



**UNIVERSITY OF  
KWAZULU-NATAL**  

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**INYUVESI  
YAKWAZULU-NATALI**

**The role of blockchain technology in the insurance industry: A case of Old Mutual in  
KwaZulu-Natal**

**By**

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**A dissertation submitted in fulfilment of the requirements for the degree of**

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**School of Management, Information Technology and Governance**

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## Declaration

I, Ndevu Khumbuzile, declare that,

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Date: 17 November 2023

## **Acknowledgement**

My work is dedicated to my parents and my daughter.

Paslina Ntombise Mawabane Ndevu, Bernard Mphakanyiswa Ndevu and Francis Nobeko Ndevu and Luminjalo Khathi.

First, I would like to begin by praising and thanking God through Jesus Christ for providing me with the strength and wisdom to be resilient and complete my dissertation. My heartfelt gratitude goes out to the following people.

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## **Abstract**

This study explores the role of blockchain technologies in the insurance industry. One of the sectors across the globe that brings huge financial relief and peace of mind in times of uncertainty and disaster is the insurance industry. This industry makes a substantial contribution to economic expansion and generates a great deal of job chances for those who are unemployed. Insurance firms make money by selling policies to clients, who then pay premiums on a monthly or yearly basis depending on the terms of the agreements they sign. However, the insurance industry is increasingly challenged by operational inefficiency which results in a high fraud rate, a lack of collaboration among the supply chain partners, a lack of sustainability, resilience, high operational costs and data insecurity. All these challenges pose a serious threat to the existence of this industry. Operational inefficiencies have resulted in high premiums for customers due to the prohibitive costs that insurance companies are experiencing. The industry as a whole has been transformed by the fraud rate into a rapid money-making scheme where people are bartering the lives of their families for insurance policies. The study's overarching aim was to determine the role of blockchain technology in combating the rampant issues facing the insurance industry. The first research objective formulated from the aim of the study was to determine the role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry. The second was to determine how blockchain technologies influence supply chain collaboration and organisational effectiveness. The third was to ascertain how blockchain technologies influence the establishment of a resilient competitive supply chain in the insurance industry. The literature reviewed revealed that blockchain technology had the capability to revolutionise the insurance industry by enhancing operational efficiency, reducing operational costs, alleviating fraud, and improving collaboration, sustainability, supply chain resilience, performance and data security. The study employed a case study design with qualitative in-depth interviews among 15 employees of Old Mutual in Durban of which five were senior managers, five supervisors and five financial advisors. The data were then analysed and interpreted using coding to identify themes and subthemes to answer the research questions and achieve the research objectives. The findings extracted from the interviews correlated with the literature review and concurred that Old Mutual's adoption of blockchain technologies produced improvements in operational efficiency, reducing operational costs, alleviating fraud, and improving collaboration, sustainability, supply chain resilience, performance and data security. These findings indicate that blockchain technologies are necessary to revolutionise the insurance industry ecosystem.

**Key terms:** Blockchain technologies, collaboration, supply chain management, fraud, and data security.

**List of Figures**

**Figure 1.1:** TOE diagram.....6  
**Figure 1.2** Thematic Map.....48

## List of Tables

<b>Table 4.1:</b> Participants' backgrounds.....	49
<b>Table 4.2:</b> Major themes, sub-themes and codes .....	51
<b>Table 4.3:</b> Theme 1- Cost Advantage as per participants .....	52
<b>Table 4.4:</b> Theme 2- Value proposition as per participants .....	53
<b>Table 4.5:</b> Theme 3- Improving customer engagement as per participants .....	55
<b>Table 4.6:</b> Theme 4- Competitive advantage as per participants.....	56
<b>Table 4.7:</b> Theme 5- Rooting out fraud as per participants .....	58
<b>Table 4.8:</b> Theme 6- Sustainability as per participants.....	59
<b>Table 4.9:</b> Theme 7- Value Chain as per participants.....	60
<b>Table 4.10:</b> Theme 8- Resilient competitive supply chain as per participants.....	62
<b>Table 4.11:</b> Theme 9 - Security as per participants .....	63

## List of Appendices

Appendix A: Budget .....	82
Appendix B: Interview Guide.....	83
Appendix C: Informed Consent.....	86
Appendix D: Ethical Clearance .....	90
Appendix E: Turnitin Report .....	91
Appendix G: Plagiarism Certificate.....	92

## Table of the Contents

<b>Supervisors' Permission to Submit Thesis/ Dissertation for Examination.....</b>	<b>i</b>
<b>Declaration .....</b>	<b>ii</b>
<b>Acknowledgement .....</b>	<b>iii</b>
<b>Abstract.....</b>	<b>iv</b>
<b>List of Figures.....</b>	<b>v</b>
<b>List of Tables.....</b>	<b>vi</b>
<b>List of Appendices.....</b>	<b>vii</b>
<b>List of.....</b>	<b>xiii</b>
<b>Abbreviations.....</b>	<b>xiii</b>
<b>CHAPTER ONE: INTRODUCTION TO THE STUDY.....</b>	<b>1</b>
<b>1.1 Introduction.....</b>	<b>1</b>
<b>1.2 Background of the Study .....</b>	<b>1</b>
<b>1.3 Problem Statement .....</b>	<b>2</b>
<b>1.4 Research Questions .....</b>	<b>2</b>
<b>1.5 Research Objectives.....</b>	<b>3</b>
<b>1.6 Literature Review .....</b>	<b>3</b>
1.6.1 Blockchain technology.....	3
1.6.2 Supply chain management .....	4
1.6.3 Supply chain performance.....	4
1.6.4 Supply chain efficiency and effectiveness.....	4
1.6.5 Supply chain resilience.....	5
1.6.6 Theoretical framework .....	5
1.6.7 TOE diagram.....	6
1.6.8 Smart contracts .....	6
1.6.9 Automated transaction.....	7
<b>1.7 Reliability.....</b>	<b>7</b>
<b>1.8 Immutability.....</b>	<b>8</b>
<b>1.9 Limpidity.....</b>	<b>8</b>

<b>1.10. Decentralisation Control .....</b>	<b>8</b>
1.10.1 Collaborative application of blockchain technology .....	9
<b>1.11 Significance of the Study .....</b>	<b>9</b>
<b>1.12 Justification of the Study .....</b>	<b>9</b>
<b>1.13 Research Methodology.....</b>	<b>9</b>
<b>1.14 Research Design.....</b>	<b>10</b>
<b>1.15 Research Approach .....</b>	<b>10</b>
<b>1.16 Sampling Method.....</b>	<b>10</b>
1.16.1 Study site .....	10
1.16.2 Target population .....	11
1.16.3 Sample.....	11
1.16.4 Sampling method .....	11
1.16.5 Sample size.....	11
<b>1.17 Data Collection.....</b>	<b>12</b>
1.17.1 Interviews .....	12
1.17.2 Data quality .....	12
<b>1.18 Data Analysis .....</b>	<b>13</b>
<b>1.19 Ethical Considerations .....</b>	<b>13</b>
<b>1.20 Limitations of the Study .....</b>	<b>14</b>
<b>1.21 Layout of Chapters .....</b>	<b>14</b>
<b>1.22 Conclusion .....</b>	<b>15</b>
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>16</b>
<b>2.1 Introduction.....</b>	<b>16</b>
<b>2.2 Background of the study.....</b>	<b>16</b>
<b>2.2 Blockchain Evolution.....</b>	<b>17</b>
<b>2.3 Supply Chain Management .....</b>	<b>19</b>
2.3.1 Supply chain performance.....	20
2.3.2 Supply chain efficiency and effectiveness.....	21
2.3.3 Supply chain resilience.....	21
<b>2.4 Technological Organisation Environment .....</b>	<b>22</b>
2.4.1 Blockchain technology.....	22
2.4.2 Smart contracts .....	23

2.4.3 Immutability .....	24
2.4.4 Limpidity .....	24
2.4.5 Decentralisation control .....	25
2.4.6 Automated transaction.....	26
2.4.7 Reliability .....	27
2.4.8 Collaborative application of blockchain technology.....	27
2.4.9 Value chain .....	27
<b>2.5 Product Development .....</b>	<b>28</b>
2.5.1 Marketing .....	28
2.5.2 Sales and distribution .....	29
2.5.3 Underwriting .....	30
2.5.4 Claim Management .....	30
2.5.5 Human Resource .....	31
2.5.6 Customer engagement.....	32
2.5.7 Operational Costs.....	32
2.5.8 Collaboration .....	33
2.5.9 Sustainability .....	33
2.5.10 Competitive advantage.....	34
2.5.11 Alleviating fraud.....	35
2.5.12 Data Security.....	36
<b>2.6 Obstacles to the Implementation of Blockchain Technology .....</b>	<b>37</b>
<b>2.7 Conclusion .....</b>	<b>37</b>
<b>CHAPTER THREE: RESEARCH METHODOLOGY .....</b>	<b>38</b>
<b>3.1 Introduction.....</b>	<b>38</b>
<b>3.2 Research Questions .....</b>	<b>38</b>
<b>3.3 Objectives of the Study .....</b>	<b>38</b>
<b>3.4 Research Methodology.....</b>	<b>38</b>
3.4.1 Research design .....	39
3.4.2 Research approach .....	39
3.4.3 Target population .....	40
3.4.4 Study setting.....	40
<b>3.5 Sampling Method and Design .....</b>	<b>40</b>

3.5.1 Sampling method .....	41
3.5.2 Sample size.....	41
<b>3.6 Data Collection.....</b>	<b>42</b>
3.6.1 Interviews .....	42
3.6.2 Data quality .....	43
3.6.3 Data saturation .....	44
<b>3.7 Data analysis.....</b>	<b>44</b>
<b>3.8 Trustworthiness .....</b>	<b>45</b>
<b>3.9 Credibility .....</b>	<b>45</b>
<b>3.10 Transferability .....</b>	<b>46</b>
<b>3.11 Dependability .....</b>	<b>46</b>
<b>3.12 Confirmability.....</b>	<b>46</b>
<b>3.13 Ethical Considerations .....</b>	<b>46</b>
<b>3.14 Conclusion .....</b>	<b>47</b>
<b>CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF RESULTS.....</b>	<b>48</b>
<b>4.1 Introduction.....</b>	<b>48</b>
<b>4.2 Backgrounds of Participants .....</b>	<b>48</b>
<b>4.3 Themes, Sub-themes and Codes.....</b>	<b>49</b>
4.3.1 Theme 1: Cost advantage .....	52
4.3.2 Theme 2: Value proposition.....	53
4.3.3 Theme 3: Improving customer engagement .....	54
4.3.4 Theme 4: Competitive advantage.....	55
4.3.5 Theme 5: Rooting out fraud.....	57
4.3.6 Theme 6: Sustainability .....	59
4.3.7 Theme 7: Value chain.....	60
4.3.8 Theme 8: Resilient competitive supply chain .....	61
4.3.9 Theme 9: Security .....	62
<b>4.4 Conclusion .....</b>	<b>64</b>
<b>CHAPTER FIVE: DISCUSSION OF RESULTS .....</b>	<b>65</b>
<b>5.1 Introduction.....</b>	<b>65</b>
<b>5.2 The role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry .....</b>	<b>65</b>

<b>5.3 How BT would influence supply chain collaborations, organisational effectiveness and sustainability in the insurance industry.....</b>	<b>68</b>
<b>5.4 How blockchain technologies influence resilient competitive supply chains in the insurance industry.....</b>	<b>70</b>
<b>5.5 Conclusion .....</b>	<b>71</b>
<b>CHAPTER SIX: CONCLUSION AND RECOMMENDATION.....</b>	<b>72</b>
<b>6.1 Introduction.....</b>	<b>72</b>
<b>6.2 Main Purpose of the Study .....</b>	<b>72</b>
<b>6.3 Overview of the Research Study .....</b>	<b>72</b>
<b>6.4 Conclusions of Findings .....</b>	<b>73</b>
<b>6.5 Recommendations.....</b>	<b>74</b>
<b>6.6 Limitations of the Study .....</b>	<b>74</b>
<b>6.7 Opportunities for Further Research .....</b>	<b>74</b>
<b>6.8 Conclusion .....</b>	<b>75</b>
<b>References .....</b>	<b>76</b>
<b>Appendices .....</b>	<b>82</b>

## List of Abbreviations

4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
BT	Blockchain Technology/ies
Iot	Internet of Things
RSC	Resilient Supply Chain
SC	Supply Chain
SCM	Supply Chain Management
SCP	Supply Chain Performance
SCR	Supply Chain Resilience
TOE	Technology Organisation Environment
VC	Value Chain

## CHAPTER ONE

### INTRODUCTION TO THE STUDY

#### 1.1 Introduction

Insurance is a mechanism whereby the losses of the few are shared by the many (Rezazahed, 2020). It distributes the cost of losses of the few by collecting a premium from many who purchased insurance coverage to insure themselves against unforeseen events (Kaffash, Azizi, Huang and Zhu, 2020:1). Insurance pays compensation to the insured when the event insured against happens, and it operates as a chain that includes Hospitals, Home Affairs, Brokerages and Burial Societies (Kaffash et al., 2020:1-3). The insurance industry contributes significantly to economic growth and the decrease in the level of the unemployment rate. Despite its massive contribution to economic growth, a lack of technological innovation in the supply chain of insurance seems to be inhibiting its growth (Chen, Deng, Tsaur, Li, Lee and Wu, 2021:2). However, the insurance industry has been criticised by a lack of transparency, collaboration, high operating costs, fraud levels and lack of sustainability, which emanates from the lack of technological innovation (Sun, 2022:5). The insurance supply chain involves multiple parties including health practitioners, Home Affairs, burial societies, distributors and customers, and the involvement of these parties make it easy for the industry to lose billions of rands due to operational inefficiency, human error, and a lack of collaboration (Sun, 2022:7). Fortunately, blockchain technology (BT), a recently developed technological application, offers a solution to significant issues facing the insurance sector. BT has been used by various industries including health, agriculture, banks and transport (Naresh, Chandra, Dilip and Devendra, 2023:7). BT minimise operation costs, enhances operational efficiency, supply chain visibility, collaboration, sustainability, supply chain performance and alleviating fraud (Boileau, 2022:3-6). They have the potential to boost the Gross Domestic Product (GDP) by R1.76 trillion over the next decade through the insurance industry (PWC, 2022:5). This study will use the case of Old Mutual to determine the role of BT in the insurance industry.

#### 1.2 Background of the Study

Old Mutual is made up of four robust companies that do well in their own marketplaces and provide a bright future for their stakeholders. Since 1999, it has been listed on a number of stock exchanges, including those in Johannesburg and London. Its branches in South Africa provide services through intermediaries, brokerages, and channel distribution to reach out to market segments. Old Mutual does not function as an independent institution but works in collaboration with various partners such as Home Affairs, hospitals, burial societies and third-party logistics. This study aimed to determine the role of BT at Old Mutual. BT are necessary for Old Mutual to enhance operational efficiency, minimise operational costs, improve collaboration, supply

chain performance, resilience, alleviate fraud and protect stakeholders' information. It is of paramount importance for this study to be conducted to increase awareness in the South African insurance industry concerning the role of BT. Furthermore, the insurance industry is experiencing prohibitive costs, operational inefficiency and fraud due to a lack of technological inefficiency. Old Mutual's success has always been in using technology to obtain a competitive advantage. Old Mutual is one of the first insurers in South Africa that adopted BT in their supply chain by introducing the chat box, Old Mutual Protect, Imed and Tableau systems which enabled them to interact with all parties involved in their supply chain including customers. According to Loukil, Boukadi, Husain and Abed (2021:5), BT could reduce operational costs, and fraud levels, and improve operational efficiency, supply chain performance, sustainability and competitiveness in the insurance industry.

### **1.3 Problem Statement**

Insurance plays a vital role in the country and across the globe by protecting citizens against unforeseen events and reducing their financial losses. It is one of the industries that is decreasing the unemployment rate and contributing to the Domestic Gross Product (GDP). In 2018, the insurance industry made up 6% of GDP and amounted to about 7-9% of GDP in 2020 (Boileau, 2022:1). However, a lack of technological innovation in the supply chain in the insurance industry is posing a big threat to its existence and resulting in high monetary losses. The insurance business faces numerous issues as a result of a lack of technical innovation, such as ineffective supply chains, subpar supply chains, a lack of transparency, resilience, and sustainability, high operating expenses, fraud, and a lack of coordination. (Achanta, 2023:7). R7 billion in South Africa has been lost as a result of operational inefficiency and fraud, while dishonest cases claims recorded in 2019 worth R787.6 million across the board (News24, June 2022). An amount of \$375 billion is wasted every year by American insurance due to administrative inefficiency (Alhassan, Qatawneh and Almobaideen, 2021:6). BT for the supply chain in the insurance industry seems to be the best possible solution to the problems that threaten the existence of insurance. By reducing operational expenses and fraud, BT will improve resilience, customer service levels, supply chain performance, overall efficiency, and the sustainable growth of the insurance sector (Baiod, Light and Mahanti, 2021:5; Boileau, 2022:6; Sun, 2022:8).

### **1.4 Research Questions**

The following research questions were addressed by the study:

- What are the roles of blockchain technologies on supply chain performance and operational efficiency in the insurance industry?
- To what extent do blockchain technologies influence supply chain collaboration, organisational effectiveness, and sustainability in the insurance industry?
- How do blockchain technologies influence the establishment of a resilient competitive

supply chain in the insurance industry?

## **1.5 Research Objectives**

The specific objectives of the study were:

- To determine the role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry
- To determine how blockchain technologies influence supply chain collaboration and organisational effectiveness and sustainability in the insurance industry
- To establish how blockchain technologies influence the establishment of a resilient competitive supply chain in the insurance industry.

## **1.6 Literature Review**

Cram, Templier and Pare (2020:1) defined literature review as “the writing process of summarising, synthesising and or critiquing the literature found as a result of a literature research”. Although many studies have been conducted on the challenges facing the insurance industry, literature on the role of BT in the insurance industry remains limited. This section discusses the literature related to BT’s role in the insurance industry.

### **1.6.1 Blockchain technology**

Blockchain is an innovative database technology that facilitates open exchange of transparent information among corporate networks. and consists of taking cryptographic hash, and electronic signature, and adding them together in a way that is permanent and unalterable (Boileau, 2022:6). With the advent of cryptocurrencies like Bitcoin and digital payments, Satoshi Nakamoto devised the concept of blockchain in 2008. Subsequently, it was expanded to include distributed ledgers, or blockchains (Kesharwani, Yadav and Sethi, 2022:2-6). Emerging technologies such as the Internet of Things, Cloud, Robotics, Edge Computing, Machine Learning and BT are driving the Fourth Industrial Revolution (4IR). However, BT will be the cornerstone of the 4IR as it is a potential method to fight corruption, which is impeding economic growth and development across the globe while ensuring operational efficiency (Sethi, 2022:2-6). Initially used for Bitcoin cryptocurrency, BT has since been used by various industries such as health, transport, agriculture and insurance due to its effectiveness (Eling and Lehmann, 2019:2-38). As a result, the agriculture industry has improved food traceability, which was a major problem, and increased efficiency in their supply chain. Additionally, transport inventory management has improved, fraud has been eliminated and it has reduced costs and saved time (Alhasan et al., 2021:2-7; Noor, 2022:2-10). Daley (2019:5) and Zhao (2020:2-9) supported the view that BT will revolutionise insurance in many aspects including reduced underwriting costs, improved sales performance, market penetration, sustainable competitiveness, compressed product development, customer service levels and supply chain collaboration.

### **1.6.2 Supply chain management**

The planning and supervision of all sourcing and procurement, conversion, and logistics management tasks is known as supply chain management. Coordination and cooperation with channel partners—who may be suppliers, middlemen, third parties, or customers—is also included (Sunil, 2019:15). In the context of insurance, channel partners can be Home Affairs, burial societies, hospitals and other third parties. The primary objective of the supply chain in the insurance industry is to create value for customers and stakeholders by integrating insurance processes from the policy application to the claim stage to be user-friendly to all channel partners including customers (Bakici, 2023:64). Rajnarayanan, Jegenath, Kumar and Arun (2023:257) stated that traditional supply chains in various sectors have revolutionised by adopting Cloud Computing, Big Data analytics, Artificial Intelligence and Internet of Things. Yet, it has proven that none of these technological innovations possess elements of transparency and immutability (Park and Li, 2021:13). Adopting BT in the supply chain of insurance, according to Brophy (2020:3-10), will add more value by enhancing customer responsiveness, transparency, operational efficiency and collaboration. By reviewing the corpus of literature on the insurance supply chain, it is evident that BT can improve the supply chain in the insurance industry by compressing product development, enhancing marketing penetration, sales distribution, underwriting and claims management.

### **1.6.3 Supply chain performance**

The degree to which supply chain operations satisfy customer needs—such as product availability, on-time delivery, and having all the inventory and capacity in the supply chain needed to fulfil that performance—is referred to as supply chain performance (Fatorachian and Kozemi, 2021:5). Chakravarun, Ratnakaram, Agasha and Vihari (2019:4) were of the view that supply chain performance in the insurance industry is measured by the following elements including marketing, product development, sales, underwriting, claims management and customer service levels. The performance of each component will be assessed on reliability, flexibility, responsiveness cost and quality. Boileau (2022:3) maintained that due to the constantly increasing competition in the insurance industry, insurers are facing huge challenges to satisfy customer requirements and this challenge requires them to improve their supply chain performance to reach the expectations of the customers. The literature review highlighted that BT has the potential to improve insurance supply chain performance by meeting and exceeding customer expectations in the insurance industry.

### **1.6.4 Supply chain efficiency and effectiveness**

Centobelli, Cerchione and Esposito (2019:2) defined supply chain efficiency as “how well a company uses resources to make and deliver quality goods and services at the lowest possible cost and effectiveness is how well the organisation satisfies its customer with its products or services”. An organisation that delivers a service or product to the right place at the right time and at the lowest costs could be considered as efficient while effectiveness hinges on whether

the organisation meets and exceeds customer expectations. Ali, Gongbing and Mehreen (2019:6) asserted that there are four elements of the supply chain on which the organisation can work to improve operational efficiency, including integration, operation, purchasing and distribution. By integrating the digital and physical worlds, trading partners can become more connected, which can lead to improved information flow and shared visibility of transactions throughout the supply chain as well as lower transaction costs. This can improve operational efficiency (Ali et al., 2019:6-8). Guerreiro and Sousa (2019:5) indicated that there is an elevated level of inefficiency and ineffectiveness in the insurance industry which is due to a lack of technological innovation and multiple stakeholders involved in different domains. Furthermore, the literature affirmed that BT proves to be the only solution that will streamline the insurance processes and reduce inefficiencies thereby significantly increasing operational efficiency, reducing cost and improving customer services.

