasising the urgent need for effective measures to overcome these challenges (Okoi & Iwara, 2021).

Recognizing the need for reform, several national leaders have tried to diminish or eradicate corruption, albeit with varying degrees of success. However, the efficacy of additional technologies, such as blockchain, in delivering the necessary impact remains uncertain. Nigeria has embarked on exploring technological solutions to address governance challenges, particularly in enhancing accountability and transparency.

Blockchain technology, characterised as a distributed database of transaction records validated by a network of computers across different countries (Sarmah, 2018), has garnered attention for its potential to revolutionise various sectors. Its fundamental attributes, including transparency, decentralisation, autonomy, immutability, and anonymity, offer numerous advantages such as empowering users, disintermediation, data integrity, reliability, and cost efficiency (Niranjanamurthy et al., 2019).

While blockchain initially gained prominence in cryptocurrency applications, its potential extends far beyond. Previous research has focussed on various applications of blockchain technology such as its impact on the growth of smart cities (Sun et al., 2016), its social impact (Al-Saqaf and Seidler, 2017), its impact on healthcare (Ahmad et al., 2019), its possibility of revolutionising voting (Boucher, 2016), applications in finance (Treleaven et al., 2017), and its applications in the internet of things (Ali et al., 2019). The technology features certain attributes such as being trust-free and democratised, thereby allowing transactions between strangers without the need for an intermediary, thus implying that contractual agreements no longer require human involvement for enforcement (Sun et al., 2016).

The evolving utility of blockchain technology further strengthens its potential to combat corruption and promote transparency. Its disruptive potential transcends financial transactions, promising broader benefits such as financial inclusion, transparent transactions, enhanced efficiency, and heightened security. While its development and implementation are still in nascent stages globally, Nigeria has outlined a roadmap for potential blockchain adoption. This strategic initiative aims to stimulate innovation, enhance public services, generate employment opportunities, mitigate corruption, and propel economic growth toward positive trajectories (National Blockchain Policy, 2023).

Experiences from implementations in countries like Brazil highlight the potential benefits of blockchain technology in governance. These include enhanced reliability and quality in data management, efficient execution of public contracts, and the prevention of bid fraud and corrupt practices. Moreover, blockchain holds promise in streamlining logistics control of regulated products and decentralising elections, fostering a more participatory approach to public policy decision-making (Moura, Brauner, & Janissek-Muniz, 2020). The anticipated advantages of blockchain holds promise in addressing governance challenges in Nigeria, such as the urgent need for economic growth, increased transparency, citizen engagement, and the mitigation of corruption.

Despite the abundance of literature on blockchain, the existing studies merely describe the technology or its applications across various domains (Dubey et al., 2023). However, the utilisation of blockchain in public governance remains in its developmental stage and has often been ignored, rendering it challenging to comprehend (Berryhill et al., 2018). Limited research exists on blockchain applications involving citizens, with emerging ideas possessing restricted functionality in implementation (Oliveira et al., 2020). Moreover, Allessie et al. (2019) assert that blockchain remains underexplored in government contexts. This paper seeks to address these gaps by examining the opportunities and challenges associated with the adoption of blockchain technology in Nigeria. Through this research, we aim to explore the diffusion of blockchain technology for governance and contribute to the understanding of its potential impact.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

To thoroughly examine the implications of blockchain technology on governance in Nigeria, it is essential to identify the factors influencing its adoption and determine the current stage of blockchain implementation within the innovation-diffusion process. Consequently, this study aims to investigate the perspectives and expectations of the stakeholders involved in this diffusion process, with the objective of assessing Nigeria's position along the innovation diffusion process. The research is therefore guided by the following research questions.

1. *To analyse the perceptions of stakeholders regarding the adoption of blockchain technology across key governance functions.*
2. *To assess the current stage of blockchain technology adoption in Nigeria within the innovation diffusion process.*

To this end, this article is structured as follows: The next section provides an overview of the study's background, including the phenomenon under consideration, relevant theories, and the context. Following this, the research design is detailed, followed by a discussion of the results in Section 3. The subsequent Section 4 concludes with a discussion of important implications, the study's limitations, and suggestions for future research directions.

2. Literature Review

2.1. Blockchain Technology and Governance

Blockchain technology is defined as a distributed ledger that records executed and shared transactions between participating users. Every transaction in the public ledger is verified by the majority of users in the system. Any information entered cannot be removed. As such, the blockchain maintains a provable record of each transaction (Crosby et al., 2016). The technology helps to mitigate several concerns because no single entity controls a transaction. Instead, more than one entity accepts or rejects transactions, ensuring that there is no single entity that has sole control of information or decisions. Its two essential and differentiating features include being a distributed ledger and also a peer-to-peer system (Dubey et al., 2023). By performing transactions without an intermediary, implementing blockchain technology helps to build trust among anonymous users. its essential features such as decentralisation, transparency, immutability and irreversibility provides a consensus mechanism that typifies the technology (Rajasekaran et al., 2022).

Blockchain technology has many features that render it applicable to governance of the public sector and governments. It has over two hundred use cases around the world (Tan et al., 2022). Some of them include better security for data management and cryptocurrencies (Bustamante et al., 2022). Various pilots are being conducted including the technology's use in the storage of judicial decisions, tracking the movement of money, electronic voting, passports, business licences, tax records and criminal records (Ølnes et al., 2017) immutable time stamps, digital wallets, decentralised ownership of information, distribution of food, health and housing as social benefits (Kalampokis et al., 2022), and the public governance of smart cities enabling transparent citizen participation (Balcerzak et al., 2022). The benefits of its applications in such use cases include transparency, reduction of corruption, data integrity and reduction of fraud. However, blockchain technology and such distributed systems are not as efficient as centralised databases and are less flexible as a result of the limited capability of scaling up. There would also be a need to introduce changes to current governance approaches (Ølnes et al., 2017). The flow of information between the levels of government would have to be taken into consideration by the system developers and policymakers (Tan et al., 2022) as it could bring about drastic changes in how the government operates, possibly leading to reduced costs of governance, securing facts and increasing the efficiency of services. Several records are still maintained manually by many governments. Blockchains can reduce the need for manual controls and thereby limit bureaucracy and the need for interaction with public officials, resulting in more user-centric services. Smart contracts can also be enabled by blockchain technology (Konashevych, 2017).

