



A Governance Framework For Blockchain Technology In The South African Insurance Industry

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By

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List of Acronyms

AI: Artificial Intelligence

AWS: Amazon Web Services

BG: Blockchain Governance

DLT: Distributed Ledger Technology

ICT: Information and Communication Technology

IT: Information Technology

OSS: Open Source Software

POPIA: Protection of Personal Information Act

P2P: Peer-to-Peer

SAP: Systems Applications and Products

TAM: Technology Acceptance Model

TOE: Technology-Organization-Environment Framework

TPB: Theory of Planned Behavior

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As I reflect on the journey that has led me to this moment, my heart is filled with gratitude and a profound sense of accomplishment. This thesis, a significant milestone in my academic career, is not just a testament to my hard work but also a celebration of the unwavering support and love I have received from those around me.

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Abstract

Purpose: The governance of blockchain technology is a topic of continuing study, and a multidisciplinary perspective on blockchain governance is essential for building a formal governance framework for this emerging technology. While the subject of blockchain governance is sometimes misunderstood, blockchain technology has gained growing interest from businesses and academics. Blockchain stakeholders cannot work or make rational decisions optimally without enough insight into the governance of blockchains. Its advancement and stabilization are of utmost importance for stakeholders that depend on blockchain. Where organizations and individual end-users must consider in their decision the element of regulation for the blockchain technology or network, regulators and developers still need to grasp it. The purpose of this study is to explore the understanding of blockchain governance by reporting on frameworks and themes that capture the main dimensions and layers of blockchain governance. The study proposes a governance framework that can assist strategic management within businesses to analyse the governance of the blockchain in a comprehensible manner in order to facilitate strategic decision-making in the insurance industries within South African organisations.

Design/methodology/approach: This deductive qualitative research that is shaped by subjectivism ontology, interpretive epistemology, uses comprehensive literature review and deductive thematic analysis of eight semi-structured and focus group interviews for data collection, which then identifies the key dimensions and layers of blockchain governance, including technical, economic, social, and legal aspects of consideration. The deductive thematic analysis selected follows the seven steps of deductive qualitative research.

Findings: The innovative blockchain governance framework consists of four perspectives, each tied to key themes from the collected data. The OSS Governance Phases focus on decision-making, community engagement, and conflict resolution. The OSS Life Cycle Stages emphasize onboarding, code contribution, and version control. The Blockchain Governance Framework Dimensions & Layers highlight on-chain voting, off-chain communication, and incentive structures. Lastly, the TOE Framework Model addresses technological readiness, organizational roles, and regulatory compliance. These perspectives align with the study's findings, ensuring clarity and alignment with research objectives.

Research limitations/implications: The paper contributes to blockchain governance theory. The innovative perspectives provide a synthesized conceptual framework for researchers to evaluate and understand blockchain governance development from multiple perspectives.

Practical implications: The synthesized blockchain governance framework presents a road map for practitioners and business managers to follow in their blockchain projects.

Originality/value: The research uses an innovative perspectives and other individual research methodologies to synthesize the existing research framework proposed. It is one of the first research papers in the information systems field to make use of deductive thematic analysis approach to consolidate the existing qualitative research and interviews to systematically propose a blockchain governance framework.

Keywords: Blockchain, governance, business management, strategic decision-making, governance framework.

1. Chapter 1: Introduction

The insurance industry was one of the most important components of the global economy. By its premiums, investments, and social and economic significance in covering people's and companies' risks. Risk assurance is a complicated, multidimensional industry that affects our daily lives. The insurance business is vital to every contemporary economy's growth (Adam-Kalfon, 2017).

Insurance was a late adoption of technology in the supply chain. Throughout recent years, protests have risen in Africa and other regions of the globe. Technology is a major influence in determining the future of the insurance sector, despite the many difficulties to adapt to, including increasing demand ratios and operational expenses that have put pressure on profit margins. The insurance business is no different when it comes to the need of adopting new technologies. Blockchain or Distributed Ledger Technology (DLT) is intended to benefit the insurance sector (Olakanmi, 2020).

Blockchain represents a departure from obsolete methods. Today, trust and jurisdiction reside in a global network, not a single institution. Blockchain governance is often misunderstood, but business and academics are becoming interested. In a meeting, a speaker thought on her view and concluded, "Who cares how it works? We must utilise it." Report (Sanlam intelligence retail, 2018).

The speaker emphasised using blockchain technology to improve the industry and become a corporate leader (Sanlam intelligence retail, 2018). This approach may be problematic if risks are neglected and Blockchain services are missed, so critical factors, such as Blockchain legislation, must be explored. Without knowing how blockchains are governed, stakeholders can't deploy them properly or make sound judgments. Blockchain must continue to grow and prosper for stakeholders (Pelt et al., 2020).

This is an exploratory study designed for a situation with limited studies. This study doesn't validate a hypothesis or show particular blockchain occurrences. It seeks to exchange information and highlight current issues on blockchain governance from an academic perspective. This article summarises the examined literature to offer an overview of the insurance business, define terminology and important concepts in blockchain technology, explore critical governance characteristics, and propose a

conceptual models and integrated solutions to solve research objectives. It states the research's goal and questions. The study technique details its epistemology and ontology. Insurance sector organisations in a TOE framework are analysed qualitatively. Also addressed are the target audience's roles and self-selection procedure. Then, the thematic analysis of semi-structured and focus group interviews of participants is explained.

This deductive research project intends to discover perceived issues, aspects, and frameworks utilised to analyse Blockchain technology in the insurance business in South Africa. The study design addresses validity and reliability, assumptions, ethics, possible dangers, and a modest project plan to create a timetable.

1.1 Purpose/Aim for the Study

1.1.1 Blockchain governance problem statement

Beck et al. (2018) highlighted a significant gap in research regarding blockchain governance, noting the absence of thorough investigation in this area. This lack of detailed analysis has led to a scarcity of tools and resources that are necessary for a deeper understanding of blockchain governance. This gap is particularly pertinent given the benefits that a comprehensive understanding of blockchain governance would offer to ecosystem actors. Lyons, Courcelas, and TimsitKen (2019) echo this sentiment, emphasizing the importance of governance comprehension not only for corporations and end users when choosing a blockchain product or platform but also for regulators and developers. The need for clear governance understanding across all levels of blockchain interaction is critical, as it informs decision-making and policy development in the blockchain domain.

Hsieh et al. (2017) highlighted the need for a deeper understanding of blockchain governance, indicating an area of research that requires further exploration. This sentiment is echoed by Ziolkowski et al. (2019), who pointed out the lack of clarity regarding crucial decision-making processes in blockchain networks, emphasizing that "little is known about what and how crucial decisions are made and enforced in blockchain networks." Additionally, Finck (2018) also observed that blockchain governance remains largely uncharted, underscoring the significance and the unexplored aspects of this field. In response to these scholarly insights, this study aims to delve into the business management perspective on these issues, seeking to shed

light on the governance challenges identified by these researchers. Consequently, this leads to the study's issue statement:

With growing concerns about Blockchain governance, it is unclear how management in South African insurance industry should control Blockchain.

1.2 Research Purpose

The purpose of this research is to advance the current understanding of blockchain governance by investigating the various dimensions and themes relevant to the effective governance of blockchain technology, specifically within the organizational context. This study aims to fill the existing knowledge gap on this subject and provide valuable insights that could inform and enhance the development of blockchain governance frameworks and policies.

1.3 Primary Research Objective

By reporting on themes that encapsulate the primary characteristics and layers of blockchain governance from the perspective of a company management in an understandable way, this research seeks to investigate the knowledge on the issue of blockchain governance and aid companies in conducting more organised analyses of blockchain governance (Saunders, Lewis & Thornhill, 2019).

1.4 Research Question

In order to realise the aims and objectives of this study, several research questions have been specified (Saunders, Lewis & Thornhill, 2019). The research is structured around the main research question (RQ).

RQ: How can blockchain governance be effectively structured and implemented in South African organizations to address the key dimensions of technological, organizational, and regulatory considerations?

The deductive method is used to answer the research topic, which is themed (Saunders, Lewis & Thornhill, 2019). The primary research topic has been broken down into a series of subsidiary ones with the purpose of improving the study's organisation (SQ).

Sub-Questions and Objectives		
Number:	Research Sub-Questions (SQ)	Research Objectives
1	What is South Africa's existing blockchain technology state relative to a global context?	To assess the maturity and adoption level of blockchain technology in South Africa compared to global benchmarks.
2	To what degree are other industries using blockchain technology?	To explore the adoption and application of blockchain technology across different industries to identify trends and innovations.
3	What concepts and structures do the governance of blockchains encompass?	To identify the key components, dimensions, and layers of blockchain governance as they apply across industries.
4	Why does blockchain technology have to be regulated in South Africa's life insurance industry?	To examine the necessity and impact of blockchain regulation specific to South Africa's life insurance sector.
5	What are the perceptions of stakeholders regarding blockchain governance?	To understand stakeholders' perspectives on blockchain governance to align governance models with practical needs.
6	How does the created blockchain governance themes influence the comprehension of a blockchain's governance?	To evaluate how the identified themes enhance understanding and analysis of blockchain governance structures.

1.5 Significance Of Study

This study addresses a critical gap in understanding blockchain governance, particularly within the context of the South African insurance industry. As blockchain technology continues to revolutionize traditional business processes, effective governance frameworks are essential to ensure transparency, security, and compliance. By proposing a blockchain governance framework, this research contributes to the theoretical understanding of blockchain governance while offering practical tools for strategic management. The findings of this study are particularly significant for business managers, regulators, and developers, as they provide actionable insights for navigating the complexities of blockchain adoption in highly regulated industries like insurance. Furthermore, this research enhances the body of knowledge in blockchain governance, bridging theoretical constructs with real-world applications.

1.6 Structure of the Thesis

This thesis is structured into six chapters. Chapter 1 introduces the study by outlining the problem statement, research objectives, research questions, and the significance of the study. Chapter 2 provides a comprehensive review of blockchain governance literature, exploring key concepts, challenges, and theoretical frameworks. Chapter 3 details the research methodology, including the design, data collection, and analysis methods. Chapter 4 presents the research findings through thematic analysis, while Chapter 5 discusses these findings in relation to the research objectives and literature, culminating in a proposed governance framework. Finally, Chapter 6 concludes the thesis with a summary of findings, implications, and recommendations for future research.

2. Chapter 2: Literature Review

2.1 Overview of the Insurance Market

2.1.1 Global insurance market status in SA

The world is becoming digital. Most businesses utilise computers, including automation, and more individuals are using mobile devices. Insurance is one of the sectors that has not yet adopted current technology (Beck et al. 2017).

A major source of revenue, production, and a major social and economic function in managing personal and corporate risks, the insurance business has become a financial powerhouse. Despite these technological advancements, the insurance industry's business model and activities have remained largely unchanged. Intermediaries dominate the market and are vital in identifying and meeting consumer needs for different custodial commodities (Yoder, Rao & Bajowala, 2012).

The Financial Services Council's Insurance Department (FSB) is controlled by the Long-Term Insurance Act 1998 (No. 52), the Insurance Laws Amendment Act 2008, and the Corporations Act (2008). The Insurance Act No. 18 of 2017 repealed and replaced several provisions of the 1998 Long-Term Insurance Act. (Page 52). The unveiling of the new legislative framework for SAM, the insurance industry's existing risk-based management system, is motivated by three elements (Alhassan, 2016).

The second pillar establishes criteria for insurers' governance and risk management (GRMFI). Insurance for life efficiency 219 law (effective 1 April 2015) (Alhassan, 2016). The GRMFI includes a risk management system and internal controls that comply with Pillar II of the Solvency II risk-based regime (Alhassan, 2016).

Recent legislative and regulatory changes put a premium on risk management, compliance, and consumer/stakeholder protection, all of which are cornerstones of the King Reports and the Business Act (2008). 2018 (KPMG; Financial Services Council).

Insurance premiums have remained stable in post-crisis economies. Europe and North America are described as having negative premium growth after higher premium growth rates in 2017 and 2018. Emerging nations followed suit, and life insurance premiums struggled to regain pre-crisis levels. South Africa has the highest insurance penetration rate (18%) and the sixth highest average premium paid. Premiums increased by 3% in 2018, although this was lower than the 6.2 percent increase in

economic performance in 2017, and the South African life insurance industry forecasts that the market is still challenged (Staib, Dr. H Puttaiah & Tschekassin, 2019).

Certain things need insurance to be practical. While developments in this industry have increased with time, the company strategy and activities have not. Intermediaries have defined and coordinated customer expectations with various insurance products (Milani, 2018).

Technologies like Insurtech are continually developing because of the nature of risk (Sayegh, 2018). Insurtech, a Fintech insurance alternative, combines term insurance with technology. The innovation might help the insurance business. It produces new values, transforms the insurance industry's eco-system, and increases efficiency and production. Artificial intelligence, Big Data, and the Internet of Things are instruments for the present insurance business process.

An AI-based insurance policy or delivery platform may minimise human activity needs. Big Data-enabled fraud prevention, risk assessment, and risk-based insurance premium pricing help expedite risk management. The Internet of Things will also provide real-time insurance and health information management services. But only the insurance incumbents can create these technologies. Blockchain, another Insurtech, disrupts the conventional insurance notion (Sayegh, 2018).

The democratic independence of blockchain will allow intelligent creation of insurance goods and services, as well as a new kind of on-demand risk-sharing insurance. Blockchain expands an insurer's position and lowers barriers to entry. Newcomer insurance companies are more inclined to participate (Sayegh, 2018).

The newest investment trend in Insurtech is finding new growth engines in the insurance company. With 2.3 billion dollars invested in Insurtech in 2017, the blockchain was used to produce multiple applications, products, and concepts across several industry sectors (Sayegh, 2018).

According to McKinsey, 40% of Insurtech businesses are driven by production. That's 22% better customer service, 10% more upselling, and 8% more cross-selling. The Insurtech growth strategy involves accessing the niche market to produce new products and find new clients. A new generation of generations who are burdened by

yearly insurance premiums and commonly utilise mobile applications has been promised by BIMA (Sayegh, 2018).

Consumers would concentrate more on mobile applications, accelerating the development of new smartphone and insurance technology. Because many mobile enterprises are based on shared economies, models face various transaction risks and stability issues that non-normalized networks will contribute to. Insurance solutions to protect against transactional instabilities may also be a big development driver (Lombard, 2017).

Some scholars wonder whether to invest in blockchain. The downsides of blockchain show the area of interest: high energy use and high operating expenses. The network nodes take a lot of energy to process transactions, and blockchain uses roughly \$6. (Sayegh, 2018). Insurers must also fundamentally restructure their processes and systems to use blockchain technology.

For example, encrypting current insurance contracts and transferring them to blockchain might take a long time and money. Interrupting insurance collecting during data conversion may be appropriate. Despite the dim outlook for short-term blockchain investment, long-term blockchain adoption and investment in the insurance business is a tidal wave. The 2017 PwC Global FinTech Survey predicts that blockchain use will reach 100% in 2021, up from 2% in 2016. Other financial industries are expected to adopt at a pace of 79% in the same year (Sayegh, 2018).

2.2 Blockchain Foundation

Many civilizations and technology media sources have covered the possibilities of blockchain. Described as the basic technology that will help in the gestalt shift and change our perception of the world. Due to the purported advantages of changing digital transaction, data storage and identity, sensitive information management, blockchain is receiving community and political media interest. The technology is expected to alter several sectors. Academics predict that this technology will accomplish for numerous businesses what the internet did for information and the internal combustion engine did for the automobile industry. According to Gartner's 2019 insurance hype cycle, AI, Blockchain, smart contracts, and Fraud Analytics are all at the apex (Gartner, 2019). If this is the case, then the Gartner hype cycle reveals

that although blockchain is decreasing, blockchain in insurance is peaking (Figure 1). (John & Pam, 2018, Gartner, 2019).

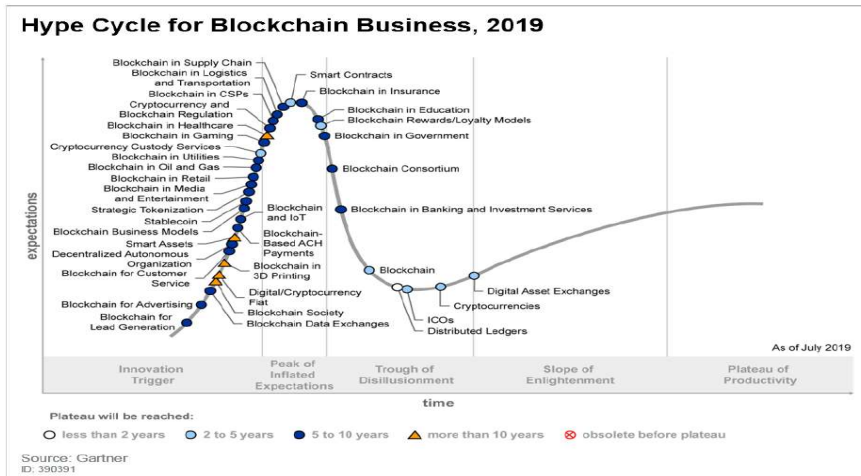


Figure 1. (Gartner, 2019)

2.2.1 Blockchain made simple.

By definition, a blockchain is a solitary form of ownership that is kept in a decentralised ledger. Due to the database approach employed to chronicle and store that collection of data records in perpetuity (Ababa 2019), this authorised decentralised ledger is irreversible, traceable, and unchangeable. For instance, in a single distributed register with often changing data, a person writing 'chain code' never grants access to information to any other member (Ryan & Van Rijmenam, 2019). In a nutshell, it is a collection of papers that are exceedingly resistant to modification and are protected by encryption.

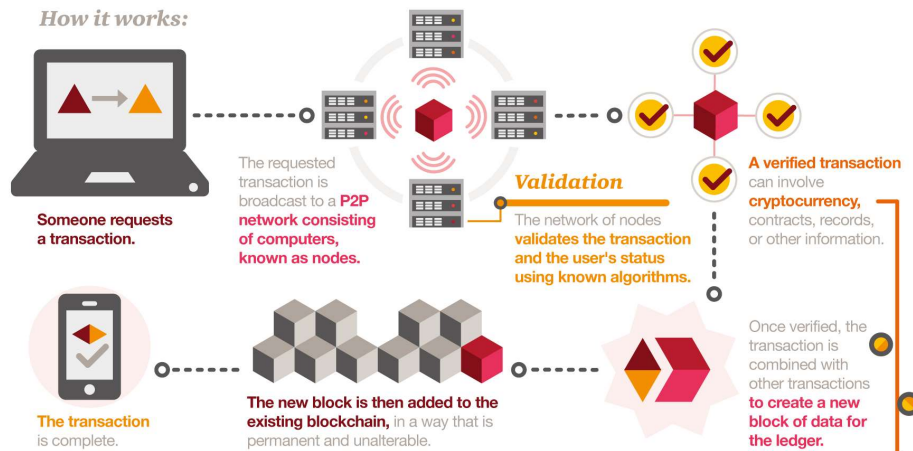


Figure 2. Visual explainer of blockchain technology – and relationships with bitcoin and cryptocurrency – by pwc (PricewaterhouseCoopers, 2013)

Transactions are kept in the data component of a block. Each subsequent block integrates data from the preceding blocks, thereby chaining them together (Jlija Golosova & Andrejs Romanovs, 2018). The digital ledger, which is stored and managed on computers linked through a network, is capable of managing and keeping data on almost everything that can be transacted, including assets, goods, and money. The transaction data (blocks identifiable by their hash) is encrypted, and the chain is constantly updated on each digital ledger and node. To hack a network using this method, each block on each computer must be modified (Golosova and Romanovs 2018).

Assume A intends to do business with B via the network. The value of the transaction will be broadcast to all network nodes. Individual A is indeed seeking a shared public key (used to encrypt the broadcast message). Individual B is capable of decoding and reading this message (D'Aliesi, 2016). Participants authenticate and verify using a digital certificate that requires a private key. Additionally, the digital signature must be unique to the message and sender, clearly recognised, verifiable, and storable, as well as fraud resistant. As a result, tampering is easy to detect. If anything in the transaction changes, including the signature, and the transaction is completed, all network nodes record the change in their digital ledgers. In general, a blockchain transaction consists of three components: an input, a content, and an output (Möser et al. 2013).