### **1.6.5 Supply chain resilience**

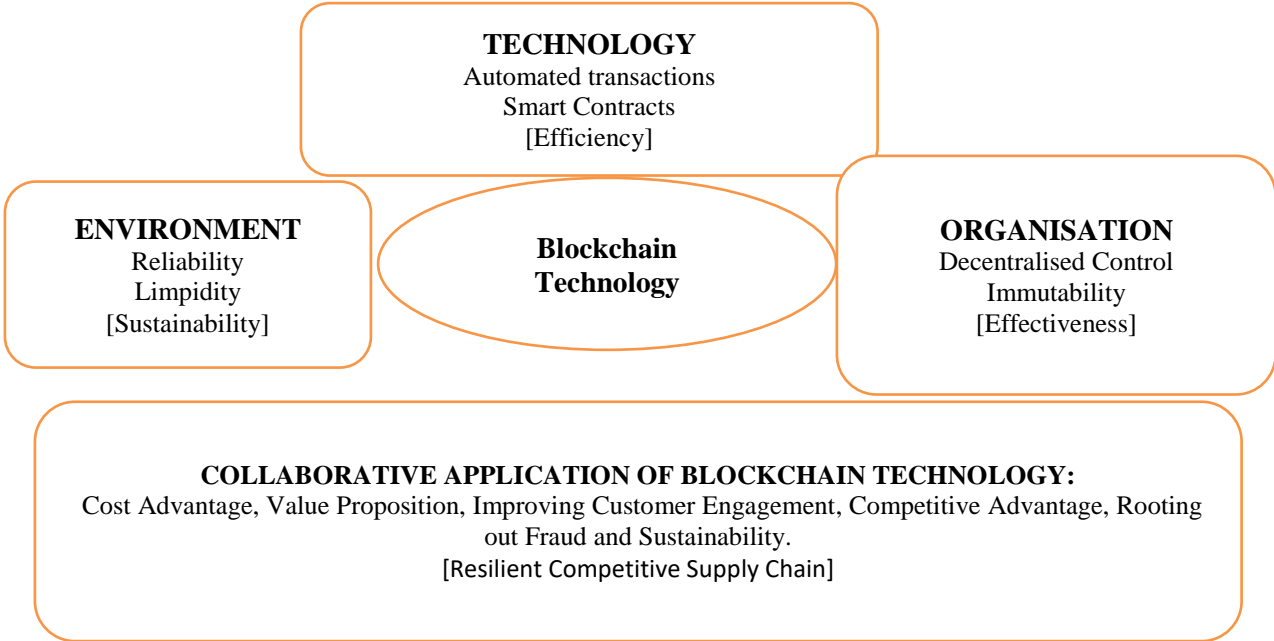
Wieland and Durach (2021:3) defined supply chain resilience as “the adaptive capability of the supply chain of the organisation to prepare for unexpected events, respond to disruptions, and recover from them by providing the service or product to the customers in a way that exceeds or meets customer expectations irrespective of disruptions”. Chowdhury, Quaddus, and Agarwal (2019:4) maintained that supply chain resilience is established by reducing the risk of a single supplier by adding more suppliers at the least possible cost and having suppliers in various locations near customers or warehouses. Moreover, for an organisation to be resilient, it must possess the following elements: reengineering, good practices, agility, collaboration, redundancy, flexibility, and a risk management culture (Chowdhury et al., 2021:4-6). According to Purhanudin, Shaari, Isa and Zakaria (2023:54), during COVID-19, 90% of insurance company sales decreased significantly due to the lack of collaboration and data exchange which might have enhanced supply chain resilience. According to the literature review, the adoption of BT in the insurance industry has the potential to improve supply chain resilience significantly by utilising smart contracts to provide transparent, safe, and fast data exchange information among supply chain partners.

### **1.6.6 Theoretical framework**

The theoretical framework explains how technology is adopted in an organisation and how the organisational, technological, and environmental contexts all have an impact on the adoption and implementation process (Tornatzky, Louis, Fleischer, and Mitchell, 1990:6). Abdulrahman and Karim (2020:1-8) stated that “businesses are operating in an increasingly complex and competitive environment and are continuously challenged by the need to enhance value chain efficiency, reduce operating costs, improve organizational processes and consolidate the business relationships with supply chain partners”. To attain these numerous goals, the integration of modern technology into the insurance supply chain is a critical factor for ensuring competitiveness (Loukil et al., 2021:1-3). Organisations now recognise the value of technical

advancements and view technology as a potent strategic tool for achieving long-term success (Sahoo, 2021:5). The organisation must constantly scan the environment in which they operate to identify emerging technological development to stay abreast of its rivals (Rajeb, Keogh and Treiblmaier, 2019:1-2). The theoretical framework delves into BT and its features such as smart contracts, automated transactions, decentralised control, and immutability in the context of the insurance industry.

**1.6.7 TOE diagram**



**Figure 1.1:** TOE diagram (adapted from Tornatzky et al.,1990)

**1.6.8 Smart contracts**

Shetty, Shetty, Pai, Rao, Bhandary, Shetty, Noyak, Dinesh and Dsouza (2022:4) defined smart contracts as “the process whereby the computer facilitates the verification, control, or execution of an agreement and all transactions without the intervention of a middleman”. It is part of BT that integrates multiple processes, which at a given period are running across various systems and databases (Chin, Yong, Woei, Chun, Cheng and Chih, 2021:5; Shetty et al., 2022). These processes are implemented in addition to BT as a platform to check the authenticity of the information captured in the contract to avoid an elevated risk of error or abuse (Zheng, Xie, Dai, Chen, Weng and Imran, 2021:3). According to Zheng et al. (2021:3-4), smart contracts save hours of a business process by automating all tasks by utilising computer protocols which result in tremendous supply chain performance in the insurance industry. It also results in high-cost savings as no agent is required to conclude that contract except all parties involved (Balcerzak et al., 2022). Furthermore, it reduces the cost and time it normally takes to conclude a contract

in previous years reduces human error, eliminates fraud and influences the entire process of insurance operation by enhancing the speed of the process (Noor, 2022:6). Currently, the insurance industry is incurring high administration costs due to inefficiency in administering contracts and inability to track signed contracts (Peker, Rodriguez, Ericsson, Lee and Perez, 2020:5-8). Bohyer and Hayajneh (2023:1) recommended that various industries, particularly the financial industry should replace conventional contracts with smart contracts to improve the inefficiencies, prohibitive costs, trust issues linked to third-parties, and manipulation of data prevalent in the insurance industry.

### **1.6.9 Automated transactions**

Hassan, Ali, Ahammed, Khan, Alsufyani and Alsufyani (2021:8) defined automated transactions “as time-stamped events that happen to create blocks in the ledger”. Automated transactions are stored using private or public keys giving the participants the option to be unidentified, nevertheless, identities can be assessed and verified by third parties (Hassan et al., 2021:8-9). The transaction in the blockchain stays like a chain and these transactions depend on the hash and their values. If fraud or any suspicious block gets detected, it will not be added to the chain (Hassan et al., 2021:8-9). This could be of immense help in the insurance industry where the level of fraud is increasing daily. BT would result in operational efficiency and improve organisational performance. The Association for Saving and Investment South Africa (2021:2) released statistics that there was a 12% increase in South African life insurance from 2019 to 2020 which totalled R587.3 million, and 2021, dishonest claims worth R787.6 million.

### **1.7 Reliability**

Oberoi and Kansra (2021:283) defined reliability as “the degree to which a system works constantly or trustworthiness of the system that extracts reliable data to help the organisation and customers logical decision”. Reliability is a fundamental element in the insurance business, and no one wants to conduct business or associate with a company that is not reliable and consistent. The reliability of blockchain is solely based on transparency and more shared records among all parties involved (Centobell, Cerchione, Del Vecchino, Oropollo and Secundo, 2022:5-7). The improved visibility brought in by the application of BT could enhance competitiveness in the insurance industry (Srivalli et al., 2023:8). Customers want to be able to track their claim whereabouts when they have submitted the claim to the insurer. As a result, tracking the claim could ease the anxiety of customers and they would be able to call the sections in the claim department where the claim is being handled rather than not knowing who to contact. BT improves traceability and trust through the verification of transactions along the way from the policy inception. Additionally, it enhances supply chain efficiency by digitising paper-based processes (Centobell et al., 2022:5-8)

## **1.8 Immutability**

Amponsah, Weyori and Adekoya (2021:47) described immutability as “the ability for a blockchain ledger to remain a permanent, indelible, and unalterable history of transaction”. Forging of documents or data by malevolent actors in the supply chain, which might be the user or anybody else involved in the process, is one of the problems facing the insurance industry (Oliver, 2023:1). BT immutability prevents nodes from altering the data already created and data modification becomes impossible for any party (Shetty et al., 2022:2). Each of the blocks have a unique reference containing a timestamp of its creation along with other relevant information, allowing a direct link to the preceding block (Popovic, Avis, Byrne, Donovan, Flynn, Fothergill, Hosseinzadeh, Lim and Shah, 2020:13). BT’s immutability minimises the vulnerability of insurers from being hacked as are the custodian of customers data and will minimise the level of fraud in this sector (Popovic et al., 2020:12-14).

## **1.9 Limpidity**

According to Oberoi and Kansra (2021:280), limpidity is dscribed “the ability to access any or all information relating to that which is under consideration, throughout its entire life cycle by recorded identification”. Chen et al. (2021:6) opined that transparency is crucial to the success of insurance companies as the stakeholders get to see all transactions and policies status to make an informed business decision. Transparency helps to “reduce information asymmetry thereby solving the problem of moral hazards and adverse selection between supply and demand of insurance” (Chen et al., 2021:1-37). Park and Li (2021:1) were of the view that the COVID-19 pandemic revealed a lack of visibility and data exchange in many industries including insurance companies whereby insurers and customers were unable to track the status of the claim due to the movement restriction. BT would provide full visibility which will enhance the customer experience to track policy history, claim progress and transaction audit trail (Trivedi and Malik, 2022:90-91).

## **1.10. Decentralisation Control**

As per Oberoi and Kansra (2021:280), decentralised control is “the transfer of control and decision-making from a centralised entity to a distributed network”. It ensures that blockchain is not regulated by any party and it is distributed in a systematic digital network, preventing anyone from tampering with the transaction (Trivedi and Malik, 2022:85). Furthermore, it also processes transactions faster than bank transactions due to intermediaries involved in the process, and thus claim proceedings are paid timeously (Gochhayat, Shetty, Mukkamala, Foytik, Kamhoua and Njila, 2020:6). There are notable trust and confidence issues amongst policyholders, intermediaries in services, and insurers which result in low market penetration and prohibitive costs in the insurance industry, as observed by Shetty et al. (2022:12). Decentralisation control will enable customer to have full control of their data. Blockchain networks generate trust by guaranteeing that transactions are verified and approved by the majority of network users

through decentralised consensus, which does away with the need for compensated middlemen or centralised organisations (Trivedi and Malik, 2022:82-92).

### **1.10.1 Collaborative application of blockchain technology**

For Sun (2022:1-6), “blockchain technologies in the supply chain of the insurance industry will enhance value chain, reduce operational costs, improve efficiency, improve business collaboration, root out fraud, improve customer engagement, promote sustainable development”. BT will play a substantial role in the insurance industry by making insurance more accessible and allowing insurers to penetrate more markets efficiently (Baiodet al., 2021:94-96).

### **1.11 Significance of the Study**

Limited studies have been conducted around and on the role of BT on supply chain performance in the insurance industry. Moreover, no studies have been conducted in the South African insurance industry. To address this gap in the corpus of literature, the study provided comprehensive knowledge about the role of BT on the supply chain in the insurance industry and its effects on the insurer’s sustainable competitiveness and economic growth of South Africa and job creation, and how the BT application can reduce operational costs and increase organisational efficiency including a better return on investment. Therefore, the study aimed to increase awareness about the importance of adopting BT in the insurance industry and how it will improve insurance partnerships, collaboration, sustainability, and performance, reduce fraud levels and contribute significantly to economic growth.

### **1.12 Justification of the Study**

This study aimed to determine the significance of BT in the insurance industry. Research is the sole method to determine BT's impact on the insurance industry's supply chain. Failure to conduct this study meant that the role of BT in the insurance industry would remain unknown and insurance companies would continue to incur high operational costs and high fraud levels due to the lack of technological innovation in their supply chain. Therefore, this study will have a significant impact on the South African insurance industry and across the globe.

### **1.13 Research Methodology**

Research methodology is the method the researcher adopts to conduct a study (Bryman, Bell and Hirschsohn, 2022:155). This study adopted a qualitative method in the form of interviews for data collection. The researcher employed in-depth interviews to obtain participants' perceptions and experiences about the use of blockchain technologies at Old Mutual. Fiester, Brubaker, Forte, Guha, McDonald and Muller (2019:16-17) argued that “a qualitative research approach enables the researcher to collect data and to get closer to the phenomenon in a way that is denied to quantitative researchers”. Through adopting this method, the in-depth interviews provided data-rich insight into participants' perceptions and experiences about the use of BT at Old

Mutual. Consequently, it enabled the researcher to construct meaning from the respondents' experiences.

### **1.14 Research Design**

Rezigalla (2020:1) defined research design as “a strategy and methodology applied for data, extending beyond general assumptions to determine ways of collecting data and reasoning.” It is a “technique, method, and structure that directs and guides the collection and analysis of data” (Creswell and Creswell, 2022:95). Sileyew (2019:4) stated that research design allows the researcher to link empirical data to its questions or objective and then to the conclusion logically and coherently to get answers from the research objectives. In this study, a case study allowed for the exploration and understanding of complex issues (Yin, 2019:19). Yin (2019:19) defined a case study as “a research approach that is used to generate an understanding of a complex issue in its real-life context”. Case study design research is effective for causal studies where pattern-matching can be used to investigate certain phenomena (Aversa, Hernandez and Doherty, 2021:6). A case study approach was selected to explore the role of BT in the insurance industry. The qualitative research strategy assisted in establishing the efficiency and effectiveness of SC operational resilience for sustainable competitiveness.

### **1.15 Research Approach**

The research approach is defined by Creswell and Creswell (2022:195) as “the procedure selected by the researcher to collect, analyse and interpret data”. Inductive research is typically used when there is little to no prior literature on a subject. Bryman et al. (2022:34) stated that an inductive approach normally involves developing a theory from qualitative data. An inductive approach starts with the collection of data and allows the researcher to develop a theory based on the patterns and themes that emerge from the raw data (Thomas, 2003:4). Likewise, interpretive research involves deriving a theory about the phenomenon of interest from the existing observed data. Furthermore, an interpretive philosophical perspective assumes that reality is subjective, multiple and socially constructed (Alharahsheh and Pius, 2019:41). In this study, both the interpretive and inductive methods aligned with the qualitative research design. The researcher depended on the patterns emerging from the experience of the participants with blockchain's role in the supply chain in the insurance industry to conclude the findings.

### **1.16 Sampling Method**

#### **1.16.1 Study site**

Sileyew (2019:5) defined the study site as “the location where the study will be conducted to collect the data”. In this study, the study site was Old Mutual in Durban situated in the centre of KwaZulu Natal under eThekweni Metro Municipality.

### **1.16.2 Target population**

Bryman, et al. (2022:6) described the target population as “a group of characters that possess common attributes that are of interest to the researcher”. This study’s target population comprised the insurance staff at Old Mutual in Durban. The Old Mutual office has about 230 staff which includes management, approximately 30 senior managers, 20 supervisors and 180 financial advisors.

### **1.16.3 Sample**

Yin (2019:20) defined a sample as “the subset of the entire group from which data is collected by the researcher”. This study’s sample was selected from senior managers, supervisors, and financial advisors at Old Mutual in Durban Offices.

### **1.16.4 Sampling method**

Locke and Latham (2019:8) identified the sampling method as “the process of selecting a sample population from the target group”. There are two types of sampling methods, non-probability and probability (Bryman et al., 2022:213). Probability sampling selects a sample from a population using the randomisation principle, whereas non-probability sampling uses a subjective approach to select units from a population. In the context of this study, qualitative research sought to understand social phenomena from the perspective of those experiencing them. Therefore, the study adopted a non-probability sampling method as the selection was based on specific characteristics. As a non-probability technique, using purposive sampling meant that the researcher could focus on participants with unique or special characteristics (Andrade, 2021:3). Furthermore, Patton (2021) stated that “purposeful samples can be stratified or nested by selecting particular units or cases that vary according to a key dimension”. By adopting a hybrid method of stratified purposive sampling, the researcher could not only select participants based on their knowledge and experience but also subdivide that population into strata, for example, senior managers, supervisors and years of service. The researcher was able to target particular demographics with a stratified purposive sample in order to meet the study's objectives and obtain relevant responses to the research questions.

### **1.16.5 Sample size**

According to Bryman et al. (2022:229), sampling size is “the number of participants or observations included in a study”. Sakaran and Bougie (2019:287) contended that an appropriate sample size must range between 30 and 500 participants. Old Mutual has 230 staff comprised of 30 senior managers, 20 supervisors and 180 financial Advisors. Five (5) senior managers were selected because they formulate that strategies to decide what technology is appropriate for Old Mutual's supply chain to obtain a competitive advantage. In the second strata of supervisors, 5 were selected based on the experience of 6 years at Old Mutual. In the third stratum of financial advisors, 5 advisers were selected based on the experience of 6 years. A total of 15 staff members

were selected to partake in this study. The respondents provided information based on the experience they had with the company before and after the adoption of BT.

### **1.17 Data Collection**

A data collection method was defined by Bryman et al. (2022:365) as “a technique the researcher uses to collect information relating to the problem identified in the study”. Typically, data collection methods comprise five data collection instruments including interviews, questionnaires, document analysis, observations, and unobtrusive methods (Sakaran and Bougie, 2019:184). According to Jentoft and Olsen (2019:5), an interview is a qualitative data collection instrument that entails asking open-ended questions to interact with the participants and collect data about the study. The second instrument, a questionnaire, is a data collection instrument that contains a series of questions to be answered by the participant relating to the research study (Gaete, Valenzuela, Godoy, Rojas-Barahona, Salmivalli and Araya, 2021:3). In this research study, in-depth interviews were conducted to obtain the participants’ experiences and perceptions of the role of BT at Old Mutual in the Durban offices. This is in line with Sharma (2022:7) who indicated that an interview allows the researcher to know more about the respondent's experience and knowledge about a phenomenon or study topic.

#### **1.17.1 Interviews**

Interviews are a research instrument for collecting data and are used to obtain information about the research study to achieve the objectives of the study (Thunberg and Arnell, 2022). Furthermore, an interview permits the researcher to draw a dialogue about the respondents’ experience of a phenomenon (Rahman, 2020). The advantage of semi-structured interviews is that it enables asking open-ended questions to get to know more about the participant's experience and knowledge about a phenomenon or study topic, as supported by Sharma (2022:7). Bryman et al. (2022:269-270) stated that in-depth interviews are designed to collect information for research purposes and the interviews permit the researcher to gain a deeper understanding of the participants’ perceptions of the phenomenon under investigation. Therefore, the study employed in-depth interviews as it aimed to elicit the participants' perceptions and experiences about the role of BT at Old Mutual. The interviews were conducted face-to-face.

#### **1.17.2 Data quality**

For Mezmir (2020:6), data quality is “the process whereby the researcher ensures that the data-gathering instrument is employed to measure what is supposed to be measured consistently.” Lincoln and Guba (1994) proposed “trustworthiness and authenticity” as the primary criterion for assessing a qualitative study. The findings should be evaluated using the following criteria: trustworthiness, credibility, transferability, dependability and confirmability. According to Bans-Akutey and Tiimub (2021:7), a triangulation test is required to cross-check findings from both qualitative and quantitative research. Therefore, the criteria of credibility, dependability, transferability, conformability, authenticity and reflexivity should be employed to establish

trustworthiness. Bryman et al. (2022:62-3) considered trustworthiness to be the process whereby the researcher ensures that the study is transferable, credibility, dependability, confirmability, authenticity and flexibility, and all these criteria are evident in the study. In qualitative research, credibility is the degree to which the data analysis is credible and reliable. Transferability as defined by the authors as “the extent the research findings can be applied to other research contexts. Dependability is defined as “the extent to which a research study could be repeated by a separate researcher and reveal the same findings”. Finally, confirmability is described as “the degree to which the findings of the study conducted could be confirmed by another researcher”. In this study, trustworthiness was applied from the initial stage which is the proposal and data collection. Therefore, if the study were replicated by another researcher, it would yield the same results.

### **1.18 Data Analysis**

Data analysis summarises the data collected. The process involves the interpretation of data collected using analytical and logical reasoning to identify and determine the pattern, relationship, and trends concerning the research objective (Cai et al., 2022:6). Data were collected through in-depth interviews. Thematic analysis ensued to identify, analyse and describe patterns across the data set. According to Bryman et al. (2021:365), thematic analysis is one of the most flexible qualitative tools for analysing data. Thematic analysis follows six steps that allow the researcher to familiarise with the data, namely generate initial codes, search for themes, review themes, define and name themes and produce a report (Lochmiller, 2021:2). NVivo software was employed to organise, analyse, and get insight into unstructured or qualitative data-like interviews. NVivo software is qualitative software used for the analysis of interviews, unstructured text, audio and videos (Mortelmans, 2019:3). In this study, thematic analysis and NVivo software were used to sort and analyse data collected through interviews. This approach was supported by Ataman and Tuncer (2022:6) when the researcher is trying to uncover respondents’ opinions and experiences.

### **1.19 Ethical Considerations**

The study adhered to the University of KwaZulu Natal's Ethical Considerations. Ethical clearance was obtained from the Research office of the University of KwaZulu Natal. The data will be archived for five years in safe storage. Approval was obtained using a signed consent form (see Appendix C). The gatekeeper’s letter was obtained from Old Mutual in the Durban offices where the study was conducted, and the letter had an Old Mutual stamp participants were informed before the interviews that participation is voluntary, and they have a right to withdraw at any time should the need arise to do so. The consent form clarified the aim of the study. The study complied with confidentiality and anonymity and pseudonyms were used for all participants.

## 1.20 Limitations of the Study

Limitations in research refer to the constraints, boundaries, or factors that can affect the scope, quality, and generalisability of a study's findings. Due to financial constraints, the study was limited to Old Mutual offices in Durban. Therefore, the findings of the study are not generalisable beyond this specific location. The participants' perspectives may also not necessarily represent the perspectives of Old Mutual employees in other locations. Another limitation presented in the study was the lack of prior research in the insurance industry concerning BT applications, particularly in South Africa. Previous research on insurance across the globe was reviewed to overcome this limitation.

## 1.21 Layout of Chapters

The dissertation comprises six chapters.

**Chapter 1:** This chapter presented a brief of the entire research study and how it was going to be executed in the form of research questions and research objectives. The motivation for this study to be pursued and how the data will be collected were also discussed in the chapter.

**Chapter 2:** This chapter discusses blockchain technologies, Technological Organisational and Environmental (TOE), and the benefits of blockchain technologies and supply chain concepts in the insurance context. This chapter also reviews the perspectives of other authors concerning blockchain technologies in the insurance industry and how it is going to revolutionise the insurance industry ecosystem.

**Chapter 3:** This chapter discusses the research design, methodologies and the tools used to collect the required data for the success of the study. The study employed qualitative methods and used interviews as data collection instruments. This chapter details the NVIVO software and thematic analysis used to sort the data into themes.

**Chapter 4:** This chapter aims to analyse the data collected through the interview, guided by the research objectives.

**Chapter 5:** This chapter discusses the research findings which were guided by the research objective. The primary data and secondary data were examined to determine whether an interlink exists with the research objectives. The literature reviews are drawn on to substantiate the primary data which is obtained through the interviews and based on these findings. Conclusions are drawn about the role of blockchain technologies at Old Mutual and how they will revolutionise the entire insurance industry ecosystem.

**Chapter 6:** This chapter discussed the main purpose of the study, recommendations for future studies, limitations of the study and provided a conclusion.

## **1.22 Conclusion**

The first chapter focused on the study introduction. In this chapter, the background of the study, the problem statement, objectives, research questions, and an overview of the literature the methodology, ethical considerations and limitations were also presented. A layout of the study concluded the chapter. Chapter two presents the literature review that underpins the conceptual framework of the study.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

A literature review is defined as a piece of academic writing demonstrating knowledge and understanding of the academic literature on a particular topic placed within a context (Paul and Criado, 2020:1). This chapter reviews the conceptual and theoretical framework that underpinned the study. The discussion commences with Old Mutual Insurance Company's background and blockchain evolution in the insurance industry followed by the conceptual framework. The conceptual framework is derived from supply chain in the insurance context which includes supply chain management, supply chain efficiency and effectiveness, and supply chain resiliency and coordination incorporating blockchain which is also propounded. Thereafter, the theoretical framework addresses the Technological Organisation Environment (TOE) and how insurance should adopt and implement blockchain technology (BT). BT features including smart contracts, automated transactions, reliability, limpidity, immutability, decentralisation and collaborative application technology are discussed next. The literature then touches on the benefits of BT and how it is transforming the insurance ecosystems. This chapter concludes by highlighting the importance of adopting BT in the insurance industry and its potential to revolutionise the insurance industry ecosystem.