Blockchains are a likely advantage when there is little to no trust in a government but such governments may be unable to introduce the technology as they may lack the technical know-how

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

(Bustamante et al., 2022). The issue of trust features very highly on the list of benefits when adopting blockchain for governance. However, while it may eliminate some reliance on trust, it creates new assumptions that may be better or worse than maintaining the status quo (Ruoti et al., 2019). There are other challenges that may be encountered in the process of adopting blockchain technology governance such as different stakeholders having their independent policies and models of governance, and a limited ability of the technology for facilitating decision-making (El Khatib et al., 2022). Considering the fact that there is very little evidence to demonstrate a comparison between blockchain and traditional approaches, it is worthwhile for governments to carry out detailed feasibility studies before full implementation (Wang et al., 2016).

Undoubtedly, there is a lot of hype around the technology (Cheng et al., 2019) and since many applications of blockchain in organisations tend to fail(Goldsby & Hanisch, 2022), it is also worth exploring the possible downsides of adopting blockchain for governance in Nigeria. The cost of establishing platforms, privacy, security; preservation of the electronic records; energy costs as a result of high computing power (Golosova & Romanovs, 2018). Internet-based systems tend to be vulnerable to attacks, systems could be very slow when additional blocks are included, it might not always be possible to ensure key privacy and selfish miners could deliberately put the system in distress (Baygin et al., 2019). The inherent risks and possible challenges can result in dire consequences. It is therefore expedient to mitigate such risks if the country fully adopts blockchain for the delivery of government services.

2.2. Theory of Adoption and Blockchain Technology

Adoption studies have been studied in the fields of information systems and computing, through a variety of theories including the technology adoption model, theory of planned behaviour, theory of reasoned action, and so on. However, these theories have typically been applied to studies considering individuals' adoption of technology (Oni, 2020). The theory of diffusion of innovations remains one of the most authoritative theories in information systems and has been used to study the adoption of technology in various contexts. The theory attempts to explain the rate at which an innovation or technology spreads. It also tries to explain how and why they spread (Rogers, 2010).

The theory tries to explain how decisions to adopt or reject an innovation are made over time. The innovation-decision process is described as the process by which a decision-making unit moves from the initial encounter of an innovation to the point of establishing an attitude to the innovation, to the point of deciding to adopt or reject, to implementing the innovation and finally confirming this decision (Rogers, 2010).

The process is made up of five stages which are as follows.

- **Knowledge:** at this initial phase, exposure to the technology has occurred with limited information about it.
- **Persuasion:** In the next phase, interest exists in the innovation and there is a measure of actively seeking related information about the technology.
- **Decision:** the decision phase is the point at which benefits and challenges of using the innovative technology are thoroughly evaluated and a decision is made to adopt or reject.
- **Implementation:** at the implementation phase, the innovation has been deployed and its usefulness is evaluated. More information about the innovation may also be sought at this stage.
- **Confirmation:** at the confirmation phase, a final decision is made to continue using technological innovation. To ensure that there is limited ambiguity about the consequences of adopting an innovation, information is sought at the different stages of the innovation decision process (Rogers, 2010). This process is shown in Figure 1.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

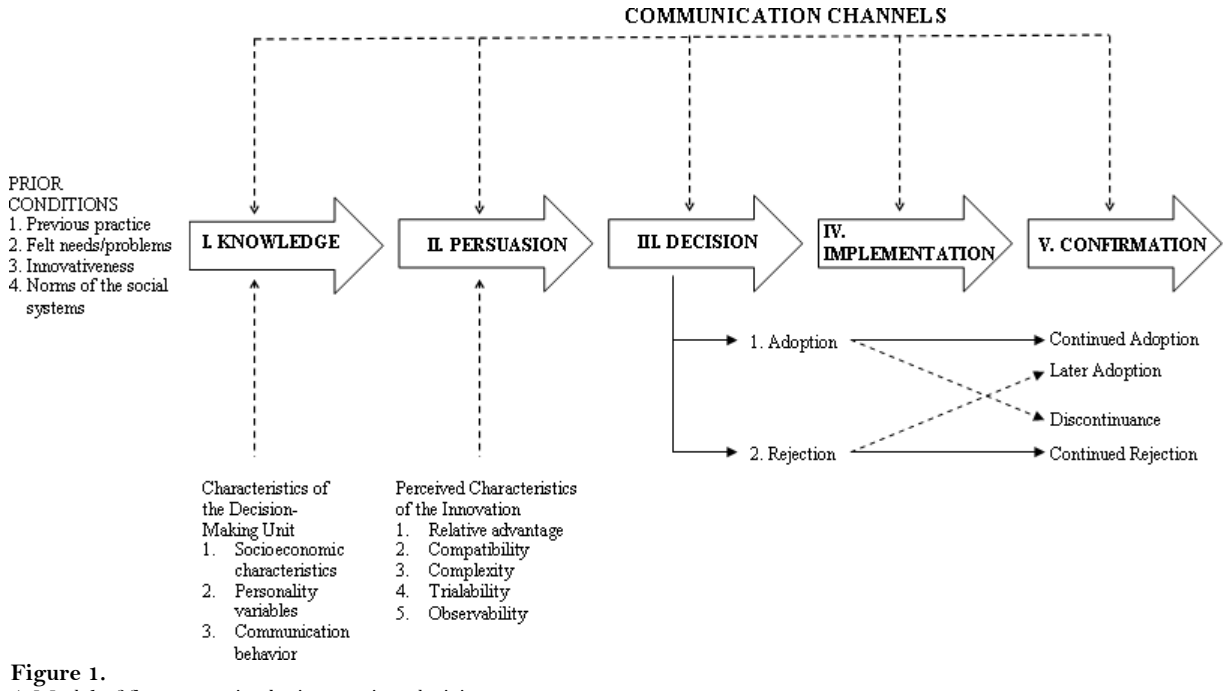

Figure 1.
A Model of five stages in the innovation-decision process
Source: Diffusion of innovations, fifth edition by Everett M. Rogers. Copyright (c) 2010 by The Free Press. Reprinted with permission of the Free Press: A Division of Simon & Schuster.)