The automated trust mechanism and the absence of centralised authority are the primary benefits of blockchain technology. Neither does this technology guarantee the depiction of two parties interacting, nor does it guarantee revenge (Grima et al. 2019).

As with the Internet, blockchain technology comes in a variety of forms. Blockchain 1.0 was intended to provide digital money in the form of cryptocurrency by using a mathematical algorithm to discover strings of codes. Blockchain 1.0 is primarily concerned with integrating cryptocurrencies into applications such as currency transfer, remittance, and digital payments (Swan, 2015).

Contracts, commercial, financial, and market applications built on top of blockchain 2.0 may now be used in lieu of cash transactions. As intelligent contracts, intellectual property, and stocks and shares are all examples (Swan 2015; Scott, Loonam & Kumar 2017).

Blockchain 3.0 offers a wide range of applications in banking, capital markets, trading, and other economic activities. It might be a single word or a sentence. The most potential use of blockchain technology is smart cities with intelligent administration, intelligent connectivity, intelligent energy usage, and intelligent economics. Through the use of blockchain and smart contracts, smart property may be swapped online for goods and P2Ps (Efanov and Roschin, 2018). This may be accomplished via the use of the Internet.

2.3 Blockchain technology in insurance

2.3.1 Problem statement

One of the finest uses of blockchain technology is in insurance. Current policy deployments are often slow and need multiple middlemen, making them inefficient and onerous (Johnson, 2017). It may be utilised extensively in insurance, enabling for quicker and smoother information flow and automation among parties, preventing fraud and maintaining audit trails. In principle, this should lead to better, safer customer service and lower insurance company overheads, increasing profitability. Recent findings demonstrate that there are several flaws in the system that limit broad adoption of blockchain. Millions of dollars were lost when digital autotomized organisations were assaulted, and hard choices had to be made between the code is law and “hard Forking”, which goes against the fundamental essence of the blockchain itself (John & Pam, 2018). Critics say ICOs are Ponzi scams. The condition has increased interest in criminal behaviour, leading to bad headlines. Concerns concerning market control and influence by parties at the top of the hill, like DAO, were expressed (Zachariadis, Hileman, & Scott, 2019). Unusually for blockchain, it forms a hierarchy with centralised stakeholders. Also, Blockchain governance, or lack thereof, is the single largest difficulty and cause for the lack of mass adoption, regardless of academic disputes regarding specific merits and drawbacks. For example, IoT, machine learning, and AI are all founded on fundamental governance created by large organisations and organisations. Examples of internet based IoT, and big data governance and controls include W3C, Internet Governance Form, and Internet Society (Zachariadis, Hileman, & Scott, 2019). Blockchain has been described as a wild west with no framework to define stakeholder responsibility, rules to accept/reject, or corrective methods.

2.4 Governance and control

Governance has several meanings in many contexts, including governmental, IT, and enterprise. Fukuyama (2013) contributed to the understanding of governance by categorizing it within the frameworks of markets, hierarchies, and networks in social science literature. Governance is the process of integrating organisational and economic activity through decision rights, incentives, and accountability (Beck, Müller, King, 2018).

2.5 Governance Challenges

While some may see blockchain as a governance instrument, they may forget the reality that it must also be regulated properly. Governance is an issue that has been discussed throughout the history of society and economic philosophy in all institutional situations. In economics, effective governance has been researched through the lens of transaction costs theory and the ramifications it may have on the development of products and services in businesses (Beck, Müller, King, 2018). To a certain degree, transaction costs theory accounts for the growth of a vertically integrated organisational model that concentrates (or centralises) economic production inside the firm's boundaries (Beck, Müller, King, 2018). The global economic landscape has been dominated by these organisational systems since the industrial revolution.

In order to stimulate the creation of innovative products and services, practitioners have experimented with flatter, decentralised organisational structures that foster more flexible work habits and empower varied segments of the firm during the past few decades (Shermin, 2017).

From project-based firms (Sydow, Lindkvist, & DeFillippi, 2004) to transitory enterprises (Bakker, 2010) to disposable enterprises, management academics have identified a number of approaches for managing economic activity (Pope & Mays, 1995). This represents a trend away from conventional, vertically linked, hierarchically controlled business structures in favour of more adaptable organisational forms capable of controlling output (Porru, Pinna, Marchesi, & Tonelli, 2017). The need for alternate governance systems capable of permitting more asynchronous work practises has grown in lockstep with the diversification of organisational forms. Lindman (2017) and de Laat (2007) agree that as work environments become more

virtual and the demand for more dispersed governance grows, the open-source community can relate to the trend away from traditional governance and has built an open-source governance framework. Numerous similarities exist between blockchain development projects and conventional open-source projects. Multiple large public blockchains are produced and distributed as free and open-source software (OSS) (Porru, Pinna, Marchesi, & Tonelli, 2017). Bitcoin and Ethereum, for instance, were both first started as open-source initiatives (Lindman, 2017). According to Bian, Mu, and Zhao (2018), open-source software development has outperformed all other platforms for building blockchain technology solutions.

For the reason that of the connections identified, OSS literature provides a good starting point for discussing blockchain said Lindman (2017). The current OSS literature can provide valuable insights when looking at blockchain governance in this study.

2.6 In OSS Governance

2.6.1 Defining OSS governance

Two approaches are used to assess the aim of OSS governance (Markus, 2007). One possibility is to see governance as a means of resolving the OSS development coordination dilemma. This implies that a greater emphasis is made on concerns such as assignment and code change acceptance.

The second viewpoint is to consider OSS management as a reaction to the institutional component of collaborative activity and group formation. In the latter situation, the emphasis is on the motivation for developers and consumers to engage. "The process through which totally or partly autonomous individuals and organisations work together to attain a common goal via direction, control, and cooperation" is how OSS governance is defined as per Markus (2007).

2.6.2 Conceptual Framework for OSS Governance

Some scholars structure their study by recognizing various stages of governance in open-source initiatives. For example, O'Mahony and Ferraro (2007) investigated the developing governance system of an open-source community throughout the course of its existence. In support of the governance phases theory proposed by O'Mahony and Ferraro (2007), Lattemann & Stieglitz, (2005) proposes the life cycle stages theory

in OSS. The authors defined four governance phases and life cycle stages: de facto governance (Introduction), designing governance (Growth), implementing governance (Maturity), and stabilizing governance (Revive).

The first phase describes the OSS project when it is run without explicit governance representatives. The project's leadership adopted an authoritarian form at this period, meaning that authority was mostly concentrated in the hands of one individual. The introduction stage, as outlined by the Governance Stages theory (Lattemann & Stieglitz, 2005), is determined by the founders' generation of ideas. The core group agrees on an informal structure with relatively general responsibilities for each member. Active resource management is unnecessary since the organisational structure is very informal and is governed by one-on-one communication and trust.

In the second phase, this present system of authoritarian rule was challenged. Formalized democratic methods were designed to limit the leader's absolute power. According to (Lattemann & Stieglitz, 2005), the Growth stage requires a more defined structure owing to the team's rising size and transitory nature. The founders' responsibilities change as they go through life, and they lose ultimate authority. They may function as catalysts, leveraging systems and structures to support and monitor the project's progress. Incentives aimed at increasing intrinsic motivation; Governance instruments to ensure that existing organisational resources are properly managed; and Communication tools to discuss future software development and optimization, facilitate knowledge sharing, and foster a sense of community. As a consequence, the organisation retains a high degree of centralization, with the core developers maintaining some project control.

The designed governance was implemented in the third phase, with community members electing leaders through clear democratic methods. According to Lattemann & Stieglitz (2005), governance tools should promote a sense of community for all members during the Maturity stage, whether through democratic elections of leaders or mechanisms to ensure transparency within the community and OSS project.

The final phase was the development of a firm and shared understanding of the governance system in place. According to (Lattemann & Stieglitz, 2005), Revival may be successful throughout the Decline or Revival stages if governance instruments are deployed and readjusted according to the community's fundamental needs, which

involves taking into consideration the community's life cycle stage and the members' type or motivation.

Within OSS communities, de Laat (2007) differentiates three stages of governance. The initial stage is governed spontaneously. During this phase, the innovation and productivity that occurred inside OSS groups happened on their own. There were no formal and clear coordination or control procedures in place. The license system was deemed to be the most essential governance tool.

The second phase, which is characterized by the growing scale of open-source communities, is internal governance. Communities created a set of governance tools throughout this period in order to maintain levels of production and creativity. These tools, according to de Laat (2007), may be classified into six types (see figure 4).

The third phase focuses on governance in relation to third parties. This stage of external governance focuses on the institutionalization of OSS communities. The popularity of OSS initiatives meant that the outside world could no longer be ignored. As new challenges surfaced, such as patenting, OSS groups found themselves more need to carefully manage their relationships with third parties. As a result, governance mechanisms were added outside the limits of OSS projects. Examples include the establishment of non-profit organizations, official spokespersons, and specified methods for how people might become a part of these new institutions.

2.6.3 Six dimensions of OSS governance tools

The phrase governance tools, according to de Laat (2007), refers to a collection of explicit and formal tools used to internally manage and regulate an OSS project. The author grouped OSS project internal governance tools into six categories:

Six dimensions of OSS governance tools	
Six dimensions of OSS governance tools	Discription
Modularisation	Modularisation refers to the technique used to divide a software program into various components. It also refers to the contrast between an experimental (innovation) and a stable (maintenance) version of a software application.
Role division	This category defines whether or not groupings of tasks are recognized and related to various levels of access to project files. Developers, observers, project owners, and core developers are some examples of positions. According to de Laat (2007), the number of roles in an OSS project might range from three to eight
Delegation of decision-making authority:	Within OSS initiatives, several choices must be taken. Examples include which techniques to use, which modules to include in a new release, and which source code is acceptable in a software program's stable version. Decision-making processes in code integration differ from centralised to decentralized architectures
Training and indoctrination:	This category explains the criteria for individuals to begin contributing to a project. It specifies whether or not contributors must demonstrate specific skill sets or technical competencies before becoming developers.
Formalisation	This category encompasses the tools and processes developed to allow internationally dispersed participants to collaborate in an organised manner. Versioning systems, email lists, testing methods, bug reporting procedures, and standards to improve work performance are some examples.
Autocracy/democracy	Whether leadership is self-appointed from on high (autocracy) or chosen democratically (democracy) (democracy). People choose their core developer team or a leader elected by the developers via democratic methods.

FIGURE 3: Six dimensions of OSS governance tools, (Laat, 2007),

2.6.4 Six dimensions of OSS governance

Markus (2007) classified parts of OSS governance into six different categories of formal and informal norms, similar to de Laat (2007).

Six dimensions of OSS governance	
Six dimensions of OSS governance	Discription
Asset ownership	This component is concerned with intellectual property licensing as well as legal categories of organizations such as foundations.
Chartering the project	Referring to information regarding a project's purpose and vision, goals, and suggestions on the anticipated features of a product.
Community management	the process of managing the members of a community. Aspects include who may is eligible to participate, what positions are offered, and how members can participate in them.
Software development procedures	This category addresses the operational methods, regulations, and structures of real software development. Release control and job allocation are two examples.
Conflict resolution and rule change	This category addresses the operational methods, regulations, and structures of real software development. Release control and job allocation are two examples.
Information and tool use	Emphasizing which tools and repositories are utilized to manage and communicate information.

FIGURE 4: Six dimensions of OSS governance, (Laat, 2007),

2.7 Applicability of OSS governance theories to Blockchain

2.7.1 Technology projects and governance

Garagol and Nilsson (2018) used de Laat's (2007) six-dimensional governance mechanism framework, which is discussed in the above figures. The authors analysed if these six mechanisms are also present in a blockchain project using Ethereum as a case study. According to the findings, the first five dimensions of OSS governance were overly evident in the instance of Ethereum. However, in the instance of Ethereum, the sixth dimension of autocracy vs democracy was perceived to be different, with leadership being difficult to identify. The authors also defined a seventh governance factor, initiative-based progress. Contributors to a blockchain project are stimulated, according to this new dimension, because they have the flexibility to pick where to contribute and to establish new subprojects.

2.8 Blockchain Governance

There has been a noteworthy shift in the sort of material written on blockchain governance in recent years. While some academics have focused on blockchain as a governance instrument, others have emphasised the importance of blockchain governance (Katina et al., 2019). We shall concentrate on the latter in this Literature study. Blockchain governance may be classified into several types. On the one hand, the system's nature dictates how it is controlled. On the other side, governance should be directed by a cohesive vision that is backed up by appropriate stakeholder choices, strategic planning, and execution. When doing action in the sense of implementation, one's attention should be directed toward controlling, integrating, and monitoring the system for supervision. Finally, responsibility for monitoring performance and deviation circumstances is established. All together, they provide a high-level overview of the governance ideas underlying blockchain technology (John & Pam, 2018).

There are several distinct types of government. As an example, consider international governance, public governance, and, as previously noted, information technology governance. In the context of software development organisations, governance refers to the way the organisation is managed, which is accomplished via the incorporation of controls, accountability, and decision-making procedures (Katina et al., 2019).

Blockchain governance is a phrase for which academic literature has failed to reach a consensus on its definition. Numerous focuses, perspectives, and levels contribute to

an environment of confusion about unambiguous ideas and definitions. Thus, demonstrating the critical requirement for consensus on what we will refer to as blockchain governance going ahead.

In the context of blockchain governance, (Katina et al., 2019) defined it as the need for direction coherence, an essential component of oversight that results in the created system's accountability. While some writers emphasise the importance of cooperation and control in blockchain, governance must be strong, fair, and predictable (PricewaterhouseCoopers, 2018).

Ethereum developers say that governance should be seen and conceived of as a set of processes and procedures, rather than as a design. Due to the difficulty of expressing the dynamics involved in the process, it is beyond the scope of this article (John & Pam, 2018). Makes a similar claim that governance in the context of blockchain is defined by formal and informal procedures. Changes to software, protocols, and even legal entities are determined via formal and informal methods (Crepaldi, 2019).

However, during the study process, writers (PricewaterhouseCoopers, 2018; Olnes, Ubacht, & Janssen, 2017; Primavera De Filippi & Loveluck, 2016) discovered a similar thread running across all of the literature: governance performs two distinct functions in the context of blockchain (Figure 1). To begin, scholarly literature often refers to or references governance by infrastructure. These regulations often relate to the source code of the blockchain's technical system. More generally referred to as On-chain regulations in the IT sector. Other academic literature portrays these norms as limiting decision-making in terms of enforcement. According to some sources, the slogan "Code is Law" means that it is a critical part of blockchain governance. This acts as a means for establishing consensus between control and nodes by replicating the transaction database and giving incentives to miners in accordance with the transaction database's distribution (Zachariadis, Hileman & Scott, 2019). This example demonstrates two different ways in which source code is involved in blockchain governance. Firstly, the code is engaged in the transactional mechanisms that assure confidence, and secondly, the code is also involved in the infrastructure's functioning (Kim, 2019).

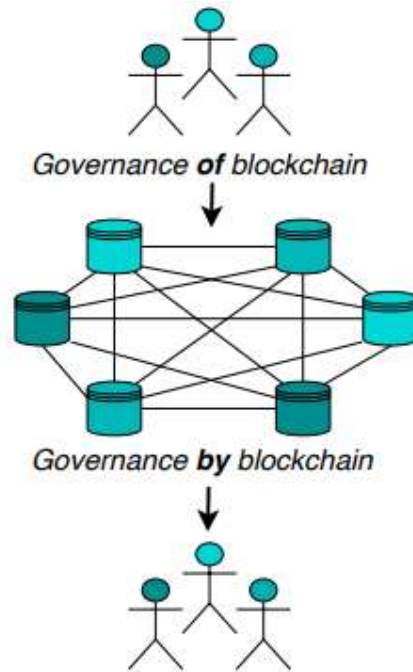


FIGURE 5: Two roles of governance in blockchain technology, adapted from (Ølnes, Ubacht, and Janssen, 2017)

However, in infrastructure governance, rules derived from the internal reference community may be included; they are referred to as endogenous rules. Exogenous rules, on the other hand, are those that are derived from an external reference community. When it comes to identifying the two rules, as previously said, it is entirely subjective to the community in question (PricewaterhouseCoopers, 2018).

For instance, while considering any blockchain network, they would analyse endogenous rules such as consensus methods and network protocol defined in the network's source code. Other distributive applications (Dapps) placed on top of the network, on the other hand, will have a viewpoint on decision-making and technical norms included in the smart contract that governs the (Dapp), while the underlying protocol should be exogenous (PricewaterhouseCoopers, 2018). Despite this, there are several advantages and benefits associated with this kind of on-chain governance. The following cases demonstrate that there is cause for concern.

Other academics adopt a different approach but reach the same result about the argument against an entirely on-chain rule system. Governance academics advise

against rushing to embrace Lawrence Lessig's "Code is the Law" approach. According to (John & Pam, 2018) study, Ehrsam (co-founder of Coinbase) says that although on-chain offers a number of advantages, the technology may be readily abused.

Another author bolsters Ehrsam's thesis. Although cryptography is effective in thwarting high-level attackers. There are instances when human nature has had an effect on an ostensibly automated process. Where a programmer suffered from fat finger syndrome. A typographical error that cost the institution millions of dollars (Crepaldi, 2019).

Another noteworthy instance: the DAO case in June 2016, only weeks after the DAO token auction ended. There was an assault, albeit it is disputed. The attacker didn't damage anything, they utilised the smart contracts precisely as stated, however there was a weakness in the code. They could consistently withdraw up to \$50 million in ether. The code was not created to verify the account balance between each transaction, according to the analysis. Investors had questions since the code didn't prepare them for what was to come. What happens when there is a crisis and no decision-making procedures? (Zachariadis, Hileman & Scott, 2019). So, the choice between On-chain and Off-chain description Forks came about (John & Pam, 2018). As a consequence, On-chain governance becomes rigid and incapable of adapting to new situations. But it must be adaptable.

Off-chain governance is accomplished by less restrictive societal norms, practises, and legislation. It is a less structured system than on-chain operations such as coding. Due of the absence of restrictions, users may readily evade the informal structure (PricewaterhouseCoopers, 2018).

Within off-chain, endogenous rules indicate the processes and methods for deciding on protocol updates and forking decisions. The techniques employed are voting systems that allow the community to weigh in on developer suggestions. On the other side, exogenous norms of infrastructure governance are influenced by external community variables, namely legal regulations. Law has an indirect effect on the blockchain, depending on whatever laws are adopted by the community to be enforced.

Just to recap, research has shown that there is more than one way of looking at blockchain governance (PricewaterhouseCoopers, 2018). As mentioned, there are

horizontal layers of rules like on-chain and off-chain and vertically overlapping both rules are the endogenous and exogenous rules (Crepaldi, 2019). Taking these perspectives into account conceptual framework that overlaps these areas will be highlighted further.

2.9 Conceptual Framework for Blockchain Governance

2.9.1 The Blockchain Governance Framework: Conceptual Framework

2.9.1.1 *Blockchain governance dimensions*

Numerous scholars have categorised the complicated phenomenon of governance into distinct dimensions. According to Pelt et al. (2020), blockchain governance aspects are broad main issues of governance that are applicable to blockchains. According to Pelt et al., (2020), the framework starts with a synthesis matrix. A synthesis matrix is a table that may aid in the organisation of concepts as well as the analysis and synthesis of relevant sources (Ramdhani et al., 2014). To build the BG framework, (Pelt et al., 2020) built a synthesis matrix using the literature assessments. At that time, the concept's granularity is unconsidered. Both the concept of software release selection and the concept of decision-making procedures may be classified as governance concepts throughout this process (Pelt et al., 2020).

Following the identification of governance concepts, the dimensions synthesis matrix has 122 rows and columns (Pelt et al., 2020). The synthesis matrix addresses these points. After that, further clustering rounds are performed to group similar or related concepts. Individual notions that cannot be connected to other concepts or that are not cited in more than one literary source are omitted. This iterative procedure resulted in the identification of 15 governance idea clusters (Pelt et al., 2020). Following that, Pelt et al. (2020) assigned a unique label to each cluster. They are then utilised to identify features of governance. Incentives, forking, dispute resolution, roles, voting style, and modularization are all labelled clusters (Pelt et al., 2020). Following that, they selected the clusters that would comprise the BG framework's dimensions. For each cluster of governance ideas, the following questions are asked: Is this a significant governance theme? Is this a sub concept or a dimension? If so, does it transcend a level of governance? Pelt et al. (2020) explain that based on these responses, some clusters are ruled out as potential candidates for their own independent governance dimension. According to Pelt et al., (2020) voting is seen as

a sub concept of decision making. Because it is a decision-making system, it is not a candidate. The other six characteristics are formation and context, roles, incentives, membership, communication, and decision-making. This study will further investigate the details each dimension and their sources of inspiration.