#### 2.2 Background of the study

In the turbulent environment in which insurance companies are operating, the success of any organisation has become reliant on the application of technology. According to Sahoo (2021:15), such a technological application is blockchain which strategically implements some of the business practices for an extended period such as data collection, classification, retrieval or use by all relevant stakeholders. Blockchain as technology has been lauded as a break-through competitive advantage in many industries including insurance due to its ability to be correlated with promising technologies like edge computing, artificial intelligence, and machine learning (Nizamuddin and Abugabah, 2021:3). BT promises to have a hopeful future and is going to transform the insurance industry through its features such as immutability, transparency, decentralisation, automation transaction and limpidity (Li and Guo, 2023:6).

The study sought to determine the role of BT in the insurance industry through the case of Old Mutual. Old Mutual Life Insurance Company offers financial security in uncertain times. Since its establishment, it has been one of the foremost companies to provide innovative and affordable services to its stakeholders. Old Mutual believes that technological innovation is critical to the success of its operation as it improves operational efficiency. In 2014, Old Mutual realised they were incurring prohibitive costs due to paper contracts, third-party logistics, operational inefficiency and high levels of fraud. As a result, Old Mutual adopted industrial revolution

applications including cyber-physical systems, the Internet of Things (IoT), Cloud Computing and Artificial Intelligence to improve operational efficiency by eliminating paper contracts and third parties (Old Mutual, 2020:4). However, the shortcomings of these systems were a lack of transparency and immutability of data. Stakeholders involved in the Old Mutual supply chain were unable to track the progress of the application and claims submitted which brought a lot of confusion among the stakeholders and it was easy for stakeholders to manipulate data in the system without asking the consent of other stakeholders. When BT was introduced into the industry, Old Mutual adopted blockchain, a system that eliminates fraud and improves operational efficiency, sustainability and collaboration (Old Mutual, 2023:11-24). BT does not allow anyone to make any changes without the consent of all the parties involved in the initial signing of the contract (Avasarala, Golani, Kelkar and Marakarkandy, 2023:5-8). The system not only enhances operation efficiency and fraud but also limits movement as stakeholders can interact without physical contact, improving sustainability (Old Mutual, 2023:7).

Several insurance companies are leading the pack by using blockchain (Baiod et al., 2021:93). KMPG International Insurance in the Netherlands and Toffee Insurance in India advocated the adoption of BT. They pointed out that it helps to reduce the claim lead time, product development, underwriting costs, sales and human errors (Avasarala et al., 2023:7-9)

## **2.2 Blockchain Evolution**

Blockchain is an advanced mechanism that allows transparent information sharing within a business network and consists of taking a cryptographic hash and electronic signature and adding them together in a way that is permanent and unalterable (Brophy, 2020:7). This idea was conceived by Satoshi Nakamoto in 2008 through cryptocurrency, Bitcoin and digital payment and it was later generalised to distributed ledgers known as the blockchain (Kesharwani et al., 2022:2-6). Blockchain has evolved from the first generation of blockchain, 1.0, which was introduced in 2009 and used a hardcoded special purpose system which focused primarily on digital currency to serve potentially malicious public participants. The second generation of blockchain, 2.0, commenced in 2014 and emphasised ways of applying smart contracts in diverse situations and domains (Amponsah et al., 2021:4-10).

The third generation was initialised in 2017 with hyper ledger projects providing an all-purpose, decentralised application including smart contracts, automated transactions, reliability, limpidity and immutability (Amponsah et al., 2021:4-7). The third generation of blockchain, 3.0, has received tremendous attention and has a lot of potential due to its key features in various fields such as its application in supply chain and insurance because of its benefits. The benefits include improving operational efficiency, reducing costs, collaboration, sustainability and fraud (Trivedi and Malik, 2022:85-86). Baiod et al. (2021:8) stated that the concept of BT can be compared to the Internet which has many technologies and applications. The core value of BT is the trustworthiness that is created between the parties involved in the chain which is one of the

values that is lacking in the insurance industry due to data tampering (Li and Guo, 2023:6). BT stores the status of actions that occurred, then updates the status of the transaction while a permanent record of the transaction remains and cannot be changed. One of the main strengths of blockchain is hashing, each block has information to be kept and every new block added to the chain is encoded with a hash, a code arithmetically produced and generated from the block data (Kumar, 2019:4). Hashing is a method used to secure passwords and each added block includes the hash of the preceding block in the same block hash (Baio et al., 2021:8-9). Transparency is another strength in which all parties involved in a transaction are aware of any actions taken on any data or transaction (Awwad et al., 2020:10-11). Furthermore, disintermediation is one of the benefits of blockchain which replaces intermediaries, enhancing efficiency, and reducing friction-related direct and indirect costs between individuals and organisations (Monrat, Schelén and Andersson, 2019:8). Therefore, falsifying and altering a new block or a transaction becomes exceedingly difficult (Hughes and Marrow, 2019:11).

The evolution of blockchain has attracted attention from various sectors including the insurance industry in numerous areas of operation such as sales, underwriting, customer onboarding, claims processing and payment (Sharifinejad, Dorri and Rezazadeh, 2021:13). The idea of incorporating BT in the insurance industry emanates from an elevated level of fraud, operational inefficiency, prohibitive costs and a lack of transparency in its supply chain due to multiple parties involved (Shetty et al., 2022:9). BT can transform various insurance sectors including travel insurance, crop insurance, property and health by creating a multiparty share network where insurers, hospitals, funeral homes, the Department of Health and the blockchain nodes prove to be beneficial (Hewa, Ylianttila and Liyanage, 2020:6). Moreover, the setup can provide the necessary disintermediation and speed required to streamline insurance processes, claim processes and alleviate fraud (Trivedi and Malik, 2022:). The success of the insurance industry depends solely on its supply chain management because if one party in the chain does not perform, it affects the entire chain. Prominent examples include Home Affairs for issuing fake death certificates and health practitioners issuing an incorrect medical history when an insurer is underwriting a potential customer even though this might have a negative impact on the success of the insurance industry (Ali, Vecchio, Putra, Kanhere and Antonelli, 2020:7). Kotongo and Bennis (2023:6) stated that blockchain, which appeared in 2008, now offers an opportunity to improve insurance supply chain management by providing solutions to the challenges faced in the insurance industry. Madhani (2021:20) argued that BT will need technological expertise to operate it and the statistics emerged that there is shortage of workforce skilled in blockchain, and BT requires hardware and software with maintenance sustain it. The literature review indicated that insurance industry will benefit greatly in employing BT, therefore insurers need to capacitate employees with all necessary skills and widen awareness of BT to channel partners to counteract the issues of the lack skills of operating BT.

### **2.3 Supply Chain Management**

Supply chain management (SCM) is the planning and management of activities involved in sourcing and procurement, conversion, all logistics management activities, and it also includes coordination and collaboration with channel partners and customers (Sunil, 2019:15). Al-Farsi, Rathore and Bakiras (2021:8) defined SCM as “an organised and systematic method between a network company and its suppliers to manufacture and sell a particular product or service to the final customer, aimed at reducing costs and being competitive in the market”. According to Srivalli et al. (2023:6), modern insurance supply chains have evolved into overly complex value networks and turned into a vital source of competitive advantage in the insurance sector. Awwad, Kalluri, Airpulli, Zambre and Jain (2019:1) viewed it of paramount importance for insurance companies to be aware of recent technological innovations and to incorporate modern technology in the supply chain can create better transparency by helping the insurance company to have control over its business. Rajnarayanan et al (2023:257) indicated that traditional supply chains in various sectors have been revolutionised by adopting Cloud Computing, Big Data analytics, AI and the IoT. However, it has been proven that none of these technological innovations possesses an element of transparency and immutability. Park and Li (2021:13) state that a lack of visibility has been revealed by COVID-19 in various sectors where most insurance companies were unable to engage customers due to a lack of transparency. Muthur, Kalla, Gur, Bohra and Liyanage (2023:3) concur that in 64 countries with 408 organisations, 69% of them lack full visibility in their supply chain and 65% of them have experienced disruption in their supply chain. Halkiopoulos, Antonopoulou and Kostopoulos (2023:44) argue that the transparency and immutability of BT can provide benefits such as increased efficiency, reduced costs and enhanced security in the insurance industry. Dursun, Birinci, Alptekin, Hasekioglu, Tunaboylu and Zaim (2022:207) agreed with Halkiopoulos et al. (2023:44) that employing BT in supply chain processes provides transparent, decentralised, secure, faster, and low-cost transaction and it adds efficiency and remove bureaucracy, particularly in insurance and traceability. Dursun et al. (2022:207) further highlighted that BT allows escrowed payment by keeping money until terms of the deal are met and agreed and then releasing automatically. Despite its benefits, there are challenges that come with employing BT in the insurance industry SC including scalability, interoperability and regulatory compliance in addition to it becoming slow and inefficient when dealing with large volumes of data considering the amount of insurance data (Divakarla and Chandrasekaran, 2022:75-76). Several studies have verified that using BT in the insurance sector will bring solutions to its supply chain management such as providing all stakeholders full transparency and preventing fraud through the immutability of data (Baiod et al., 2021:95; Trivedi and Malik, 2022:89; Xia, Li, and He, 2023:8). From the literature, it can be concluded that incorporating BT in insurance will bring full transparency, prevent fraud and increased efficiency and insurance effectiveness and some these challenges are continuously addressed due to the evolvement of BT to make it scalable, interoperable and compliant.

### **2.3.1 Supply chain performance**

Supply chain performance is defined by Joby and Pillai (2019:2) as “a process of quantifying the effectiveness and efficiency of all supply chain processes”. Fatorachian and Kazemi (2021:64) contend that supply chain performance must result in customer satisfaction by making products or services available to customers on time which requires sufficient inventory, capacity, and responsiveness in the organisation. According to Sinoimer (2023:8), quantitative performance can be described numerically such as fill rates, costs, and resource utilisation in the organisation. while qualitative performance is those with no numerical measurement as such customer satisfaction, product quality and supply chain resilience. Imadeddine, Nauofal and Ari (2022:12) believe that all companies are trying to provide quality services or products to customers at the lowest cost. For Boileau (2022:3), due to the constantly increasing competition, insurers are facing huge challenges to satisfy customer requirements and this challenge requires them to improve their supply chain performance to reach the expectations of the customers. Chakravarani et al. (2019:4) are of the view that in the insurance industry, supply chain performance is measured by the following elements including marketing, product development, sales, underwriting, claim management, and customer service levels and all these elements are assessed based on reliability, responsiveness, cost and quality.

To improve their operations, the insurance industry started making use of mobile devices, Big Data, AI, IoT and chatbots to enhance their supply chain performance (Amah and Saxena, 2022:8). However, these systems resolved some of the issues which were experienced but left transparency and fraud still haunting the industry (Ali, 2020:9). According to Venkamaraju, Sunitha, Ester and Nitin (2019:6), BT has the potential to improve supply chain performance by sharing the customer data based recorded at various online and inquiry nodes to the agent or advisers and sharing newly designed financially engineered policies. BT can easily achieve the transfer or distribution of information effectively at a lower cost and improve sales and distribution (Sun, 2022:2). Furthermore, Kim and Shin (2019:8) investigated the influence of BT on supply chain performance. Their findings revealed that the qualities of blockchain such as information transparency, immutability, and smart contracts had a significant positive impact on supply chain performance in the insurance industry. In support of the study conducted by Kim and Shin (2019:8), Luay (2022:7) investigated the influence of BT on supply chain performance and the study findings revealed that employing blockchain yielded financial improvements in terms of profitability and return investment. Dursun et al. (2022:209) argued that, irrespective of all benefits comes with BT, the current BT platform cannot accommodate the high degree of transactions throughout requirement of the SC system. The literature showed that insurance supply chain performance will be improved significantly by incorporating blockchain technologies as all insurance stakeholders including customers could easily access their information such as policy history and claims. As a result, insurance companies can improve sales through the efficiency and effectiveness that will be brought by BT in the insurance supply chain.

### **2.3.2 Supply chain efficiency and effectiveness**

According to Madhani (2021:5), supply chain efficiency is defined as “doing things right and effectiveness is doing the right things”. Supply chain performance is the analysis of both efficiency and effectiveness in completing a given task. Efficiency is seen as a ratio between the normal level of inputs over the real level of outputs, in other words, it is a ratio of the resources utilised against the results derived (Alshurideh, Kurdi, Alzoubi, Ghazal, Said, Alhamad, Hamadneh, Sahawneh and Al-Kassem, 2022:3-6). The efficiency of an organisation’s supply chain process is measured by how it harnesses resources in the best way possible and how well it leverages resources to meet its predetermined goals for cost savings. Higher efficiency in the supply chain process results in substantial cost reduction while effectiveness results in high service level improvement. On the one hand, Chen et al. (2021:2) believed that the insurance industry is experiencing an elevated level of inefficiency and ineffectiveness in their supply chain due to a lack of transparency and the longevity process of purchasing a policy and claim processes. On the other hand, Trivedi and Malik (2022:2) opined that the insurance supply chain is complicated and involves prohibitive costs and manual processes to verify whether all stakeholders meet and comply with the agreed conditions in the contract which is an unjust experience for customers. However, Guerreiro and Sousa (2019:5) argued that inefficiency and ineffectiveness are due to a lack of technological innovation in the insurance supply chain and multiple stakeholders in different domains. Wadnerson (2022:3) conducted a study about insurance inefficiency and discovered that a lack of visibility in the insurance industry when information is shared between insurers, peers, providers, claimants and carriers contributes to inefficiency. Bakici (2022:64) maintained that BT will enhance efficiency and effectiveness in the insurance supply chain by reducing administrative errors, transactions, operational issues and information flow. Similarly, Srivalli et al. (2023:7) recommended BT in the insurance industry by affirming that it will streamline processes and reduce inefficiencies thereby increasing operational efficiency and significantly reducing cost and improving customer services. Conversely, Kafeel et al (2023:31) argued that as much as BT will enhance efficiency and effectiveness in the insurance, however BT alone is not enough, proper organisational change are necessary. Therefore, change management needs to be done prior adopting BT for readiness.

### **2.3.3 Supply chain resilience**

According to Dmitry (2021:8), supply chain resilience is described as a “firm’s capability to withstand, adapt, and recover from disruptions to meet customer demands, ensure target performance, and maintain vulnerability”. Bayramova, Edward and (2021:12) defined it as “the capability of the supply chain to develop preparedness against unforeseen disruptions to respond in a resourceful and timely manner and restore their former condition or improved state”. Sawyerr and Harrison (2019:7) were of the view that collaboration with supply chain partners in the insurance industry in the event of disruption is the first prerequisite because it improves other elements of resilience such as visibility, awareness and decision-making. Shakariah and Parast (2020:8) conducted a study on the elements of supply chain resilience flexibility, agility,

redundancy, and collaboration. The findings revealed that collaboration is the most imperative strategy to cope with control disruption. In line with this finding, Purhanudin et al. (2023:54) stated that During COVID-19, 90% of insurance company sales decreased significantly due to the lack of collaboration and data exchange which might have enhanced supply chain resilience. There was no technological application that enabled all supply chain partners to communicate without physical contact, which was the problem and remains a challenge in the insurance industry. Wong, Tan, Lee Ooi and Sohol (2021:12) suggested that technological innovation in sales production in the insurance and blockchain applications will strengthen the collaboration which ultimately improves resilience as the more connected supply partners, the more the supply chain will be able to respond to the changes that arise in the insurance industry. Bayramova, et al. (2021:7) believed that the adoption of BT in the insurance industry will improve supply chain resilience significantly by utilising smart contracts to provide transparent, safe and fast data exchange information among supply chain partners. Vivaldini and de Sousa (2021:10) argued that low trust relationship between partners could be a stumbling block for the implementation of BT due to the confidentiality of the information among the insurers. BT will provide fully guaranteed security and privacy in terms of information exchange to build trust among insurers and channel partners.

## **2.4 Technological Organisation Environment**

The theoretical framework for this study describes the technology adoption in an organisation and how the process of adopting and implementing are influenced by the technological context, organisational context and environmental context (Tornatzky et al., 1990). It is a classical framework that proposes a generic set of factors that determine and predict the likelihood of innovation technology adoption. The framework posits that the three-enterprise context influences the adoption and implementation of technological innovation namely, technological development, organisational condition, business and organisational configuration, and industry environment (Li, 2020:1). According to Hajar and Hadi (2021:9), complex and constant changing business environments and customer demands and the need for flexibility and responsiveness in the organisation are turning the spotlight to advanced technological innovation. Organisations have realised the importance of technological advances and consider technology as a strong strategic weapon for ensuring sustainable performance (Sahoo, 2021:12). Therefore, the organisation must constantly scan the environment in which they operate to identify emerging technological developments to stay abreast of their rivals (Ishaq and Khan, 2020:6). The theoretical framework will delve into BT and its features such as smart contract, and automated transactions decentralised control, immutability in the context of the insurance industry.

### **2.4.1 Blockchain technology**

According to Mahyuni, Adrian, Darma, Krisnawijaya, Dewi and Permana (2020:3-7), “Blockchain is a decentralised digital ledger with many functions that can be applied for making

contracts, tracking goods, and making payments”. Blockchain records every transaction on a block across multiple copies of the ledger that are shared with all parties involved in the transaction. BT has an advantage over other competing technologies such as machine learning, augmented, internet of things and cloud computing or systems in the modern services-oriented organisation. Blockchain-based infrastructure or frameworks can tender a sustainable incentive mechanism by providing services like sharing economy, smart contracts and cyber-physical interaction (Rahman, Rashid, Shamim, Hossain, Hassanain, Alhamid and Guizani, 2019:6). Sahoo and De (2020:3) were of the view that the application of BT in the life insurance industry is inevitable for the overall sales-effectiveness of the organisation because BT deals with peer-to-peer linked structures that maintain the orderly transactions and avoid double spending problem. Numerous studies conducted indicated that blockchain focuses on record keeping, verification, data privacy, transparency and the simultaneous consumption of data/information through a decentralised process without any manipulation in the insurance (McKinsey, 2021:12-17). Loukil et al. (2021:15) argued that blockchain will reduce costs, and improve transparency, and save time through automation. Correspondingly, Purhanudin et al. (2023:9) stated that blockchain will reduce operational costs and improve operational efficiency. In contrast, Kesharwani et al (2022:3) concurred with Oliver (2023:4) that scalability in BT is critical issue as number of transactions increases and the system is more likely of bulking. BT needs to explore off-chain processing and layer two to ensure scalability of BT based insurance system to widen the space and allow it to handle large amounts of transactions without being vulnerable to bulking issues.

#### **2.4.2 Smart contracts**

Singh and Singh (2022:40) defined smart contracts “as an agreement that is self-enforced as a code and managed by the blockchain and it is encoded within a computer program automatically executed, provided certain criteria are met”. Smart contracts were introduced by Nick Szabo in 1994 and are defined as a set of promises specified in a digital form, including protocols within which parties perform on the other promises (Bohyer and Hayajneh, 2023:6-8). Since 1994, the notion of smart contracts has evolved from a concept to a usable application, providing opportunities for a multitude of organisations (Dolgui et al., 2020:4). The smart contract was initially developed to create trust between transactions and get rid of intermediaries, which can incur unnecessary expenses and inefficiencies (Peker et al., 2020:5-8). Hassan et al. (2021:1) pointed out that “there are situations where insurance companies refuse to pay the insured by misrepresenting conditions and terms of the contract and false claims are other issues that are troubling the insurance companies”. These manual contracts that insurers are currently using lack transparency and multiple loopholes. Furthermore, Bohyer and Hayajneh (2023:1) maintained that various industries, particularly the financial industry should replace traditional contracts with smart contracts to improve the inefficiencies, prohibitive cost, and lack of trust associated with third-party, and the manipulation of data that is prevalent in the insurance industry. Sharifinejad et al. (2020:3) were of the view that smart contracts are going to bring

massive relief to the insurance industry as one of the fundamental challenges they are facing is the forging of documents or data by malicious entities that can be either user or insurance companies to favour their condition. Similarly, Madhani (2022:11-23) and Purhanudin et al. (2023:8) offered that creating policies by the insurance company with their customers as smart contracts on the BT can offer control, precision, traceability and save administrative costs and could lead to automatic claim payout. Divakarla and Chandrasekaran (2022:45) argued that smart contracts are inflexible and once completed cannot be altered compared to traditional contracts in the insurance industry. Furthermore, once a mistake has been mistake identified, one must start from scratch which is time-consuming and inefficient. Therefore, both insurance company and the stakeholders can avoid the issue of incorrect data capturing by verifying information before it is entered into the system. Smart contracts will enhance efficiency and effectiveness, and minimise costs and fraud rate in the insurance.

### **2.4.3 Immutability**

According to Amponsah et al. (2021:447), the definition of immutability is “the ability for a blockchain ledger to remain a permanent, indelible, and unalterable history of transaction”. Each stored block is linked to its previous block in the chain, making it almost impossible for hackers to subsequently change blocks as they will have to manipulate any succeeding block plus most of their replications. However, Rachamalla (2021:49) contended that while BT is secure, there are still vulnerabilities that can be exploited by attackers. Cyber Insurance Risk (2022) recently reported that 82% of the largest insurance companies are the main target of ransom attackers from cybercriminals. It was also discovered that 20% of the top 99 insurance companies have a high rate of vulnerability to ransomware and an amount of \$40 million was paid to ransomware. The Federal Trade Commission attested that about \$50 billion in unwanted costs come from the theft of insurance by hackers. Therefore, Haweyk (2023:2) and Hassan et al. (2021:1-6) argued that since insurance companies are the guardians of sensitive consumer data, which might harm their reputation and the reputation of the insurance sector as a whole if it falls into the wrong hands, BT will reduce the industry's susceptibility to hacking. The endorsement and other policies will be scripted in the smart contract on the Ethereum network so that any wrong endorsement will easily be noticed (Hassan et al., 2021:6-8). In contrast, Kesharwani, Yadav and Sethi (2022:3) argued that BT uses encryption permanently which requires a mining system that results in huge energy consumption. The huge energy consumption costs would be covered by large reduction of administrative costs due to elimination of intermediary and more effort are continuously done to find new ways of minimising the huge energy consumption by BT.

### **2.4.4 Limpidity**

Limpidity is defined by Oberoi and Kansra (2021:280) as the “ability to access any or all information relating to that which is under consideration, throughout its entire life cycle by recorded identification”. For Chen et al. (2021:5), transparency is of critical importance to the success of insurance companies as the stakeholders have access to all the transactions and

policies' statuses to make an informed business decision. Moreover, transparency helps to reduce information asymmetry thereby solving the problem of moral hazards and adverse selection between supply and demand of insurance (Chen et al., 2021:1-37). Park and Li (2021:1) asserted that the COVID-19 pandemic has revealed a lack of visibility and data exchange in many industries including insurance companies whereby insurers and customers were unable to track the claims status due to the movement restriction. In agreement, Preethi and Achanta (2023:7) stated that insurers are facing the challenge of a lack of transparency, which makes it difficult to track the progress of policies, claims and transactions by the stakeholders. In Loukil et al.'s (2021:5) opinion, transparency is guaranteed through blockchain in the insurance industry worldwide and blockchain will become the repository of a huge amount of information that cannot be repudiated and can be used for data analysis. Transparency creates a good climate in the insurance industry and enables all stakeholders to detect suspicious transaction patterns and market behaviours (Amponsah et al., 2021:445-455; Loukil et al., 2021:5) The transparency of BT ensures that policy records are tamper-proof and easily auditable, and every alteration or update made to the policy is recorded as a new block in the blockchain. Madhani (2022:16) recommended BT in the insurance sector stating that through its features of transparency, it will provide a reliable and auditable trail of insurance transactions which will make it difficult for fraudsters to manipulate or falsify and enhance operational efficiency. Jazel and Chobar (2023:53) argued that some businesses may not trust BT because to them it is new and unproven technology. However, BT has been employed in various industries including agriculture, transport, finance insurance, food and health industry and has been proven to enhance process by streamlining and traceability to improve customer services.