The theory is often used to explain how and why innovations are adopted. However, it has been criticised for focussing on the innovation and its attributes without necessarily considering the impact of various entities or groups that have an influence on how the innovation is used or adopted. It has also been criticised for not considering the consequences of adoption (Oni, 2020; Oni & Papazafeiropoulou, 2014; Papazafeiropoulou & Gandecha, 2007). This research adopts the same stance and argues that the views of the various entities that are involved in the blockchain adoption process are important and contribute meaningfully to the adoption process. Consequently, social theories such as social shaping of technology, social construction of technology (SCOT), stakeholder theory and actor network theory can support the study of complex systems such as blockchain technology for governance (Papazafeiropoulou & Gandecha, 2007).

Rogers' theory implies that at the core of an adoption decision, are the innovation's characteristics. While the characteristics are important and have consistently helped to explain the rate of adoption, it leaves out pertinent issues, as mentioned previously. In Nigeria, various stakeholders are impacted by the adoption of blockchain technology and some of these include citizens, financial institutions, the government, and related agencies within the government, blockchain stakeholders in blockchain technology (SIBAN), vendors (developers) etc. These groups are diverse and may not have the same view of the technology, its application, benefits, concerns, or the current position along the innovation-decision process. The adoption of blockchain will have far-reaching consequences for the identified stakeholders and the nation. These views are therefore important to help solve the problem identified in the first section of this paper. Therefore, following Papazafeiropoulou and Gandecha (2007), this research will apply notions from a sociotechnical theory (Geels & Johnson, 2018) to ensure that the potentially different views of the stakeholders involved in the diffusion of blockchain technology are taken into consideration. This research relies on SCOT in particular as an SST theory that can shed more light on the phenomenon and the context within which it exists.

SCOT provides an alternative to technologically deterministic theories such as DOI. The nature of technology and what it can accomplish are perceived as a result of human interpretation. It is a

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

multidirectional model that has four important components which include, relevant stakeholders, interpretive flexibility, closure, and stabilisation (Pinch & Bijker, 1984).

- **Relevant stakeholders**: Members of a certain group of people who share the same set of meanings attached to a particular artefact or technology.
- **Interpretive flexibility:** This describes the notion that different stakeholders can have different meanings about the same technological artefact. Not only is there flexibility in how people interpret or think about technology, but their design is also flexible.
- **Closure and Stabilisation:** Closure describes a situation in which consensus occurs when a problem arising during the development of a technology or artefact has been resolved. When the stakeholders involved in adopting or using a technology agree that a problem is solved, that results in the stabilisation of the technology (Pinch & Bijker, 1984). The notion of interpretive flexibility is particularly pertinent to this study because the data that has been obtained indicates a difference in the views of the relevant stakeholders about the current stage of the diffusion process of blockchain technology.

The phases involved in SCOT are as follows:

- Identifying the relevant stakeholders
- Defining them in more detail
- Uncovering the problems each of these groups has with respect to the artefact
- Identifying several variants of the solution around each of these problems.

Explaining the developmental process brings out all the various conflicts. The model emphasises the multidirectional nature of a technological artefact. The interpretative flexibility of an artefact must be shown. The technological artefact under consideration is blockchain technology and there are different stakeholders involved in the adoption and diffusion process.

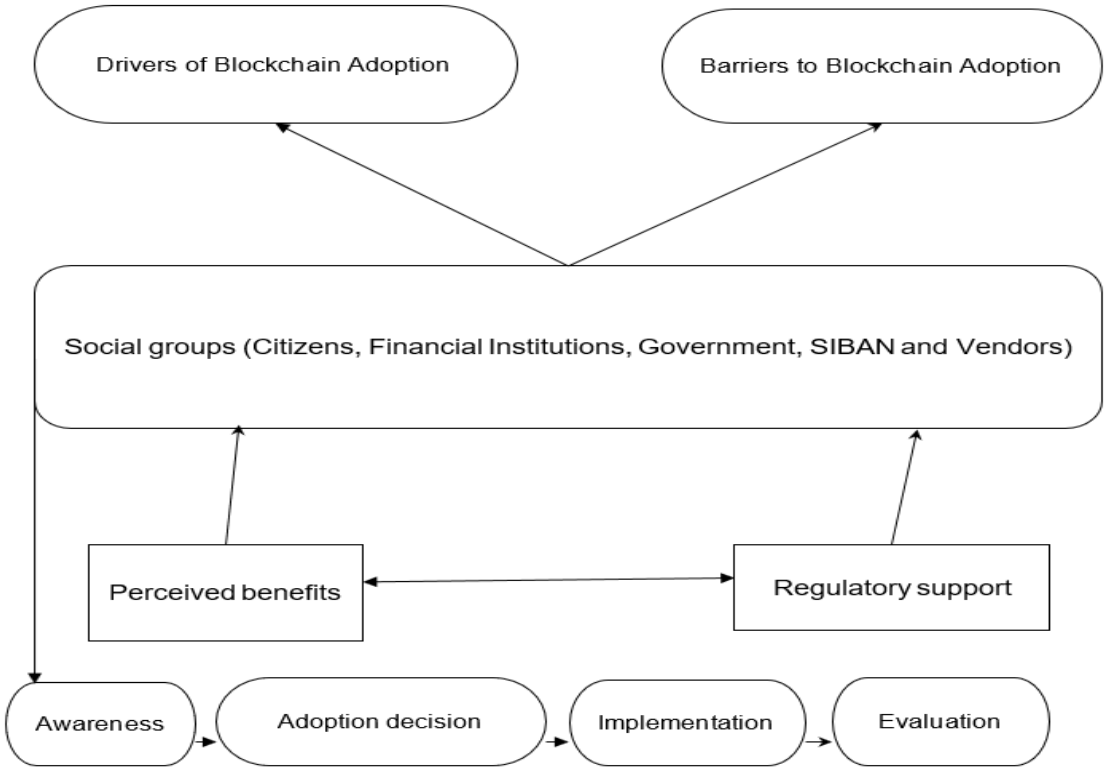

Figure 2.
Conceptual framework.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