2.9.1.2 Blockchain governance layers

The Blockchain Governance (BG) architecture incorporates a crucial element known as governance layers, which constitutes the second foundational element (Pelt et al., 2020). Pelt et al. (2020) have identified several instances in which authors have adopted a three-layered approach to characterize the governance of open-source software (OSS) or blockchain projects. The utilization of analytical levels or layers serves the purpose of breaking down the governance structure into more manageable and comprehensible components. To distinguish between these governance layers, we employ Carter's tiered framework (Carter, 2018). Carter (2018) categorizes governance into three distinct levels: the community level, the implementation level, and the on-chain level. In this context, these layers are respectively referred to as the off-chain community layer, the off-chain development layer, and the on-chain protocol layer. This research endeavor aims to delve deeper into the specifics of each layer and explore their sources of inspiration.

2.9.1.3 Combining governance dimensions and layers

In their study, Pelt et al. (2020) discuss the integration of governance features and layers within the blockchain framework. This integration involves the layering of dimensions on top of the existing layers, with the recognition of two notable exceptions. Firstly, the framework's periphery is identified as representing the dimension of formation and context, encompassing the historical aspects of blockchain that are applicable to all three levels. To gain a comprehensive understanding of blockchain governance, it becomes essential to delve into the blockchain's creation process and its contextual background (Pelt et al., 2020).

Furthermore, Pelt et al. (2020) elaborate on how the overlap of a dimension and layer results in the emergence of more specific governance concepts. As part of the governance dimension identification process, an initial set of governance concepts is established, drawing insights from various blockchain governance themes discovered by the researchers.

2.10 Theoretical framework

The TOE Framework

The TOE system Some academics have used TOE analysis at an organisational level. Tornatzky & Fleischer (1990) devised a framework to examine technology and service adoptions inside businesses, as well as value generating concepts in their modelling methodologies (Tornatzky et al. 1990, quoted by Gangwar, Date & Ramaswamy, 2015). Several researchers have used the TOE model to evaluate software uptake and operational technology utilisation.

Tornatzky and Fleischer (1990) created the TOE framework. It assesses an organization's technological innovation via three organisational aspects. The technical framework discusses internal and external organisational procedures that use contemporary methodologies and take into consideration organisational factors (Chau & Tam 1997). The organisational factors that encourage or inhibit technological growth are explored.

Integrated systems and personnel knowledge are two examples of these characteristics. The external environment consists of rivals, regulations, and capital risk. This is true to some degree, even if the scenario deviates from the DOI principle in terms of environmental considerations. Baker (2012) feels the TOE system will continue to play a critical role in driving research on innovation uptake. Tornatzky and Fleischer suggested the TOE framework in Figure 6. (1990).

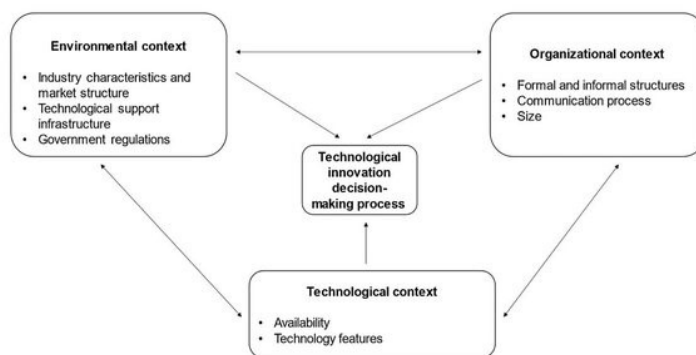


Figure 6. Technology-Organisation-Environment framework (Tornatzky and Fleischer 1990, P. 154)

Figure 6 depicts three aspects of technological progress decision-making. The external operational environment includes industrial features, technology financing,

and governance. Usability and application availability follow. In addition to contributing to technical advancement, these functions may be leveraged to develop new business models. The organisation includes communication, operational structure, and future efficiency (Tornatzky & Fleisch 1990).

The Technology-Organization-Environment (TOE) Framework has been effectively utilized to analyze the operational aspects and inherent procedures within various departments of organizations. It is crucial to acknowledge that the adoption of new technologies is influenced by factors such as the type of organization, its size, and the sector it operates in. Consequently, the assessment of an organization's readiness for technology adoption necessitates the application of tailored data processing methods specific to each department. In conducting research on IT implementation within organizations, the TOE framework, as proposed by Tornatzky and Fleischer (1990), serves as a valuable analytical tool. Although the research findings primarily revolved around the company's supply chain, the insights gained from this analysis can be extrapolated and applied to the broader spectrum of the organization.

#	Author	Technological considerations	Organisational considerations	Environmental considerations
1	Wang et al., (2016)	Perceived benefits*, data security*, data integrity, complexity*, compatibility*, technology maturity*, uncertainty	Organisational size*, top management support*, organisational readiness*, responding capability	Regulatory environment*, dynamics*, market dynamics*
2	Lansiti and Lakhani (2017)	Relative advantage*, cost savings, complexity, accessibility, trialability, compatibility*	Technology readiness*, organisational size*, top management support*, value chain readiness	Competitive pressure*, relationship with partners, government policy, business use cases*
3	Guo and Liang (2016)	Cost, data security*, privacy, relative advantage*, business concerns*, compatibility*, disintermediation*	Organisational readiness*, top management support*, blockchain knowledge, information intensity	Market dynamics*, government support*, regulatory environment*, industry standards*
4	Crosby et al., (2016)	Perceived benefits*, relative advantage*, privacy, data security*, relative advantage*, data security*, privacy, disintermediation*	Customer relationship, top management support*, organisational readiness*, technology readiness*, organisational readiness*, business model readiness*, relative advantage*	Government support*, regulatory environment*, competitive pressure*, trading partner pressure, government*, public perception of the industry, standards*, market dynamics, government support*
6	Shier et al. (2016)	Complexity*, relative advantage*, perceived benefits*, legacy infrastructure, compatibility*	Organisational readiness*, management support*, employee disruption	Regulatory environment*, governmental support*
7	O'Dair et al., (2016)	Relative advantage*, perceived benefits*, complexity*, compatibility*, data governance, disintermediation*	Blockchain knowledge, organisational size*, organisational readiness*, business model readiness	Emergence of use case examples, government regulation*, market dynamics, critical user mass*
8	Folkshicyn and Lemmon (2016)	Data security*, privacy, perceived benefits*, disintermediation*, cost savings, continuity of service	Organisational readiness*, customer relationship, size, top management support*	Market dynamics*, trading partner support*, regulatory environment*
9	Tapscott et al., (2016)	Perceived benefits*, data security*, privacy, technology maturity*	Organisational readiness*, organisational size*, business model readiness*, blockchain knowledge*	Government support*, market standards, regulatory environment*
10	Mending et al., (2017)	Data security*, latency, throughput, usability, hard forks, wasted resources	Organisational readiness*, organisational size*, governance, business models, top management support*	Regulatory environment*, market dynamics, competitive pressure*
11	Pilkington (2015)	Perceived benefits*, complexity*, technology maturity*, compatibility*, blockchain (public v private)	Organisational size*, top management support	Competitive pressure*
12	Morbido (2017)	Complexity*, perceived benefits, compatibility*, maturity*, cost	Blockchain incentives*, innovativeness*, technological readiness*, value chain readiness*, top management support and involvement*, size	Regulatory environment*, government support, business use cases*, trading partner support*
14	Schueber and Schürtz (2017)	Perceived benefits*, smart contract coding*, complexity	Technology responding capability, information intensity, organisational readiness*, value chain readiness*	Industry pressure*, business use cases*
15	Lindman et al., (2017)	Complexity*, perceived benefits*, technology maturity*, compatibility, technology architecture*	Technology readiness*, Value chain readiness, business models, organisational readiness*	Regulatory environment*, market dynamics*
16	Chen et al., (2018)	Perceived benefits*, complexity*, smart contract coding*, energy consumption	Top management support*, organisational readiness*	Market dynamics, governmental projects, industry pressure*

*Considerations found to be significant.

Table 1. TOE and blockchain theory

According to Parker and Castleman (2009), models and frameworks are often used to gather data rather than to verify results. According to the study, there is no one structure or environment that promotes creativity. The frameworks will vary according on the nature and extent of the innovation (Molla & Licker 2005). The TOE paradigm is a well-developed and systematic theoretical lens through which technology adoption may be analysed (Pudjianto & Hangjung, 2009). This is consistent with the aims of this investigation.

Gangwar et al. (2015) used TAM to create hybrid study models to examine perceived utility and ease of usage as proposed by TAM. TOE is not always used to bring new products or services to the market. So, extra-organizational adoption of intelligent contracting by a client is not best served by the TOE model.

Other literary frameworks such as Davis' TAM (Technology Admission Model) and Ajzen's TPB (Planted Competency Theory) have also been recognised. The emphasis is on users and their comprehension of technology usability (Pudjianto & Hangjung, 2009). This study seeks to explore how companies and users regard technology. Innovation adoption is framed by organisational decision-making, according to Tornatzky and Fleischer (1990). The TOE structure best fit this research purpose.

For example, Pudjianto and Hangjung (2009) suggest expanding the TOE framework to better examine drivers and identify development acceptability challenges (Zhu et al. 2006). Also, internal and external variables impact an organization's performance (Donaldson 2001). Consequences: decision-makers must focus on traits that foster or expedite innovation adoption The TOE system links three qualitative components, including cultural and industrial variety (Oliveira & martins 2011).

Thus, following Borgman et al. (2013), our theoretical framework will be integrated with the OSS phases, Lifecycle and BC governance views which will be employed as a moderator (Borgman et al., 2013).

Based on the foregoing, this study utilised the TOE framework for the insurance industry's Blockchain governance dimensions and layers, while using OSS phases, Lifecycle to establish a since of time. The next parts discuss the TOE model and Governance viewpoint. Finally, describe the study's conceptual structure.

Table 2. TOE and blockchain theory

	Blockchain Applicability	
Perceived benefits	The impression of advantages which could improve by adoption of blockchain technologies (Rogers, 1995).	Technological View
Complexity	The problems found in designing blockchain applications (e.g. algorithms for validations, smart contract systems, distributed ledger technology, etc.) (Rogers, 1995).	
Compatibility	Blockchain applications have the potential to integrate with legacy systems. (e.g., supply chain integration, system architectures,	
Data Security	The defense from disruptive powers and unintended acts of unauthorized users of data inside the blockchain (Summers, 2004), such as a cyberattack or a data breach (Poremba, 2017).	
Maturity	That the system has been in operation long enough to eliminate or reduce the bulk of its original faults and issues by further development (Daim, 2016).	
Governance	The development of policies by representatives of the governing body of an organisation and constant oversight of their proper execution. This requires decision-making processes needed to align members' roles with their key responsibility to improve the stability and sustainability of the organizations (Hopkins, 2010).	
Organizational readiness	Different corporate tools are required to implement modern IT technologies (Weiner, 2009). The concept has been expanded to incorporate and underline the relevance of corporate skills to the work with blockchain technologies.	Organisational View
Top management support	Management opinions on technical projects, involvement in them and the degree to which the top management supports technological progress. (Kulkarni, RoblesFlores, & Popovic, 2017).	
Organizational size	Studies conducted and industry reports suggest that large companies are more likely than small and medium-sized (SMEs) to implement blockchain technology (Clohessy, Acton, Godfrey and Houston 2017). Organizational scale is thus an crucial element when deciding how blockchain technology is utilized within the company.	
Regulatory environment	Modern disruptive technology needs to be investigated and issues addressed by developing special regulations on the distributed ledger technologies to ensure adequate security for customers and financial transparency.	Environmental View
Market dynamics	The fast-changing technical world of blockchain needs to be tracked by the company to analyse current procedures and determine how blockchain can be used as application key differences. (Clohessy, Acton, & Rogers, Blockchain Adoption: Technological, Organisational and Environmental Considerations, 2018). The organization and insurance industries must be aligned with their readiness to meet this rapidly shifting environment.	
Industry/Competitive pressure	Innovation is needed to continue being competitive due to the outside competition of the market. The existence of such competitive competition influences the ability to take advantage of an company in this sector substantially.	
Government support:	The use of blockchain technology in businesses would depend heavily on the manner in which the government of the country where the company is headquartered is taking action.	
Associations	The effectiveness of the Blockchain system relies so much on the network impact that an individual user of the item or service has on the value of the product for others, which raises the value of the product / service relative to the number of consumers who use it (Shapiro & Varian, 1998).This makes it very important to gauge associations for the organization to join.	

As stated in the literature study, blockchain governance and governance viewpoints vary based on the users and technology. It is a summary of the many governance models discussed in the literature study, in the context of TOE framework.

Below in figure 5 and 6 depicts the conceptual framework's multi stages before the final perceived Blockchain governance problems stage. To begin, Hazen et al. (2012) and Niknejad, Hussin & Amiri (2019) define four governance phases and life cycle to apply a time scale. The state/space/location is then made up of the technology, organisation, and environment structure, which is adopted from Tornatzky et al. (1990).

To adopt/ evaluate a blockchain governance framework for the insurance business in South Africa, the four governance phases and life cycles, TOE and OSS Governance framework will help investigate the major considerations that should be taken into account when considering Blockchain Governance.

OSS Governance Phases

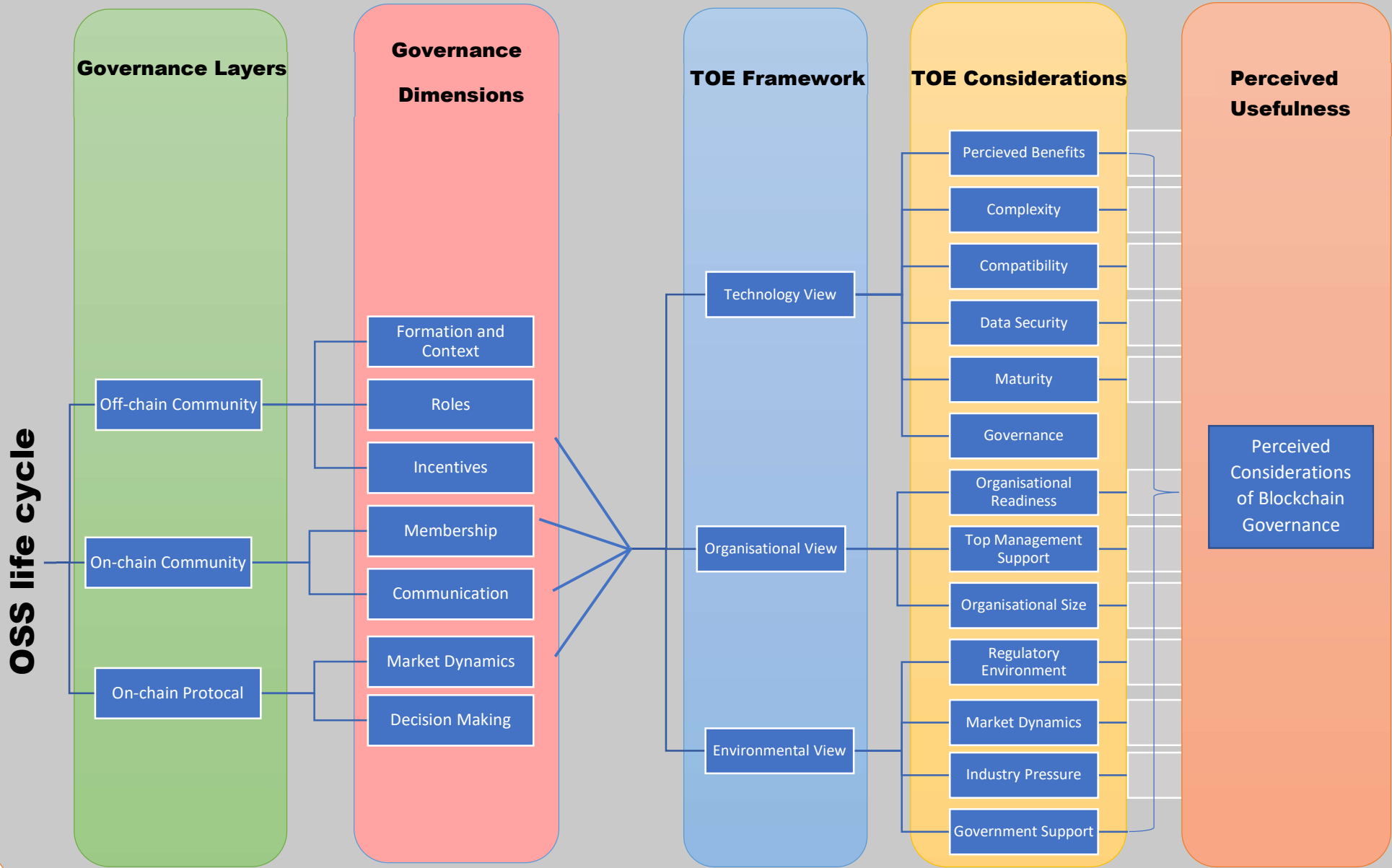


Figure 5. Proposed Theoretical Framework for Blockchain Governance

3. Chapter 3: Research Methodology

The study design outlines the methodology, principles, processes, and strategies used to answer research questions and accomplish research objectives (Saunders et al., 2019). This section explains the research's philosophy. The next parts describe the study strategy, purpose, methods, case study, sample, timing, instrument and analysis, ethics, and confidentiality.

3.1 Research Philosophy

The word research philosophy refers to the creation and nature of knowledge (Saunders et al., 2019). As a starting point, this study will provide information about the ontology and epistemology, which are two fundamental views on how new information is acquired. Epistemological assumptions pertain to human understanding, while ontological assumptions pertain to the reality of the study (Saunders, Lewis, & Thornhill, 2016).

3.1.1 Ontology

The ontological position is one that considers the relationship between knowledge and existence (Marsh, Ercan & Furlong, 2017). It may also be used to refer to the field of study concerned with establishing whether or not a thing really exists. Yilmaz (2013) distinguishes between two distinct types of ontological stances: objectivism and subjectivism. Information, in the view of objectivists, is easily available and can be collected objectively independent of one's social standing (Saunders et al., 2019). The view of subjectivists, on the other hand, is that knowledge is generated by individual perspectives and actions.

The researcher has chosen, from an ontological standpoint, the viewpoint that corresponds to the participants' subjective experiences of reality. This research would examine the attitudes and perspectives of different categories of individuals inside an organisation. Organizations are not only complex market circumstances but also distinct in character, and this distinction is accounted for by gathering data that is relevant to the participants in the research and taking into consideration the reality in which they operate. (Saunders, Lewis & Thornhill, 2019).

3.1.2 Epistemology

Bur-rell & Morgan, (2016) Epistemology is the study of how we come to know things, what counts as reliable information, and what methods we might use to share this data with others. Levers, (2013) explains how knowledge is utilised and why it has the characteristics it has. There are two epistemological views available to researchers: positivism and interpretivism. Interpretivists think that social processes or constructs provide access to reality (Saunders et al., 2019). The positivist philosophy is founded on natural scientific methods (Pawlikowski et al., 2018).

To achieve the aims of this research, the researcher maintains an interpretative perspective on reality, based on the premise that knowledge and reality are social products that cannot be comprehended independently of social actors (Orlikowski & Baroudi, 1991)

3.2 Research Method

Research may be conducted in one of three ways: qualitatively, quantitatively, or utilising a hybrid of the two (Saunders et al., 2019). In contrast to the objective nature of quantitative research, which relies on the collection of data amenable to rigorous statistical analysis in order to answer the research questions at hand, the subjective nature of qualitative research, which relies on interviews with respondents in order to ascertain the latter's opinions or attitudes concerning the phenomena in question, is exemplified by the use of the latter (Kothari, 2004). Mixed method research is a combination of quantitative and qualitative research methods (Venkatesh et al., 2013), allowing the researcher to use the strengths of both techniques to provide a clear answer to the research questions (Fetters et al., 2013). Contrary to quantitative research, which establishes answer categories, qualitative research collects new perspectives through open participant responses (Pope & Mays, 1995). Therefore, a qualitative approach is more suited to satisfy this study's objectives, which are to focus is on participants' unique experiences and by reporting on themes that encapsulate the major characteristics and layers of blockchain governance from the viewpoint of business management in an intelligible way to help companies analyse blockchain governance in a more organised manner (Saunders et al., 2019).