#### **2.4.5 Decentralisation control**

According to Oberoi and Kansra (2021:280), decentralised control is “the transfer of control and decision-making from a centralised entity to a distributed network”. Decentralisation is a fundamental concept in BT that plays a vital role in ensuring trust among stakeholders in the insurance industry (Betti, Khoury, Halle and Montreuil, 2019:9). Shetty et al. (2022:12) stated that there is a lack of trust and confidence between policyholders, insurers and intermediaries in services. Furthermore, a general mistrust exists because of the operational inefficiency of insurance firms based on the regular incidence of consumer fraud and companies' rejection in the insurance industry. This results in low market penetration and prohibitive costs in the insurance industry. Chen et al. (2021:2) were of the view that a decentralised blockchain network consensus enables the members to collectively agree on the validity and order transactions without relying on a central authority. Through decentralised consensus, blockchain networks establish trust by ensuring that transactions are validated and agreed upon by most of the members in the network and it eliminates the need for intermediaries or centralised entities which insurance is spending in paying intermediaries (Brophy, 2020; Trivedi and Malik, 2022:82-92).

Bakici (2021:67) and Madhani (2022:13-14) argued that with blockchain decentralisation, trust between parties no longer has to be executed by the third party and thus makes the transaction quicker, enabling peer-to-peer interaction among customers without any third and cost-effectiveness which will result in affordable insurance policies. It has also been discovered that insurance spend 40% of their time on the claims management process due to the intermediary or central authority and decentralisation control can ensure fast and more accurate claims management by providing improved service to the insured at the sometimes (Njegomir, Demko-Rihter and Bojanić, 2021:1-10). Conversely, Sazu and Jahan (2022:287) argued that BT exposes new risks to interactions that were previously handled by a central body. As a result, decisions now depend on consensus which may not always indicate what is right. Despite this critique, the literature review indicated that decentralisation will improve decision-making and results in efficiency as there no longer third party to be consulted prior making decision.

#### **2.4.6 Automated transaction**

Hassan et al. (2021:8) defined automated transactions “as time-stamped events that happen to create blocks in the ledger”. Automated transactions are stored using private or public keys giving the participants the option to be unidentified. Nevertheless, identities can be assessed and verified by third parties (Hassan et al., 2021: 8-9). Mathur, Kalla, Gur, Bohra and Liyanage (2023:5-31) believed that trust and harmonisation in the system are ensured as all transactions and other data are transparently certified before joining the ledger using the Merkle tree presented by Ralph Merkle. The Merkle tree is a complete binary tree structure that helps with the verification and assurance of consistency of data by helping to haste security authentication in big data systems. Issues such as mistrust and contract disputes in the insurance industry, according to Sun (2022:1-6), can be solved through technical means such as time stamping thereby enhancing the level of trust and security. The customer’s transaction information will be kept in the chain and form a consensus on the BT which fundamentally eliminates potential risks such as information tampering. As BT is underpinned by protocols that require users to confirm transactions as a precondition for posting, Baiod et al. (2021:78-105) argued that the validity of transactions is ensured. As a result, automated transactions will enhance operations, combat fraud and foster trust among stakeholders because once blocks are created, added to the chain, ordered accurately, and timestamped an immutable record of the sequence and timing of the blocks in the chain is created. Kesharwani et al. (2022:3) opined that BT can be time consuming as it requires peer-to-peer verification every time a transaction is conducted. This results in inefficiency. However, BT verification helps in delaying payment processes at later stages by detecting errors in the first few stages, thereby speeding up processes and making the system more efficient.

### **2.4.7 Reliability**

Oberoi and Kansra (2021:283) defined reliability as “the degree to which a system works constantly or trustworthiness of the system that extracts reliable data to help the organisation and customers make logical decisions”. Insurance companies spend an amount of time on signing an agreement maintenance of the database, payment and collection because the system is not reliable which results in high administrative costs (Chen et al., 2021:13). Boustani and Elisabetta (2022:298) maintained that insurance companies frequently fail to efficiently manage data and data must be able to be saved in an irreversible and permanent which is currently a challenge in the insurance industry. Moreover, if the family’s insurance history is not clear, the applicant must apply to each insurance company to check the insurance contents one by one to sort out all the insurance rights and interests because of the lack of reliability insurance industry (Chen et al., 2021:13). Oliver (2021:2) and Grima, Kizilkaya, Sood and Erden (2021:15) argued that BT will improve the accuracy of data and information management and reduce errors during work. BT will also notify customers about the premium due date, display the history of policy, speed up claim disputes and help to eradicate inefficiencies and enhance customer services (Oberoi and Kansra, 2021:279; Boustani and Elisabetta, 2022:299).

### **2.4.8 Collaborative application of blockchain technology**

According to Sun (2022:1), the collaborative application of BT will bring a massive transformation in the South African insurance industry and across the globe. With the adoption of BT, the insurance industry is undergoing a reconstruction of insurance formats, a remodelling of the insurance value chain and a renewed insurance experience. BT will enhance the insurance value chain, decrease operational costs, improve, coordination, sustainability, customer engagement, and competitive advantage alleviating fraud and tightening data security (Chen et al., 2021:3-7; Oberoi and Kansra, 2021:277-280; Noor, 2022, 14; Shetty et al., 2022:1-13; Sun, 2022:1-7).

### **2.4.9 Value chain**

As an activity analysis, the value chain was seen by Rajeb and Rajeb (2021:3) as “one of the most applied analytical tools used by companies to diagnose and improve their firm’s competitive advantage”. This approach distinguishes between business activities, dividing them into smaller and more manageable pieces and analysing each activity’s impact on cost and value to optimise the value chain (Wadnerson, 2022:5). In Cappiello’s (2020:1) view, blockchain is destined to modify the financial and insurance ecosystem, impacting all activities that compose the whole insurance value chain, from product development to pricing underwriting, sales and distribution, marketing underwriting and claiming. Porter (1998) described value activities to be physical and technologically distinct activities a firm delivers to its customers and distinguishes between the primary and supporting activities. The insurance industry’s primary activities consist of marketing, product development, sales, underwriting and claim management, while

support services include general management, human resources, and the legal department (Popovic et al., 2020, 8).

## **2.5 Product Development**

Thiyagarajan, Sathya, Anusha and Kavitha (2023:85) defined product development as “a series of steps that include the conceptualisation, design, development and marketing of newly created”. Product development is a crucial stage that requires due diligence by insurance companies to ensure the product is customised (Antonella, 2020:4). Boileau (2022:5) stated that a growing number of newly formed insurers are focusing on consumers by offering better services to obtain a big market share and competitive advantage. Kar and Navin (2021:8) highlighted that smart contracts and BT will give birth to new products that will be attractive to customers and provide a competitive advantage. They further indicated that an incentive for the of birth new products is that they will be very cheap considering the low administrative costs involved, while increase the profit margins of the insurance companies. Yet, Oberoi and Kansra (2021:281) cautioned that to develop a product or service that is customised the insurance companies need the availability of big data of customers. Chen et al. (2021:13) concurred that the insurance industry depends on a large amount of data for survival in terms of developing new products and services. A lack of customer trust in the insurance industry is the main factor that prohibits the development of the insurance sector due to the leakage of customer information and violation of customer privacy (Boileau, 2022:3). As a result, Big Data is imperative. Trivedi and Malik (2022:91) argued that by using BT, copious amounts of data may be efficiently managed, shared, and monetised. The authors went on to say that blockchain and smart contracts will help the insurance industry develop new products for competitive advantage and attract customers which enhances insurance market penetration. Sun (2022:4) recommended BT in the insurance industry by affirming that in insurance product development and design, with the immutability of BT, insurance companies can deeply mine data information of insured customers and further optimise risk pricing and product innovation which can improve the richness and fit of insurance products at the lowest price. In contrast, Bhuvana, Madhushree and Aithal (2020:150) argued that a lack of interoperability is a challenge in BT as insurance heavily relies on big data to develop a customised product. Therefore, BT is used in conjunction with other applications including Big Data that can guarantee reliable data. Furthermore, ongoing investigations are attempting to address the issue of interoperability.

### **2.5.1 Marketing**

Online advertising has become an essential part of the business world in sectors across the world. Desai (2019:1) described marketing as “activities a company undertakes to promote the buying or selling of a product or service” and digital marketing as the “marketing of products or services using digital technology on the internet, but also including mobile phones, display advertising and any other digital medium”. Despite the benefits of online advertising including

measurability, interactivity, increased revenue, trust and cost-effectiveness, numerous issues are associated with it in the insurance industry (Baiod et al., 2021:96-106). Stakeholders in the insurance industry are concerned about the confidentiality of the information and viewers' advertising data, while publishers and advertisers are concerned about fraud, inefficiency, measurement and cost in advertising. According to Guidi (2020:97), existing online advertising is built on centralised systems that store all customers' information which raises challenges due to customers not actively controlling their data, thus their data can be managed, sold or stolen. To combat this issue, Krishan (2018:97) highlighted that BT will enable direct connection between stakeholders in online advertising without intermediaries which helps to provide accurate information. Baoid et al. (2020:97-103) further argued that BT through smart contracts will reduce transaction costs, create trust and share information about the third parties' reputation for honesty which will build transparency, control spending, and reduce fraud. The literature review confirmed that through BT, customer data will be in the control of customers which will prevent fraud as there will be no need for third parties in the insurance industry. Conversely, Elliot, Floden, Overland, Raza, Staron, Woxenius, Basu, Rajput, Schnelder and Stefansson (2021:7) argued that despite all these benefits of BT in the insurance marketing environment, there are still some challenges including standardisation, infrastructural problems, operations issues and the cost of implementing BT. The infrastructure of BT has shifted from being centralised to decentralised, allowing customers to own their data. This shift minimises fraud and provides customers the peace of mind to freely interact with insurance agents without concerns that their data will be misused. Additionally, the implementation costs will be doubled by the savings on administrative expenses and the increase in sales brought about by market penetration.

### **2.5.2 Sales and distribution**

Sales and distribution is “the process of planning, organising, and controlling the activities of a company's sales force and distribution network” as described by Panda and Sahadev (2019:7). Boustani and Elisabetta (2022:296) stated that the insurance business is one of the industries that is marked by fierce rivalry and price-conscious clients. As a result, the insurance industry is experiencing high pricing pressure which decreases the sales force. Therefore, insurance companies must look for alternative ways of generating sales in a cost-effective way to succeed in obtaining sustainable competition. Mutembei and Njuguna (2019:557) maintained that an insurance company needs to sell its products/services at a -profit margin and the least cost. The only way to maximise sales is to sell at a lower price which requires the insurance company to try ways to decrease cost. Fei, Wang and Ma (2023:48) argued that BT can reduce costs, large-scale human resources, the cost of labour, and the intermediate costs of sales and improve operational efficiency which results in lower premiums paid by customers. Yang (2023:487) expected BT to increase insurance market sales by 62.73% over the coming years.

### **2.5.3 Underwriting**

Chakravaram, Ratnakaram, Agasha and Vihari (2019:4) described underwriting as the “process of evaluating insurance to determine the risk associated with the applicant by reviewing his/her submitted medical records, financial soundness and his lifestyle also taking other demographic factors of the applicant like age gender”. In Cappiello’s (2020:4-7) view, “the insurance market is characterised by information asymmetries and from the point of view of insurers, these concern the need to find sufficient information about a customer’s risk profile”. Furthermore, the ability of the insurer to calculate the cost of risk as precisely as possible is a critical component of an insurance business model; nevertheless, the insurance industry's demise stems from inaccurate information about potential customers. For Chen et al. (2021:2-7), insurance is experiencing low efficiency, and prohibitive costs in the underwriting department due to inefficiency. For example, when a consumer applies for a medical insurance policy, they have to visit the hospital for a medical examination, mail the insurance company the necessary medical certificate, either in person or by mail, and then wait for the insurance company to make a decision on their application. Bodemer (2023:2) argued that BT will enhance the underwriting process by providing access to trusted and immutable data. Brophy (2020:10) pointed out that underwriting comes from a traditional paper-based process, and it is evident that BT has the potential to innovate and radically change the insurance underwriting process for the benefit of all stakeholders. Using a decentralised and distributed ledger, data from a variety of sources, including policyholders, outside parties, and gadgets, can be safely accessed and verified by insurers. Immutable records on the blockchain guarantee the accuracy and dependability of underwriting data, lowering the possibility of fraud, cutting expenses, increasing efficiency, and removing the possibility of wrong information. This allows insurers to make better underwriting decisions by using transparent and dependable data (Trivedi and Malik, 2022:91; Bodemer, 2023:2).

### **2.5.4 Claim Management**

The Insurance Institute of South Africa (2021:126) specified that a claim is “a formal request by a policyholder to an insurance company for coverage or compensation for a covered loss or policy”. Amponsah et al. (2021:455) stated that processing insurance claims may be incredibly laborious, time-consuming, ineffective, and prone to human error; especially when validation is accomplished through paper procedures. In addition, there is a lack of transparency in the claim submission process, and the processing is linked to unfavourable consequences such as delays and errors that result in subpar customer service because multiple entities are involved, including insurers, insured parties, regulators, and third parties. These entities are typically characterised by inefficiencies and maliciousness. Popovic et al. (2020:9) contended that the claim process is costly because of manual administration, reconciliation and settling the dispute. Fraud is also a potential issue for the policyholder due to information asymmetry and data silos. In a study by Njegomir et al. (2021:28) on claim processes in the insurance industry, they found that claims and the costs related to their processing represent approximately 75% of insurers’ total costs and

40% of the time spent on a claim. This results in low productivity. Popovic et al. (2020:9) argued that BT will bring solutions to the insurance industry in terms of claim management by ensuring that the insurance product is written into smart contracts which automatically pay out claims upon receiving the right parameters. The literature review indicates that BT will significantly improve customer claims by making the process user-friendly and transparent and prevent fraud by eradicating duplicate claims. Similarly, Bodemer (2023:2) stated that after the validation process is finished, smart contracts will handle the computation and payment of claim compensation. Contracts provide the ability to release funds in accordance with predetermined guidelines and conditions, resulting in a quicker and more efficient payout. However, Meena and Meena (2020:2) argued that there is lack of technical skills because BT cannot operate itself and requires a workforce with the required skills. Therefore, the insurance industry needs to train employees on how to operate the system to reap the benefits of BT.

### **2.5.5 Human Resource**

Human resources were defined as “employees/personnel /workforce/manpower, and technological resources, system, computer, and technical know-how and the process of getting the suitable candidate for vacant positions in an organisation” by Dash (2023:7). Yi, Yung, Fong and Tripath (2020:5) surveyed the cost of bad hires, the findings revealed that 37% of employees cited less productivity, 32% wasted time recruiting and training employees, 31% found unmatched and poor work quality, and 50% of new hires quit within six months. Insurance incurs a lot of costs due to employees who quit after training before they actually start working. Therefore, it is important when searching for an employee to select from a massive pool of prospective employees to get the best candidate that matches the job specification. The insurance industry requires an honest person with integrity as the insurer wants someone who is going to represent them and live their values, which include respect, honesty and integrity. According to a report issued by AmaBhungane in 2022, Postbank, one of the state-owned banks in South Africa, lost an amount of R90 million to employees or contractors who revealed system vulnerabilities to fraudsters. In another study conducted by Alexander Forbes in 2022, it was indicated that fraudsters can hack HR Payroll to pay a non-existent employee which sometimes takes up to 18 months for a company to notice.

The process of getting the best candidate in the insurance industry is slow and inaccurate. Moreover, the potential for fraud due to prospective employees tweaking their resume to suit the job specification emphasises how complex it is (Fachrunnisa and Hussain, 2020:7). BT can enhance employers’ ability to verify and assess the education, skills and performance of potential recruits and prevent fraud and cybersecurity in HR, including employees and contractors (Yi et al., 2020:15).

### **2.5.6 Customer engagement**

Customer engagement is described by Bansal and Pruth (2021:45) as “persuading customers to get involved in the experiences business build for them”. Consumers are becoming digital consumers and attempting to interact with businesses online. Consequently, businesses must opt for various digital channels to connect with them. Madhani (2022:16) was of the view that customers across industries require more integrity and transparent business practices which is currently lacking in multiple sectors including in the insurance industry. Customer trust is typically the heartbeat of the insurance industry and brings sustainable competitiveness. According to customer principles, acquiring a new customer can cost five to seven times more than keeping the existing one (Madhani, 2022:19). A lack of customer-centric technological innovation in the insurance industry has been their downfall as it relates to customer engagement. This is mostly due to a lack of transparency and data security (Sun, 2022:4). In this context, Yin (2023:95) was convinced that BT in the insurance industry will bring major transformation in the customer engagement process and has the potential to expand interaction with customers and to enhance customer services. Furthermore, keeping customer data secure is the biggest challenge for insurers and BT will solve that problem as BT data is not held centrally. This provides relief to customers as they can engage with insurers without having to worry about the security of their confidential data. In support, Oberoi and Kansra (2021:279) stated that BT will enhance customer engagement by reminding customers about premium collection dates, policy displaying, the customer policy history, the online purchasing policy, customer loyalty points and the availability of claim options. Halima and Yassine (2022:10-15) conducted a study on the implementation of blockchain in insurance operations in the Moroccan insurance industry. They discovered that for the last couple of years, the customers have been incredibly happy to experience the changes brought by BT and it drastically improved customer engagement.

### **2.5.7 Operational Costs**

Operational costs were described by Egieya, Amidu and Hachaichi (2023:3) as “day-to-day business expenses such as salaries, wages, cost of maintenance, material, supplies and insurance”. Sun (2022:3) stated that the traditional insurance process is complex, inefficient and costly and the cost of additional insurance companies is labour costs and operational costs. Pillay and Njenga (2020:100) believe that most insurance companies still use traditional channels such as commission agents which skyrockets administration costs. For Callay (2019:5), more human intervention increases processing costs, and these costs compound the pressure on consumers, often leading customers to cancel their policies. The Accenture report in 2023 shows that 55% of South African policyholders changed insurers within three years due to expensive premiums (Pillay and Jenga, 2021:100). Hooper and Holtbrugge (2020:5) contended that BT is going to reduce operational costs through smart contracts which eliminates the human intervention in multiple insurance operations including agents. The importance of BT in the insurance industry was highlighted by Zheng et al. (2020:2) who argued that smart contracts will reduce operational

costs, resulting in a reduction in the premiums paid by consumers. Importantly, numerous reports suggest that implementing BT in the insurance industry will reduce the operational costs of a company from 10% up to 72% due to the elimination of expensive third-party services (Njegomir et al., 2021:5; Boustani and Elisabetta, 2022:3). In contrast, Morkunas, Paschen and Boon (2019:8) stated that BT costs are exorbitant due to expensive specialised developers and require complex integration efforts. The costs might be high at the implementation stage, however after that stage, costs start to decline drastically which enables the organisation to recover their initial investment.

### **2.5.8 Collaboration**

Xia, Li, and He (2023:1) defined collaboration as a “functional network that connects suppliers, manufacturers, distributors, retailers, consumers, and third parties”. A lack of visibility in insurance when information is shared between insurers, peers, providers and claimants was mentioned by Boileau (2022:3) who considered it a loophole for fraud. Chen et al. (2021:13) highlighted that when a patient applies for medical insurance claim services, the patient must go to the hospital to apply for a diagnosis certificate and receipt, then send the relevant application to the insurance through the insurance business personnel which reveals a lack of collaboration. For Silva et al. (2019:6), collaboration in the context of insurance faces many challenges such as lack of data transparency, advanced trust mechanism, traceability and understanding among partners where each party tries to achieve its objective and there is no mutual understanding to achieve a common goal which to improve customer service. Xia et al. (2023:11) believed that successful collaboration requires all parties to establish mutual understanding and a shared vision and share resources to achieve a collective goal which is to provide outstanding customer service. In this context, blockchain will improve the efficiency of collaboration among insurers, channel partners and stakeholders and connect all these partners through blockchain, sharing and transferring information on the chain based on fully guaranteeing the privacy and security of information of all parties (Sun, 2022:5). On the one hand, Loukil et al. (2021:10) recommended BT in insurance claiming that it will enhance collaboration which will result in low premiums for customers, improve customer experience and reduce costs for insurers. On the other hand, Shetty et al. (2022:12) contended that the insurance industry faces challenges in implementing BT to fully share information. As a result, the insurance ecosystem needs to come to an agreement on the creation of BT and recognise the value of information sharing.

### **2.5.9 Sustainability**

Weiland, Hickmann, Lederer, Marquardt and Schwindenhammer (2021:2-7) defined sustainability as “fulfilling the needs of the current generation without compromising on future generations while ensuring a balance between economic growth, environmental care, and social well-being”. Economic sustainability refers to the ability of an economy to continue growing by utilising resources efficiently while social well-being is about maintaining the well-being of society (Wong et al., 2021:8). Furthermore, organisations must be consistent in providing the

service or producing a product to obtain a competitive advantage. BT has the potential to enhance the efficient use of resources in insurance and play a decisive role in improving global warming which harms our lives in many aspects. According to Park and Li (2021:7), there are two fundamental reasons why focusing on sustainability is critical. First, the role of the supply chain has become vital in all sectors including the insurance industry and over 93% of the world's 250 largest firms report on sustainability which requires them to abide by sustainability regulations. Second, incorporating emerging technology in the supply chain in industries could enhance the regulations already in place to promote sustainability. Collier, Elliot and Lehtonen (2021:9) stated that insurance lost an estimated amount of \$144 billion due to climate change which emanates from the burning of fossil fuels and diesel fuel and insurance.

Blockchain has become a prominent technology across various sectors including transport, health and finance based on its features including smart contracts, reliability, limpidity and immutability to promote sustainability (Wong et al., 2021:3). Berg and Myllmaa (2021:9) speculated that “identifying and managing environmental risks in various industries is challenging due to a lack of transparency and visibility”. The incorporation of BT in the insurance industry can enhance the efficient use of resources through transparency and can also provide real data to insurers in reducing greenhouse gas emissions (Saber, Kouhizadeh, Sarkis and Shen, 2019:2-13). By recognising, evaluating, controlling, and keeping an eye on risks and opportunities related to environmental, social, and governance concerns (UNEFPI), BT can guarantee that all activities within the insurance value chain are carried out responsibly and with an eye towards the future. Conversely, Kumar and Duong (2023:34) maintain that BT's high power infrastructural requirements have a negative effect on the environment due to high energy consumption. However, the overall benefits that emanates from employing BT will justify the high-power usage.

### **2.5.10 Competitive advantage**

Subrahmanyam and Azad (2019:138) described competitive advantage as “the ways that a firm can produce goods or deliver services better than its rivals”. Owing to its complexity, the insurance sector has emerged as one of those most impacted by technical advancement during the explosive growth of global financial technology. With the rapid development of emerging technologies such as blockchain, the insurance industry has quickly begun to use these emerging technologies, transforming old methods and aligning itself with BT in order to cut costs while delivering high-quality goods and services that meet consumer demands. Kimani and Paul (2021:8) stated that competition in various industries has gained a high momentum in the modern market dynamics through emerging technologies which have changed how the business is operating including the application of strategies. Pillay and Njenga (2021:101) observed that insurance operating costs are higher than in other sectors of the financial service industry which impedes the competitiveness in this sector, as these costs are passed on to customers in the form of premiums and insurance policies become affordable. Therefore, Al-Jaroodi and Mohamed

(2021:2) predicted that BT will reduce costs significantly and, accordingly, insurance can also lower the price of their insurance goods and up their level of competition to draw in more clients. Importantly, as BT will make it possible for insurance businesses to introduce new automated insurance solutions for their clients without having to worry about expensive administrative costs, insurance policies will become more competitive and more inexpensive for consumers (Al-Jaroodi and Mohamed, 2019:2; Srivalli et al., 2023:6; Fei et al., 2023:44). Shetty et al. (2022:12) argued that many insurance companies do not have sufficient information of BT and how it will sustain their business growth strategically. Despite this argument, BT has proven in many industries across the globe that it provides a sustainable competitive advantage.