The initial element of the framework comprises the key stakeholders involved in the diffusion of blockchain technology in governance. Each of these groups plays a distinct role and exerts specific influences on the adoption process. Citizens, as the end-users of blockchain-enabled government services, significantly impact the broader acceptance of the technology. Their trust and comprehension of blockchain are pivotal in determining the success of its integration into governance. Financial institutions, which facilitate secure transactions, contribute by integrating blockchain into existing financial systems. The government, positioned at the centre of policy formulation and implementation, plays a decisive role in the regulatory and technical incorporation of blockchain into governance structures. Advocacy and intermediary organisations, such as the Stakeholders in Blockchain Technology Association of Nigeria (SIBAN), are instrumental in promoting the adoption of blockchain by raising awareness and educating key stakeholders. Furthermore, technology providers, who design and implement blockchain infrastructures, are indispensable to the technical diffusion and ongoing maintenance of these solutions.

The next component examines the factors influencing blockchain adoption among these stakeholders. Perceived benefits such as transparency, efficiency, and security are key motivators for blockchain adoption by citizens, government entities, and financial institutions. Government policies and regulatory frameworks serve as either enablers or inhibitors of blockchain adoption. Effective governance that prioritises transparency, data protection, and legal clarity fosters trust among users and institutions alike. Advocacy groups, such as SIBAN, play a crucial role in raising awareness and educating both government bodies and citizens about the potential advantages and applications of blockchain. Technology vendors and developers also contribute by ensuring the availability of secure, scalable blockchain solutions, which encourages adoption by both governmental agencies and financial institutions.

The barriers component highlights the challenges that impede or delay the diffusion of blockchain technology in governance. Limited awareness of blockchain technology among citizens and government personnel often leads to scepticism, resulting in resistance to its adoption. Moreover, the technical complexity of blockchain presents challenges, particularly for governmental agencies that lack the necessary expertise. Ambiguous or insufficient regulatory frameworks can create uncertainty, thereby stalling the adoption process. Additionally, the implementation of blockchain systems necessitates substantial investments in technology, training, and infrastructure, which may be prohibitive for governments operating with limited financial resources.

Advocates of blockchain, such as SIBAN, along with developers, actively promote the benefits of blockchain to government bodies and financial institutions, raising public awareness through campaigns. Government agencies, in collaboration with financial institutions and technology providers, evaluate the feasibility of blockchain adoption. Regulatory frameworks and pilot projects are then introduced to test its applications in governance. Vendors deploy blockchain solutions in targeted government sectors, while the government establishes regulatory guidelines and fosters public-private partnerships to support adoption. Feedback from citizens, financial institutions, and governmental bodies is crucial in assessing the outcomes of blockchain initiatives. Based on this feedback, the government may revise its policies, enabling the technology's further spread to additional sectors if the results are favourable.

3. Methodology

This paper is considering the adoption of blockchain, a technology that is relatively new within the context of governance in Nigeria. To achieve this, an exploratory research design has been chosen to explore the views and expectations of the entities involved in the diffusion process, to gain an understanding of where the country currently is, along the innovation diffusion process. With a mix of interviews and documentary analysis, this research adopts a qualitative approach to understand the views of the relevant stakeholders and their perspective on the adoption of blockchain governance in Nigeria. The decision to adopt a qualitative approach for this research stems from two primary

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

considerations. Firstly, the limited existing research on blockchain in Nigeria suggests a scarcity of professionals knowledgeable about the topics addressed in this paper. Secondly, the intricate social dynamics surrounding the adoption of innovative technologies necessitate a method that allows participants to express themselves freely through open-ended questions. This approach facilitates the exploration of issues that may not be apparent to the researcher and mitigates the potential biases often associated with quantitative approaches.

As previously mentioned, this is an initial exploratory study conducted because of the novelty of the technology under consideration, and its results will be further explored in future research. This pilot study has been designed to gain an understanding of what the various stakeholders believe about the technology and its phase of adoption. To begin with, the stakeholders involved in the diffusion process of blockchain technology for the purpose of governance had to be identified. A thorough examination of existing literature revealed that several key stakeholders play pivotal roles in this diffusion process. Among these groups are citizens, who represent the primary beneficiaries and end-users of government services. Their perception and acceptance of blockchain technology can significantly influence its successful adoption. Financial institutions are also essential stakeholders, as they are deeply involved in managing secure and efficient transactions, a core application of blockchain. Additionally, the government and its related agencies, such as regulatory bodies and public service providers, are central to both the development and implementation of blockchain policies.

Notably, specific organizations that promote blockchain adoption, such as the Stakeholders in Blockchain Technology Association of Nigeria (SIBAN), have been identified as critical actors that advocate for the technology and provide necessary support for both public and private sector integration. Furthermore, vendors, particularly developers and technology providers, are instrumental in the technical diffusion, as they design and maintain the blockchain infrastructures.

By involving these diverse stakeholders, this study aims to reflect a comprehensive picture of blockchain adoption in public governance. However, to ensure representativeness, careful consideration was given to the selection of interviewees. Individuals from each stakeholder group were chosen based on their roles, expertise, and involvement in blockchain-related initiatives. For instance, government representatives included officials directly responsible for digital transformation efforts, while vendors were selected from companies with significant experience in blockchain development.