3.2.1 Case Study

The inclusion of Sanlam, a leading player in the South African insurance sector, as a case study provides critical insights into the practical application of blockchain governance frameworks in a highly regulated and complex environment. Sanlam's blockchain initiatives, such as using smart contracts to automate beneficiary fund management, highlight the potential for blockchain to streamline operations, enhance transparency, and secure transactions. These efforts underscore the need for robust governance mechanisms that address data integrity, stakeholder accountability, and regulatory compliance. By analysing Sanlam's operations, this study identifies key governance dimensions, including on-chain decision-making processes for transaction validation and off-chain communication strategies for coordinating stakeholders. This case study bridges theoretical governance frameworks with practical implementation, offering actionable insights for organizations adopting blockchain technologies.

The case study design employs a qualitative methodology, combining semi-structured interviews with Sanlam executives, IT managers, and compliance officers with document analysis of policies, operational guidelines, and blockchain project reports. This approach ensures a comprehensive understanding of how blockchain aligns with Sanlam's strategic objectives and addresses regulatory challenges, such as compliance with the Protection of Personal Information Act (POPIA) (Finck, 2018). Findings reveal that regulatory compliance remains a critical barrier to adoption, emphasizing the need for governance frameworks that balance innovation with legal adherence. These insights not only contextualize blockchain governance within the South African insurance industry but also validate the innovative governance framework's applicability. The case study's findings demonstrate how governance mechanisms can resolve technological, organizational, and regulatory challenges, providing a model for broader adoption across the insurance sector.

3.2.2 Research Approach

Research methodologies are deductive and inductive. In deductive research, hypotheses or propositions are generated to explain a theory; the following phase is to acquire evidence to support or reject the hypotheses or propositions (O'Reilly, 2012;

Saunders et al., 2019). Inductive research has little or no assumptions, allowing a hypothesis to emerge from the data (O'Reilly, 2012; Saunders et al., 2019).

Deductive qualitative research is shaped by subjectivism ontology, interpretive epistemology, and the generation of propositions derives mainly from starting with a well-established theory and proceeding from there. The deductive qualitative approach and analysis is best suited for this research as it allows for the discovery of novel information by using an already-established theory as a starting point (Gilgun,2005). Using the theoretical setup shown in Figure 5&6. The literature study served as inspiration for the original structure. The aggregation and examination of data will be driven by predetermined themes.

According to Saunders, Lewis & Thornhill (2019), the first stage in doing deductive qualitative research is to conduct a literature review, which should lead to a conceptual framework for the study. In the second stage, called proposals, we use the frameworks to pick out our researchable ideas. Third, based on the theories, the researcher may draught a code book. Step 4: Question Matrix If data is to be gathered via interviews, the codebook may be used to generate interview questions for different interviewee groups, taking into account all competing hypotheses and their propositions. The fifth step is to gather data for the study by interviewing participants or collecting samples according to the same criteria as the question matrix. The sixth stage is analysing the data, which is broken down into three sections. To begin, the collected data is analysed using the code book. The second stage is to recognise themes. Last but not least, contemplating the claims made by the various theories. Step 7 is the final report of findings.

3.3 Research Timeframe

This study is a cross-sectional examination that has been conducted throughout the organization's present phasing back of workers after Covid-19. This study adopted a cross-sectional timeframe due to the time limitations of the master's programme. Since the master's programme time limitation, a backwards, accelerated method is out of the question (Saunders et al., 2019).

3.4 Target Audience

Employees with knowledge-based roles are the target audience. Governance of the blockchain is designed with key stakeholders in mind. These parties are businessmen who will assist in the development and maintenance of blockchain technology (Saunders et al., 2019). These individuals must participate to get a business user viewpoint.

Enterprise architects, business analysts, Developers, IT developer team managers, business managers, administrators, internal auditors, quality and control employees, and external vendors will be needed. These roles were developed for interviews and focus groups and shown to effect decision making, blockchain technology usage, and maintenance.

3.5 Sample

Participants were chosen using purposive and convenience sampling. Purposive sampling, used in qualitative investigations (Ramorola, 2013), includes selecting persons who can supply the needed information (Sekaran, 2003). This self-selected test is whether sample population are directly or indirectly agreeing or rejecting to participate in the research. Test participants must volunteer, which improves ethics to be best placed (Saunders, Lewis & Thornhill, 2019). Participants must fulfil sample selection requirements. Researchers established categorization criteria. Ensure all agreeing participants participate towards the study. It will shorten the time needed to search for relevant groups who may engage in the study (Saunders, Lewis & Thornhill, 2019). This improves performance and helps discuss phenomena thoroughly. Self-selection bias is probable; therefore, the research is not typical of the public but rather an admission of each individual's reality (Sharma, 2017).

The project aims to gather data from 5-25 persons, however the optimal sample size has yet to be identified. This number compares to the sample size of comparable research conducted in the past, which included semi-structured focus groups (Saunders, Lewis & Thornhill, 2019).

3.6 Data Collection Strategy and Instruments

Due to the exploratory nature of this research, it is essential to gather as much data as possible. This exploratory study will collect data via focus groups and semi-structured interviews (Saunders et al., 2019).

The semi-structured interview is a qualitative data gathering method in which researcher ask participants a number of pre-defined yet open-ended questions. In lieu of unstructured samples, the participants have more control over the interview's themes (Given, 2008). The researcher had a list of topics to address as well as additional crucial questions, although the application might vary across interviews. We realise that interviews may be conducted in a variety of ways, including formal and unstructured formats.

In structured interviews, questions are prepared and refined beforehand. All applicants are asked the same questions during formal interviews. It becomes more difficult to schedule formal interviews. In addition, unstructured interviews are a sort of interview in which the questions asked by the researcher are not predetermined. Therefore, when numerous applicants are presented diverse questions, it is more difficult to analyse their replies and evaluate them in groups (Saunders, Lewis, & Thornhill, 2019). The researcher elected to conduct a semi-structured interview with a focus group as a result.

Focus groups are group session interviews in which the subject is communicated directly and objectively to the participants and the focus is placed on facilitating and capturing meaningful interactions amongst participants. Generally, nonprobability is used to choose participants (Saunders, Lewis & Thornhill, 2019).

Sampling, often for a specified purpose. In addition, few authors stress the use of specialised groups for research initiatives inside an organisation. Individuals may interpret an offer to participate in a focus group interview as a command rather than a choice. Because time is a limited resource, this method is appropriate for conducting a qualitative investigation (Saunders, Lewis & Thornhill, 2019).

Given the above, the data collection occurred following the development of the research instrument and gaining approval from the UCT Ethics Committee. The data collecting strategy for this exploratory research has consisted of semi-structured

interviews and focus groups. The qualitative data for the interview questions was acquired with the participants' consent using the capturing tools from Microsoft Teams in conjunction with virtual group interviews. The interview recordings were subsequently transcribed to text format. The data was imported into NVivo 14, where the data was further analysed and evaluated.

The purpose of the semi-structured interview questions is to simplify a series of questions and guarantee that new propositions and areas of possibly relevant data may emerge from the replies. Therefore, the interview procedure will not be interrupted (Kvale & Brinkmann 2015).

3.6.1 Data Analysis

The link between data collection and interpretation is often the primary focus of qualitative research since it provides the most fruitful avenue for the investigation and elucidation of underlying meanings. Since words and images may be interpreted in a variety of ways, it is important to carefully investigate the participants' interpretations and draw conclusions about the relationships between the themes they reveal (Saunders et al., 2019). Therefore, the qualitative methods outlined below was used to analyse the information gathered.

3.6.1.1 Qualitative Data Analysis

In the semi-structured focus group, a comprehensive approach to the model of theme analysis must be developed. Data patterns are identified, analysed, and reported via thematic analysis (themes). In qualitative data analysis, thematic analysis is utilised often and flexibly. There have been several efforts to give a more systematic method to its application, with most writers combining deductive and inductive versions to form Deductive thematic analysis, a hybrid technique (Braun & Clarke 2006; Fereday & Muir-Cochrane 2006; Rishi, Jauhari, & Joshi 2015).

Deductive thematic analysis is a research approach that initiates its process with a well-established theoretical framework (Boyatzis, 1998). Jones et al. (2018) provide a practical example of theory-driven analysis by constructing their coding framework based on Edwards' (2015) concept of community capacity. The deductive thematic analysis method, as outlined by Boyatzis (1998) and Fereday and Muir-Cochrane (2006), involves a systematic sequence of steps. First, it entails addressing sampling

and design considerations. Second, it requires the development of a code manual, which includes labeling, defining, and describing when each theme is applicable. Third, the code's reliability is validated or tested. Fourth, data is summarized, and initial themes are identified. In the fifth step, the template of codes is applied, and additional coding may occur. Next, in step six, connections between codes are established, and overarching themes are identified. Finally, the analysis process is completed by corroborating and legitimating the coded themes within the research context. This deductive approach offers a structured and theory-driven method for conducting thematic analysis while ensuring the validity and reliability of findings through a systematic process (Boyatzis, 1998; Fereday & Muir-Cochrane, 2006; Jones et al., 2018).

Caulfield (2019) agreed that different interpretations of a thematic analysis can be used in an interpretative study to explore different interpretations of a phenomenon. The aim of this study is to search for topics from a dataset, identify key trends from a dataset, produce a themed analysis, as well as to report clear thematic patterns on the subject.

3.7 Research Validity and Reliability

The study rigor can be described internally and externally as validity and reliability in qualitative analysis according to Yin (2012). Reliability refers to the coherence of data analysis measures and the capacity to replicate the findings using such measures, while validity concerns the quality of test outcomes (Bryman & Bell, 2011). The results are derived by the study. According to Saunders et al. (2019), the probability of receiving an incorrect response is minimized by reliability and validity. In order to enable triangulation and enhance the quality and reliability of obtained data, the interviews were performed with policy makers and employees who are influenced by blockchain management in various divisions of an insurance undertaking. The following section discusses the validity of this research and its reliability.

3.7.1 Research validity

In multiple sources of evidence by Denzin, (1978), there are multiple types however the most suitable type is Theory triangulation, which is the use of different theoretical viewpoints for determining competing hypotheses as well as for interpreting the single set of data. The systematic method of substantiating the study questions supported

internal validation. Svensson (2013) maintained that original studies which contribute to market theory have external validity. With the external validity the proposed sample size is relatively small due to cross-sectional outlook. Internal validity in this study was ensured through a meticulous approach to validating the research questions, which involved the pre-testing of the interview schedule. Additionally, rigorous procedures were employed to filter out any irrelevant data during the analysis phase. Moreover, ethical standards were strictly adhered to throughout the study, as recommended by Yin (2012).

3.7.2 Research reliability

Stability refers to how well a system can function without making any mistakes in its computations. Yin (2012) said a theory may be reliable if they were consistent, mistake risks were avoided, and interview participants didn't ask leading questions. This research satisfied all requirements. Lubbe (2003) suggested using a process to increase the credibility of a research project. All interviews were transcribed to avoid inferences. These records may be simply reviewed and reanalysed. During data collection and interpretation, the researcher contacted management to promote testing queries. Peers and colleagues addressed its research process to resolve challenges and problems in research design, methodology, interpretations, themes, and conclusions.

3.8 Project Risks and Mitigations

No research project is immune to project risk(s) such as technical, ethical, and participation failures. The following risks and mitigation strategies have been identified:

Table 3. Risks and Mitigations

Risk	Mitigation Strategy
Limited time frame	To fulfil all project deadlines, the researcher must follow the specified work timetable.
Data collection processing takes longer than is necessary	Confirm that the sample size is attained, the researcher will track the survey response rate within a first week. If a weak response rate is present during the first week, the researchers will reassess the distribution of the sample.
Poor response rate from focus group	To obtain the right sample size needed for the analysis, the researcher would have to send emails requesting participation throughout the chosen departments.
Researcher has not used Nvivo before and this could make analysing data problematic	Studying of Nvivo will be done to make sure that the process is understood before attempting to analyse the data of the study.
Focus Groups may not bring out all the personal perspectives	The follow up with the interviewees will provide a session for areas that have not been highlighted as a concern.
Virtual meeting might not obtain same result as of physical.	We accept the risk that due to Covid 19 a virtual approach needs to be implemented and that the social cues will not be as obvious. The mitigation will be for the researcher to study hearing cues to interpret feel of the environment of the group
Approval delay: Delays of research design acceptance and ethics approval	By submitting the correct documentation on time, the delay will be minimal.

3.11 Limitations

Systemic problems in the research's analytic components constitute conceptual roadblocks (Saunders, Lewis & Thornhill, 2019). There are a few things that prevent the study from going further: The sample is too small to draw any firm conclusions about the population as a whole. Due to the temporal constraints of the study, it's possible that more people who use Blockchain will be in charge of making decisions than of keeping the system running smoothly.

3.12 Ethical Considerations

The Faculty of Commerce Ethics committee of the University of Cape Town gives ethical approval. Documentation for Ethical Approval is included with the research design. The consent must first be sought from the delegate of the organisation with the authority to permit employee interviews. After organisational authorization had been acquired, consent forms were sent to individuals for approval. This investigation

focuses on acceptance procedures. Before conducting interviews, participants should be informed of the purpose of the research, how data will be gathered and shared, and whether the data will be utilised. The participant's permission is required to record the interview. They are permitted to leave the interview at any time and are not obligated to respond to any questions they do not like to. In the absence of a person or organisation in any study, all gathered information would be kept private. As identities are acquired, both sets of gathered data are transformed into pseudonyms to safeguard the participants' privacy. On the researcher's computer, the data is encrypted, and password protected. It is restricted to just the researcher and mentor. Before the interview, this information must be outlined on paper and signed. Such interviews would need approval from the University of Cape Town's Ethics Committee. No interviews are booked prior to receiving authorization (Saunders, Lewis & Thornhill, 2019).

3.13 Assumptions

Candidates must have knowledge of Blockchain Technology and insurance. Even if they are novel, the respondent knows learning theories or can link their learning experience to them. The study proposes that data from seasoned and well-recognized subject matter experts will suffice to flag blockchain governance risks in South African insurance.

4. Chapter 4: Research analysis and interpretation

4.1 Introduction

The preceding chapter delved into the intricacies of the research design and methodology. This current chapter, however, shifts its focus towards presenting and elucidating the study's findings within the broader context of the research. These findings are derived from a deductive thematic analysis, which was diligently conducted on the transcriptions obtained through the interview process. A total of eight participants actively participated in the interviews, with three of them engaging in a collective interview session as a focus group, addressing various aspects of the research questions. The upcoming section provides an in-depth exploration of the participants' demographics, while the subsequent section delineates the approach and outcomes of the deductive thematic analysis, shedding light on the emergence of key themes identified during the analysis process. Sections present the findings from the Blockchain Governance Dimensions, Blockchain Governance Layers, OSS Governance Phases, OSS Project Life Cycle Technology, Organization and Environment perspective respectively.

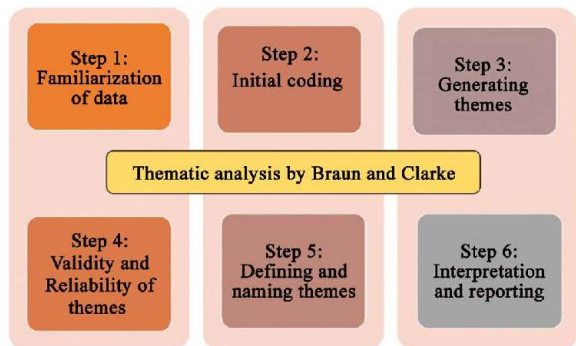


Figure 7. Thematic analysis (Prashanti & Kumar, 2016).

A deductive thematic analysis approach was used to analyse the collected interview data (Braun & Clarke, 2006) as outlined in chapter 3. From the thematic analysis of the interview transcripts, the researcher identified seven major themes. The Chapter first introduces the themes and illustrates these via a thematic map, provides a description of the interviewees, and then details an account of the emergent themes, namely: Blockchain Governance Dimensions, Blockchain Governance Layers, OSS Governance Phases, OSS Project Life Cycle, TOE perspective. Table 5 represents an

example of codes created for Participant A with the participant's responses as examples of the types of references that were coded.

Codes	References	Example Reference
1: Conceptual Blockchain Governance Dimensions	19	"I was the single point of conduct for and pretty much involved in deciding whether we were getting any value from, from, from those workshops."
9: Conceptual Blockchain Governance Layers	6	"...you need consensus from all these other clusters of the business, you know, so that you can optimize on the benefit that you get for and each one will say for us this is the maximum benefit that we would get."
13: Environmental Level	13	"there's a consortium that some people here in South Africa try to form South Africa blockchain consortium or something like that and but it went it went dead."
21: Organisational Level	12	"Because I think looking back if we had gone to the group CEO and given the chance and present to him that this is what we are looking at and we need funding for it."
30: OSS Governance Phases	11	"The initial part of the work was really just understanding blockchain."
35: OSS Project Life Cycle	9	"We had architects and businesspeople and through active participation come up with potential use cases that we could use as, as, As for POC."
40: Technological Level	26	"Once we can tell who is responsible for all those, then we can begin to see where regulation and governance of the blockchain would come into play because it would have to follow the exact governance models that are there in one way or another."

Table 4 - Example of associated codes developed for Participant A with number of coded references.

The number of codes and total references for the dataset is listed in table 6 below.\

Participant	Code	References
Participant A	27	62
Participant B	29	104
Participant C	22	64
Participant D	8	15
Participant E+ F + G	27	94
Participant H	29	96

Table 5 - Number of codes and references per participant

Refer to Figure 6 for the thematic map showing the seven themes and their respective subthemes.

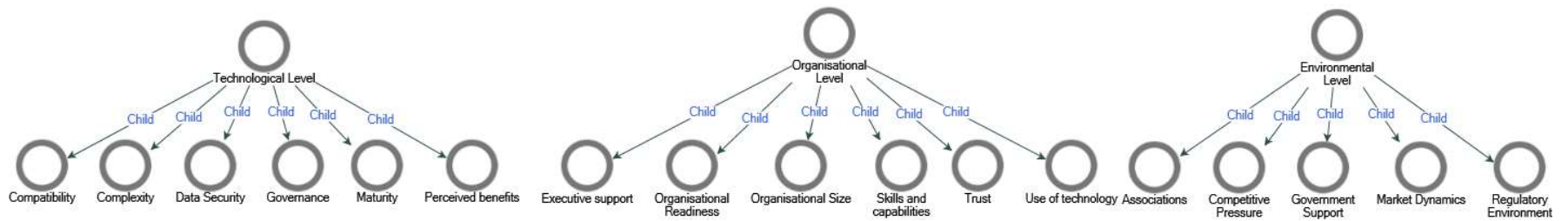
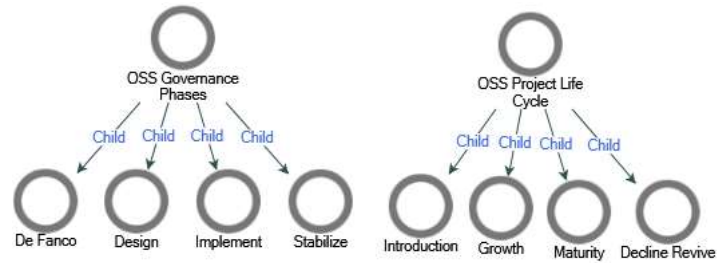
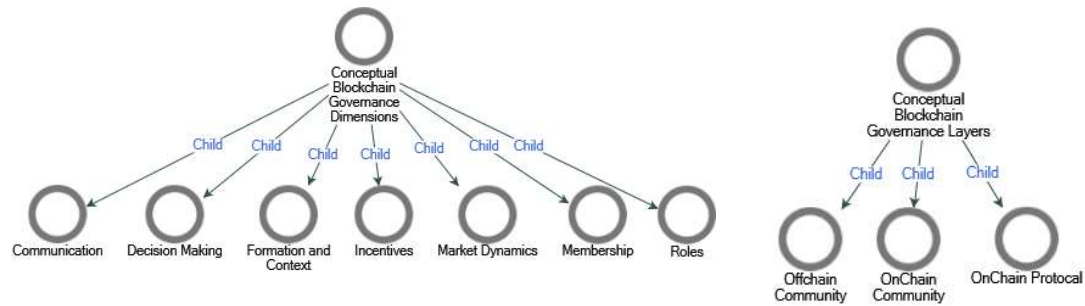


Figure 8: Thematic map

4.2 Research Findings

The study involved interviews with eight individuals representing six different financial services companies in South Africa. These participants held various roles, including business executives, technology experts, and board members. In order to protect their privacy, each participant was given a pseudonym, and you can find a summary of their profiles, interview durations, and the number of NVivo nodes used for analysis in Table 5.