### **2.5.11 Alleviating fraud**

Fraudulent activities present a significant issue to businesses since they result in significant expenditures for the insurance industry when resolving claims because of deliberate oversight, fraud, and loopholes. Fraud was defined as “an act of or omission intended to gain dishonest or unlawful advantage” by Suseel and Rastogi (2022:17). Insurance fraud is an issue for insurers as well as sincere policyholders since it causes them to lose anywhere from 0% to 15% of their revenue. Fraud is divided into three categories. The first category includes claims/policyholder/customer fraud which describes fraud against the insurance company during the purchase, execution or claims processing of an insurance product or policy. This category involves exaggerating losses/damages, staging un-occurred incidents, falsely reporting, and claiming damage loss and false death claims (Suseel and Rastogi, 2022:1). The second category is intermediary fraud including insurance agent /third party administrator agent or any intermediary perpetrates any fraud against the policyholder, customer or the insurance. This category involves premium diversion where the premium is collected from the buyer but not passed on to the insurer through the intermediary, failure to disclose or misrepresent the risk for lower premiums, commission fraud trying to ensure non-existent policyholders by paying the initial premium (Suseel and Rastogi, 2022:20). The third category is internal fraud. This is when a director, manager or officer in the higher ranks indulges in misappropriation or fraud against the insurance company and this involves fake documents and falsification of signatures. Insurance fraud is the gravest problem threatening the feasibility of insurance companies across the globe, and it has the power to drive up premiums for policyholders and destroy the entire industry.

Common fraudulent activities occurring in the insurance industry include manipulating another person's policy, fabricating a death to gain benefits under a policy, or submitting false or inaccurate information on the application to obtain coverage and maybe reduce prices (Syamkumar et al., 2021:550). According to statistics, India suffered R45.000 crore in 2019 and in the same year, insurance fraud totalled \$100 billion in the United States, \$4 billion in Australia, \$3 billion in the United Kingdom, and \$2 billion in the other Eu nations (Chen et al., 2021:1; Loukil et al., 2021:1; Suseel and Rastogi, 2022:18). The Association for Saving and

Investment South Africa (2021:3) reported that there was a 12% increase in South African life insurance from 2019 to 2020 totalling R587.3 million, compared to 2837 claims (537.1 million) in 2019, and in 2021, dishonest claims were worth R787.6 million. Kar and Navin (2020:10) opined that the insurance industry's main motivation for adopting BT is to prevent fraud which threatens the existence of this sector. Furthermore, Sathya and Balakumar (2022:10) added that BT in insurance is not only to prevent fraud but to enhance operational efficiency in all areas of the insurance from development to the claim stage. Other studies conducted regarding BT in the insurance industry to alleviate fraud indicated that its immutability feature BT significantly prevents fraud. When a stakeholder tries to commit fraud, the system will detect an attempt before it occurs and alert the stakeholders of any potential fraud that could be perpetrated (Baiod et al., 2021, 94; Sazu and Jahan, 2022:277; Trivedi and Malik, 2022:89; Bohyer and Hayajneh, 2023:7). But according to Baiod, Light, and Mahanti (2021:104), there are barriers to reducing fraud in the insurance sector, including a lack of knowledge of BT and a lack of skills among stakeholders to manage BT. Therefore, insurers need to spread awareness by facilitating workshops with their stakeholders about the risk of fraud and the significance of alleviating fraud.

### **2.5.12 Data Security**

Lu, Huang, Zhang, Maharjan and Zhang (2020:2) defined data security as “the process of safeguarding digital information throughout its entire life cycle to protect it from corruption, theft and unauthorised”. Bhavani, Bhavani, Rajitha and Vaishnavi (2023:9-15) cautioned that an increasing amount of personal data, including location information, and web-searching behaviours in various industries particularly those dealing with customers daily such as insurance companies, are being collected by the built-in sensors inside the products which bring a huge risk to privacy leakage of data owners. Likewise, Sun (2022:3) stated that customer data in the insurance industry is facing serious threats, and problems such as information leakages, loss and theft have caused huge violations of customer privacy. Alarmingly, these technological developments in the insurance industry employ a centralised server model that exposes the industries to security and privacy limitations (Rahimi and Gudapati, 2023:167). Although the existing centralised system in the insurance that is used to keep customer data could provide security to a certain extent, Rahimi and Gudapati (2023:167) warned that it could crash due to malicious attacks or faults. This issue can be resolved through network decentralisation by the adoption of BT. Hawayek (2023:2) advocated the adoption of BT in the insurance industry by affirming that it will enhance security for sensitive customer data by utilising cryptography and distributed consensus mechanisms, customer data can be stored securely and accessed only by authorised parties. However, according to Al-Jaroodi and Mohamed (2022:9), security is the primary issue because BT applications are extensively connected into the internet and are susceptible to cyberattacks, such as theft, which might render them unusable. Through decentralising the data, only authorised stakeholders will have access to it to safeguard the data

from cyber-attackers. Further, BT designers include security and privacy as the integral elements of BT.

## **2.6 Obstacles to the Implementation of Blockchain Technology**

Despite all the overwhelming benefits of BT, the literature review revealed some scepticism concerning blockchain's real potential (Akande, 2018). Additionally, a lack of knowledge exists regarding the technology, its applications, and its legal ramifications (Shetty et al., 2022). Businesses will need to incorporate blockchain-based solutions into their current network and information infrastructure. However, certain insurance products, like life insurance and property insurance, have unique business models or frameworks that work in different ways. Based on the diversity of insurance offerings, blockchain-based applications for the different players in the network will have to be designed and developed. Choosing the right technology stack and obtaining IT support for the application present additional challenges. According to Zhao (2020:305), there are other barriers to blockchain-based insurance due to the regulatory environment. While blockchain-based insurance avoids enforcing regulation, there is a chance that the lack of a legal framework will result in inefficiencies, like premiums not being invested effectively, and that such insurance may be essentially prohibited by the legal system.

## **2.7 Conclusion**

This chapter provided a comprehensive discussion of the theoretical and conceptual framework of the insurance industry by examining the existing literature to reveal the gap that needs to be filled. A lack of transparency, high operational costs, inefficiency, and fraud levels in the insurance industry indicate that BT is necessary to improve and save the severely threatened industry. The literature further indicates that for the insurance industry to gain a competitive advantage must constantly engage customers who are the heart of the business and collaborate with their partners to be resilient during tough times referencing COVID-19. The existing technology in the insurance industry discussed in the insurance context revealed that transparency and fraud have not been resolved by the adoption of previous technologies. BT may prove to be the solution to the current challenges faced by insurers in their supply chain. Despite the many benefits of implementing BT in the insurance industry, there are numerous challenges that comes with BT including scalability, regulatory, interoperability, security and energy consumption. There are many continuous approaches to address these challenges such as off-chain solutions to address scalability, to develop interledger protocol to address interoperability, and unlock the full potential of BT to minimise energy consumption. Ultimately, many sectors have successfully implemented BT in their business processes. Thus, the insurance sector can benefit from BT by significantly improving insurance supply chain management, value chain, collaboration, sustainability, data security, operational costs and rooting out fraud. The following chapter (3) presents the research methodology guided by the objectives outlined in Chapter One.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

A literature review was presented in the preceding chapter to determine the role of blockchain technology (BT) in the insurance industry. The secondary data provided by other researchers in the insurance industry related to blockchain technologies was used to identify a gap in the insurance industry. This chapter details the research design and data collection techniques used to collect data. In particular, there will be an explanation of the research design, methodology, purpose, questions, objectives, approaches, study site, target population, sample, methods, sample size, data collecting, data quality, and data analysis. The chapter concludes with an explication of ethical considerations, limitations of the study and conclusion.

#### **3.2 Research Questions**

This study aimed to provide answers to the following research questions.

- What are the roles of blockchain technologies on supply chain performance and operational efficiency in the insurance industry?
- To what extent do blockchain technologies influence supply chain collaboration, organisational effectiveness, and sustainability in the insurance industry?
- How do blockchain technologies influence the establishment of a resilient competitive supply chain in the insurance industry?

#### **3.3 Objectives of the Study**

The following objective emanated from the research questions to guide the study.

- To identify the role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry
- To determine how blockchain technologies influence supply chain collaboration organisational effectiveness, and sustainability in the insurance industry
- To establish how blockchain technologies influence the establishment of a resilient competitive supply chain in the insurance industry.

#### **3.4 Research Methodology**

The research methodology refers to the method the researcher adopts to conduct a study (Bryman et al., 2022:155). There are three types of research methodologies namely, quantitative, qualitative and mixed research approaches. Quantitative data is based on countable or measurable and may be presented graphically while qualitative data is interpretational-based, descriptive and related to language (Fiester et al. (2019:16). A mixed methods approach

incorporates both quantitative and qualitative methods. The researcher judiciously employed a qualitative methodology for gathering and analysing non-numerical data using in-depth interviews as a data collection tool to address the research objectives. As opposed to quantitative methods, Creswell and Poth (2019) attested that qualitative methods allow researchers to explore participants' narratives and uncover the social construction of their experiences. In qualitative research, respondents are able to freely disclose their experiences, thoughts and feelings without constraint. Moreover, Fiester et al. (2019:16-17) argued that a qualitative research approach enables the researcher to collect data and to get closer to the phenomenon in a way that is denied to quantitative researchers. Through adopting this method, the in-depth interviews provided data-rich insight into participants' perceptions and experiences about the use of BT at Old Mutual. Consequently, it allowed the researcher to construct meaning from the participants' experiences.

### **3.4.1 Research design**

Research design was described as “a strategy and methodology applied for data, extending beyond general assumptions to determine ways of collecting data and reasoning” by Rezigalla (2020:1). A research design is also known as “a technique, method and structure that directs and guides the collection and analysis of data” (Creswell and Creswell, 2022:95). A research design is based on the nature of the research problem or issue being addressed, and the researcher's subjective experiences. Sileyew (2019:4) stated that “research design allows the researcher to relate empirical data to its questions or objective and then to the conclusion logically and coherently to get answers from the research objectives.” Because the study employed a case study methodology, the researcher was able to ascertain the connections between the variables under investigation. In this study, the researcher aimed to determine the relationships between blockchain and insurance processes in the insurance industry. Yin (2019:19) perceive a case study as “a research approach that is used to generate an understanding of a complex issue in its life context”. Case study design research is effective for causal studies where pattern-matching can be used to investigate certain phenomena (Aversa et al., 2021:6). Consequently, a case study design was deemed appropriate to explore the role of blockchain technologies in influencing supply chain performance in the insurance industry. Secondary data from journals, articles, and publicly available documents from insurance companies in the insurance industry were perused to identify a literature gap in order to attend to the research objectives. The data were collected from Old Mutual insurance senior managers, supervisors, and financial advisors who had relevant experience with BT in the organisation.

### **3.4.2 Research approach**

The research approach is “the procedure selected by the researcher to collect, analyse and interpret data” (Creswell and Creswell, 2022:195). Typically, inductive research is applied when there is little to no prior literature on a subject. Bryman et al. (2022:34) stated that an inductive approach normally involves developing a theory from qualitative data. An inductive approach begins with collection data and allows the researcher to develop a theory based on the patterns

and themes that emerge from the raw data (Thomas, 2003:4). Likewise, interpretive research involves deriving a theory about the phenomenon of interest from the existing observed data. Kirongo and Odayo (2020:4) indicated that the selection of philosophy depends on the question that would be asked in the research. Furthermore, an interpretive philosophical perspective assumes that reality is subjective, multiple and socially constructed (Alharahsheh and Pius, 2019:41). In this study, both the interpretive and inductive methods correlated with the qualitative research design. The researcher depended on the patterns emerging from the experience of the participants with blockchain's role in the supply chain in the insurance industry to conclude the findings.

### **3.4.3 Target population**

According to Bryman et al. (2022:6), a target population comprises a group of characters that possess common attributes that hold interest for the researcher. The target population for this study was Old Mutual staff based in the Durban offices. The Old Mutual office has about 230 staff including management. There are approximately 30 Senior Managers 20 Supervisors and 180 Financial Advisors. Old Mutual is one of the biggest insurance companies in the world and possesses more than half of the insurance market share in South Africa. As a result, Old Mutual's senior managers, supervisors and financial advisors are more knowledgeable about blockchain technologies in their operation which aided the study in achieving its main objective.

### **3.4.4 Study setting**

Sileyew (2019:5) defined the study site as "the location where the study will be conducted to collect the data". In this study, the study site was Old Mutual in Durban in the centre of KwaZulu-Natal under eThekweni Metro Municipality. Old Mutual is one of the biggest insurance companies in South Africa and globally. Old Mutual has branches in every mall in South Africa as part of enhancing customer service and reducing unemployment rates. It possesses a big market share in the insurance industry due to a high level of technology utilisation to penetrate new markets and enhance supply chain performance. Furthermore, Old Mutual has been leading in terms of adopting emerging technologies in South Africa starting from the Fourth Industrial Revolution (4IR) to blockchain technologies. Therefore, using Old Mutual as a study site was beneficial to the study and other insurance companies due to the level of experience Old Mutual has in adopting various emerging technologies and their influence in the insurance industry.

### **3.5 Sampling Method and Design**

Yin (2019:20) defined a sample as "the subset of the entire group from which data is collected by the researcher". The study sample was selected from senior managers, supervisors and financial advisors. Specific participants who work with blockchain daily were selected for the study. Their participation was invaluable in achieving the study's primary goal, which was to ascertain blockchain's function in the insurance industry. Furthermore, Old Mutual was selected as it occupies more than half of the insurance market share in South Africa. Durban was selected

as the location for the study since it was the point of origin. Blockchain was first piloted in Durban and all those senior managers, supervisors and financial advisers possess vast knowledge about how it works, and what the challenges and benefits of having BT at their disposal.

### **3.5.1 Sampling method**

Stratton (2021:1) identified the sampling method as “the process of selecting a sample population from the target group”. There are two types of sampling methods, non-probability and probability (Bryman et al., 2022:213). Probability sampling selects a sample from a population based on the randomisation principle, whereas non-probability sampling selects units from a population using a subjective process (Locke and Latham, 2019:8-9). In this instance, qualitative research sought to understand social phenomena from the perspective of those experiencing them. Therefore, the study adopted a non-probability sampling method as the selection was based on specific characteristics. As a non-probability technique, using purposive sampling meant that the researcher could focus on participants with unique or special characteristics (Andrade, 2021:3). Furthermore, Patton (2001) stated that purposeful samples can be stratified or nested by selecting particular units or cases that vary according to a key dimension. By adopting a hybrid method of stratified purposive sampling, the researcher could not only select participants based on their knowledge and experience but also subdivide that population into strata, for example, senior managers, supervisors and years of service. A stratified purposive sampling enabled the researcher to target specific criteria of people to provide appropriate answers to the research questions and achieve the aim of the research.

### **3.5.2 Sample size**

According to Bryman et al. (2022:229), sampling size is “the number of participants or observations included in a study”. Sakaran and Bougie (2019:287) contended that an appropriate sample size must range between 30 and 500 participants. Old Mutual had 230 staff comprised of 30 senior managers, 20 supervisors and 180 financial Advisors. Five (5) senior managers were selected because they formulate that strategies to decide what technology is appropriate for Old Mutual's supply chain to obtain a competitive advantage. In the second strata of supervisors, 5 were selected based on the experience of 6 years at Old Mutual. In the third stratum of financial advisors, 5 advisers were selected based on the experience of 6 years. A total of 15 staff members were selected to participate in this study. This sample size was chosen to achieve saturation rather than maximise the findings' potential for generalisation suggested by Saunders, Sim, Kingstone, Baker, Waterfield, Bartlam, Burroughs and Jinks (2018). The goal of this sample size, as supported by Brink (2006), did not focus on the generalisability of findings but the identification of appropriate respondents who could provide information based on the experience participants had with Old Mutual before and after the adoption of BT.

The participant's responsibilities in the organisation were as follows:

- Senior managers were responsible for formulating a strategy that is compatible with the vision of the organisation and ensuring that they adhered to the company act law. They oversaw the performance organisation and supervised the work of the middle managers.
- Supervisors were responsible for putting into practice the strategy formulated by senior managers and supervising the work submitted by the financial managers.
- Financial advisors sold the organisation's products to the customers and supervised their work before submitting it. They implemented what was formulated by senior managers and put into practice by the middle managers in pursuit of the organisation's mission. All these participants were using blockchain technologies to collaborate and thus were able to provide valuable information on the role of blockchain relating to competitive advantage, value proposition, customer engagement, cost advantage, rooting out fraud, sustainability, value chain, resilience and security in the organisation.

### **3.6 Data Collection**

Bryman et al. (2022:365) defined a data collection method as “a technique the researcher uses to collect information relating to the problem identified in the study”. Typically, data collection methods include five data collection instruments which are interviews, questionnaires, observations, document analysis and unobtrusive methods (Sakaran and Bougie, 2019:184). According to Jentoft and Olsen (2019:5), an interview is a qualitative data collection instrument that entails asking open-ended questions to interact with the respondents and collect data about the study. The second instrument, a questionnaire, is a data collection instrument that contains a series of questions to be answered by the participant relating to the research study (Gaete, Valenzuela, Godoy, Rojas-Barahona, Salmivalli and Araya, 2021:3). The third instrument, observation, can be defined as a data collection instrument that entails observation which is based on the observer's subjective interpretation of what they see (Hurst, 2023:5). Document analysis, the fourth instrument, is a qualitative research method that investigators employ to gather data, which entails assessing written and electronic records to decipher their significance and expand on the data participants supplied (Morgan, 2022:6). In this research study, in-depth interviews were conducted to obtain the participants' experiences and perceptions of the role of BT at Old Mutual in the Durban offices. This was in line with Sharma (2022:7) who indicated that an interview enables the researcher to probe deeper about the respondent's experience and knowledge about a phenomenon or study topic.

#### **3.6.1 Interviews**

As a research instrument for collecting data, interviews are used to get information about the research study to achieve the research objectives (Thunberg and Arnell, 2022:6). An interview permits the researcher to draw a dialogue about their experience of a phenomenon (Rahman, 2020:9). The advantage of using interviews for data collection, was that it allowed the researcher to ask open-ended questions to get to know more about the participant's experience and knowledge about a phenomenon or study topic, as supported by Sharma (2022:7). Bryman et al.

(2022:269-270) identified two types of interviews. Semi-structured interviews provide a lot of freedom while adhering to the interview rules (Adeoye-Olatunde and Olenik, 2021:6). It allows the researcher to probingly investigate any subject. It is suggested that the researcher should use semi-structured interviews if the time is limited. The second type of interview, in-depth interviews, are designed to collect information for research purposes and the interviews permit the researcher to know the respondents better (Rutakumwa, Mugisha, Bernays, Kabunga, Tumwekwase, Mbonye, and Seeley, 2020:7). The study employed in-depth interviews as the researcher wanted to elicit the respondents' perceptions and experiences about the role of BT at Old Mutual. The interviews were conducted face-to-face. The interview guide which aided the researcher in asking the questions contained two sections. Section A comprised demographic information and section B comprised nine headings which covered all the research questions. The interview was recorded to allow the researcher to capture everything that was said. Interviews were both recorded and written down to ensure that interviewees' utterances were captured accurately. Interviews lasted approximately 30 minutes each. Thereafter, the researcher listened to the interview recordings several times to ensure that the interviews were transcribed verbatim, and the transcribed interviews were submitted to the participants to check if this is the participant's interpretation point of view.

### **3.6.2 Data quality**

For Mezmir (2020:6), data quality is “the process whereby the researcher ensures that the data-gathering instrument is employed to measure what is supposed to be measured consistently.” Lincoln and Guba (1994) proposed “trustworthiness and authenticity” as the primary criterion for assessing a qualitative study. The findings should be evaluated using the following criteria: trustworthiness, credibility, transferability, dependability and confirmability. According to Bans-Akutey and Tiimub (2021:7), a triangulation test is required to cross-check findings from both qualitative and quantitative research and the following criteria should be employed, trustworthiness which consists of credibility, dependability, transferability, conformability, authenticity and reflexivity. Bryman et al. (2022:62-3) considered trustworthiness to be the process whereby the researcher ensures that the study is transferable, credibility, dependability, confirmability, authenticity and flexibility, and all these criteria are evident in the study. In qualitative research, credibility refers to how credible and reliable the data analysis is. Transferability as defined by the authors is “the extent the research findings can be applied to other research contexts”. Dependability is defined as “the extent to which a research study could be repeated by a separate researcher and reveal the same findings”. Finally, confirmability is described as “the degree to which the findings of the study conducted could be confirmed by another researcher”. In this study, trustworthiness was applied from the initial stage which is the proposal and data collection. Therefore, if the study were to be replicated by another researcher, it would yield the same results.

### 3.6.3 Data saturation

According to Mwita (2022:2), data saturation is “a point at which the researcher finds out that all needed data have been collected and there is not any new relevant information or data that can be collected from the participants”. Hennink and Kaiser (2022:2) argued that “saturation is often reached between the 9<sup>th</sup> and 17<sup>th</sup> interview, and on average saturation is reached by the 13<sup>th</sup> interview”. Therefore, the researcher realised that 15 participants would be sufficient to obtain information to the success of the study as all participants have a similar experience which is to work with sales using technology as the tool of trade. Data saturation was reached on the 12<sup>th</sup> interview; thereafter, the participants were not offering any new information that would be valuable to the study. Instead, it was a repetition of the same information which was already provided by other participants. That was when the researcher considered saturation reached.

### 3.7 Data analysis

After interviews were recorded, written down and transcribed verbatim, data analysis ensued to summarise the data collected. Data Analysis involves the interpretation of data collected using analytical and logical reasoning to identify and determine the pattern, relationship, and trends concerning the research objective (Cai et al., 2022:25). According to Cresswell and Cresswell (2022:278), data analysis consists of three steps including data reduction, data analysis and conclusions. The secondary data were drawn from the literature review which includes journals, articles, and insurance company websites, while the primary data were extracted from interviews with Old Mutual staff which comprises senior managers, supervisors and financial advisors about the role of BT in the insurance industry. Data collected through the interview were analysed using thematic analysis and NVivo software. Bryman et al. (2022:365) asserted that thematic analysis is one of the most flexible methods of qualitative data analysis. The objective of thematic analysis is to identify, analyse and describe patterns across the data set. The main benefit of utilising thematic analysis for data analysis is its simplicity which enables researchers who are new in the research space to use it. Additionally, thematic analysis does not inhibit the researcher from applying it to any theoretical framework due to its flexibility.

Mishra and Alok (2022:30) outlined six thematic analysis procedures that let the researcher to become acquainted with the data, create initial codes, search for themes, review themes, define and name themes, and produce a report.

**Step one: Familiarising yourself with the data.** transcribing data, if necessary, reading and re-reading the data writing down initial ideas. The objective here is to understand the context in which the study is conducted and contextualise the data.

**Step two: Generate initial codes.** Mark pertinent data points for each other by carefully coding the data's intriguing qualities throughout the data collection. The main objective here is to ensure data collected makes sense to the reader other than the researcher by arranging it systematically.

**Step three: Search for a themes.** Collate codes into potential themes and gather all data relevant to each potential theme.

**Step four: Review themes.** Check if the themes work well relating to the themes created in level 1 by generating a thematic map.