Previous studies highlight the importance of diverse stakeholder involvement in the diffusion of innovation, particularly in public governance contexts. According to Rogers (2003), the diffusion of an innovation, such as blockchain, requires active participation from various stakeholders who influence the process. Similarly, Janssen et al. (2020) emphasize the role of government and private sector collaboration in facilitating technology adoption in governance structures. Additionally, recent research by Ølnes, Ubacht, and Janssen (2017) points to the crucial role of intermediary organizations like SIBAN in promoting blockchain within both government and business circles.

These references strengthen the argument for the representativeness of the selected stakeholders. By including such a wide array of stakeholders, this study ensures that the insights gathered reflect a well-rounded understanding of blockchain's adoption in public governance.

From these identified groups, representatives were selected to collect data. Purposive sampling was used (Robinson, 2014) because of their ability to contribute meaningfully to the research as a result of the positions that they hold within their organisations.

The research relies on data gleaned from interviews conducted in Lagos, Nigeria, in 2023-2024 and secondary data available from their website (https://siban.org.ng/). The following were selected as interviewees for this initial phase. 5 vendors, 5 management staff of financial institutions ranging from microfinance to commercial banks, 3 government agency management staff, and SIBAN. For SIBAN, this research relied on secondary data available from their website (https://siban.org.ng/). The reason for selecting these representatives is because they form the core of service providers that would lead the decision to adopt or reject the technology within their institutions (Robinson, 2014). The interviews were conducted between November 2023 and January 2024 and lasted for a duration of 25-90 minutes.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

The questions were designed in line with the themes covered in the theoretical review in the previous section. Open-ended questions were asked to ensure that as much information as possible was gleaned from the process.

Table 1.
Key summary details for each of the 14 interviewees.

Job Title	No. of participants	Sector represented
Government officials	3	Governance
Vendors (Technical developers)	5	Development
Management Staffs	5	Finance industry
SIBAN	1	Public policy

This research adopts an interpretive stance. Interpretive methods begin with a stance that our reality is a social construction by human actors (Walsham, 2006). These are considered useful for information systems and adoption studies where a new phenomenon is being studied. This approach is considered appropriate as there are several social, political, and cultural issues involved in the adoption of blockchain technology. The adoption of technology for governance cannot be seen as distinct from its organisational and cultural context (Walsham, 1995).

13 Semi-structured interviews were conducted with representatives of relevant stakeholders to understand what the implication of adopting the technology is, within the current context and to also determine where the country lies in terms of the current phase of innovation decision. Where semi-structured interviews were not possible, the views of the stakeholders were sought from white papers and policy documents (National Blockchain Adoption Strategy (National blockchain policy, 2023; OECD, 2023; Kuppuswamy et al., 2023)). Interviews can be supplemented by other forms of data including press, media web-based data and internal documents of the organisations being studied (Walsham, 2006). The interviews were recorded and transcribed. They were then analysed using intentional analysis (Lacity & Janson, 1994).

4. Results and Discussion

4.1. Level Of Knowledge About Blockchain Uses Cases in Governance

Private developers are at the forefront of building the blockchain technology applications and use cases for the government and are understandably enthusiastic about the possibilities that the technology affords. Their current position is that the technology is ready for deployment but there are several challenges to surmount before the country can be declared ready for adoption. According to one of the interviewees from the vendor social group, *"the road map is clear, but the government must be at the forefront of scaling up"*. Several use cases have been identified by this social group but the use case that appears the most ubiquitous *is the application of real-time settlement.*

However, the Government and Financial institutions are the most poised to adopt that feature. Indeed, an interviewee from the financial institution social group explained that some banks were *already applying blockchain technology for automated teller machine (ATM) interbank reconciliation.* This makes settlement faster, as it eliminates the need for an interbank switch. A very important benefit of blockchain adoption for financial institutions is the ability to *eliminate the middleman for Interswitch transactions ensuring that banks can monitor transactions in real-time.* A government agency social group interviewee made it clear that the expectation of the government is that *the banks will roll out the feature of real-time settlement first and then the government will follow.* After the government implements real-time settlement, *there will be an integration of the national identity number (NIN) to ensure identity management, after which other use cases can then be implemented.*

The overall indication is that private developers (vendors) seem to be very much aware of the possible use cases within blockchain technology. However, they identified a key role for the government in its deployment and regulation. They also noted that the regulatory frameworks that could be

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

designed might not reflect industry expectations due to a lack of experienced professionals within the government circle who can provide the necessary knowledge and expertise required for such frameworks. One of the vendors cited the recent backlash of the government against the prevalence of cryptocurrencies in the country, which also raises questions about the government's level of enthusiasm in adopting blockchain technology.

However, the interaction with government officials indicated that while the country is currently not focused on blockchain technology and its use cases, they also agreed that it could provide crucial benefits for the overall improvement of governance processes. They noted, however, that such adoption would proceed slowly due to the government's concerns about security issues associated with blockchain technology, including hacking and corruption of the system by its developers. This implies that the level of knowledge across each social group seems to vary widely. While private developers appear very enthusiastic about the process, government officials do not particularly share the same level of enthusiasm.

4.2. Level of Perception Among the Different Stakeholders

While the representatives of the vendor social group displayed enthusiasm and readiness for the roll-out of blockchain technology, the consultant expressed some doubt about the government's willingness to adopt blockchain for governance. In the interviewee's words, *"the technology for ensuring that blockchains can be used across many government services already exists but whether the will to implement it exists, remains to be seen.* Another interviewee from the same social group explained that *current systems are heavily centralised and give complete power to certain individuals, but the inherent features of blockchain technology ensure that no single person has complete control, when it comes to governance".* This means that it is impossible for a single individual to make a drastic change and all parties must always reach consensus. Transparency is currently one of the biggest challenges with the government. The government sets rules within which banks and other institutions must operate. However, monitoring such rules and policies is usually where the problem lies as it is currently possible to cheat the system. A vendor interviewee was of the opinion that *such problems can be better resolved by coding these rules into the blockchain and the government can easily regulate and ensure that the institutions remain in line.* Everyone within the ecosystem is therefore constrained by the code and the activities can be easily tracked. This also ensures security making it suitable for governance. However, if the will to break the cycle of corruption is lacking, then adoption of the technology will either not happen or remain partial.