To make sense of the interview data, codes with similar meanings were combined and given more general names. This coding process was guided by established frameworks like the Technology-Organization-Environment (TOE) and Open Source Software (OSS) Governance frameworks, as outlined by Braun and Clarke (2006). It's important to note that the study's main aim wasn't to prove or disprove these frameworks but to organize and interpret the data using them as helpful guides.

The main themes and sub-themes that emerged are listed in table 7.

Name	Description	Files	References
Conceptual Blockchain Governance Dimensions		5	66
Communication		5	10
Decision Making		4	17
Formation and Context		5	16
Incentives		2	5
Membership		1	2
Roles		5	16
Conceptual Blockchain Governance Layers		5	27
Off-chain Community		4	7
On-Chain Community		5	9
On-Chain Protocol		5	11
Environmental Level		6	88
Associations		5	7
Competitive Pressure		4	11

Name	Description	Files	References
Government Support		5	16
Market Dynamics		5	14
Regulatory Environment		6	40
IT Governance		2	2
IT Governance Dimensions		1	1
Organisational Level		6	72
Executive support		3	13
Organisational Readiness		3	11
Organisational Size		3	6
Skills and capabilities		5	16
Trust		3	5
Use of technology		6	21
OSS Governance Dimension tools		1	1
OSS Governance Dimensions		0	0
OSS Governance Phases		4	32
De Fanco		4	15
Design		4	8
Implement		3	6
Stabilize		2	3
OSS Project Life Cycle		4	27
Decline Revive		2	3
Growth		4	8
Introduction		4	14
Maturity		2	2
Technological Level		6	113
Compatibility		4	13

Name	Description	Files	References
Complexity		5	17
Data Security		4	13
Governance		6	48
Maturity		1	1
Perceived benefits		5	21

The primary emphasis in this research predominantly revolved around the Technological Level perspective, which emerged as the central theme. Within this context, Governance emerged as the most frequently discussed sub-theme, particularly due to the limited understanding of Blockchain governance. The determination of the sample size followed the criterion of saturation, a point at which the collection of additional data would not yield new insights, as outlined by Thompson and Walker (1998). Saturation was reached after the seventh interview, as subsequent interviews failed to introduce novel themes. It is essential to note that qualitative research samples aim to provide in-depth insights rather than seeking quantitative representation (Miles & Huberman, 1994). At this point, the data collection process was completed.

The final step in the deductive thematic analysis process involves the creation of a report. This report features carefully selected and compelling excerpts that are subsequently linked back to the research question and the existing literature, in line with Braun and Clarke's guidance (2006). The ensuing sections present the segmented report, organized based on the perspectives of the Technological, Organizational, and Environmental (TOE) framework, OSS governance phases, and the OSS project life cycle, thereby offering a comprehensive overview of the study's findings.

4.2.1 Technology perspective

The research primarily centered on the technology perspective, which emerged as the most prominent aspect in terms of the number of references, underscoring its pivotal role in blockchain governance. Within this perspective, three key themes were discerned. Governance stood out as the most substantial theme, followed closely by the complexities and challenges encountered from a technological vantage point. Table 8 provides a

comprehensive overview of these technology-related themes and their corresponding sub-themes, complete with source attributions and references, offering a structured representation of the findings.

Sub-themes	Sources	References
Technological		
Level	6	113
Compatibility	4	13
Complexity	5	17
Data Security	4	13
Governance	6	48
Maturity	1	1

Table 8 - Sub-themes in the technology perspective by sources and references

Each theme is made up of sub-themes that outline the extent to which these themes emerged in the research. These have been broken down in the following sub-section.

Governance

The Governance are tabled in table 7 below and show that the governance had the most significance in the interviews where the regulations of the technology are largely uncharted and grey areas. This does not necessarily mean that the magnitude of the governance was weighted by the number of references but would indicate the commonality of subject surrounding governance itself. The governance of blockchain was therefore confirmed by the participants and congruent to what was referenced in the literature.

The development of policies by representatives of the governing body of an organization and constant oversight of their proper execution. This requires decision making processes needed to align members roles with their key responsibility to improve the stability and sustainability of the organizations (Hopkins, 2010).

The interviewees underscore the necessity of establishing robust governance structures in blockchain systems, emphasizing the importance of clearly delineating responsibilities. They advocate for regulatory frameworks aligned with existing governance models. Moreover, there is a recognition of the delicate balance required in governance, cautioning against excessive regulations that could impede the exploration and development of practical use cases in consortium-based or private blockchain initiatives.

“So, laying out the governance part is actually very important. – Participant H

“Once we can tell who is responsible for all those, then we can begin to see where regulation and governance of the blockchain would come into play because it would have to follow the exact governance models that are there.” – Participant H

“We got to that point where we started talking about governance and I reached out to the I don't know if you saw their website but there's a consortium that some people here in South Africa try to form South Africa blockchain consortium or something like that and, but it went it went dead.” – Participant H

“If it's going to be consortium based or private blockchain within certain with certain players, then governance is very, very important. – Participant E

“Too much governance when you're trying to find and play around and do POCS is going to actually kill the ability to find use cases” – Participant E

The interview transcripts highlight the inquiry into the roles and responsibilities associated with internal governance within a company. Participants emphasize the need for enhanced policies and governing bodies to enforce accountability. A notable point emerges regarding the transformative impact of transitioning from ad hoc approaches to a robust and collectively embraced governance framework, describing it as a pivotal moment in unlocking business potential.

“What are the roles and responsibilities of the people inside the company that handles the governance.” – Participant C

“We need to have better policies in place as well as have governing bodies that can hold people accountable.” – Participant B

“When we stopped trying to just do everything ourselves and ad hoc and actually implemented what you would call a strong and shared language of governance was actually a point of unlocking the business.” – *Participant D*

Perceived benefits

The impression of advantages which could improve by adoption of blockchain technologies (Rogers, 1995).

The interview participants advocate for blockchain technology as a potent tool in combating corruption, emphasizing its ability to maintain transparency while preserving privacy. They posit that implementing blockchain can enhance accountability within teams, leading to increased honesty and organizational cost-efficiency, ultimately boosting profitability. Additionally, the participants foresee the potential for blockchain, particularly in insurance, to offer flexible day-to-day solutions, foster fractional reserve systems, and provide resilience against manipulation due to its highly distributed nature. Another group of participants highlights the strategic advantage of early blockchain adoption, suggesting that pioneering efforts could position organizations as industry leaders, not only on a global scale but also within the specific context of South Africa.

“It will completely eradicate any form of corruption because everything is there by public, but still private.” – Participant A

“It will bring honesty to light, so see it as a method of managing teams where people have accountability” – Participant A

“Cost to organization becomes less and your profitability becomes higher.” – Participant A

“[...], insurance you will be able to provide a day-to-day solution instead of a long-term commitment with Different orders that have to run which gives you fractional reserve.” – Participant A

“That’s highly distributed and not easy to destroy or manipulate.” – Participant B

“If it's a good use case and it works, then you can lead the way for future industries to also make use of it.” – Participant E + F + G

“Can have an Advantage over our competitors if we do this early enough and we could be pioneers for the rest of the industry and even in South Africa in general.” – Participant E + F + G

Complexity

The problems found in designing blockchain applications (e.g. algorithms for validations, Smart contract systems, distributed ledger technologies) (Rogers,1995).

The interview findings underscore the scarcity of individuals proficient in implementing blockchain technology, presenting a major hurdle. Participants express the dependency on external implementation partners due to a lack of in-house capabilities, raising questions about the legal feasibility rather than just technical viability. Furthermore, there is a recognition of the complexity in adapting existing governance policies to an environment lacking predefined rules, adding a layer of intricacy to the implementation process.

“That was one of the biggest issues but there were not enough people who would who understood how to implement blockchain” – Participant H

“We were never in a position where we could do it on our own. we would have had to have an implementation partner” – Participant H

“can we legally do this; not can we technically do this.” – Participant E+ F + G

“Trying to use existing governance policies and trying to apply them to something where we don't actually have a rule set. So, it is tricky.” – Participant B

Data Security

The defense from disruptive powers and unintended acts of unauthorized users of data inside the blockchain (Summers, 2004), Such as a cyberattack or a data breach (Poremba, 2017).

The interview content highlights the importance of considering privacy laws in the implementation of blockchain technology. Specifically, using blockchain for information storage is seen as relatively straightforward, but complexities arise when dealing with information outside the blockchain, with legal governance influenced by the location of customers. The participants, as a group, underscore the critical roles of privacy and security, particularly within the realm of financial services, as primary concerns in the adoption of blockchain.

“There's still then privacy laws that need to be taken into account” – Participant B

*“it's a lot easier when it comes to, let's say we use a blockchain for just storing information.”
– Participant B*

“Changes based on where the customers you know based is generally will use the laws will govern where they based” – Participant B

“What about if there's information that sits outside of the blockchain because you got to understand if we're doing,” – Participant B

“The one would be privacy and the other one would be security, especially in financial services.” – Participant E+ F + G

Compatibility

Blockchain applications have the potential to integrate with legacy Systems.

The interview participants emphasize the paramount importance of integration and compatibility when implementing blockchain solutions. They highlight the necessity of creating a blockchain system that seamlessly integrates with existing systems, noting the advantageous capabilities of major technology providers such as Microsoft Azure, AWS, and SAP in facilitating blockchain integration. The repeated emphasis on adopting blockchain at a group level underscores the collective and collaborative nature required for successful implementation.

“[...] the integration and the compatibility are very important.” – Participant E+ F + G

“[...] create a blockchain that's going to be compatible with our systems” – Participant E+ F + G.

“Good thing is with, with Microsoft, Azio, with AWS, with the SAP, they all have blockchain, uh, integration, uh capabilities.” – Participant E+ F + G

“You can easily integrate the system into reading of the blockchain” – Participant E+ F + G.

“When you're looking at a thing like blockchain you want something that can be adopted at a group level,” – Participant H

“When you're looking at a thing like blockchain you want something that can be adopted at a group level,” – Participant H

Maturity

That the system has been in operation long enough to eliminate or reduce the bulk of its original faults and issues by further development (Daim, 2016).

The interviewee discusses the development of a government protocol termed as an Oracle, primarily functioning on the Stellar blockchain, resembling a spot contract. The system's operational history has led to significant refinement, eliminating or minimizing its initial faults and issues through ongoing development efforts, aligning with the literature highlighting the iterative nature of system enhancement (Daim, 2016).

“we've developed a government. Protocol, which we call our Oracle because it is essentially an Oracle, it's based on the spot contract. This is entirely developed on the stellar blockchain.” – Participant A

4.2.2 Organizational perspective

The organizational context explored in this study encompassed several recurring themes identified in the existing literature. These themes included aspects such as organizational structure, change management, executive support, and the importance of skills and capabilities within the organization. Additionally, the utilization of technology and the establishment of trust emerged as pivotal themes when viewed through the lens of technology adoption frameworks, which aligns with findings from prior research in the field, as illustrated in Table 12.

Sub-theme	Sources	References
Organisational Level	6	72
Executive support	3	13
Organisational Readiness	3	11
Organisational Size	3	6
Skills and capabilities	5	16
Trust	3	5

Use of technology	6	21
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Table 8 - Sub-themes in the Organisational perspective by sources and references

These themes were identified in the interview data and aligned with what was found in the literature. The following subsection discusses the sub-themes in more detail.

Use of technology

The use of technology at an organizational level within the TOE (Technology-Organization-Environment) Framework for blockchain governance in the insurance industry involves strategically incorporating technological advancements to enhance operational efficiencies, transparency, and security in managing insurance processes through blockchain (Hendricks, 2020).

The interview participants discuss the development of a stable coin for cross-border fund transfers and specialize in tokenizing real estate investment trusts, illustrating diverse applications of blockchain technology. Additionally, there is an acknowledgment of the prevailing perception of blockchain as a get-rich-quick scheme leading to scams and financial losses, underscoring the need for increased public awareness. Furthermore, the inquiry into companies requiring blockchain solutions prompts reflection on the rationale behind such adoption, emphasizing the importance of understanding the specific value proposition offered by blockchain technology.

“a stable coin that allows them to send funds across borders.” – Participant A

“[...]specializes in tokenizing real estate investment trusts” – Participant A

“[...]the client life cycle that explains how we do the KYCYB section” – Participant A

“[...]They see it right now; it's seen as a get rich quick scheme and people are just getting scammed and losing their money and people aren't informed enough about the technology”– Participant B

“a lot of companies require some type of a blockchain solution, and you got to ask them, well, why do you want to do it on the blockchain?” – Participant C

Skills and capabilities

In the context of this study, training and education encompass the extent to which a company imparts knowledge and skills to its workforce concerning the utilization of a tool, both in terms of quality and quantity, as elucidated by Schillewaert et al. (2005). Given the intricate nature of blockchain as an information system, it becomes imperative for organizations to adequately prepare and educate their employees prior to embarking on its implementation journey. Such preparatory measures serve multiple purposes, including the alleviation of employee apprehension and stress associated with the adoption of blockchain technology. Furthermore, they foster motivation and facilitate a deeper comprehension of the technology's inherent benefits in relation to their respective roles within the organization. By reducing ambiguity and equipping employees with the requisite knowledge, these training and education initiatives lay a solid foundation for the effective utilization of blockchain technology in future endeavors..

The interviewees highlight the pivotal role of education, particularly during the Ethereum and Solidity boom, emphasizing the abundance of online courses and resources. Despite efforts to stay current, challenges persist, and attempts to apply existing frameworks encounter unanswered questions. The overarching theme emerges that the lack of understanding about blockchain remains a significant barrier, with participants noting that educating clients and entrepreneurs is crucial for widespread blockchain adoption. This aligns with the Technology-Organization-Environment Framework, which underscores the importance of skills and capabilities within organizations for effective blockchain governance (Hendricks, 2020).

“we definitely got more involved when there was a big, umm, boom in sort of education around Ethereum and solidity.” – Participant B

“there's been an abundance of courses and educational content online, stuff like YouTube channels with guys will just explaining the concepts of blockchain as well as solidity and how to interact and use it.” – Participant B

“we have looked into it, and we still struggle, and we try to actively keep up to date with what's happening” – Participant B

“We're educating clients” – Participant B

“we've tried to apply existing sort of frameworks to what we're doing, but there's certain things that we just don't have the answers to, and we try to act with those.” – Participant B

“Education is the major barrier because 99% of people still don't understand what blockchain is” – Participant C

“That is the single factor why blockchain innovation has not exploded into every possible sector currently, because nobody understands it.” – Participant C

“it becomes very and it's hard because. Entrepreneurs don't really understand blockchain and what the blockchain can really provide you.” – Participant H

Executive support

Management opinions on technical projects, involvement in them and degree to which the top management support technological progress (kulkarni, Roblesflores & Popvic, 2017)

The interviewee highlights the challenge of obtaining funding for blockchain initiatives, specifically in addressing concerns related to compliance, governance, and trust in information sharing within the regulated insurance industry. The decision-making process is influenced by the need for leadership support and a willingness to take calculated risks. In alignment with Kulkarni, Roblesflores, and Popvic (2017), the participant expresses the importance of management opinions, involvement, and top management support in advancing technological projects like blockchain within the organizational context.

“if we had gone to the group CEO and given the chance and present to him that this is what we are looking at and we need funding for it.” – Participant H

“it came down to the decision making part and then the questions around compliance and you know the stuff that you want to put together in your in your research you know governance, how is this going to be, how do we trust that these guys will not share information with you know we don't want to quickly jump into this and we you know insurance is heavily regulated. we shelved that part.” – Participant H

“You need probably leadership that's prepared to say OK we we're giving you so many millions to do this and we are prepared to take the risk of it failing[...].” – Participant H

“I think the best way to approach that is to 1st learn as much as I can myself.” – Participant B

Organizational Readiness

Different corporate is required tools to implement modern IT technologies(Weiner, 2009). The Concept has been expanded to incorporate and underline the relevance of corporate skills to the work with blockchain technologies.

“we'd run strategy sessions with a select group of people twice a year, and we actually, in the middle of 1 at the moment and that goes through, everything goes through governance, goes through legal, goes through tech, it goes through fluidity as a company, it goes through products that we develop ourselves. So, it covers the entire gamut of who we are, where we are, what do we do right in, in operations, we have retrospective of the projects and then what we do in a court three sessions, we give feedback.” – Participant C

“We want to move from version three of this to this new product which is in version 2.5 and then it becomes a case of them actually sitting down during feedback or a Friday afternoon session with the team to say we've been playing with this. This is what we love about it. And then it becomes one where we make a call and we say great, you know what, for the next six months we stay on the old technology, and we'll reevaluate in six months' time.” – Participant C

“[...] majority of crypto is purchased in South Africa. We are I think we have the top 12 list of the world, so people understand the concept here very well. It's the organizations that don't understand that that well. So, there's the gap, the end user knows it.” – Participant A

“we've tried to apply existing sort of frameworks to what we're doing, but there's certain things that we just don't have the answers to, and we try to act with those.” – Participant B

Organizational Size

Studies conducted and industry reports suggest that large companies are more likely than SMEs to implement blockchain technology(Clohessy, Action, Godfrey and Houston, 2017). The organizational and insurance industries must be aligned with their readiness to meet rapidly shifting environment.

The interview participants discuss the comprehensive strategy sessions held biannually, covering governance, legal aspects, technology, and the company's overall fluidity. Decision-making involves evaluating and providing feedback on technology versions, allowing for flexibility in transitioning between them based on team assessments. While the end-users in South Africa grasp the concept of crypto well, there is noted organizational understanding gaps, underscoring a need for bridging this knowledge divide. This aligns with research suggesting that larger companies are more inclined to adopt blockchain technology, emphasizing the importance of organizational readiness in rapidly evolving environments (Clohessy, Acton, Godfrey, and Houston, 2017).

“it does become interesting for how the big players do it and how the smaller players do, because the smaller players may have a larger risk appetite.” – Participant C

“If you sit with an Old Mutual, you know what I mean. They’ll have a complete risk team. They’ll have a complete evidence team that can then step in and help, but when you’re in a small company, how do they achieve that becomes very, very hard.” – Participant C

“[...]from a development perspective and some of the bigger companies that we’ve dealt with, it’s a lot better than Smaller Companies, because they have a they have a complete understanding in relation to risk governance and what that MVP is going to be because they know that this is the target market.” – Participant C

Trust

Trust, in the context of technological adoption, can be understood as a delicate balance between the perceived benefits and associated risks (Nam et al., 2020). Within the literature, the concept of trust in the adoption process is intricately linked to the realm of change management. It's worth noting that ineffective change management efforts can hinder the establishment of trust in the adoption process (Willcocks & Lacity, 2015).

The participants emphasize the significance of trust and credibility in blockchain technology, addressing the need to enhance credibility within the context of its public perception. This aligns with the literature, which frames trust as a cost-benefit trade-off in technological adoption, emphasizing the importance of effective change management for gaining trust in the adoption process (Nam et al., 2020; Willcocks & Lacity, 2015). The overarching theme

suggests that establishing trust is crucial for overcoming the perception of blockchain as a get-rich-quick scheme and reducing instances of scams and misinformation.

“it’s a trust and credibility technology” – Participant D

“We just we need to bring more credibility into this” – Participant D

“one aspect of blockchain technology, but it’s probably one of the most well known and most prevalent in society at the moment. They see it right now; it’s seen as a get rich quick scheme and people are just getting scammed and losing their money and people aren’t informed enough about the technology” – Participant B

4.2.3 Environment perspective

The dominating theme in the environment perspective was regulatory environment. The South African insurance industry context was the major reason for the theme being dominant because of the lack of regulatory understanding and context. The second most cited theme was government support, is strongly linked to the lack of regulatory clarity and policies. These are shown in table 13 below.