**Step five: Define and name themes.** The details of each of them continue analysing the whole data collected during the entire study. Make a clear definition of each theme.

**Step six: Produce the report.** The last part of the theme is to select clear, compelling extracts as examples. Analyse those extracts based on the research questions and literature and produce a scholarly analytical report.

NVivo software is qualitative software used for the analysis of interviews, unstructured text, audio and videos (Mortelmans, 2019:3). In this study, thematic analysis and NVivo software were employed to sort and analyse data collected through interviews. This approach was supported by Ataman and Tuncer (2022:6) when the researcher is trying to uncover respondents' opinions and experiences. NVivo software was employed to organise, analyse and attain insight into unstructured or qualitative data like interviews. According to Bryman et al. (2022:402-403), there are essential steps that need to be followed in coding data when using NVivo software.

**Step one:** Read the interviews in the document viewer several times to ensure understanding and put it into the context of the study.

**Step two:** Highlight the important parts of the text and create codes that are relevant to the project.

**Step three:** Go back to the documents and code them using NVivo software.

**Step four:** Alternatively, code while browsing the documents.

### 3.8 Trustworthiness

According to Bryman and Bell (2019:63-65), trustworthiness is the process whereby the researcher ensures that the study is transferable, credibility, dependability, confirmability, authenticity, and flexibility. All these criteria are evident in the study. Triangulation was used to determine trustworthiness through secondary data analysis including journals, articles and insurance companies' websites, whereas and primary data were derived directly from the interview participants. This is aligned with another requirement of triangulation which entails using "more than one method of investigation and source of data so that findings about the phenomena can be cross-checked".

### 3.9 Credibility

For Cresswell and Creswell (2022:278), credibility in qualitative research is "the extent to which the data analysis is believable and trustworthy". Research triangulation has gained popularity recently among researchers as a method to ensure the credibility of study findings. Despite there being multiple accounts of an aspect of social reality, it is the credibility or feasibility of the

researcher's account that will determine its acceptability to others, as argued by Bryman et al. (2022:63). The authors further maintain that establishing credibility entails ensuring that research is carried out according to long-standing good practice principles. Importantly, the findings should be submitted to the people who were studied to confirm that the researcher correctly understood what was asked during the interview. Thereafter the transcribed interviews were submitted to the participants to check if this is the participant's interpretation point of view.

### **3.10 Transferability**

According to Bryman et al. (2022:63), transferability is “the extent the research findings can be applied to other research contexts”. As a result, qualitative research tends to focus on the contextual distinctiveness and importance of the social phenomenon under study. This gives people access to a database so they may assess if research findings could be applied in a different setting. The transferability of this study has been achieved through the transfer of data from the interview into the qualitative data NVivo that was then classified into themes corresponding to the study objectives.

### **3.11 Dependability**

Bryman et al. (2022:63-64) proposed dependability as a parallel concept to reliability in quantitative research. It has been argued that researchers should adopt an auditing approach to establish trustworthiness by keeping complete records of all phases of the process problem formulation, selection of research participants, and the interview transcript data analysis decisions in an accessible manner. Furthermore, it has been recommended that auditing should occur after the study has been completed to ensure that good practice procedure was followed. Dependability in this study was ensured by keeping all records from the problem formulation to interview records and transcripts.

### **3.12 Confirmability**

Confirmability is “the degree to which the findings of the study conducted could be confirmed by another researcher” (Creswell and Creswell, 2022:278-279). Ensuring that the researcher behaved in good faith and did not allow personal values to influence the study's conclusions is the main goal of confirmability (Bryman et al., 2022:63). The data collected from the interview was linked to the study objective and the participants provided informed consent, and interview records have been safeguarded.

### **3.13 Ethical Considerations**

As the researcher was granted permission by the University to conduct a study, research ethics required the researcher to conduct the research professionally, following the university's procedures and processes. To obtain access to conduct the research, permission was granted by the University of KwaZulu-Natal Ethics Committee (UKZN). The university ethical clearance

application process was concluded, and access was granted before the data were collected (see Appendix D Ethical). The process was completed online on the Research Information Gateway (RIG) through which the relevant documents were submitted. Access to the study location was also provided by Old Mutual to interview the participants (they signed voluntary consent forms with all details of the research process). All participants who were involved in this study were assured of confidentiality by remaining anonymous during the entire research process. The participants were made aware that participating in this study is voluntary and that they were thus free to withdraw at any time.

### **3.14 Conclusion**

In this chapter, the research design, approach sampling, data collection and data analysis were discussed together with how they were applied. This study adopted a non-probability, stratified purposive sampling method due to the qualitative nature of the study which sought to understand the phenomena of BT from the perspective of those experiencing it. Furthermore, the chapter discussed the data collection instruments which included interviews as primary data literature review as a secondary data collection to ensure trustworthiness. All protocols were observed in accordance while conducting the research with the permission of UKZN on the Old Mutual premises. Anonymity and confidentiality were guaranteed while administering the interviews and the writing of the report. The next chapter discusses data analysis, interpretation of data and findings using and NVivo software to sort the data into themes that were analysed.

## CHAPTER FOUR

### DATA ANALYSIS AND INTERPRETATION OF RESULTS

#### 4.1 Introduction

This chapter presents the data from the interviews and analyses the results. As indicated in Chapters 1 and 3, a qualitative research approach was employed for collect collection and analysis elicited at Old Mutual, Durban through the interviews as the study aimed to explore the role of (BT) in the insurance industry. Interview questions were formulated based on research questions and aligned with the research objectives. The participants included 15 employees of which five were senior managers, five supervisors and five financial advisors from Old Mutual in Durban. After obtaining permission from all the participants, the interviews were recorded, and the researcher took notes during the interviews. Coding was used for data analysis and interpretation depending on the interviewees' responses. All participants' interview transcripts were uploaded on NVivo software and coding was created under each research question to sort the data into themes. Thereafter, each participant's transcript significant information was allocated according to its related theme to respond to the research questions and achieve the research objectives.

The main objective of data analysis and interpretation of results from the responses obtained through the interview was to gain insight into their perceptions regarding the role of blockchain technologies (BT) in the insurance industry. The following were the research objectives of this study.

- To identify the role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry
- To determine how blockchain technologies influence supply chain collaboration organisational effectiveness, and sustainability in the insurance industry
- To establish how blockchain technologies influence the establishment of a resilient competitive supply chain in the insurance industry.

#### 4.2 Backgrounds of Participants

As previously stated, the primary aim of collecting the data from the interviews was to obtain the interview participants' views of the role of BT in the insurance industry. With this aim in mind, relevant information was obtained through interviews from Old Mutual employees at their Durban Branch which falls under the eThekweni Metro Municipality. Old Mutual senior managers, supervisors and financial advisors are all using BT to improve operational efficiency, coordination, organisational effectiveness, coordination, reduce administrative costs and alleviate fraud. Five senior managers, five supervisors and five financial advisors. Senior

managers were represented by participants 1 to 5 and supervisors, were represented by participants 6 to 10 and financial advisors were represented by participants 10 to 15. The backgrounds of the participants are depicted in Table 4.1.

**Table 4.1:** Participants’ backgrounds

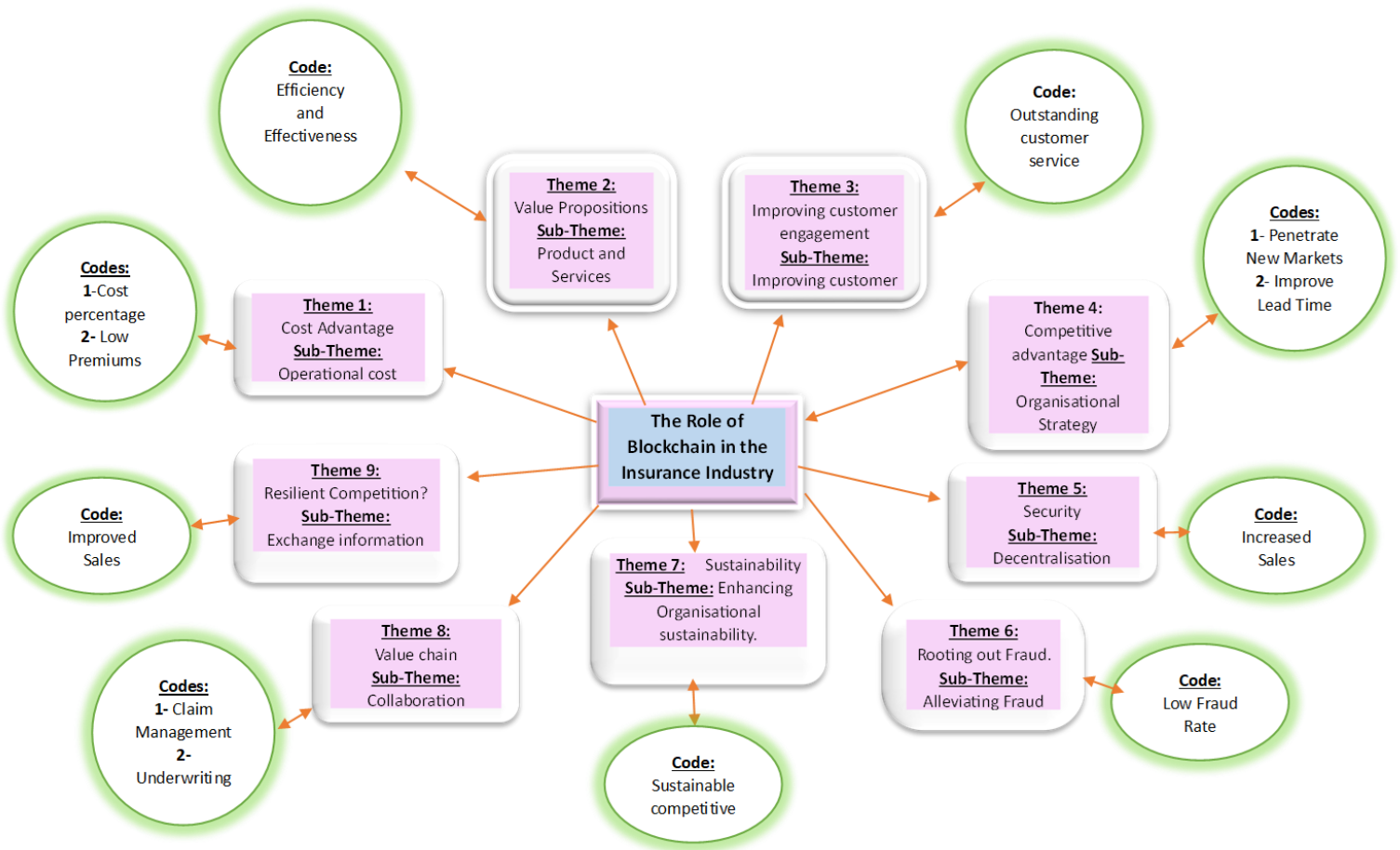
<b>PARTICIPANTS’ BACKGROUND</b>			
	<b>Position</b>	<b>Number of Experience</b>	<b>Educational Level</b>
<b>P1</b>	<b>Senior Manager</b>	<b>9 years</b>	<b>Diploma in Information Technology</b>
<b>P2</b>	<b>Senior Manager</b>	<b>17 years</b>	<b>Diploma in Marketing</b>
<b>P3</b>	<b>Senior Manager</b>	<b>7</b>	<b>Diploma in Financial Management</b>
<b>P4</b>	<b>Senior Manager</b>	<b>8</b>	<b>Diploma in Administration</b>
<b>P5</b>	<b>Senior Manager</b>	<b>12</b>	<b>BCom in Accounting</b>
<b>P6</b>	<b>Supervisor</b>	<b>6</b>	<b>Certificate in Financial Planning</b>
<b>P7</b>	<b>Supervisor</b>	<b>7</b>	<b>Certificate in Banking</b>
<b>P8</b>	<b>Supervisor</b>	<b>5</b>	<b>Diploma in Public Management</b>
<b>P9</b>	<b>Supervisor</b>	<b>13</b>	<b>Degree forensic</b>
<b>P10</b>	<b>Supervisor</b>	<b>9</b>	<b>Diploma in Business Administration</b>
<b>P11</b>	<b>Financial Advisor</b>	<b>6</b>	<b>Certificate in financial planning</b>
<b>P12</b>	<b>Financial Advisor</b>	<b>7</b>	<b>Diploma in Information Technology</b>
<b>P13</b>	<b>Financial Advisor</b>	<b>6</b>	<b>Diploma in Business Informatics</b>
<b>P14</b>	<b>Financial Advisor</b>	<b>6</b>	<b>Certificate in Information Technology</b>
<b>P15</b>	<b>Financial Advisor</b>	<b>8</b>	<b>Certificate in financial planning</b>

### **4.3 Themes, Sub-themes and Codes**

The research questions informed the interview questions, which in turn complemented the study goals. Transcripts of the interviews provided rich, unprocessed data that were the first step in the examination of qualitative interview data. In general, by breaking down enormous amounts of

data into more manageable chunks of knowledge, analysis seeks to identify specific findings, lessons, or inferences. Themes had to be identified to go from the individual observations the interviewer made to finding patterns within those observations. NVivo coding was used to create categories from meaning units or actual phrases used in specific text segments (Thomas, 2005:5). Nine themes were identified through NVivo by sorting and analysing the data from the participants' responses.

**Figure 1.2**



Thematic Map. Source: compiled from NVivo.

- Theme 1:** Cost advantage  
**Theme 2:** Value proposition  
**Theme 3:** Improving customer engagement.  
**Theme 4:** Competitive advantage  
**Theme 5:** Rooting out fraud.  
**Theme 6:** Sustainability  
**Theme 7:** Value chain  
**Theme 8:** Resilient competitive supply chain  
**Theme 9:** Security

**Table 4.2:** Major themes, sub-themes and codes

Theme	Sub-theme and Code
Cost advantage	<ul style="list-style-type: none"> <li>• Operational costs</li> <li>• <i>Low premiums</i></li> <li>• <i>Cost percentage</i></li> </ul>
Value proposition	<ul style="list-style-type: none"> <li>• Products and services to enhance customer service.</li> <li>• <i>Efficiency and effectiveness</i></li> </ul>
Improving customers engagement	<ul style="list-style-type: none"> <li>• Improving customer service</li> <li>• <i>Outstanding customer service</i></li> </ul>
Competitive advantage	<ul style="list-style-type: none"> <li>• Organisational strategy</li> <li>• <i>Penetrate new market.</i></li> <li>• <b><i>Improved lead time</i></b></li> </ul>
Rooting out fraud	<ul style="list-style-type: none"> <li>• Alleviating fraud</li> <li>• <i>Low fraud rate</i></li> </ul>
Sustainability	<ul style="list-style-type: none"> <li>• Enhancing organisational sustainability</li> <li>• <i>Sustainable competitive advantage</i></li> </ul>
Value chain	<ul style="list-style-type: none"> <li>• Collaboration</li> <li>• <i>Underwriting</i></li> <li>• <i>Claim management</i></li> </ul>
Resilient competitive supply chain	<ul style="list-style-type: none"> <li>• Exchange information</li> <li>• Increased sales</li> </ul>
Security	<ul style="list-style-type: none"> <li>• Decentralisation</li> <li>• <i>Increased sales</i></li> </ul>

Source: compiled from NVivo

As established in the literature review in Chapter 2, it is imperative to incorporate BT in the insurance supply chain to enhance operational efficiency, coordination, value chain, competitiveness, sustainability and alleviate fraud in the insurance industry. All the themes in Table 4.2 constitute elements that will help to determine the role of BT in the insurance industry.

### 4.3.1 Theme 1: Cost advantage

As a modern technology, BT promises to enhance insurance supply chain performance by reducing costs drastically through smart contracts, eliminating human intervention in various insurance operations. Furthermore, BT will enable insurance companies to bring innovative products to the market due to the cost reduction in product development which ultimately results in competitiveness. Therefore, it will be easy for insurance companies to interact with channel partners through BT, resulting in customers purchasing more insurance products at lower costs and this improves efficiency and effectiveness. The secondary data uncovered that all organisations strive to reduce costs while providing quality services or products and BT has the potential to fulfil the insurance companies’ vision of providing a quality service at low costs. The data supported this finding as detailed in Table 4.3 and the statements that follow.

**Table 4.3:** Theme 1- Cost Advantage as per participants

Theme 1-Cost Advantage	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
Operational costs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓
<i>Low premiums</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Cost percentage</i>	✓	✓	✓				✓			✓	✓				

Source: Compiled from NVivo

**Q: What influence does blockchain have in the organisation that results in low cost?**

**P1, P2, P3, P4, P5, P6, P8, P9, P10** and **P11** indicated, “*blockchain technology has brought significant change that has reduced costs in the organisation as the financial advisors are no longer going to the market to sell our products but are using blockchain technology through smart App to connect and get customer signed the contract while there are in the office and that results in cost reduction because we are no longer paying for them to go to the market*”. **P12** added, “*It has improved underwriting and reduced costs in the underwriting administration*”. **P13** explicitly stated, “*Blockchain technology has eliminated human intervention at Old Mutual operations such as data capturers, and minimised legal department that used to draft customer contracts and couriers that was previously used to transport our documents to Head Office in Cape Town*”. Additionally, **P7, P14** and **P15** emphasised,” *blockchain technologies at Old*

*Mutual has reduced premium paid by the customer when comparing before its adoption due to capability of blockchain technologies to reduce administration costs”.*

**Q: At what cost percentage do you think the organisation has saved since the adoption of blockchain as compared to before it adopted blockchain?**

**P1** affirmed, “*Old Mutual has saved costs approximately by 42% since the adoption of blockchain technology when you compared to before we adopt blockchain*”. **P2** and **P7** added, “*the organisation has saved a lot of operational costs approximately 37% since the adoption of blockchain in the organisation*”. **P3** further indicated, “*28% of costs have been saved by Old Mutual since the introduction of blockchain technologies in all aspects of the organisation*”. other participants did not specify the exact percentage of cost reduction.

**4.3.2 Theme 2: Value proposition**

The insurance companies’ strategy is to outcompete rivals by offering products and services that exceed customer expectations and remain relevant to the market. Furthermore, insurance companies intend to be efficient and effective in the way insurance activities are executed. BT has been identified as a solution to bring value proposition in the insurance industry by making insurance services accessible and capability modernised insurance products to meet the current needs aligned with the current trends. The secondary data identified the value proposition role of BT in the insurance industry. This finding was attested to by the respondents in Table 4.4. their comments that follow.

**Table 4.4:** Theme 2- Value proposition as per participants

Theme 2 Value Proposition	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Products and services to enhance customer service	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓
• <i>Efficiency and effectiveness</i>	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓

Source: Compiled from NVivo

**Q: What role does blockchain play to ensure that the organisation remains relevant to the market it serves?**

**P1, P2** and **P3** iterated, “*blockchain enables Old Mutual to send customer reminders about the premium deduction and in terms of funeral cover when a child is covered in that policy,*

*Blockchain technology generates information and alerts the policyholder that the child is no longer covered”. P4, P5 and P7 added, “claim withdrawals have been compressed as compared before through blockchain and blockchain technology enables insurance to generate customer data in order to design policies according to their needs which keeps us relevant to the industry”. P1 indicated, “the customers can register for loyalty points by themselves without having to worry about the leakage of their data in the system because blockchain technology protects customer information from being misused without consent”. P2 further stressed, “We design Old Mutual products according to customer needs through the information we collect using blockchain technology and customer information is protected as we cannot get information without consent from customers, and organisation provides loyalty points to our customers, and analyse the data we extract using blockchain technology and design product according to customer needs”.*

**Q: What benefits have you added to the products or services you are providing to customers since you have adopted blockchain technology?**

*P5, P3 and P14 explicitly articulated the essential benefits of adopting BT. They commented, “The customer can view their policy history without going to the office or consulting their financial advisors and simultaneously ensure that customers feel safe doing business with us because of the security brought in by blockchain technology through smart contracts”. It is ensuring, “the customer policies do not lapse due to non-payment because customers are constantly reminded about payment date.”*

**Q: What problems was the organisation facing before the implementation of blockchain technology and how has it been resolved?**

*In the narrative, P3 highlighted, “the organisation function was inefficient and costly; the organisation was spending a lot of money on Old Mutual function and Blockchain has resolved a lot of administrative issues and streamlined the process”. P4, P5, P7 and P8 explained that “the underwriting process was long, time-consuming, and now that Old Mutual has adopted blockchain technologies, The process is short and policies that are underwritten are issued or declined within a brief period”. P7 underpinned the fact that “blockchain technology has reduced the costs of underwriting due to the elimination of human intervention because it was a lengthy process before Old Mutual can decide about the underwritten customer proposal”. P7 further indicated, “the process of underwriting involved a financial advisor, data capture and courier company to take the medical examination to Old Mutual Cape Town”. However, it was recently noticed that the process does involve many human interventions and it manifests the magnitude of efficiency and effectiveness.*

**4.3.3 Theme 3: Improving customer engagement.**

The sustainability of the insurance industry relies heavily on customers as the heartbeat of the business. Customers must be kept happy and insurance companies must provide services or

products that meet and exceed customer expectations at the least cost. Therefore, BT enhances customer engagement and keeps customers connected to the organisation as was revealed in the Section 2.5.9. This finding was affirmed by the primary data collected in Table 4.5 and the responses that follow.

**Table 4.5:** Theme 3- Improving customer engagement as per participants.

Theme 3 improving customer engagement	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Improving customer service	✓	✓	✓		✓				✓		✓		✓		✓
• Outstanding customer services	✓	✓	✓	✓	✓		✓		✓		✓		✓	✓	✓

Source: Compiled NVivo

**Q: What do you do to remain connected to your customers?**

**P1, P3, P7, P8 and P15** stated, “*Old Mutual has a Chatbot that customers use to communicate with the organisation and blockchain technology collects data that is accurate which makes it easy to identify customers who qualify for cashback*”. **P1** further indicated, “*Customers with a retirement policy at Old Mutual received their certificate to submit to SARS without going to Office*”. **P2** added, “*blockchain technology enables Old Mutual to analyse where it gets business in the market and what are the needs of the customer and visit those markets and do presentations on how to navigate Old Mutual services using the latest technology*”.

**Q: Can customers track the status of their policy or claim progress without going to the office and how?**

**P1, P2, P3, P4, P5 and P9** agreed that “*Old Mutual customers can track the progress of the claim and policy status using WhatsApp number without going to the office, and this has resulted in outstanding customer services where the customer is always connected to the organisation whenever they need help with the services*”.

**4.3.4 Theme 4: Competitive advantage**

The secondary data in Section 2.5.10 indicated that BT will enable the insurance company to launch new products at the lowest price due to its ability to reduce administrative costs. In this way, the insurance products or services will be affordable to customers and the insurance

industry will become competitive and new insurance companies will start to enter the market. In industries where there is a high level of competitiveness, the price of products or services tends to decrease, which will be beneficial to the customers. This finding was attested to by the participants as supported in Table 4.6 and the responses that follow.

**Table 4.6:** Theme 4- Competitive advantage as per participants

Theme 4	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Organisational strategy	✓	✓	✓	✓	✓	✓		✓	✓						✓
• Penetrate new markets	✓	✓	✓	✓	✓	✓	✓		✓				✓	✓	✓
• Improved Lead time	✓	✓	✓	✓	✓		✓		✓					✓	✓

Source : Compiled from NVivo

**Q: What is the organisational strategy that makes customers keep on buying your products and trust your services?**

**P1, P2, P3, P4, P6, P8** and **P15** indicated, “*Old Mutual’s strategy is to keep its promises to customers and be visible to the market through blockchain technologies which enable customers to track their transactions without going to Old Mutual branches and customers can also take policies online because they know that no one can take advantage of their information and misuse it*”. **P4** further commented that “*Old Mutual strategy is to offer the most affordable premium through different segment including Old Mutual foundation and blockchain technology has played a big*”. Generally, customers do not get time to conduct business with Old Mutual during office hours. In this instance, **P5** highlighted, “*blockchain technologies enable the customer to do business with the company even after hours through Old Mutual SnapApp where customers give the financial advisors consent to access customer information and recommend a policy according to the need of the customers and make a customer sign a contract through smart contracts*”.