The representatives from financial institutions appear pessimistic about the use of decentralised systems for developing trust. They expressed concerns about the financial services industry, emphasising its critical role in the economy and advocating for heavy centralization due to potential exploitations within blockchain technology. They argued that while theft from the current system is traceable, migrating to blockchain could raise accountability and risk management issues. They questioned who would be held accountable and how risks would be insured in the event of widespread loss of funds. These uncertainties led them to hesitate about full migration to blockchain. However, they acknowledged the potential for certain aspects of documentation and record-keeping processes to be migrated to blockchain, while emphasising that core banking functions should remain heavily centralised and regulated.

4.3. Level of Adoption of Blockchain Technology Across Key Governance Functions

The intention of policy developers is to leverage the key strengths of blockchain technology such that it can deliver value in key areas, including Identity management, land administration, immigration, clearing and forwarding, company registration and voting. The Blockchain Technology Association of Nigeria believes that the country is well poised for full adoption and believes that the policy will place Nigeria at the forefront of the continent's digital economy space if full implementation takes place. However, they also noted the challenges that could possibly be encountered as a result of the decentralised nature of blockchain. Security and scalability challenges were also raised as issues that will

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

have to be surmounted before the technology is fully implemented. These issues have been raised in the literature and considering the fact that they are inherent challenges with blockchains, the policy should already have a means of ameliorating these challenges prior to declaring the country ready for the adoption of the technology, but it currently does not have any plans in place for mitigating the risks.

Again, on the part of the developers and consultants, the speed of executing transactions might also prove to be a challenge and that has not yet been mitigated in the policy or roadmap for blockchain adoption for governance in the country. An interviewee from the vendor social group expressed concerns about how quickly transactions can be completed along the blockchain. In the participant's words, *"validating transactions across all nodes means that the transactions cannot currently be as fast as they are in centralised systems. However, within a year, speeds should be up to ten times faster than they currently are"*. Agility and flexibility are additional challenges that will have to be mitigated to ensure that scalability is not a challenge for the implementation.

A participant from the government agency social group expressed the point that *payment switches have been approved and banks can start to connect with each other over blockchains, rendering the regulator's job easier than it currently is.* This point is also in line with the view of a vendor social group interviewee. However, the participant expressed some doubt in the long-term viability of blockchain technology rollout. In their words, *"the interest appears genuine but more for certain aspects of the technology than others. As far as payments are concerned, there are green shoots of implementation, but the other use cases are points of conversation, for now."* Developers are poised to roll-out every use case possible for governance in Nigeria, but there is uncertainty about whether the government would welcome the transparency that the technology affords. According to one vendor social group participant, *it appears that there might be a desire to continue to exploit the loopholes in the current system for individual benefits.* Managing population information, managing user identity and voting are some of such use cases that can be rolled out but are not currently being considered.

Because of the fact that the developers and vendors appear ready to roll out blockchain across every governance function, interviewees from both stakeholders question the commitment of the government to the full adoption of the technology. Financial institutions also appear to favour some use cases above others. Eliminating the middleman for Interswitch transactions ensuring that banks can monitor transactions in real-time is one that they appear to favour. The regulator also appears to favour this use case. Identity validation is another use case that would be beneficial for both the financial regulator and the financial institutions. Decentralised finance can be rolled out to citizens ensuring that financial exclusion is grossly reduced, if not eliminated altogether. Vendors and consultants agree that the technology will completely transform governance. There is also agreement on the edge the country will have above others within the continent and beyond if it remains at the forefront of blockchain adoption.

Policy documents indicate a desire *"to create a Blockchain-powered economy that supports secure transactions, data sharing, and value exchange between people, businesses, and Government, thereby enhancing innovation, trust, growth, and prosperity for all". (National blockchain policy, 2023) pg 15.* However, the policy seems to be at odds with current practice in terms of the speed of the adoption of the technology. It is easier to steal from a privately stored cookie jar than from one kept in an open marketplace in the view of many people (Crosby et al., 2016). This implies that corruption cannot continue to thrive where there are decentralised systems with transparency. This seems easier said than done because an increase in transparency can only be effective when corruption thrives in the dark and not when it is practised openly where there is widespread corruption (De Vries & Sobis, 2016), as is the case in Nigeria. It is evident that corrupt governments are intent on human rights abuses or those governments that wish to hold on to absolute control of the information and finance sectors (Al-Saqaf and Seidler, 2017). Ethical leadership would have to be adopted before the country can benefit from the inherent features of blockchain technology that can enhance governance in Nigeria. Having rewards for ethical behaviour and sanctions for breaches can help to promote the desire for and implementation of transparency (Monteduro et al., 2023).

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

The results indicate that the adoption of blockchain technology in the country is currently at the decision phase which is the third phase of the innovation process. However, the stakeholders as identified from existing literature and policy documents including citizens, financial institutions, the government, and related agencies within the government, blockchain stakeholders in blockchain technology (SIBAN), and vendors (developers), have different views about how far along the innovation-decision process the country is.

4.4. Challenges and Limitations of the Study

It is essential to acknowledge a significant limitation faced by this study, namely, the relatively small sample size. This limitation was influenced by a shortage of professionals knowledgeable about the field of discussion, thereby restricting the scope and breadth of the discussion itself. Additionally, the use of qualitative methods as the sole means of data collection introduces a high potential for bias in interpretation. The incorporation of a quantitative approach would have served as a complementary tool to verify findings and provide a more comprehensive understanding across various thematic lines, to improve the depth of discussion. Therefore, further research studies are suggested to include a complementary data collection approach and cross-sectoral analysis. Such an approach would help identify individual challenges and levels of perception within each sector, contributing to a more robust exploration of the topic.