Sub-theme	Sources	References
Environmental Level	6	88
Associations	5	7
Competitive Pressure	4	11
Government Support	5	16
Market Dynamics	5	14
Regulatory Environment	6	40

Table 10 - Sub-themes in the Environmental perspective by sources and references

Regulatory Environment

Modern disruptive technology needs to be investigated and issues by developing special regulations on the distributed ledger technologies to ensure adequate security and financial transparency.

The interviewees highlight the challenges in navigating legal and regulatory aspects of blockchain technology, noting that legal professionals, tax specialists, and auditors often lack a comprehensive understanding of the best approaches. The discussion emphasizes the dynamic nature of legal considerations, influenced by the location of customers and companies, with a particular emphasis on privacy laws. In alignment with this, the need for specialized regulations on distributed ledger technologies is underscored, emphasizing the importance of ensuring security and financial transparency in the context of modern disruptive technology.

“we've consulted with, with lawyers as well as tax specialists and auditors and most of them don't actually know umm, how, how best to approach it.” – Participant A

“we've consulted with, with lawyers as well as tax specialists and auditors and most of them don't actually know umm, how, how best to approach it.” – Participant A

“changes based on where the customers you know based is generally will use the laws will govern where they based, will govern the laws where they companies reach will govern how we you can do certain things.” – Participant B

“There's still then privacy laws that need to be taken into account and is the company complying with privacy laws that are, you know, that's also been quite a big thing that's come out.” – Participant B

The interviews highlight the challenge of crafting suitable contracts in the absence of well-established laws for blockchain applications, emphasizing the need for a tailored approach for each customer. The discussion extends to partnerships with government agencies, exemplified by Luna partnering with SARS to address legal complexities. Legal considerations, rather than technological aspects, emerge as a primary concern, emphasizing the importance of establishing the legality of blockchain applications. The call for special regulations aligns with the recognition that modern disruptive technology, like distributed ledger technologies, requires specific regulatory frameworks to ensure security and financial transparency.

“when it comes to when it comes to all company, how we try to approach it is for each customer we try and figure out what is the best, the best sort of contract that protects them as well as protects us.” – Participant C

“The problem with that is there isn't there aren't many laws that are actually set up yet, so you're seeing, you know, like for example, Luna has just now had to partner with SARS,” – Participant C

“the main one was less about the technology itself, but it was more about whether it actually is legal to do it” – Participant E

“I reached out to the I don't know if you saw their website but there's a consortium that some people here in South Africa try to form South Africa blockchain consortium or something like that and, but it went it went dead.” – Participant H

“the Prudential Authority, which is under the custodianship of the South African Reserve Bank, the Financial Sector Conduct Authority, they also regulate the insurance industry.” – Participant H

Government Support

The use of blockchain technology in business would depend heavily on the manner in which the government of the country where the company is headquartered is taking action.

The interviewees discuss the evolving regulatory landscape, noting the Financial Services Contract Authority's new regulation categorizing crypto products as normal financial instruments. Challenges arise in the absence of a centralized entity for dispute resolution, with courts struggling to comprehend both traditional software and emerging blockchain technologies. Participants express uncertainty about the South African government's stance, highlighting the critical role of governmental actions in shaping the feasibility of blockchain technology adoption in business within specific jurisdictions.

“the FCA or the financial Services contract authority is putting in a new regulation via the Fires Act that identify crypto product as normal financial instruments.” – Participant A

“There's no entity, there's no single entity that I can go to as a user and say, hey guys, this happened.” – Participant B

“the courts are any struggle with just normal software let alone this brand new blockchain technology that's come along.” – Participant B

“I don't know what the South African government is doing in that sense” – Participant C

Market Dynamics

The fast-changing technical world of blockchain needs to be tracked by the company to analyze current procedures and determine how blockchain can be used as application key differences (Clohessy, Action & Rogers: blockchain adoption: Technological, Organizational and Environmental considerations, 2018). The organization and insurance industries must be aligned with their readiness to meet this rapidly shifting environment.

The interviewees highlight the global nature of their clients, discussing the absence of a centralized entity for dispute resolution in blockchain transactions and the emerging need for insurance coverage in the evolving blockchain landscape. The participant emphasizes the importance of adapting to digitization and fractionalization to avoid being left behind, echoing the sentiment that aligns with Clohessy, Action, and Rogers (2018) in emphasizing the need for organizations and the insurance industry to be ready for the rapidly changing blockchain environment.

“All of our clients are up businesses from around the world.” – Participant B

“There's no entity, there's no single entity that I can go to as a user and say, hey guys, this happened.” – Participant B

“But at the same time, there's no protection like you can't buy insurance or you can't have insurance to cover that. And there are actually companies that are coming out now.” – Participant B

“They'll ensure certain things, and it's quite expensive in the premiums are high and again we're still because it's so new, we're slowly starting to develop these things and put them in place. And I think with better governance and more systems in place, it's it protects everyone.” – Participant B

“if companies do not adapt to digitization and fractionalization now, they will completely be left behind as we are seeing currently with the banking industry.” – Participant A

Competitive Pressure

Innovation is needed to continue being competitive due to the outside competition of the market. The existence of such competitive competition influences the ability to take advantage of a company in this sector substantially.

The interviewees express a cautious approach to market entry, prioritizing quality over speed to mitigate risks. The sentiment is echoed in the acknowledgment that competitors are not a significant source of concern, and the focus is on maintaining a pace aligned with the organization's rhythm. The overarching theme underscores the importance of innovation and a balanced cadence to remain competitive in a market influenced by external competition.

“I definitely think there's the sense of you need to be first to market, I would rather take my time to do it properly, then rush it and get into trouble and risk,[...].” – Participant B

“are we worried about our competitors? Not really.” – Participant C

“they risk appetite is slightly larger, I'm happy for them, OK, we can only run at the pace of the drum that we beat.” – Participant C

“We have to maintain as higher cadence as possible, but still ensuring that the quality we deliver” – Participant C

Associations

The effectiveness of blockchain system relies so much on the network impact that an individual user of the item or service has on the value of the product for others, which raises the value of the product or service relative to the number of customers who use it(Shapiro & Varian,1998). This makes it very important to gauge for the organization to join.

The interviewee discusses the utilization of a third-party service for a specific function, underscoring the modular approach to blockchain implementation. Additionally, the perception of crypto as a potential scam is noted, reflecting prevalent skepticism in the broader public. The summary aligns with Shapiro and Varian's (1998) concept of network effects, emphasizing the significance of gauging the organizational impact within the network to assess the value and effectiveness of joining a blockchain system.

“we use a third party service to do one specific thing” – Participant B

“a lot of people still think that, you know, crypto is a scam.” – Participant B

4.2.4 OSS Governance Phases

OSS Governance Phases	4	32
De Fanco	4	15
Design	4	8
Implement	3	6
Stabilize	2	3

Table 11 - Sub-themes in the Governance Phases perspective by sources and references

De Fanco

The first phase represents an OSS project managed without specific governance representation. In support of the Governance Phases theory, the introduction stage is governed by the founders' objectives (Lattemann & Stieglitz, 2005).

The interview participants outline the initial phases of blockchain implementation, emphasizing the importance of infrastructure, technology selection, and executive team engagement. The focus during the discovery phase involves setting up meetings to understand individuals' goals and how they perceive blockchain's role in achieving those objectives. Additionally, the discussion touches on the necessity of laying out business rules and adopting principle-based governance, aligning with theories that highlight the significance of founders' objectives in the initial stages of project management (De Fanco; Lattemann & Stieglitz, 2005).

“it starts off with our infrastructure, the appropriate technologies selection” – Participant A

“we have like the executive team having an introductory call and meeting and then in terms of the discovery phase” – Participant B

“we try to do set up initial meetings and get an idea of what the individuals are trying to achieve and how they believe blockchain is going to help them.” – Participant B

“Now the question is first you need to lay out all the business rules for it in my opinion.” – Participant E

“Your governance initially when that something so new and such new technology should be more principle based” – Participant E

“When you're on the experimental side, I think, I think principles around security and privacy and ad those type of things should be borne in mind.” – Participant E

“The initial part of the work was really just understanding blockchain.” – Participant H

“Initially the idea was that we would layout the, the theoretical foundation of what blockchain is for those who didn't know and do some training using playground” – Participant H

“You go and prepare a real case and you go and pitch to the PPIC for money.” – Participant H

Design

In the second phase, this present system of authoritarian rule was challenged. Formalized democratic methods were designed to limit the leader's absolute power. According to (Lattemann & Stieglitz, 2005, the Growth stage requires a more defined structure owing to the team's rising size and transitory nature. The founders' responsibilities change as they go through OSS life cycle stages, and they lose ultimate authority.

The interview participants discuss the collaborative process of generating potential use cases for proof-of-concept (POC), involving architects and business professionals. Emphasizing a pragmatic approach, the governance process is suggested to be more deeply implemented when transitioning to production rather than during the initial stages. This aligns with the Growth stage in Lattemann and Stieglitz's (2005) framework, which emphasizes the need for a more defined structure as the team size increases and the project advances.

“From there we had architects and businesspeople and through active participation come up with potential use cases that we could use, for POC” – Participant H

“a deep governance process should only really come into place when you're talking about putting something into production and not before” – Participant B

“the minimal viable product right about four months' worth of Dev.” – Participant C

Implement

The third phase, the designed governance was implemented, with community members choosing leaders using transparent democratic procedures. According to (Lattemann & Stieglitz, 2005), governance tools should foster a feeling of community for all members throughout the Maturity stage, whether via democratic elections of leaders or procedures to guarantee transparency within the community and OSS project.

The interviewees discuss a two-year development effort on the Stellar network, emphasizing the ease of implementation. The focus is on streamlining processes through "straight through processing" to minimize client acquisition time and enhance automation. Additionally, the mention of needing an implementation partner underscores the collaborative nature of blockchain projects. The reference to community members choosing leaders aligns with the implementation of democratic governance during the third phase of the project.

"we've developed for the last two years on the stellar network, we found it very easy to implement" – Participant A

"the implementation afterwards and processes that flows and with that we believe in a process called straight through processing, which means that the time to client acquisition is as short as possible and as automated as possible." – Participant A

"we would have had to have an implementation partner" – Participant H

Stabilize

The final phase was the development of a firm and shared understanding of the governance system in place. According to (Lattemann & Stieglitz, 2005), Revival may be successful throughout the Decline or Revival stages if governance instruments are deployed and readjusted according to the community's fundamental needs.

The interview participants discuss the fading interest and lack of commitment to fund a project, leading to its discontinuation. The ongoing maintenance of existing systems is highlighted, necessitated by continuous technological changes and the implementation of virtual control measures. The mention of developing a firm and shared understanding of the governance system aligns with the final phase, emphasizing the importance of establishing a comprehensive understanding as a project evolves.

“it kind of died out because there was no interest in in, I mean there was no one wanted to commit the funds to do it” – Participant H

“it kind of died out because there was no interest in in, I mean there was no one wanted to commit the funds to do it” – Participant A

“from there we maintain it because there's a lot of maintenance that takes place every day, technology changes and there's therefore we have virtual control in place and we have to maintain things, update things,” – Participant A

4.2.5 OSS Project Life Cycle

OSS Project Life Cycle
Decline Revive
Growth
Introduction
Maturity

Table 12 - Sub-themes in the Project Life Cycle perspective by sources and references

Introduction

The first phase represents an OSS project managed without specific governance representation. In support of the Governance Phases theory, the introduction stage is governed by the founders' objectives (Lattemann & Stieglitz, 2005).

The interview participants discuss the initial phases of their blockchain project, starting with the establishment of infrastructure and an emphasis on understanding the fundamentals of blockchain technology. The importance of laying out business rules is highlighted, reflecting the early stages of governance development. A cautionary note is introduced about excessive governance during exploratory phases potentially hindering the discovery of use cases, aligning with Lattemann and Stieglitz's (2005) Governance Stages theory, which suggests an informal structure during the introduction stage to facilitate idea creation and trust-based communication.

“it starts off with our infrastructure” – Participant H

“the initial part of the work was really just understanding blockchain.” – Participant E

“first you need to lay out all the business rules for it in my opinion.” – Participant E

“too much governance when you're trying to find and play around and do PO CS is going to actually kill the ability to find use cases” – Participant E

Growth

In the second phase, this present system of authoritarian rule was challenged. Formalized democratic methods were designed to limit the leader's absolute power. According to (Lattemann & Stieglitz, 2005, the Growth stage requires a more defined structure owing to the team's rising size and transitory nature. The founders' responsibilities change as they go through OSS life cycle stages, and they lose ultimate authority.

The interview participants discuss the implementation processes, emphasizing the adoption of "straight through processing" for efficient and automated workflows. Reference to a minimal viable product with a development timeline of approximately four months is made. The engagement with an implementation partner, such as IBM and Microsoft, for their cloud platforms, highlights the collaborative nature of blockchain projects. The discussion aligns with Lattemann and Stieglitz's (2005) Governance Stages theory, indicating a shift from an authoritarian rule to formalized democratic methods during the Growth stage, necessitating a more defined structure as the team size grows and founders lose ultimate authority.

“the implementation afterwards and processes that flows and with that we believe in a process called straight through processing” – Participant A

“know about the minimal viable product right about four months’ worth of Dev.” – Participant A

“implementation partner. this is where IBM and even Microsoft came with their cloud platforms” – Participant H

Maturity

The third phase, the designed governance was implemented, with community members choosing leaders using transparent democratic procedures. According to (Lattemann & Stieglitz, 2005), governance tools should foster a feeling of community for all members throughout the Maturity stage, whether via democratic elections of leaders or procedures to guarantee transparency within the community and OSS project.

The interview participants highlight the increasing complexity of laws as a blockchain project scales, emphasizing the ongoing need for maintenance in response to technological changes. The third phase involves the implementation of designed governance, with community members participating in the election of leaders through clear democratic methods. This aligns with Lattemann and Stieglitz's (2005) Governance Stages theory, suggesting that during the Maturity stage, governance tools should foster a sense of community through democratic processes and transparency mechanisms within the project.

“the laws and stuff become a bit more difficult when you start to scale” – Participant E

“we maintain it because there's a lot of maintenance that takes place every day, technology changes” – Participant E

Decline Revive

The final phase was the development of a firm and shared understanding of the governance system in place. According to (Lattemann & Stieglitz, 2005), Revival may be successful throughout the Decline or Revival stages if governance instruments are deployed and readjusted according to the community's fundamental needs.

The interview participants discuss the decline of a project due to a lack of interest and commitment of funds, emphasizing the importance of picking up lessons for iterative improvements. The need for continuous maintenance, updates, and the addition of new features is highlighted, relying on analytic software to assess user interactions. The reference to the final phase aligns with Lattemann and Stieglitz's (2005) Governance Stages theory, suggesting that successful revival during the decline stage depends on deploying and readjusting governance instruments based on the community's fundamental needs.

“it kind of died out because there was no interest in in, I mean there was no one wanted to commit the funds to do it” – Participant A

“pick up the lessons that you need to pick up and then, you know, do a next iteration and improve on that” – Participant D

“we have to maintain things, update things, add new features if certain things are not working, rely on analytic software behind the, the front end to see how the users interact with the application.” – Participant H

4.2.6 Conceptual Blockchain Governance Dimensions

Conceptual Blockchain Governance Dimensions
Communication
Decision Making
Formation and Context
Incentives
Market Dynamics
Membership
Roles

Table 13 - Sub-themes in the Blockchain Governance Dimensions by sources and references

Communication

This dimension delves into the diverse modes of communication among blockchain stakeholders, encompassing both formal and informal channels. It encompasses a spectrum of communication tools, ranging from coordinated systems to tracking mechanisms. Additionally, it scrutinizes open forums, such as meetings and working groups, where stakeholders engage in discussions.

The interview participants emphasize the importance of consensus mechanisms within the blockchain framework. They discuss the implementation of different systems for efficient reporting and the involvement of team members in meetings to ensure collaboration. The emphasis on obtaining consensus from various business clusters is noted, aligning with the dimension of communication tools and discussions in both formal and informal ways within the blockchain context.

“you look at a consensus mechanism” – Participant A

“we try to do is have different systems in place. So, like for example being able to submit a report.” – Participant B

“We will pull team members into the meetings” – Participant B

“the consensus model is important” – Participant B

“we actually speak to the people we say here's a framework that we're looking at putting together and we actually get the people to comment on that framework.” – Participant C

“you need consensus from all these other clusters of the business, you know, so that you can optimize on the benefit that you get for and each one will say for us this is the maximum benefit that we would get.” – Participant H

Decision Making

This dimension elucidates the processes involved in decision-making, their monitoring, and consensus-building across the three layers of governance. Additionally, it delves into the establishment of structured decision-making procedures (Lattemann & Stieglitz, 2005).

The interview participants emphasize the significance of decision-making in the context of blockchain governance, specifically addressing factors like encryption and access control for data mining and record confirmation. The importance of understanding how decisions is influenced and managed within the governance structure is highlighted. The reference to being a single point of conduct underscores the central role in decision-making, aligning with the dimension that examines how decisions are made, monitored, and agreed upon across different layers of governance.

“the decision making was a huge part reason being because that directly links to the governance itself.” – Participant E

“how does that all influence the decisions?” – Participant E

“the encryption you want to include and who are the nodes that has actually has access to mine the data and to and to confirm the records.” – Participant E

“at what point would there need to be a decision making, a decision making aspect that needs to happen here and what that decision making is, what how do we manage those decisions” – Participant E

“I was the single point of conduct for and pretty much involved in deciding whether we were getting any value from, those workshops.” – Participant H

“The encryption you want to include and who are the nodes that has actually has access to mine the data and to and to confirm the records.” – Participant H

Formation and Context

This dimension focuses on essential contextual information about a blockchain. Key aspects to consider encompass the blockchain's intended purpose, the manner in which it was launched, and the underlying ideology that shaped its inception.

The interview participants discussed the importance of offloading key factors and intellectual property from the blockchain to enhance software uniqueness. The challenge of selecting the right blockchain for a given solution is emphasized, and the need to establish the blockchain's flow before posing questions is highlighted. The reference to background information aligns with the dimension that emphasizes exploring the purpose, launch style, and formative ideology of a blockchain.

“Like key factors or things that make your software unique and that could be your intellectual property you can offload that from the blockchain. So, try and have it off chain.” – Participant B

“The hardest part that that we found was how do you choose the right horse for the right solution” – Participant C

“The hardest part that that we found was how do you choose the right horse for the right solution” – Participant C

“We first need to establish the flow of the blockchain first before we can start asking the questions.” – Participant E

Incentives

This dimension captures the motivational factors involved for the roles specified in the roles dimension. This is done by looking at the incentives present on the three layers of governance. It includes questions such as what the intrinsic sources of motivation are and how developers are funded.

The interview discussions revolve around the variation of dimensions based on roles, incentives, and decision-making, particularly in the context of governance. The mention of the short-term insurance industry introduces the idea of different incentive mechanisms. The dimension highlighted focuses on understanding motivational factors within specified roles, exploring intrinsic sources of motivation, and examining funding mechanisms for developers across different layers of governance.

“Dimensions of that also vary depending on like you said the roles incentives and then and then you are also the, the decision making was a huge part reason being because that directly links to the governance itself.” – Participant B

“Short term insurance industry which may be kind of it's a different incentive mechanism.” – Participant B

Membership

This dimension delves into the management of participation and membership within the blockchain ecosystem, shedding light on the inclusivity of the network. It scrutinizes whether the blockchain allows open access for individuals seeking to join and actively engage. Key inquiries in this dimension revolve around the procedures facilitating new member onboarding and whether potential contributors have a direct avenue to engage in the developmental aspects of the blockchain.

The interview participants discuss the ability to choose a master within the network of participants and highlight the management of memberships. The dimension under consideration emphasizes the management of participation and membership for various roles within the blockchain. It includes questions about the openness of the blockchain for new members, the process for joining the network, and the direct involvement of new contributors in the development process.