**Q: What role do blockchain technologies have in the organisation which helps it to penetrate new markets?**

**P1, P2, P4, P6, P7** and **P13** stated, “*blockchain technology enables Old Mutual to tap into new markets through online marketing and where a customer can take a policy wherever it is and sign using smart contracts where the information entered cannot be altered*”. **P4** further

indicated that “*Old Mutual can interact with their customers irrespective of geographical area due to the usage of blockchain technologies*”. Thus, BT facilitates the process of penetrating new markets.

**Q: How has blockchain helped the organisation to improve performance?**

**P2, P3, P4, P5** and **P6** indicated, “*blockchain technology has helped the organisation to reach the market efficiently and effectively by reaching out to clients who are in deep rural areas and where it is not easy to get there with a car, and Old Mutual can advise a customer about the financial planning and make them sign using USSD which also protect customer information*”.

**P2** and **P3** iterated, “*blockchain technology has enhanced Old Mutual performance by eliminating non-adding value activities which resulted in improved performance and the customer gets to know as soon as possible whether the proposal is accepted or not and get the contract immediately*”.

**P1, P2, P3, P4, P5, P8, P14** and **P15** also highlighted, “*blockchain technologies have compressed the product development and made it easy for a product to the market and claims processes have also been compressed to 4 hours from 24 hours*”. **P5** and **P14** indicated, “*the policy is written in the smart contract which makes Old Mutual payout claims automatically upon receiving the correct documentation and the underwriting has been improved through blockchain technology; the process is efficient as there is less human involvement in the process*”. Thus, overall performance and sales distribution have improved since the adoption of BT. In support, **P7** added, “*driving around servicing customers was inefficient due to the time constraints and costs involved. Old Mutual was paying for their employees to go to the market to sell their products and financial advisors were responsible for taking customers to the medical doctor for underwriting purposes but now the Head office gets the medical report directly from the medical doctor and blockchain technologies provide the reliable data from the medical doctor for customer health issues*”. **P7** further indicated that “*it takes an hour once all information has been obtained about the customer medical examination to issue a policy*”.

**4.3.5 Theme 5: Rooting out fraud.**

Fraud is one concerning factor that has a negative impact on the insurance supply chain performance due to a lack of trust among insurance stakeholders. A study conducted by Nizamuddin and Abugabah (2021:7) in the insurance industry about the role of BT indicated through its features of immutability, BT will prevent fraud as once data is entered into the system no one can manipulate it. When a customer or any stakeholders involved in the insurance company attempt to commit fraud, the system will detect it and alert all stakeholders about the potential fraud to be committed. This will save insurance company revenue. The secondary data collected in Section 2.5.11 indicated BT’s role in rooting out fraud in the insurance industry. This finding was attested to by the participants’ responses as seen in Table 4.7 and the comments that follow.

**Table 4.7:** Theme 5- Rooting out fraud as per participants.

Theme 4 Rooting out fraud	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Alleviating Fraud	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓
• <i>Low fraud rate</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓

Source: Compiled from NVivo

**Q: How does blockchain eliminate fraud?**

**P1, P2, P3** and **P4** indicated, “*blockchain has eliminated fraud at Old Mutual due to the decentralisation of control and when financial advisors want to view customer information, they must get the consent from customers and their system does not allow them to view the information without the consent which prevents fraud*”. **P4** further elaborated that “*the information entered in the system cannot be changed without customer or any stakeholders consent involved in that transaction*”. **P5** substantiated, “*blockchain technology played a significant role in rooting out fraud because when you write a customer a policy online the system requires a customer to ask many questions to confirm the ownership of the information which prevent fraud such as four digits of the customer id number. when you make a mistake while capturing the customer data or transaction the system does not allow you to make a change or you must start the process from scratch*”. **P15** added, “*Old Mutual has reduced fraud through the adoption of blockchain because when a customer takes a policy, a customer will receive a policy document immediately and if the customer is not aware of that policy can report to the organisation*”. **P1** further elaborated that “*consent to capture the customer information is granted by the customer which prevents any attempt to commit fraud and when you view customer information the system shows all customer history information, and it becomes easy to identify if the customer is committing fraud with the policy is applying for*”.

**Q: How was the fraud rate in the organisation before the adoption of blockchain and how is it now?**

**P1, P6** and **P15** indicated, “*the fraud rate was very high before the implementation of blockchain because you could just use customer information without consent and the average percentage was approximately above 60% and now it has decreased drastically*”.

**Q: What other measures do the organisation have to complement blockchain to eliminate fraud?**

This question was necessary to probe the possible measures to curb fraud. **P1, P2, P5 and P8** agreed that “*the organisation has a fraud forum and fraud hotline to supplement blockchain technology in alleviating fraud*”.

#### 4.3.6 Theme 6: Sustainability

Companies must comply with sustainability regulations which stipulate that organisations must make use of resources to produce a product or service without compromising the ability of future generations to meet their own needs, as stated in Section 2.5.9. Furthermore, the secondary data confirmed that organisations must be consistent in providing the service or producing a product to obtain a competitive advantage. BT has the potential to enhance the efficient use of resources in insurance and play a decisive role in improving global warming which harms our lives in many aspects. Global warming affects the insurance industry due to the number of claims the insurance companies receive when an unnatural event occurs such as an earthquake and other repercussions. In addition, BT will play a crucial role in ensuring that insurance companies obtain a sustainable competitive advantage. The secondary data indicates that BT will have a positive contribution towards minimising global warming and participants testified through the interview that BT will reduce the number of claims and improve global warming. This finding is supported by the participant data as depicted in Table 4.8 and the responses that follow.

**Table 4.8:** Theme 6- Sustainability as per participants

Theme 6 Sustainability	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Enhancing organisational sustainability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• Sustainable competitive advantage	✓	✓	✓		✓		✓	✓			✓		✓	✓	✓

Source : Compiled from NVivo

#### Q: What is the organisational strategy relating to sustainability?

**P1, P2, P3, P4 and P9**, “*Old Mutual provides donations to schools, hospitals and clinics as part corporate social responsibility, and Old Mutual gives away garbage bins to schools and clinics to stimulate recycling to minimise global warming and constantly donate certificates and school*

*uniforms as part of corporate social responsibility*". According to **P4** and **P9**, "*constantly giving to the community helps the organisation stay connected to the customers, and able to produce unique products that suit customer needs and that results in sustainable competitive advantage*".

**Q: What is the role of blockchain technology in the organisation to enhance sustainability?** **P3** and **P5** highlighted, "*blockchain technology played a significant role at Old Mutual to enhance sustainability because we are not going to the market which helps us to save costs and not pollute the environment*". **P3** and **P5** further indicated that "*Old Mutual marketing staff does not use more cars to go to the market and when the situation compels them to do so, they use one big car that accommodates many people as the way of reducing costs and pollution in the environment*". **P5** added, "*global warming has resulted in bad weather conditions that are unpredictable where we experience a lot of floods which ultimately increases claims in the organisation, and blockchain technology minimises the amount of pollution Old Mutual staff caused in the environment*".

**Q: What other measures does the organisation have in place to improve sustainability?** This related question was essential to probe measures to improve sustainability. **P7** stated, "*Old Mutual provides affordable premiums and employees are advised to use one car when going to the market to save costs and minimise the impact of pollution in the atmosphere*".

#### 4.3.7 Theme 7: Value chain

BT will revitalise the insurance industry by adding value to key insurance elements including product development, marketing, sales distribution underwriting, claims and collaboration. The secondary data (see Section 2.4.9) indicated that blockchain will revolutionise the insurance ecosystem where customers will be free to take policies and external stakeholders to invest due to alleviation of fraud in the process. BT will bring life to the insurance industry. This finding is attested to by the participants as detailed in Table 4.9 and demonstrated by the comments that follow.

**Table 4.9:** Theme 7- Value Chain as per participants

Theme Value Chain	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Collaboration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
• Underwriting	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
• Claim management	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓

Source: Compiled from NVivo

**Q: How does blockchain technology improve collaboration in the organisation?**

**P1, P2, P3, P4, P7, P11** and **P12** commented, *“Blockchain technology has improved collaboration within the organisation and with our partners such as Home Affairs ,and when you submit a death claim at Old Mutual, through improved collaboration , once the death is registered at Home Affairs after 48 hours the system will download the death certificate and the customer does not need to submit it because the system does not give you an option to upload because it is already been downloaded”*. **P1** and **P2** further elaborated that *“Old Mutual is now called one shop stop due to the adoption of blockchain technology, and in the past we used to have different divisions and when you go to the Old Mutual Finance office, and you want help that is related to Old Mutual Group Scheme, the customer will be sent to Old Mutual Group which is far from the customer perspective”*. **P1, P11** and **P13** added, *“Old Mutual is able to assist a customer that went to another division through the features of blockchain technology which is transparency and blockchain technology helps the employee who sometimes goes to the market to sell services or products to be able to assist all customers without referring to another division and blockchain technology has improved collaboration significantly”*. In contrast, **P12** stated, *“blockchain technology has indeed improved collaboration however, the technical glitches and network are our worst enemy and it could be good if these systems can work offline”*.

**Q: What influence does blockchain have in the underwriting process?**

**P7** and **P8** agreed that *“blockchain technology has improved the process of underwriting and has streamlined a lot of processes”* **P7** and **P8** further explain that *“blockchain technology has reduced the costs of underwriting due to the elimination of human intervention because it was a long process before Old Mutual can decide about the underwritten customer proposal”*. The BT has improved operational efficiency and administrative costs. **P11** added, *“the process of underwriting was involving a financial advisor, data capture and courier company to take the medical examination to Old Mutual Cape Town however now the process only involved financial advisors, and customers are happy because the process is short, and they get to know about their proposal results within a week once all medical tests are done by the prescribed Doctor. **P11** further indicated that *“Blockchain technology helps Old Mutual to quickly identify if the customer is not submitting the proposal for the first time which improves the efficiency of the process”*.*

**Q: Has the adoption of blockchain improved the claim process and how?**

**P1, P3, P8, P10** and **P14** explicitly stated, *“Blockchain has improved the claim process and not it takes 4 hours for claim payout provided all documentation has been submitted”*.

#### **4.3.8 Theme 8: Resilient competitive supply chain**

Resilient is the ability for an organisation to bounce back quickly to normal operation after it has been disrupted. In addition, resilient requires the organisation to be proactive and constantly exchange information so that can respond swiftly to unforeseen changes.

COVID-19 was the real test in the insurance industry where many insurance companies were unable to sell their product or services due to gathering restrictions and many insurance personnel lost their job because of the decline in sales. However, Old Mutual was able to continue selling their product or sales due to the BT usage. Thus, Old Mutual was able to generate sales. This finding is substantiated by the participants as illustrated in Table 4.10 and the responses that follow.

**Table 4.10:** Theme 8- Resilient competitive supply chain as per participants

Theme 8 Resilient competitive supply chain	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 11	P 12	P 13	P 14	P 15
Sub-theme and code															
• Exchange of information	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				✓
• Sales declines	✓	✓	✓		✓			✓			✓		✓	✓	✓

Source : Compiled from NVivo

**Q: How has blockchain technology helped the organisation to keep selling and providing services to your customers in tricky situations like COVID-19?**

**P1, P2, P3** and **P15** indicated, “during COVID-19 Old Mutual was able to sell products due to blockchain technology adoption and customers were also able to claim and withdraw from their saving services”. **P7, P8** and **P15** further confirmed that “Old Mutual was able to continue to operate and exchange information with their channel partners through the implementation of blockchain”. **P1, P2, P8** and **P15**, further iterated that “Old Mutual could not experience a high decline in sales because Old Mutual was able to reach out to their customers irrespective of the COVID-19 regulations”. In contrast, **P4, P6** and **P10** stated, “the organisation did experience a light decrease in sales due to the scepticism of customers to share their information”. According to **P7, P8** and **P15**, “when a customer takes a policy there is pop on the customer’s phone which asks a customer to accept it is aware of the policy and the system requires the customer to put the last four digits of a customer ID number. COVID-19 was never a stumbling block for Old Mutual to sell policy through the adoption of BT.

**4.3.9 Theme 9: Security**

The secondary data (see Section 2.5.12) indicated that BT has decentralised customer information which means customers have control over their information and it becomes difficult

to be hacked or for fraud to occur due to the unavailability of the customer information. The participants attested that BT helped Old Mutual get more business because customer provide their information themselves and no unauthorised persons can access their information. This finding is supported by the data in Table 4.11 and the comments that follow.

**Table 4.11:** Theme 9 - Security as per participants

Theme 9 Security	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P1 0	P 1 1	P 1 2	P1 3	P 1 4	P 1 5
Sub-theme and code															
• Decentralisation	✓	✓	✓	✓		✓		✓		✓			✓		✓
• Increased sales	✓	✓		✓		✓		✓			✓		✓	✓	✓

Source: Compiled from NVivo

**Q: How do you ensure that the system cannot be hacked?**

**P1, P2, P3, P4** and **P6** stated, “*all transactions and customer information are encrypted and blockchain has a built-in security which becomes difficult for the hackers to crack the system, and customers have the control of their information*”. **P1, P2, P3, P4** and **P6** further indicated that “*when you do the needs analysis of the customer you have to get consent from the customer where the customer will receive notification from the cell phone which requires them to accept that customers have granted you access to use their information*”. According to **P11, P13** and **P15**, “*the customer’s information has been decentralised which make it difficult for the hackers and any other person to have access to that information unauthorised and customer are the owners of their information*”. In addition, **P11, P13** and **P15** stated, “*decentralisation of customer information has made customer free to do business with Old Mutual which has drastically improved sales*”.

This related question is essential to probe on shortcomings of blockchain: **What other limitation of blockchain technology in the organisation**

**P2** and **P7** agreed that “*the problem with blockchain is the network. When there is no electricity, it becomes a problem to manoeuvre the system*”. **P2, P7** and **P8** further added that “*when you capture a customer information or transaction, and you make a mistake the system does not allow you to continue with the application, and the system assumes that you are trying to manipulate the system or commit fraud which is time-consuming, and you end up losing a customer*”.

#### **4.4 Conclusion**

Based on the data analysis from the information provided by the respondents, BT at Old Mutual has enhanced operational efficiency, organisational effectiveness, resilience, sustainability, reduced operational costs, alleviated fraud and improved competitiveness in the insurance industry. Nonetheless, the system become a problem when you make a mistake because it does not allow you to make changes and you must delete that transaction and it asks for reason. This element of immutability which prevents fraud is time consuming when you have made any mistake in the transaction. In additional, some customers are not aware of BT, and they are sceptical to share their information with the agent. Therefore, insurance companies need to spread the awareness about BT in the insurance ecosystem and staff needs to be trained more about how to operate these systems. This chapter evaluated whether the research questions were answered, and research objectives achieved. The research findings will be propounded in Chapter Five.

## CHAPTER FIVE

### DISCUSSION OF RESULTS

#### 5.1 Introduction

The previous chapter analysed and interpreted the primary data collected through the interviews for the research to be completed. In this chapter (5), the findings are aligned with the aim, objectives and research questions formulated to determine the role of blockchain technology (BT) in the insurance industry. The major findings are also linked with the larger body of literature drawn from articles, books, and company websites. The study's primary aim was to determine the role of BT in the insurance industry which emanated from the lack of technological innovation that results in high operational costs, inefficiency, and high fraud rate in the insurance industry.

The responses from Old Mutual staff who participated in the interviews attested to the data collected through the literature review. Moreover, it confirmed that BT has the potential to revolutionise the entire insurance industry ecosystem. The interviews revealed that Old Mutual had been experiencing high operational costs, a lack of collaboration, inefficiency and elevated levels of fraud before the implementation of BT which posed a concern since most insurance companies have not adopted BT to address the issues identified in the literature review. The findings were aligned with the research problem identified in the insurance industry and the research objectives provided in Section 1.5.

- To determine the role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry
- To determine how blockchain technologies influence supply collaborations, organisational effectiveness, and sustainability in the insurance industry
- To establish how blockchain technologies influence resilient competitive supply chains in the insurance industry.

#### 5.2 The role of blockchain technologies on supply chain performance and operational efficiency in the insurance industry

This objective was formulated to determine whether BT has a significant role in improving how Old Mutual interacts with its stakeholders, to enhance supply chain performance and operational efficiency. The data gathered from Old Mutual participants expressed that BT adoption would result in cost advantage in terms of reduced operational costs and low premiums for customers which enhances supply chain performance and operational efficiency. Eighty-six (86) % of the participants were of the view that Old Mutual BT would save costs with an average of 30% due to the elimination of human intervention in all operations. On the contrary, 14% of the

participants were of the view that BT has not had a big impact on cost reduction which may have yielded an improved supply chain performance and operational efficiency. These findings resonate with the study conducted by Hooper and Holtbrugge (2020:5) in Section 2.5.6 that indicated that BT would result in cost advantages in the insurance industry through smart contracts which eliminate human intervention in multiple operations. Sun (2022:2) further indicated that BT would enhance the transfer or distribution of information effectively at a cheaper cost and improve supply chain performance and efficiency through transparency. It also aligns with studies by Bakici (2022:64) and Kim and Shin (2019:8) that affirmed that blockchain technology would enhance efficiency and effectiveness in the insurance supply chain by reducing administrative errors, transactions, operational issues, and information flow which would ultimately improve supply chain performance and operational efficiency, having a significantly positive impact on supply chain performance in the insurance industry. Overall, the adoption of BT in the insurance industry was estimated to significantly reduce operation costs from 10% up to 72% by Popovic et al., (2020:65); Njegomir, Demko-Rihter and Bojanic (2021:5); Boustani and Elisabetta (2022:3). In essence, the findings revealed that BT would drastically reduce costs through the elimination on non-adding values in the insurance supply chain and ultimately the performance Old Mutual and operational efficiency would be improved.

An overwhelming percentage (80%) of the participants indicated that incorporating blockchain technology has given Old Mutual a value proposition by enabling it to produce innovative products and services that are relevant to the market. Participants also said that blockchain technology has improved supply chain performance and operational efficiency, making life easier for all stakeholders. Customers no longer need to visit the office to view the history of Old Mutual policies, and they can complete all transactions without having to go to any of the company's branches. These findings correspond with a study by Trivedi and Malik (2022:91) in Section 2.3.2 which uncovered that BT would help the insurance industry to develop new products and services that would attract customers at least cost and process of purchasing products and services would be user-friendly. This finding was further supported by Oberoi and Kansra (2021:279) who confirmed that blockchain technology would add value proposition in services to the customers and cost efficiency and remove barriers, data duplication and data to be accessible.

The majority (73%) of the participants were of the view that BT has helped Old Mutual to obtain a competitive advantage by penetrating an untapped market while 17% of the participants were not fully convinced of the impact of BT to penetrate new markets. Participants further commented that through smart contracts customers can purchase products or services even though they are in a different geographical area from the agent. These findings are corroborated in Section 2.5.9 by the findings of studies conducted by Al-Jaroodi and Mohamed (2019:2), Srivalli et al. (2023:60) and Fei et al. (2023:44) that revealed that blockchain technology would make it possible for insurance companies to introduce new automated insurance products for their clients without having to worry about expensive administrative costs. This would increase

the affordability of the products for a larger number of clients and increase market penetration. In addition, Brophy (2020:8) indicated that the numerous benefits of BT included enhancing supply chain performance, compressing product development and reducing lead time of the insurance processes. The findings are further supported by a study conducted by Oliver (2023:2) which revealed that blockchain technology would streamline policy issuance by enabling secure and efficient data sharing among insurers, intermediaries and policyholders and this would ultimately result in outstanding supply chain performance and efficiency. In essence, having innovative products or services, streamlined processes and penetrating new markets would automatically enhance competitiveness and supply chain performance and efficiency.

Most of the participants (87%) indicated that BT has drastically reduced fraud at Old Mutual while 13% were of the view that fraudsters still found some loopholes in the system which jeopardised supply chain performance and operational efficiency, not only at Old Mutual but in the entire industry. These findings were supported by Sathya and Balakumar (2022:10) in Section 2.5.10 who ascertained that BT would not only prevent fraud but also enhance operational efficiency in all areas of the insurance from product development to the claim stage. Furthermore, Baiod et al. (2021:94), Sazu and Jahan (2022:77) and Bohyer and Hayajneh (2023:7) further revealed that BT through its features of immutability would prevent fraud significantly when any stakeholders try to commit fraud, the system would detect fraud before it occurs and alert the stakeholders of any potential fraud to be committed. In addition, Amponsah and Weyori (2021:447) found that once data is entered into the system it cannot be altered and the system would verify it against the existing information in the system which reduces the error and fraud. Therefore, this finding instils trust among insurers and supply chain performance and operational efficiencies.

According to 60% of the participants, BT would strengthen the data security against hackers and stakeholders who want to use customer information to their own benefit while 40% of the participants expressed that the system fails them when there is no electricity or network which results in a decline in sales and leaves their information vulnerable to the hackers. These findings resonate with the study conducted by Rahimi and Gudapati (2023:167) in Section 2.5.11 that indicated that the existing centralised system in the insurance industry that is used to keep customer data could provide security to a certain extent, however, it could crash due to malicious attacks or faults. Fortunately, this issue could be resolved by adopting of BT through a decentralised network. Bakici (2021:67) and Madhani (2022:13-14) discovered that through decentralisation, customers would have control of their information and transactions no longer need to be executed by a third party. Thus, transactions would be quicker, enabling peer-to-peer interaction among customers without a third party which would ultimately improve operational efficiency and supply chain performance. Hawayek (2023:2) further found that BT would enhance security for sensitive customer data by utilising cryptography and a distributed consensus mechanism, confirming that customer data can be stored securely and accessed only by authorised parties. Therefore, strengthening the data security through incorporating BT in the

insurance industry would enhance the speed of interaction among stakeholders which reduces the lead time and turnaround of transactions. These findings strongly indicate that the insurance industry would benefit significantly from adopting BT through reduced administrative costs, operational efficiencies and enhanced supply chain performance through reduced lead time and faster market penetration.

### **5.3 How BT would influence supply chain collaborations, organisational effectiveness and sustainability in the insurance industry.**

The purpose of this objective was to determine how BT would influence supply chain collaboration, organisational effectiveness and sustainability at Old Mutual and by extension, the entire insurance industry. The interview data collected from Old Mutual indicated that BT has improved organisation supply chain collaboration and sustainability and how the organisation provides products and services at the least cost. Out of all the participants, 67% were of the view that the sustainability of the organisation solely depends on customer engagement as customers are the heartbeat of the organisation's success and BT is a cornerstone of customer engagement. However, 23% of the participants did not praise BT in terms of customer engagement, commenting that some customers were reluctant to engage due to security reasons. These findings were supported by the literature in Section 5.5.5 where Kansra (2021:279) indicated that BT played a critical role in keeping customers connected to the organisation by reminding them about premium collection dates, the customer history display policy, the online purchasing policy, customer loyalty points and the availability of a claim option. In addition, Yassine's (2022:10-15) study which investigated the implementation of blockchain, discovered that customers had been incredibly excited to see the recent changes brought by BT. As a result, it drastically improved customer engagement which ultimately enhanced the sustainability of the organisation. Zheng et al. (2020:2) further found that through smart contracts, insurers could reduce costs which would result in lower premiums, thus sustaining the insurance industry.