5. Conclusion

Although the challenges currently facing Nigeria seem numerous and insurmountable, there are initiatives that could return the country to a transformative track. Accountability and transparency have been enhanced in recent times through internet-enabled initiatives, but there is still a lot of room for improvement, particularly in reducing the level of corruption and opacity in governance. The adoption of blockchain technology has the potential to deliver the necessary impact. The technology features decentralised, democratised, and trust-free attributes that allow transactions without the need for an intermediary. This makes it capable of disrupting financial transactions, institutions, and governance, offering benefits such as improved efficiency, transparent transactions, and more secure transactions.

As of 2023, a roadmap has been created for the potential adoption of blockchain technology with the aim of boosting innovation, improving public services, creating job opportunities, reducing corruption and improving the economy. Studies on the application of technology in public governance have been limited and, in some instances, difficult to understand. There are examples of successful adoption in Brazil, but adoption remains in its infancy, in Nigeria.

Considering the novelty of the technological phenomenon and the novelty of its application within the context under study, the research design adopts an interpretive stance and interviews representatives of relevant stakeholders as identified from the literature and policy documents, following notions from SCOT and the steps of the innovation-decision process of the diffusion of innovations theory. The study argues that the views of the stakeholders are crucial for understanding the journey toward adoption or away from it. These groups are diverse and do not have a unified view of the technology, its application, benefits, concerns, or current position along the innovation-decision process. The results indicate that the adoption of blockchain technology is currently at the decision phase, the third phase of the innovation process. However, various stakeholders, including citizens, financial institutions, government agencies, and developers, have different views on the country's progress. Policy developers aim to leverage blockchain technology's strengths in key areas such as identity management, land administration, immigration, clearing and forwarding, company registration, and voting but the diffusion of the technology has not been as speedy as previously expected. Nevertheless, this may be a positive development, as there is no evidence, from the strategy document and roadmap, that the policymakers have considered the challenges that come with blockchain adoption.

This study attempts to reveal the views of stakeholders involved in the process of diffusion of blockchain technology and has obvious implications for practice. The research can help policymakers

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 342-355, 2024
DOI: 10.55214/25768484.v8i6.2069

and other agencies to realise the disparity in the views of the technology and stakeholder mapping and engagement can remove divides and ensure a more uniform view of the adoption process. In addition, ethical and conscientious leadership needs to be entrenched in governance for Nigeria to reap the benefits of blockchain adoption.

Copyright:

References

[1] Ahmad, S. S., Khan, S., & Kamal, M. A. (2019). What is blockchain technology and its significance in the current healthcare system? A brief insight. *Current Pharmaceutical Design*, *25*(12), 1402–1408.

[2] Ali, M. S., Vecchio, M., Pincheira, M., Dolui, K., Antonelli, F., & Rehmani, M. H. (2019). Applications of Blockchains in the Internet of Things: A Comprehensive Survey. *IEEE Communications Surveys & Tutorials*, *21*(2), 1676–1717. https://doi.org/10.1109/COMST.2018.2886932

[3] Allessie, D., Janssen, M., Ubacht, J., Cunningham, S., & Van der Harst, G. (2019). The consequences of blockchain architectures for the governance of public services: A case study of the movement of excise goods under duty exemptions. *Information Polity*, *24*(4), 487–499.

[4] Balcerzak, A. P., Nica, E., Rogalska, E., Poliak, M., Klieštik, T., & Sabie, O.-M. (2022). Blockchain technology and smart contracts in decentralized governance systems. *Administrative Sciences*, *12*(3), 96.

[5] Baygin, N., Baygin, M., & Karakose, M. (2019). Blockchain technology: Applications, benefits and challenges. *2019 1st International Informatics and Software Engineering Conference (UBMYK)*, 1–5.

[6] Berryhill, J., Bourgery, T., & Hanson, A. (2018). *Blockchains unchained: Blockchain technology and its use in the public sector*.

[7] Boucher, P. N. (2016). *What if blockchain technology revolutionised voting?*

[8] Bustamante, P., Cai, M., Gomez, M., Harris, C., Krishnamurthy, P., Law, W., Madison, M. J., Murtazashvili, I., Murtazashvili, J. B., & Mylovanov, T. (2022). Government by code? Blockchain applications to public sector governance. *Frontiers in Blockchain*, *5*, 869665.

[9] Cheng, S. F., De Franco, G., Jiang, H., & Lin, P. (2019). Riding the blockchain mania: Public firms' speculative 8-K disclosures. *Management Science*, *65*(12), 5901–5913.

[10] Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. *Applied Innovation*, *2*(6–10), 71.

[11] De Vries, M., & Sobis, I. (2016). Increasing transparency is not always the panacea: An overview of alternative paths to curb corruption in the public sector. *International Journal of Public Sector Management*, *29*(3), 255–270.

[12] Dubey, R., Gupta, M., Mikalef, P., & Akter, S. (2023). Incorporating blockchain technology in information systems research. In *International Journal of Information Management* (Vol. 68, p. 102573). Elsevier.

[13] Ebekozien, A. (2020). Corrupt acts in the Nigerian construction industry: Is the ruling party fighting corruption? *Journal of Contemporary African Studies*, *38*(3), 348–365.

[14] Eja, K. M., & Ramegowda, M. (2020). Government project failure in developing countries: A review with particular reference to Nigeria. *Global Journal of Social Sciences*, *19*, 35–47.

[15] El Khatib, M., Al Mulla, A., & Al Ketbi, W. (2022). The Role of Blockchain in E-Governance and Decision-Making in Project and Program Management. *Advances in Internet of Things*, *12*(3), 88–109.