“You can choose within the network of participants who is going to be to be the master” – Participant C

“The memberships that's going to take place” – Participant C

Roles

This dimension serves the purpose of recognizing the distinct roles existing within each of the three governance layers. Additionally, it seeks to elucidate the hierarchical arrangements and relationships among these roles.

The interview participants discussed the importance of blockchain in bringing honesty and accountability to team management. They highlight the voting process, involving key individuals enforcing rules, and emphasize the significance of auditing the code. The dimension being addressed focuses on identifying roles and responsibilities within the company that handles governance, aiming to describe hierarchical structures between the roles on each of the three layers of governance.

“It will bring honesty to light, so see it as a method of managing teams where people have accountability.” – Participant C

“They’re voting certain people, and then the you’ve got key individuals that are part of the doll, and they will enforce rules that then get voted on and implemented as well as changed if they need to be changed or removed, if they need to be removed.” – Participant C

“Certain things that become very you have to ensure and that you have is who audits the code.” – Participant C

“What are the roles and responsibilities of the people inside the company that handles the governance.” – Participant C

4.2.7 Conceptual Blockchain Governance Layers

Conceptual Blockchain Governance Layers
Off-chain Community
On-Chain Community
On-Chain Protocol

Table 14 - Sub-themes in the Blockchain Governance Layers by sources and references

Off-chain Community

The off-chain community layer represents the uppermost tier among the three layers and deals with governance issues in the real-world context, with a particular emphasis on a project's broader community. This layer offers a broader, more general definition of the

project and underscores the connections between the community and the underlying governance layers.

The interview participants discuss the off-chain aspects, including community and development, along with on-chain protocols that need consideration. The off-chain community layer is identified as the highest layer, focusing on governance matters in the real world and the broader community of a project. It aims to capture the general definition of a project and the connections of the community to the underlying governance layers.

“there's off chain community, there's off chain development and on chain protocol as well that we need to take into account.” – Participant C

“We had technical people and yes and some businesspeople there to understand what blockchain was.” – Participant C

“we had technical people and yes and some businesspeople there to understand what blockchain was.” – Participant C

On-Chain Community

The off-chain development layer pertains to governance activities occurring outside the blockchain network, with a specific emphasis on the software development aspect. This layer delves into the dynamics of roles associated with development, examining how decisions are formulated and executed during the protocol's maintenance.

The interview participants highlight Stellar's robust governance protocol and the use of the latest technology in their smart contracts system. Emphasizing the significance of compliance and transparency, they mention integration with an API layer connected to the Stellar blockchain. In terms of on-chain community governance, the focus is on the real-world aspects of software development, examining how roles related to development interact and decisions are made in maintaining the protocol.

“stellar has a very strong governance protocol and it keeps everybody honest and they're smart contracts system from a software development point uses the latest technology” – Participant A

“compliance is extremely important for us in transparency is even more important to us then with this it's integrated with these API layer that speaks to the blockchain date work which is stellar.” – Participant C

“we had technical people and yes and some businesspeople there to understand what blockchain was.” – Participant B

“We had identified a team of developers would do this and but then the constraint there was the financial part of it.” – Participant C

On-Chain Protocol

The on-chain protocol layer encompasses the governance processes that occur within the blockchain's core protocol. This layer involves themes such as decision-making procedures, voting mechanisms, and rules of interaction that are embedded directly into the blockchain's infrastructure.

The interview participants discuss the integration of primary governance protocols on Stellar, emphasizing the issuance of assets and their conversion to USDC. They delve into the importance of selecting knowledgeable individuals for software development, focusing on code quality and adherence to standards. Additionally, considerations about encryption, nodes, and data mining access are highlighted in the context of on-chain governance, addressing decision-making processes, voting mechanisms, and interaction rules embedded in the blockchain's infrastructure.

“Primary governance protocol is both on stellar we just integrated these other two as well from there the asset gets issued and then that that gets paid to USDC which is the virtual.” – Participant A

“The distributed nature of blockchain is where does the software reside? do Dou choose the right person who understands? What is it that you're trying to develop and what is it that you actually want to try and deliver? Because they can reach through the code, and they go. You know what, from a coding perspective, it follows the right things. That aren't any memory leaks. It follows the right. Call it the standard to for them to give you the stamp to say it has been.” – Participant C

“So, the encryption you want to include and who are the nodes that has actually has access to mine the data and to and to confirm the records.” – Participant E

4.3 Findings in Summary

The study investigates the implementation and governance of blockchain technology, exploring various dimensions and layers within the context of Technological, Organizational, and Environmental levels (Hendricks, 2020). The findings reveal challenges in the integration of blockchain due to a lack of expertise and the necessity for implementation partners, emphasizing the importance of compatibility with existing systems (Participant Group). Privacy laws and security concerns emerge as critical factors, especially in financial services, contributing to the complexity of applying governance policies to a rule-set-lacking environment (Participant B). The participants stress the need for education and awareness in overcoming the major barrier to blockchain innovation, as the majority of individuals and entrepreneurs lack a clear understanding of the technology (Participant C, H).

The study identifies the significance of leadership commitment and risk-taking in blockchain adoption within regulated industries like insurance (Participant H). Governance decision-making involves considerations of compliance, accountability, and risk, with an acknowledgment of the need for leadership support and proactive learning (Kulkarni et al., 2017). Furthermore, the study highlights the role of strategy sessions in comprehensive organizational governance, covering legal, technical, and operational aspects, contributing to a shared understanding of the company's goals and challenges (Participant C).

Regarding blockchain governance in the insurance industry, the study indicates the importance of skills and capabilities at the organizational level within the Technological-Organizational-Environmental (TOE) Framework (Hendricks, 2020). Participants emphasize the need for careful consideration of privacy laws, security measures, and regulatory compliance, suggesting that the legal landscape influences the adoption and implementation of blockchain solutions (Participant B). The study also underlines the role of government regulations in shaping the use of blockchain technology, with implications for security and financial transparency (Nam et al., 2020).

The interview transcripts shed light on educational efforts and courses surrounding blockchain technology, emphasizing the continuous struggle to keep up with advancements (Participant B). Participants highlight the lack of understanding of blockchain among

entrepreneurs and individuals, hindering its widespread adoption across sectors (Participant C, H). The study echoes existing literature by emphasizing the need for educational initiatives to bridge the knowledge gap and facilitate innovation in various sectors (Clohessy et al., 2017).

In the context of the interview transcripts, the study addresses the challenges and considerations related to blockchain governance, highlighting key factors such as integration, compatibility, privacy laws, security, education, and regulatory compliance. The findings contribute to a nuanced understanding of blockchain governance at the Technological, Organizational, and Environmental levels, within the OSS Governance Phases and OSS Project Life Cycle, aligning with the Conceptual Blockchain Governance Dimensions and Layers. This comprehensive analysis lays the groundwork for future research and practical implementations in the evolving landscape of blockchain technology.

5. Chapter 5: Discussion

The findings in chapter 4 are discussed in this chapter. The proposed blockchain governance framework provides a structured approach for strategic management within South African insurance organizations to analyze and implement blockchain governance effectively. It integrates four key perspectives: OSS Governance Phases, OSS Life Cycle Stages, Blockchain Governance Framework Dimensions & Layers, and the TOE Framework. These perspectives collectively address technological innovation, regulatory compliance, and organizational readiness, bridging theoretical models with practical applications. The framework's novelty lies in its holistic approach, tailored to the specific challenges of the South African insurance sector, such as integrating blockchain with existing systems and ensuring compliance with laws like the Protection of Personal Information Act (Finck, 2018).

In Chapter 5, the framework is applied through three core perspectives. The **Technology Perspective** focuses on data security, system compatibility, and blockchain's dynamic evolution (Summers, 2004; Hendricks, 2020). The **Organizational Perspective** emphasizes executive support, skill development, and strategic alignment to foster trust and readiness for blockchain adoption (Kulkarni et al., 2017; Weiner, 2009). The **Environmental Perspective** highlights the impact of regulatory frameworks, societal perceptions, and global trends on blockchain implementation (Clohessy et al., 2018). Together, these perspectives form a cohesive framework that addresses real-world challenges and provides a replicable model for blockchain governance in similar industries.

OSS Governance Phases				
	De Fanco	Design	Implement	Stabilize
Technological	Blockchain Governance Framework Dimensions & Layers			
Organisational				
Environmental				
	Introduction	Growth	Maturity	Decline/Revive
OSS Life Cycle Stages				

Figure7: Proposed Framework for Blockchain Governance

5.1 Technology Perspective in Blockchain Governance

The complexity, data security, compatibility, governance, and technological evolution aspects form the crux of the Technology Perspective in Blockchain Governance. The inherent complexity of blockchain technology, as highlighted by Rogers (1995), requires specialized knowledge for effective implementation. Data security and privacy, crucial in financial services, pose challenges in governance and policy application, necessitating robust security measures (Summers, 2004). Compatibility with existing systems is essential for seamless integration and effective functioning, as suggested by Hendricks (2020). Governance of blockchain technology, especially in regulated industries, requires balancing innovation with compliance (Pawlikowski et al., 2018). Continuous technological evolution demands ongoing learning and adaptation, making it a dynamic and evolving field (Gilgun, 2005).

5.2 Organizational Aspects of Blockchain Governance

Organizational aspects of blockchain governance encompass executive support, organizational readiness, skills and capabilities, trust, and strategic alignment. Executive support, vital for securing resources and signaling priority, significantly impacts the success of blockchain projects (Kulkarni et al., 2017). Organizational readiness and adaptability are key to preparing for and integrating blockchain technology effectively (Weiner, 2009). Developing specific skills and capabilities in blockchain is crucial for successful implementation and is linked to reducing anxiety and enhancing motivation among employees (Schillewaert et al., 2005). Trust, particularly in the context of change management, is fundamental in fostering commitment to blockchain adoption (Willcocks & Lacity, 2015). Strategic alignment of blockchain technology within organizational processes ensures its alignment with overall goals (Hendricks, 2020).

5.3 Environmental Factors in Blockchain Governance

Environmental factors impacting blockchain governance include the regulatory environment, government support, market dynamics, societal impact, and global trends.

Navigating the complex legal and regulatory landscape is essential for compliance and successful blockchain implementation (Poremba, 2017). Government policies and support can facilitate or hinder technological innovation, influencing blockchain's adoption and utilization (Nam et al., 2020). Market dynamics and competitive pressures necessitate staying abreast of technological advancements and market trends (Clohessy et al., 2018). Public perception and societal attitudes towards blockchain significantly influence its adoption rate and success (Shapiro & Varian, 1998). Global trends and international developments in blockchain technology require adaptive and responsive governance approaches.

5.4 Governance Dimensions and Layers

The governance dimensions and layers framework provide a comprehensive understanding of blockchain governance, encompassing communication, decision-making, formation and context, incentives, market dynamics, membership, off-chain community, on-chain community, and on-chain protocol. Effective communication channels are essential for coordination and transparency in blockchain governance (Shapiro & Varian, 1998). Transparent and well-structured decision-making processes maintain integrity and trust in the blockchain system (Kulkarni et al., 2017). Understanding the blockchain's formation and context aligns it with organizational goals (Weiner, 2009). Aligning incentives with organizational objectives is key to successful governance (Schillewaert et al., 2005). Managing market dynamics and membership shapes governance policies effectively (Clohessy et al., 2018). The off-chain community involves real-world governance matters, while the on-chain community pertains to governance related to software development. The on-chain protocol comprises governance embedded in the blockchain's infrastructure (Nam et al., 2020; Poremba, 2017; Pawlikowski et al., 2018).

5.5 OSS Governance Phases and Project Life Cycle

The OSS Governance Phases and Project Life Cycle framework provide insights into the evolution of blockchain governance in organizations, from informal structures to more sustainable models. The De Facto Phase is characterized by informal governance led by project founders (Lattemann & Stieglitz, 2005). The Design Phase involves the development of structured governance mechanisms. The Implementation Phase sees the deployment of these governance principles. The Stabilization Phase involves refining and

solidifying governance structures. The OSS Project Life Cycle stages include the Introduction, where basic concepts are established; Growth, marked by expanding scope and scale; Maturity, where the project is fully operational; and Decline/Revival, characterized by challenges and potential revivals through innovation (Lattemann & Stieglitz, 2005).

5.6 Summary of findings

Blockchain governance research faces a significant gap in thorough investigation and tools/resources, as noted by Beck et al. (2018), which hinders a deeper understanding of this crucial area. This lack of clarity is particularly relevant considering the importance of governance comprehension for various stakeholders, including corporations, end-users, regulators, and developers, as emphasized by Lyons, Courcelas, and TimsitKen (2019). Hsieh et al. (2017) and Ziolkowski et al. (2019) also stress the need for deeper exploration of blockchain governance, given the limited understanding of crucial decision-making processes in blockchain networks. Finck (2018) similarly underscores the uncharted nature of blockchain governance. In response, this study seeks to shed light on governance challenges from a business management perspective.

In Chapter 2, the literature review detailed key concerns pertaining to the research's purpose. To realise the aims and objectives of this study, several research questions were created. The findings in this chapter were used to answer the research questions. The research is structured around the main research question (RQ).

5.6.1 Research Questions and Sub-Questions:

5.6.1.1 RQ: what areas should be considered when needing to Govern Blockchain technology.

within an organisation?

To answer these questions comprehensively, the researcher proposed an innovative conceptual framework tailored to the analysis of blockchain governance within the insurance industries within South Africa. This framework draws inspiration from established models such as the Technology-Organization-Environment (TOE) framework, Open Source Software (OSS) phases, project lifecycle principles, and fundamental concepts and theories within the realm of public management. The proposed framework posits that governance of blockchain technology in the public sector is influenced by critical design choices encompassing

infrastructure, application architecture, interoperability, decision-making mechanisms, incentive structures, consensus protocols, organizational structures, accountability mechanisms, and governance control measures. These components collectively shape the landscape of blockchain governance within the public sector, thus serving as an invaluable tool for analysing and understanding its intricacies.

Furthermore, the primary research topic has been deconstructed into a series of subsidiary inquiries, a method employed to enhance the overall organization and coherence of the study (SQ).

5.6.1.2 SQ: To what degree are other industries using Blockchain technology?

Comparison of Blockchain Usage in Various Industries

In industries like banking and finance, blockchain technology has seen a more rapid adoption rate compared to the insurance industry. This can be attributed to the inherent nature of financial transactions and the benefits blockchain offers in terms of security, transparency, and efficiency. For example, banks have been exploring blockchain for cross-border payments and fraud reduction (Clohessy et al., 2018). The banking sector's early adoption is often driven by the need to enhance transactional efficiency and reduce costs associated with traditional banking processes (Nam et al., 2020).

On the other hand, the insurance industry, particularly in South Africa, is in a relatively nascent stage of blockchain adoption. Factors such as regulatory uncertainties and the complexity of insurance processes present unique challenges. The insurance sector is heavily regulated, and the adoption of new technologies such as blockchain requires careful navigation of the regulatory landscape (Poremba, 2017). Moreover, the insurance industry's reliance on legacy systems and the need for substantial transformation for blockchain integration can slow down its adoption rate (Weiner, 2009).

The Need for a Blockchain Governance Framework

Given the varying degrees of blockchain adoption across industries, the need for a comprehensive blockchain governance framework becomes evident. Such a framework is crucial in addressing industry-specific challenges, regulatory compliance, and ensuring effective implementation of blockchain technology. For the insurance industry in South Africa,

a governance framework that considers factors like data privacy, legal compliance, and market dynamics is vital (Pawlikowski et al., 2018).

A governance framework also helps in navigating the complexities of blockchain implementation, such as ensuring compatibility with existing systems, managing organizational change, and aligning technology with business objectives (Hendricks, 2020). In the insurance industry, where blockchain can revolutionize processes like claims processing and policy management, a robust governance framework ensures that the technology aligns with industry regulations and organizational goals (Kulkarni et al., 2017).

5.6.1.3 SQ: What concepts and structures do the governance of blockchains encompass?

Technology Aspect in Blockchain Governance

The technology dimension of the TOE framework, as adapted from Tornatzky et al. (1990), is fundamental in understanding blockchain governance. This dimension encompasses the technical aspects of blockchain, including its architecture, compatibility with existing systems, and data security protocols. The technology factor is crucial in determining the feasibility and practicality of implementing blockchain within an organization. The technological infrastructure must align with the blockchain's requirements to ensure smooth integration and functionality (Pawlikowski et al., 2018).

Organizational Aspect in Blockchain Governance

The organizational dimension addresses the internal attributes of the organization, such as management structure, employee skill sets, and the overall readiness for blockchain adoption. As suggested by Kulkarni et al. (2017), leadership commitment and the organizational culture play a pivotal role in the successful adoption and governance of blockchain technology. Organizational readiness, particularly in terms of skills and capabilities, is essential for navigating the complexities associated with blockchain governance (Weiner, 2009).

Environmental Aspect in Blockchain Governance

The environmental aspect considers the external factors that impact blockchain governance. This includes regulatory policies, market trends, competitive landscape, and societal perceptions of blockchain technology. Governmental policies, as discussed by Nam et al.

(2020), significantly influence the adoption and regulation of blockchain technology. The societal and market dynamics surrounding blockchain also shape the governance structures and strategies (Shapiro & Varian, 1998).

OSS Governance Phases and Lifecycle

The OSS Governance Phases and Lifecycle, proposed by Niknejad, Hussin, and Amiri (2019), offer a temporal perspective on blockchain governance. These phases – from the initial, more informal stages to more structured and mature stages – illustrate the evolution of governance as the blockchain initiative progresses. The Lifecycle aspect adds a sense of time and development stages to the governance model, acknowledging the dynamic nature of blockchain technology and its governance needs.

BC Governance Dimensions and Layers

The Business Context (BC) governance dimensions and layers provide a nuanced understanding of the specific governance requirements based on the users and technology. This multi-staged conceptual framework, incorporating technology, organization, and environmental structures, is crucial for identifying and addressing the unique governance challenges and considerations in different business environments (Tornatzky et al., 1990).

Implications for Business Managers

For business managers, particularly in South Africa, this comprehensive framework offers a structured approach to evaluating and implementing blockchain governance. The study's framework will investigate the key considerations in blockchain governance, taking into account the specific business environment, technological requirements, organizational capabilities, and external influences. The final stage of the framework aims to identify the perceived problems in blockchain governance, thus enabling managers to develop effective strategies and solutions.

Conclusion

In conclusion, adopting the TOE framework, along with the OSS Governance Phases and Lifecycle, and incorporating BC governance dimensions and layers, provides a holistic approach to understanding and implementing blockchain governance. This approach is particularly beneficial for business managers who need to consider a range of factors – technological, organizational, and environmental – to effectively govern blockchain initiatives within their specific business contexts.

5.6.1.4 SQ: Why does Blockchain technology have to be regulated in organisations?

Data Security and Privacy

In the context of the insurance industry, where sensitive personal and financial information is routinely processed, blockchain technology must be regulated to ensure data security and privacy. As blockchain networks can store and transmit vast amounts of data, they must be governed to prevent unauthorized access and data breaches. Ensuring the security and privacy of blockchain systems is critical to protect sensitive customer information (Poremba, 2017). Regulations can stipulate standards for encryption, access controls, and other security measures, thus safeguarding data integrity and confidentiality.

Compliance with Legal and Financial Regulations

The insurance industry in South Africa, like in many other jurisdictions, is subject to stringent legal and financial regulations. Blockchain technology in insurance must comply with these regulations to ensure legal and financial propriety. For instance, regulations may dictate how blockchain is used in underwriting, claims processing, and fraud detection. The regulatory framework ensures that blockchain applications in insurance adhere to the legal standards, including compliance with policies like the Protection of Personal Information Act (POPIA) in South Africa (Pawlikowski et al., 2018).

Fostering Trust and Transparency

Regulation is essential in fostering trust and transparency in the use of blockchain technology in the insurance sector. Trust is a critical component in insurance transactions, and blockchain can enhance this trust by providing a transparent, immutable ledger for transactions. However, without regulation, there's a risk of misuse or misinterpretation of the technology. Guidelines and standards can ensure that blockchain is used in a manner that is transparent, fair, and trustworthy, which is essential for both insurance providers and customers (Shapiro & Varian, 1998).