All the participants (100%) indicated that BT has improved organisational sustainability through reduced negative environmental impact on global warming and consistency in producing quality products that meet customer needs and services. These findings resonate with a study conducted by Saberi et al. (2019:2) which revealed that incorporating BT in the insurance industry would enhance the efficient use of resources through transparency and can also provide real data to insurers in reducing greenhouse gas emissions. In addition, Wong et al. (2021:3) further indicated that BT through smart contracts, reliability and immutability has been used in various sectors including transport, health and finance to promote sustainability. Moreover, Oberoi and Kansra (2021:282) found that BT would increase the bottom line of insurers by saving capital, aggregating deals and boosting customer retention which would result in a sustainable competitive advantage by providing unique good products at a lower premium.

Most of the participants (93%) affirmed that BT has improved collaboration at Old Mutual and would improve the entire insurance industry and the claim management and underwriting process have been streamlined significantly. Stakeholders are no longer required to go to Old Mutual branches to file a claim nor or the office to submit customer medical examination findings for underwriters to decide about a customer proposal. Home Affairs, medical practitioners and third parties can interact directly with Old Mutual to enhance customer experience which, in turn, enhances collaboration. Seven per cent (7%) of the participants indicated that BT becomes a problem during load shedding and network issues. These findings are supported by Sun (2022:5) in the literature who indicated that BT would improve the efficiency of collaboration among insurers, channel partners, and stakeholders and connect all these partners through technology, sharing and transferring information on the chain based on fully guaranteeing the privacy and security of information of all parties. Loukil et al. (2021:10) further BT would enhance collaboration which would result in low premiums for customers, improving customer experience and reducing costs for all parties involved in the insurance industry.

On the one hand, 80% of the participants agreed that BT would enhance underwriting processes through collaboration the proposal is submitted within a day or less depending on the availability of the medical report. On the other hand, 20% indicated that it is difficult for customers who are in rural areas to obtain medical reports. These findings resonate with the study conducted by Bodemer (2023:2) in Section 2.5.3 which revealed that BT could enhance the underwriting process by enabling insurers to obtain the most trusted and immutable data from the medical practitioner and immutable records via BT to ensure the integrity and reliability of underwriting data. This reduces the risk of fraudulent costs, improves efficiency in collaboration and ensures that insurers make more sound underwriting decisions based on data transparency. Similarly, Chen et al. (2021:2) discovered that BT maintains a reliable database through decentralisation and reliability, non-tampering, transparency and traceability to promote collaboration in the insurance industry. Past insurance records, credit records and personal health records of the insured would be recorded on the BT one by one which cannot be altered. Chakravaram et al. (2019:6) found that BT plays an effective role by authenticating the customer data provided against data recorded in its distributed ledger when the customer was transacted on similar purchases with other insurers and the underwriting process is fast and cheap due to collaboration.

According to 80% of the participants, BT has dramatically enhanced claim processing and it now takes four hours for a claim to be paid out to the claimants. The participants further indicated that customers can even use WhatsApp to submit their claims and track the progress without going to the office which reduces costs for both parties. However, 20% of the participants stated that the BT network poses challenges. When a death is registered at Home Affairs, BT would pick up that information which means that the customer does not necessarily have to submit a death certificate. These findings are supported by the literature presented in Section 2.5.4. A study conducted by Popovic et al. (2020:9) revealed that BT would bring solutions to the

insurance industry in terms of claim automation by ensuring that insurance products are written into smart contracts that automatically pay out claims upon receiving the right parameters. In addition, Oliver (2023:2) indicated that smart contracts would automate the calculation and disbursement of claim payout and once the validation process is complete, the contract can trigger the release of funds based on predefined rules and conditions, ensuring a faster and more efficient payout. Hooper and Holtbrugge (2020:12) conducted a study on BT's impact on claims and found that BT can reduce claim processing time and lowering operational costs. Another study conducted by Sazu and Jahan (2022:281) indicated that almost 50% of claims reached beneficiaries in 30 minutes.

Therefore, these findings strongly suggest that the insurance industry, through adopting BT, would enhance organisational effectiveness by offering quality products and outstanding customer services at the least cost, while ensuring sustainability within the organisation and protecting the environment. Collaboration would create a good insurance ecosystem where customers have peace of mind, and all stakeholders are rapidly benefiting from being involved in the insurance ecosystem.

#### **5.4 How blockchain technologies influence resilient competitive supply chains in the insurance industry.**

The purpose of this research objective was to determine how BT influences a resilient competitive supply chain. Most of the respondents expressed that BT contributes to Old Mutual's resilience. They further stated that during COVID-19 many insurers were unable to service their customers and sell products which resulted in people losing their jobs and some insurers exiting the industry. According to 79% of study participants, Old Mutual was able to process customer transactions and sell insurance products during COVID-19 because it assured customers that their privacy information would be protected. Additionally, customers were able to complete their transactions from the comfort of their own homes rather than having to go to the office, which encouraged them to keep purchasing Old Mutual goods and services. They further affirmed that they were able to share information with all their stakeholders including medical doctors, inventors, and Home Affairs through BT. In contrast, 21% of participants said that the organisation's sales had declined as a result of the scepticism of exchanging information with strangers, making it difficult to conduct business and interact with clients.

These findings were corroborated by Vivaldini and De Sousa (2021:6) who discovered that through increased visibility in the insurance SC helps stakeholders to collaborate, as it favours the exchange of information and greater transparency and generating reliability. In addition, Kumar and Anbanandam (2019:7) indicated that the more connected insurance companies with their partners and customers, the more effectively the insurance SC would be able to respond to the changes that arise. Another study conducted by Chang and Chen (2020:2) further revealed that BT makes it possible for the insurance industry to share and exchange information with the

full guarantee of security and privacy. Elham and Adel (2023:1-6) emphasised that agility has become a critical success factor for organisations particularly the insurance industry due to continuous changes in customer lifestyle, which requires insurance companies to adjust accordingly in terms of services and products. The need for efficient and transparent information sharing to enable swift decision-making and response to market changes is of paramount importance in the insurance industry and blockchain is the enabler of the insurance industry SCR (Abderahmna, John and Horst, 2021:1-5; Baiod et al.,2021:94-101; Mesbaul and Sakila, 2022:276-275; Ritesh, Mahima, Madhura, Kiran and Janki, 2023:1-6; Shiha, 2023:24-25).

These findings indicate that BT acts as an enabler for supply chain resilience through the exchange of information with a full guarantee of security and data protection through immutability. The free exchange of information among insurers and partners would enable them to withstand any challenges that might arise and be responsive to the customer's needs through a large information that would be at the insurer's disposal.

## **5.5 Conclusion**

This chapter presented a discussion of the results. It commenced by determining what this research aimed to achieve which is the research objective. Thereafter, data collected through the primary data and the secondary data were examined to determine whether an interlink or contradiction with the research objectives existed. The study achieved all trustworthiness criteria. Both primary and secondary data indicated that blockchain technologies are necessary to revolutionise the insurance industry ecosystem. However, network issues are an ongoing problem with Old Mutual stakeholders when trying to exchange information or capture customer transactions. The following chapter (6) provides conclusions and recommendations for future research emanating from this study. The limitations and ethical issues were also discussed.

## CHAPTER SIX

### CONCLUSION AND RECOMMENDATION

#### 6.1 Introduction

The preceding chapter presented the empirical findings of the study. This chapter (6) begins by delineating the main purpose of the study. An overview of the research study and results about the use of blockchain technologies (BT) at Old Mutual based on primary and secondary data follow. The implication of the study, limitations and delimitations are then discussed. Thereafter, the recommendation and future research on the role of blockchain technologies at Old Mutual and the entire insurance industry are discussed before the study is concluded.

#### 6.2 Main Purpose of the Study

The purpose of the study was to determine the role of BT at Old Mutual and the insurance industry on minimising operational costs and fraud rates and improving collaboration, sustainability, efficiency, effectiveness, competitiveness, resilience, supply chain performance and security. Furthermore, this study aimed to highlight the importance of blockchain technologies for the South African insurance sector, as the literature review reveals that the sector is at risk of extinction due to operational inefficiencies, high fraud rates, resilience and insecurity. BT in the insurance industry is the cornerstone for its success due to the full guarantee of privacy, security and transparency in terms of transactions and exchange of information to all stakeholders and reduces operational costs significantly. The only way to safeguard the data needed by stakeholders is to use BT. This would operational efficiency, collaboration, supply chain reliance, and performance while lowering stakeholder scepticism about doing business with the insurance company. Blockchain technologies would revolutionise the entire insurance industry ecosystem. Therefore, this study was of paramount importance to be conducted to salvage the dying industry.

#### 6.3 Overview of the Research Study

This section presents an overview of the various chapters. The study investigated the role of blockchain technologies in the insurance industry to minimise operational costs, and fraud rates, and improve collaboration, sustainability, efficiency, effectiveness, competitiveness, resilience, supply chain performance and security.

**Chapter 1:** This chapter presented a brief of the entire research study and how it was going to be executed in the form of research questions and research objectives. The motivation for this study to be pursued and how the data will be collected was also discussed in the chapter.

**Chapter 2:** This chapter discussed blockchain technologies, Technological Organisational and Environmental (TOE), and the benefits of blockchain technologies and supply chain concepts in the insurance context. This chapter also reviewed the perspectives of other authors concerning blockchain technologies in the insurance industry and how it is going to revolutionise the insurance industry ecosystem.

**Chapter 3:** This chapter discussed the research design, methodologies and the tools used to collect the required data for the success of the study. The study employed qualitative methods and used interviews as data collection instruments. This chapter concluded with a description of the process of the NVIVO software used for thematic analysis to analyse and sort the data into themes.

**Chapter 4:** This chapter analysed the data collected through the interview, guided by the research objectives.

**Chapter 5:** This chapter discussed the research findings which were guided by the research objective. The primary data and secondary data were examined to determine whether there is an interlink with the research objectives. The literature reviews were used to substantiate the primary data which was obtained through the interviews and based on these findings. Conclusions were drawn about the role of blockchain technologies at Old Mutual and how they will revolutionise the entire insurance industry ecosystem.

**Chapter 6:** This chapter discusses the main purpose of the study, recommendations for future studies, limitations of the study and provides a conclusion.

## **6.4 Conclusions of Findings**

Given the literature review examined and primary data obtained through the interview concerning the role of blockchain technologies in the insurance industry, the lack of technological innovation presents the biggest threat to the survival of the insurance industry. This is evident in the issues that emanate from a lack of technological innovation including operational inefficiency, high operational costs, high fraud rate, poor supply chain performance, poor supply chain resilience, a lack of collaboration and the security of all stakeholders. These issues should be addressed proactively. To operate efficiently and effectively, the insurance industry must adopt BT as it provides the following vital functions: immutability, transparency, smart contracts, decentralised control, and reliable and automated transactions. These functions have the potential to revolutionise the insurance industry and enhance its competitiveness in South Africa and across the globe. The literature review indicated that BT is crucial for the success of the insurance industry as it minimises the movement of stakeholders and the exchange of sensitive information by offering a full guarantee of security and privacy. However, the literature review also revealed some scepticism concerning BT implementation in the insurance

industry including the regulatory environment and the cost of diversifying applications. Furthermore, it was noted by respondents that connectivity issues are often a challenge which the organisation should address. Despite these perceived issues, primary data collected during the interviews indicated that Old Mutual values BT due to its ability to enhance supply chain performance and operational efficiency, alleviate fraud, improve resilience, and make insurance products and services more affordable to their customers while allowing them feeling safe while conducting business with the organisation.

## **6.5 Recommendations**

Based on the findings and discussions presented, it is recommended that the insurance industry may start adopting blockchain technologies to enhance operational efficiency and supply chain performance. It should:

- use smart contracts to alleviate human intervention to reduce human errors and operation costs which will result in low premiums and competitiveness in the insurance industry;
- strengthen the coordination between insurers and their stakeholders to improve the exchange of information which will enhance supply chain resilience, and that can only be possible through the adoption of BT;
- decentralise data control by allowing customers to control their information which reduces the amount of customer information available to the public as this will drastically alleviate fraud; and
- embrace the significance of transparency and immutability of data, and that will minimise stakeholders' frustration about the transactions and policy and claim status.

## **6.6 Limitations of the Study**

Limitations in research refer to the constraints, boundaries, or factors that can affect the scope, quality, and generalisability of a study's findings. Due to financial constraints, the study was limited to Old Mutual offices in Durban. Therefore, the findings of the study are not generalisable beyond this specific location. The participants' perspectives may also not necessarily represent the perspectives of Old Mutual employees in other locations. Another limitation presented in the study was the lack of preceding research in the insurance industry concerning BT applications, particularly in South Africa. Previous research on insurance across the globe was reviewed to overcome this limitation.

## **6.7 Opportunities for Further Research**

This study only focused on Old Mutual in Durban, KwaZulu-Natal, in which much perspective and insight was obtained about the significance of blockchain technologies in the insurance industry. Nonetheless, the insurance industry is huge with many insurance companies in which those insurers can also provide a valuable contribution to the role of blockchain technology (BT). This study could also be carried out using a quantitative method in which data can be presented

and analysed through statistical methods such as graphs and pie charts. Furthermore, questionnaires and focus groups could be used as data collection tools to yield valuable information. Therefore, future research opportunities could focus on the role of blockchain technologies to gain a competitive advantage which could attract investment for further research.

## **6.8 Conclusion**

The concluding chapter summarised the purpose of the research study and its contribution. The study's limitations were explored and recommendations for further research. The qualitative approach using interview instruments was analysed linking to the research objectives to present the findings of the study. The literature view indicated that the insurance industry is experiencing high administration costs, a lack of supply chain efficiency, coordination, and sustainability and a high fraud rate and all these elements contribute to high premium rates, poor customer service, high fraud rate, low market penetration, resilience and competitiveness in the insurance industry. It is recommended that high competitiveness in the insurance industry would be of immense help to the economic growth of this country and more job opportunities would be created for the youth that is facing a high unemployment rate. Not only will competitiveness create job opportunities, but insurance companies would also be able to offer bursaries to deserving students to further their studies as Old Mutual has consistently been doing. This research study has also demonstrated that blockchain technologies would revolutionise the insurance industry by enhancing operational efficiency, supply chain performance, coordination, resilience, minimising costs, alleviating fraud and strengthening data security. The main findings indicated that blockchain technologies have improved the supply chain efficiency and effectiveness of Old Mutual by enabling the organisation to respond swiftly to business changes due to the amount of reliable data extracted through blockchain technologies. Therefore, blockchain technologies will salvage the insurance industry from incurring prohibitive costs, and fraud rates and improve operational efficiency, coordination and competitiveness. It is hoped that this research study will be a motivation to the entire insurance sector to start adopting and implementing blockchain technologies, as insurance companies will save more costs and start opening more branches to enhance customer experience and create more job opportunities while providing affordable services and products in South Africa and across the globe.

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## Appendices

### Appendix A: Budget

#### Proposed Budget

The proposed budget includes data analysis and report writing.

Items	Amount
1. Editing	R5000
2. Printing of Questionnaire and Online	R600
3. Transport	R3500
4. Binding	R2300
5. Interview Equipment	R1500
Total budget R18300	

#### Research Schedule

Schedule	Activities
<b>April</b>	Research Proposal
<b>May- July</b>	EC and Writing Literature Review
<b>August - September</b>	Data Collection and Data Analysis
<b>October</b>	First Draft
<b>November</b>	Final Draft and Submission for Examination

## Appendix B: Interview Guide



### School of Management, IT & Public Governance COLLEGE OF LAW AND MANAGEMENT STUDIES Interview Questions Guide

#### INTRODUCTIONS

**I will introduce myself and thank the participant for agreeing to come and sacrifice their time.**

I am Khumbuzile Ndevu, a master's Degree Student from the School of Information Technology, Governance, and Management, University of KwaZulu-Natal (UKZN).

For the completion of my study, I am required to conduct interviews for my dissertation. The title of my study is: **The Role of Blockchain in the insurance industry: A Case of Old Mutual in Durban, KwaZulu Natal**

**I will read the rules of the interview.**

Participation in this interview is voluntary and your name will not be disclosed. there is no risk attached to participation in this study. All responses will be of immense importance to the success of this study. The study was approved by the University of KwaZulu-Natal higher degree committee. You have a right to withdraw from this interview at any time, should you wish to do so. Do you have any questions about what I have already explained to you? if not, let's get straight to the questions.

#### Section A

##### 1. Demographics Questions

- What is your current position in the organisation?

Senior Manager	Supervisor	Financial Advisor

- How long have you been with the company?

2-5 years	5-10 years	10 +

- What is your level of education?

Certificate	Diploma/Degree	Honours/Masters

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## **Section B**

### **COST ADVANTAGE**

- What influence does blockchain have in the organisation that results in low cost?
- At what cost percentage do you think the organisation has saved since the adoption of blockchain as compared to before it was adopted?

### **VALUE PROPOSITION**

- What role does blockchain play to ensure that the organisation remains relevant to the market it serves?
- What benefits have you added to the service or product you are providing to customers since the adoption of blockchain?
- What problem the organisation was facing before blockchain implementation and how it has been resolved?

### **IMPROVING CUSTOMER ENGAGEMENT**

- What do you do to ensure that you remain connected to your customers?
- Can customers be able to track the status of the policy and claim progress without going to the branch? And how?

### **COMPETITIVE ADVANTAGE**

- What is the organisational strategy that makes customers keep on buying your product and trust your service?
- What role does blockchain have in the organisation which helps it to penetrate new markets?
- How it has influenced the organisation to improve performance.

### **ROOTING OUT FRAUD**

- How blockchain does eliminate fraud?
- How was the fraud rate in the organisation before the adoption of blockchain and how is it now?
- What other measures does the organisation have to complement blockchain to eliminate fraud?
- What other challenges does the organisation have with fraud?

### **SUSTAINABILITY**

- What is the organisational strategy relating to sustainability?
- What is the role of blockchain in the organisation to enhance sustainability?
- What other measures does the organisation have in place to improve sustainability?

- What are the challenges the organisation has which impede its strategy for improving sustainability?

### **VALUE CHAIN**

- How does blockchain improve collaboration in the organisation?
- What influence does blockchain have in the underwriting process?
- Has the adoption of blockchain improved the claim process and how?

### **RESILIENT COMPETITIVE SUPPLY CHAIN**

- How blockchain has helped the organisation to keep selling and providing services to your customers in tricky situations like COVID-19?

### **SECURITY**

- How do you ensure that the system cannot be hacked
- How do you ensure that a client's information is not disclosed to an unauthorised person?
- What other limitations of blockchain in the organisation?

## **Appendix C: Informed Consent**

### **UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)**

#### **APPLICATION FOR ETHICS APPROVAL For research with human participants**

#### **INFORMED CONSENT RESOURCE TEMPLATE**

Note to researchers: Notwithstanding the need for scientific and legal accuracy, every effort should be made to produce a consent document that is as linguistically clear and simple as possible, without omitting vital details as outlined below. Certified translated versions will be required once the original version is approved. There are specific circumstances where witnessed verbal consent might be acceptable, and circumstances where individual informed consent may be waived by HSSREC.

#### **Information Sheet and Consent to Participate in Research**

Date: 14-06-2022

Greetings: (Good morning and thank you for availing yourself of this interview).

My name is (provide details) from (Provide information about the researcher (name, department/institution and various contact numbers and email addresses)

Name: Khumbuzile

Surname: Ndevu

Student number: 221055481

Email address [221055481@stu.ukzn.ac.za](mailto:221055481@stu.ukzn.ac.za)

Contact number: 0735548792

From the School of Information Technology, Governance, and Management, University of KwaZulu-Natal (UKZN).

You are being invited to consider participating in a study that involves research (interview). The aim and purpose of this research is to (determine the role of blockchain in the insurance industry: A case of Mutual Old in Durban KwaZulu-Natal). The study is expected to enrol (15 participants, five senior managers, five supervisors and five financial advisors, all in Durban offices from three branches). It will involve the following procedures (). The duration of your participation if you choose to enrol and remain in the study is expected to be (30 minutes per participant). The study is funded by (is funded by the University).

The study may involve the following risks and/or discomforts (does not involve any risk to the participants). We hope that the study will create the following benefits (the study will bring transformation into the insurance industry). The researcher must disclose in full any appropriate alternative procedures and treatment etc. that may serve as possible alternate options to study participation.

If the research could potentially involve risk, explain in full if compensation exists for this risk, what medical and/or psychosocial interventions are available as treatment, and where additional information can be obtained.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number\_\_\_\_\_).

In the event of any problems or concerns/questions you may contact the researcher at (provide contact details) or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details are as follows:

Supervisor; Dr T.P Mbhele

Email address: Mbhelet@ukzn.ac.za

Contact details: 0312607524

Ethics Committee Administrator: M.Snyman

Email address: Snymanm@ukzn.ac.za

Contact details: 0312604557

Administrator: A. Pearce

Email address: Pearce2@ukzn.ac.za

Contact details: 0312608162

## **HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION**

**Research Office, Westville Campus**

**Govan Mbeki Building**

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557- Fax: 27 31 2604609

Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)

State clearly that participation in this research is voluntary (and that participants may withdraw participation at any point), and that in the event of refusal/withdrawal of participation, the

participants will not incur penalty or loss of treatment or other benefit to which they are normally entitled. Describe the potential consequences to the participant for withdrawal from the study and the procedure/s required from the participants for orderly withdrawal. Under what circumstances will the researcher terminate the participant from the study?

State clearly if any costs might be incurred by participants because of participation in the study. If there are incentives or reimbursements for participation in the study, state how much and why they will be given.

Describe in detail the steps that will be taken to protect confidentiality of personal/clinical information, and the limits of confidentiality if applicable. Describe the fate of the data and stored samples.

Participation in this interview is voluntary and your name will not be disclosed. There is no The risk attached to participation in this study. All responses will be of immense importance to the The success of this study. The study was approved by the University of KwaZulu-Natal higher. Degree committee. You have a right to withdraw from this interview at any time, should you? Wish to do so.

-----

### **CONSENT (Edit as required)**

I (Name) have been informed about the study entitled Role of Blockchain in the Insurance Industry: A Case of Old Mutual in KwaZulu-Natal by Khumbuzile Ndevu 221055481

I understand the purpose and procedures of the study (add these again if appropriate).

I have been allowed to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits to which I usually am entitled.

I have been informed about any available compensation or medical treatment if injury occurs to me because of study-related procedures.

If I have any further questions/concerns or queries related to the study, I understand that I may contact the researcher at (provide details).

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

Supervisor: Dr. T.P Mbhele

Email address: Mbhelet@ukzn.ac.za

Contact details: 0312607524

Ethics Committee Administrator: M. Snyman

Email address: Snymanm@ukzn.ac.za

Contact details:0312604557

Administrator: A. Pearce

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Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview YES / NO

\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature of Witness**  
**(Where applicable)**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature of Translator**  
**(Where applicable)**

\_\_\_\_\_  
**Date**

## Appendix D: Ethical Clearance



14 August 2023

**Khumbuzile Ndevu (221055481)**  
School Of Man Info Tech & Gov  
Westville Campus

Dear K Ndevu,

**Protocol reference number:** HSSREC/00005768/2023

**Project title:** The role of blockchain in the insurance industry: A case of Old Mutual in KwaZulu-Natal

**Degree:** Masters

### **Approval Notification – Expedited Application**

This letter serves to notify you that your application received on 22 June 2023 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

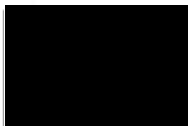
**Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.**

This approval is valid until 14 August 2024.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Yours sincerely,



## Appendix G: Plagiarism Certificate



### CERTIFICATE OF COMPLETION

This is to certify that

**Khumbuzile Ndevu**

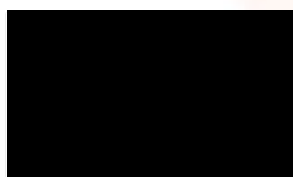
Has successfully completed the

UNDERSTANDING PLAGIARISM  
ONLINE SHORT COURSE

Administered by

The University Teaching and Learning Office (UTLO)

Issued date: 15 March 2023



**Professor Rubby Dhunpath**  
Director: Teaching and Learning