[16] Folarin, S. (2021). Corruption, politics and governance in Nigeria. *Nigerian Politics*, 377–394.

[17] Geels, F. W., & Johnson, V. (2018). Towards a modular and temporal understanding of system diffusion: Adoption models and socio-technical theories applied to Austrian biomass district-heating (1979–2013). *Energy Research & Social Science*, *38*, 138–153.

[18] Goldsby, C., & Hanisch, M. (2022). The boon and bane of blockchain: Getting the governance right. *California Management Review*, *64*(3), 141–168.

[19] Golosova, J., & Romanovs, A. (2018). The advantages and disadvantages of the blockchain technology. *2018 IEEE 6th Workshop on Advances in Information, Electronic and Electrical Engineering (AIEEE)*, 1–6.

[20] Kalampokis, E., Karacapilidis, N., Tsakalidis, D., & Tarabanis, K. (2022). Artificial intelligence and blockchain technologies in the public sector: A research projects perspective. *International Conference on Electronic Government*, 323–335.

[21] Konashevych, O. (2017). The concept of blockchain-based governing: Current issues and general vision. *Proceedings of the European Conference on E-Government, ECEG*, 79–85.

[22] Kuppuswamy, C., Ajetunmobi, A., Coco, L. L., Ramalingam, S., Gan, H. C., Lampard, A., Adegbite, O., & Adedeji, M. A. (2023). *A Blockchain for Nigeria-Exploring Blockchain Policy and Adoption in Nigeria*.

[23] Lacity, M. C., & Janson, M. A. (1994). Understanding Qualitative Data: A Framework of Text Analysis Methods. *Journal of Management Information Systems*, *11*(2), 137–155. https://doi.org/10.1080/07421222.1994.11518043
[24] Monteduro, F., D'Onza, G., & Mussari, R. (2023). Corruption spreads: Understanding interorganizational corruption contagion in municipal governments. *International Journal of Public Sector Management*.
[25] Niranjanamurthy, M., Nithya, B. N., & Jagannatha, S. (2019). Analysis of Blockchain technology: Pros, cons and SWOT. *Cluster Computing*, *22*, 14743–14757.
[26] Odo, L. U. (2015). Democracy, Good Governance, and Development in Nigeria: The Challenges of Leadership. *IOSR-JHSS: IOSR Journal of Humanities and Social Science*, *20*(6), 01–09.
[27] Okoi, O., & Iwara, M. (2021). The failure of governance in Nigeria: An epistocratic challenge. *Georgetown Journal of International Affairs*.
[28] Oliveira, T. A., Oliver, M., & Ramalhinho, H. (2020). Challenges for connecting citizens and smart cities: ICT, e-governance and blockchain. *Sustainability*, *12*(7), 2926.
[29] Ølnes, S., Ubacht, J., & Janssen, M. (2017). Blockchain in government: Benefits and implications of distributed ledger technology for information sharing. In *Government information quarterly* (Vol. 34, Issue 3, pp. 355–364). Elsevier.
[30] Oni, O. (2020). Challenges and opportunities of adopting ICTs in the humanitarian sector in Nigeria. *Information and Communication Technologies for Humanitarian Services*, 311.
[31] Oni, O., & Papazafeiropoulou, A. (2014). Diverse views on IT innovation diffusion among SMEs: Influencing factors of broadband adoption. *Information Systems Frontiers*, *16*(4), 729–747.
[32] Page, M. T., & Okeke, C. (2022). *Stolen dreams: How corruption negates government assistance to Nigeria's small businesses*. Carnegie Endowment for International Peace.
[33] Papazafeiropoulou, A., & Gandecha, R. (2007). Interpretive flexibility along the innovation decision process of the UK NHS Care Records Service (NCRS): Insights from a local implementation case study. *International Journal of Technology and Human Interaction (IJTHI)*, *3*(2), 1–12.
[34] Pinch, T. J., & Bijker, W. E. (1984). The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social Studies of Science*, *14*(3), 399–441.
[35] Rajasekaran, A. S., Azees, M., & Al-Turjman, F. (2022). A comprehensive survey on blockchain technology. *Sustainable Energy Technologies and Assessments*, *52*, 102039.
[36] Robinson, O. C. (2014). Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, *11*(1), 25–41.
[37] Rogers, E. M. (2010). *Diffusion of innovations*. Simon and Schuster.
[38] Ruoti, S., Kaiser, B., Yerukhimovich, A., Clark, J., & Cunningham, R. (2019). Blockchain technology: What is it good for? *Communications of the ACM*, *63*(1), 46–53.
[39] Sarmah, S. S. (2018). Understanding blockchain technology. *Computer Science and Engineering*, *8*(2), 23–29.
[40] Sun, J., Yan, J., & Zhang, K. Z. (2016). Blockchain-based sharing services: What blockchain technology can contribute to smart cities. *Financial Innovation*, *2*(1), 1–9.
[41] Tan, E., Mahula, S., & Crompvoets, J. (2022). Blockchain governance in the public sector: A conceptual framework for public management. *Government Information Quarterly*, *39*(1), 101625.
[42] Treleaven, P., Brown, R. G., & Yang, D. (2017). Blockchain technology in finance. *Computer*, *50*(9), 14–17.
[43] Walsham, G. (1995). Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems*, *4*, 74–81.
[44] Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems*, *15*(3), 320–330.
[45] Wang, H., Chen, K., & Xu, D. (2016). A maturity model for blockchain adoption. *Financial Innovation*, *2*, 1–5.
[46] Yagboyaju, D. A., & Akinola, A. O. (2019). Nigerian state and the crisis of governance: A critical exposition. *Sage Open*, *9*(3), 2158244019865810.
[47] Yeboua, K., Cilliers, J., & Le Roux, A. (2022). Nigeria in 2050: Major player in the global economy or poverty capital? *ISS West Africa Report*, *2022*(37), 1–64.