Organizational and Environmental Dynamics

The organizational and environmental dynamics in South Africa necessitate the regulation of blockchain in insurance. The TOE framework, as adapted from Tornatzky et al. (1990), underscores the importance of aligning technology with organizational goals and the external environment. In the South African context, where the insurance industry faces unique market dynamics and cultural aspects, regulation helps ensure that blockchain technology aligns

with these specific conditions. Regulations can guide how blockchain is to be implemented and managed within organizations, taking into account factors like market demands, competitive landscape, and cultural nuances (Weiner, 2009).

Aligning with Global Standards and Best Practices

Lastly, regulation of blockchain in the insurance industry is crucial to align with global standards and best practices. The insurance industry is increasingly globalized, and South Africa is no exception. Regulations can ensure that the use of blockchain in insurance meets international standards, facilitating global interoperability and compliance. This alignment is crucial for maintaining the competitiveness and credibility of South African insurance providers on the international stage (Nam et al., 2020).

Conclusion

In conclusion, the regulation of blockchain technology within organizations, particularly in the insurance industry in South Africa, is imperative. It ensures data security and privacy, compliance with legal and financial standards, trust and transparency, alignment with organizational and environmental dynamics, and adherence to global standards. These regulations are vital for the successful, secure, and effective implementation of blockchain technology in the insurance sector.

5.6.1.5 SQ: What are the perceptions of the stakeholders regarding blockchain governance?

Technological Complexity and Innovation

Stakeholders often perceive blockchain technology as complex and innovative. This perception is influenced by the technical intricacies of blockchain, such as its decentralized nature, cryptographic security, and immutability. The innovative potential of blockchain to transform traditional business processes is also a significant factor in stakeholder perceptions. Rogers (1995) emphasized that the adoption of new technologies is influenced by their perceived complexity and relative advantage. In the context of blockchain, stakeholders recognize its potential for efficiency, transparency, and security enhancements.

Organizational Readiness and Capability

From an organizational standpoint, stakeholders perceive blockchain governance in the context of organizational readiness and capability. This involves assessing whether the

organization has the necessary resources, infrastructure, skills, and cultural readiness to adopt and effectively govern blockchain technology. According to Weiner (2009), organizational readiness for change is a crucial predictor of the successful implementation of new technologies. Stakeholders in organizations consider factors like leadership support, employee training, and the alignment of blockchain initiatives with organizational strategy.

Legal and Regulatory Frameworks

Legal and regulatory frameworks significantly influence stakeholder perceptions of blockchain governance. In the insurance industry, for instance, stakeholders are particularly concerned about compliance with existing regulations and the potential for new regulations to impact blockchain adoption. Pawlikowski et al. (2018) noted that the evolving regulatory landscape for blockchain technology poses challenges and uncertainties for organizations. Stakeholders perceive the need for clear and supportive regulations to ensure legal compliance and to foster a conducive environment for blockchain innovation.

Societal Impact and Trust

The societal impact and the role of trust are critical in shaping stakeholder perceptions of blockchain governance. Shapiro and Varian (1998) highlighted the importance of network effects in technology adoption, where the value of a technology is influenced by the number of its users. Stakeholders are aware that blockchain technology can significantly impact society, particularly in terms of data privacy, security, and trust in transactions. The transparent and immutable nature of blockchain can enhance trust among stakeholders but concerns about privacy and potential misuse remain.

Market Dynamics and Competitive Advantage

Finally, stakeholder perceptions are shaped by market dynamics and the competitive advantage that blockchain technology can offer. In a rapidly evolving market, stakeholders recognize the need for organizations to stay competitive by adopting innovative technologies like blockchain. Clohessy et al. (2018) argued that understanding market trends and the competitive landscape is crucial for the strategic implementation of new technologies.

Conclusion

In conclusion, stakeholder perceptions regarding blockchain governance are influenced by a combination of technological, organizational, legal, societal, and market factors. Understanding these perceptions is crucial for the successful adoption and implementation

of blockchain technology within organizations. A comprehensive blockchain governance framework that addresses these aspects can facilitate effective decision-making and strategy formulation concerning blockchain initiatives.

5.6.1.6 SQ: How does the synthesized blockchain governance framework influence business managers' comprehension of blockchain governance?

Enhancing Understanding of Technological Implications

The synthesized framework aids business managers in comprehensively understanding the technological implications of blockchain governance. By breaking down complex blockchain technology into more digestible components, such as security protocols, data integrity, and system interoperability, managers can better grasp the technical challenges and opportunities. Rogers (1995) noted that the perceived complexity of a technology influences its adoption and utilization. Thus, a clearer understanding of blockchain's technical aspects can facilitate more informed decision-making and strategy development in utilizing this technology.

Aligning Blockchain Initiatives with Organizational Goals

The organizational aspect of the framework provides business managers with insights into aligning blockchain initiatives with broader organizational goals. This includes assessing organizational readiness, resource allocation, employee training, and cultural fit. Weiner (2009) highlighted that organizational readiness for change significantly impacts the successful adoption of new technologies. By using this framework, managers can ensure that blockchain adoption is in line with the organization's strategic objectives and capabilities.

Navigating Legal and Regulatory Environments

The framework also guides business managers in navigating the complex legal and regulatory environments associated with blockchain technology. Understanding the legal implications, compliance requirements, and potential regulatory changes is crucial for managers. Pawlikowski et al. (2018) emphasized the evolving nature of legal and regulatory frameworks in the context of new technologies like blockchain. The framework equips managers with the knowledge to ensure that blockchain initiatives comply with existing laws and are adaptable to future regulatory changes.

Assessing Societal and Market Influences

Furthermore, the framework helps business managers assess the societal and market influences on blockchain governance. This includes understanding public perceptions, ethical considerations, and market trends. Shapiro and Varian (1998) discussed the importance of network effects and public trust in technology adoption. Managers can use the framework to evaluate how societal attitudes and market dynamics might impact the adoption and success of blockchain initiatives.

Facilitating Strategic Decision-Making

Finally, the synthesized framework facilitates strategic decision-making by providing a comprehensive view of the entire lifecycle of blockchain governance, from initial conception to maturity and potential decline. It allows managers to anticipate challenges at different stages of the blockchain project and to plan accordingly. Understanding the OSS Governance Phases and Lifecycle, as proposed by Niknejad, Hussin, and Amiri (2019), helps managers foresee the evolution of blockchain governance and prepare for each phase effectively.

Conclusion

In summary, the synthesized blockchain governance framework significantly influences business managers' comprehension of blockchain governance by providing a structured and holistic view of the various factors that impact blockchain technology in a business context. This comprehensive understanding is crucial for effective decision-making, strategic planning, and successful implementation of blockchain initiatives within organizations.

6. Chapter 6: Conclusion

This review of the literature intends to educate academics on the innovative and difficult nature of blockchain governance in the South African insurance sector. As previously said, the notion of insurance and blockchain governance may take on a variety of various meanings based on the viewpoint of the users and technology. On the one hand, individuals discuss the application of blockchain technology to augment current governance mechanisms. On the other hand, users who examine current blockchain technology's governance (Ølnes et al., 2017). Additionally, layers to consider when examining blockchain governance include governance issues across separate blockchain development teams and governance factors such as regulations that apply to all blockchains. Finally, we provide a conceptual framework for debating blockchain governance from a variety of theoretical views and host practical workshops. Whereas one set of writers develops on the Open-Source Governance method (De Laat, 2017; Jensen & Scacchi, 2010), another group expands on the Open-Source Governance approach. Nonetheless, numerous writers analyze the governance of blockchains using a multi-layered methodology (PricewaterhouseCoopers, 2018) and the identification of governance aspects and layers (Pelt et al., 2020). Incentives are another common subject in the studied literature when it comes to governance (Beck et al., 2018; Carter, 2017; Hsieh et al., 2017). Additionally, several writers emphasize the need of a blockchain consensus process (Beck et al., 2018; Filippi & Loveluck, 2016; Kaal, 2019; PricewaterhouseCoopers, 2018) and the governance element of forking (Beck et al., 2018). (Beck et al., 2018; Filippi & Loveluck, 2016; John & Pam, 2018). However, these contentious literature and frameworks suggest that there is more to uncover and examine in greater detail the blockchain governance frameworks that may be applicable to various insurance industries in South Africa, as well as the various perspectives that may shed light on a different aspect or similarity within a data-driven industry such as insurance companies and their business processes.

In the "Research Methodology" chapter of the study, the focus is on outlining the methodological framework, starting with the research philosophy that underpins the study. This philosophy is rooted in the creation and nature of knowledge, discussing ontology and epistemology as fundamental views on how information is acquired and understood (Saunders et al., 2019). Ontology in this context addresses the relationship between

knowledge and existence, distinguishing between objectivist and subjectivist stances (Marsh, Ercan & Furlong, 2017; Yilmaz, 2013). The research adopts a subjective perspective, focusing on individual experiences within organizations.

The methodology also incorporates a qualitative approach, suitable for exploring participants' unique experiences and perspectives, especially concerning blockchain governance in business management (Saunders et al., 2019; Kothari, 2004). This approach is supported by a deductive research strategy, which involves generating hypotheses or propositions from established theories and then testing these through data collection and analysis (O'Reilly, 2012; Saunders et al., 2019).

Finally, the research methodology emphasizes the importance of reliability and validity in qualitative analysis. The study employs techniques such as triangulation and systematic methods to ensure the credibility of its findings (Yin, 2012; Denzin, 1978). This rigorous approach aims to provide a comprehensive understanding of blockchain governance within the targeted business environment.

In the context of the interview transcripts, the study elucidates the challenges and considerations pertaining to blockchain governance, encompassing integration, compatibility, privacy laws, security measures, education, and regulatory compliance. These findings contribute to a comprehensive understanding of blockchain governance across Technological, Organizational, and Environmental levels, within the framework of OSS Governance Phases and the OSS Project Life Cycle, aligning with the Conceptual Blockchain Governance Dimensions and Layers. This nuanced analysis provides valuable insights for future research and practical implementations in the ever-evolving landscape of blockchain technology.

The implications of the research and future research recommendations are detailed in the sections that follow.

6.1 Implications

This study contributes to the existing literature in two significant ways. Firstly, despite the growing interest in blockchain technology within the public sector and the associated governance challenges, there has been a noticeable dearth of academic research in the field of public administration addressing this topic. To fill this void, the researcher employed a

Deductive thematic analysis approach, synthesizing prior qualitative research and exploring the governance dynamics of blockchain-based systems within the context of public administration literature. Secondly, the current body of literature on blockchain governance suffers from fragmentation, lacking a unified framework to comprehensively consolidate and analyze the implications of governance decisions in the design of blockchain systems. The proposed framework offers a cohesive reference point for both researchers and companies, facilitating structured analyses of blockchain governance. This framework's applicability extends beyond the public sector, making it relevant to various industry sectors.

6.2 Limitations

This literature review on blockchain governance within organizational contexts has certain limitations that warrant acknowledgment. Firstly, the study encountered challenges in comprehensively including all relevant papers within the sample. This limitation arises from the sheer diversity of blockchain applications and the substantial volume of articles published, particularly in the last three years. Secondly, an attempt was made to maintain the sample's strict alignment with the review's scope. Given the multifaceted nature of the topic, encompassing elements of both governance and blockchain, some potentially valuable papers may have been excluded. However, the researchers are confident that they reached a saturation point in their investigation, as they observed repetition of previously explored concepts. It's important to note that while this literature review serves as a foundational resource and facilitates an initial understanding of blockchain governance within organizations, it may not independently suffice to build a comprehensive case for the subject. Instead, it provides a backdrop for further empirical inquiries, offering avenues for future research and exploration.

Systemic problems in the research's analytic components constitute conceptual roadblocks (Saunders, Lewis & Thornhill, 2019). There are a few things that prevent the study from going further: The sample is too small to draw any firm conclusions about the population as a whole. Due to the temporal constraints of the study, it's possible that more people who use Blockchain will be in charge of making decisions than of keeping the system running smoothly.

6.3 Suggested future research.

In conclusion, this paper outlines two crucial avenues for potential future research that have the potential to enhance the proposed Blockchain Governance (BG) framework. Firstly, empirical validation stands as a paramount necessity to validate the exploratory findings unearthed in the current study. The validation process could encompass diverse research methods, including technical action research, surveys, interviews, and focus groups. Insights gathered through these methodologies would serve as valuable feedback for the iterative refinement of the BG framework.

Secondly, there is a need to establish a comprehensive definition of what constitutes effective blockchain governance, acknowledging its contextual nuances and underscoring various quality attributes such as transparency, efficiency, and equitable distribution of power. Expanding the proposed BG framework to encompass direct value judgments or employing it for performance evaluations presents a promising avenue. By delving into these research areas, this study has the potential to further enhance and fine-tune the BG framework, offering invaluable insights into the intricate landscape of blockchain governance.

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APPENDICES

Appendix 1: Research Instrument

Questions

Introduction

The interview is planned to last no longer than 60 minutes. As already mentioned, there are multiple questions that I would like to cover. If time begins to run short, it may be necessary to interrupt you in order to complete the line of questioning.

Background information

_ Can you briefly tell me about your affinity with blockchain technology?

- First experience?
- Function and activities Prompt
- Years active

Perception of governance

How is your organisation governed? from a technological point of view

What type of governance do you currently use? To manage your blockchain products.

What was required to implement governance in Blockchain applications successfully?

In what ways do you think better governance has, and could further, help your business?

Perception of blockchain governance

The next few questions seek to explore what you think about when you hear the concept of blockchain governance. There is no right answer here, I am solely interested in whatever comes to mind when you think about the topic.

- What do you think about when you hear the concept of blockchain governance?
- In your context, how would you define blockchain governance?
- Following this definition, is blockchain governance relevant in your activities related to blockchain?
- In what way?
- Why (not)? Prompts
- To others in your environment?

Defining blockchain governance

Since you have just described your own thoughts on the topic of blockchain governance,

I would now like to continue by explaining some of the different types of roles

blockchain governance can have. Followed by the scope of blockchain governance that I'm focusing on in my thesis.

Explain governance **by** vs. **of** blockchain

Explain layers of blockchain governance:

The way I define blockchain governance in my thesis is: "the means of achieving the direction, control and coordination of stakeholders within the context of a given blockchain project to which they jointly contribute."

- To what extent is my scope different to yours?
- Is this scope of blockchain governance relevant for your blockchain related activities?
- Did you previously look into how the governance of a particular blockchain works?
- What for?
- Did you use any artefacts? Prompts
- Approach used?

Technology Factors

In terms of the way you usually do business, has anything unexpected occurred since using Blockchain technology applications?

How would you describe the level of difficulty in the adoption of Blockchain technology?

How compatible has Blockchain technology been with your business processes and employee operations?

How will blockchain technology affect the role of agents and brokers in the insurance industry?

How will blockchain technology affect contractual practices?

Organisational Factors

Where do you see your company's involvement with Blockchain technology one year from now?

How do you support your employees in using Blockchain technology?

Was the cost of the Blockchain technology adoption an important issue for your company? Discuss the impact of the company's financial resources and IT infrastructure on the adoption decision of new IT in your organization?

To what extent did your employees affect your decision to adopt Blockchain technology?

Environmental Factors

In your opinion, to what extent does the readiness of your competitors to adopt blockchain affect your company's pace of implementation of the same?

How do government and government regulations support the adoption and use of blockchain in your industry? How has this support been experienced in your organization?

In your opinion, what is the major barrier to the adoption of Blockchain technology?

Do you find these concerns easy to understand and apply blockchain to your industry?

Do you think it could be beneficial for stakeholders that are looking into the governance of a particular blockchain?

- Why (not)?
- If yes, could you describe such a situation? Prompts
- What about the comparison of blockchains?
- Which type of stakeholders?

Are there any aspects you would like to change to the concerns raised?

- Additions
- Duplicates Prompts
- Removals

Framework Questions

Off-chain community

As the highest of the three layers, the off-chain community layer encompasses the governance matters taking place in the real world with a focus on the wider community of a project. It highlights how a project is defined more generally and captures the ties of the community to the governance layers below.

Off-chain development

The off-chain development layer encompasses the governance matters taking place in the real world with an explicit focus on the software development process. For example, it looks at how roles related to development interact and decisions are made in the maintenance of the protocol.

On-chain protocol

The on-chain protocol layer comprises all the governance matters taking place on the blockchain through its underlying protocol. Examples include the decision making processes, voting mechanisms and rules of interaction encoded directly into the infrastructure of the blockchain.

ROLES

Off-chain community

What roles are defined within the community?

Are there observable hierarchical structures between these roles?

Off-chain development

What are the available roles related to development?

Are there observable hierarchical structures between these roles?

Which responsibilities are assigned to these roles?

On-chain protocol

What are the available network participant types?

Are there observable hierarchical structures between these participant types?

INCENTIVES

Off-chain community

What are the associated incentives for the available community roles?

Do these incentives include monetary or non-monetary rewards?

Off-chain development

What are the associated incentives for the available development roles?

Are developers paid?

How is funding arranged for developers?

Are developers hired to work on the project?

On-chain protocol

What are the associated incentives for the available network participants?

Do these incentives include monetary or non-monetary rewards?

MEMBERSHIP

Off-chain community

Are there available processes or rules for community management?

How are the borders of the community defined?

Is the community open for people to join and participate?

Who can join the available community roles?

Off-chain development

What are the rules and processes for participation management?

Is training and indoctrination necessary for developers?

How is the source code's access management arranged?

Does the project have modularisation?

On-chain protocol

What is the process to enable new members to participate in the network?

Is there a structure or voting mechanism to control the addition of nodes?

COMMUNICATION

Off-chain community

What media are used for development discussions?

What is the coordination and tracking systems being used?

Off-chain development

How does discussion on development take place?

What are the media used for community discussions?

How does the community achieve agreement?

On-chain protocol

How does the communication between network participants take place?

DECISION MAKING

Off-chain community

Does the community have input on development decisions?

Are there any signalling systems for the community?

Does this include voting mechanisms?

Off-chain development

What is the process of generation of decision proposals?

How are proposals accepted?

How does the execution and implementation of decisions work?

Who has the release authority on new versions?

On-chain protocol

What is the consensus mechanism being used?

Are there any signalling systems for network participants?

Does this include voting mechanisms?

CONFLICT RESOLUTION

Off-chain community

Are there processes for ownership dispute resolving within the community?

Did the community previously fork to resolve disagreement?

Off-chain development

What are the procedures to solve arising conflicts?

Are there processes for coordinating a hard fork?

Did developers previously fork to resolve disagreement?

On-chain protocol

Are there procedures for transaction reversal

Did network participants previously fork to resolve disagreement?

Appendix 2: Example of nodes

The screenshot shows a software interface with a 'Codes' sidebar on the left and a 'Communication' window on the right. The 'Codes' sidebar contains a tree view of nodes with columns for 'Name', 'Files', and 'References'. The 'Communication' window displays a text document with references and coverage percentages.

Name	Files	References
Conceptual Blockchain Governance Dimensions	1	1
Communication	5	10
Decision Making	4	17
Formation and Context	5	16
Incentives	2	5
Market Dynamics	0	0
Membership	1	2
Roles	5	16
Conceptual Blockchain Governance Layers	1	1
Offchain Community	4	7
OnChain Community	5	9
OnChain Protocol	5	11
Environmental Level	0	0
Associations	5	7
Competitive Pressure	4	11
Government Support	5	16

The 'Communication' window shows the following text:

<Files\University of Cape Town research study on Blockchain Techno... coded [0,38% Coverage]

Reference 1 - 0,09% Coverage

if you look at a a consensus mechanism

Reference 2 - 0,29% Coverage

blockchain, like what stellar is that users of federation mo... model you you instantly go carbon negative.

<Files\University of Cape Town research study on Blockchain Techno... [0,45% Coverage]

Reference 1 - 0,15% Coverage

And what we try to do is have different systems in place.
So like for example being able to submit a report.

Appendix 3: UCT Ethics approval

The screenshot shows an email from Commerce Faculty Ethics approval. The subject is "Synthesis Of A Governance Framework For Blockchain Technology In The South African Insurance Industry". The email body contains the following text:

Dear Aldo Damon,

Thank you for your submission to the **Ethics** in Research Committee.

Your application has been approved, and your signed **ethics** clearance and reference number is attached, and can also be downloaded via Submittable again in the future.

Regards,

Commerce **Ethics** in Research

Submission ID: 35863829

There are files available for download via Submittable.



Submission_
Synthesis Of A Gove