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FACTORS FOR THE ADOPTION OF BLOCKCHAIN TECHNOLOGY IN AN ELECTRONIC DOCUMENT MANAGEMENT ORGANISATION

By

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DECLARATION

I, Muhammed Shaheer Abubaker, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed  **Date: 07 February 2024**

ABSTRACT

The purpose of this study is to identify factors that influence the adoption of blockchain technology (BCT) in an EDM organization employing the Technology, Organization and Environment (TOE) framework.

Understanding why and how an innovation is accepted in a system, has developed many theories for a long period of time, evolving from Roger Von Everett's Diffusion of Innovation Theory (DoT) (2015) all the way through, and beyond, the TOE framework developed by Tornatzky and Fleischer (1990). BCT is an innovation that gained popularity through cryptocurrencies where it is used to create a peer-to-peer network which records monetary transactions removing the need for a centralized database. The cryptographic architecture of BCT promotes promising data security features that industries outside of Finance can benefit from.

Electronic Document Management Systems are technologies which maintain, store, manage and even distribute electronic documents. Research concerning the utilization of BCT within these systems has been done before. This study however focuses on the organizations who develop these systems and offer the product as a service. The research questions are geared towards identifying the factors that contribute to the decision to adopt an innovation in three organizational elements which mirror the TOE framework.

A mixed method case study approach was employed using a sequential design that integrates the qualitative technique with a light quantitative method. The development of rating scale survey questions alongside interview questions was designed to systematically address the three elements of an organization as defined by the TOE framework. Furthermore, each element comprises key constructs which have been noted in previous studies, of which, a selected few constructs were chosen for this study in light of time constraints. The survey questions were administered via online forms platform which assisted in the data collection management process for further analysis and the interviews were conducted via various means, either face-to-face or a virtual meeting.

The results of the two methodologies were first collated into categories, defined by the relevant construct and element, thereafter a comparison was made to derive insight into the most dominating construct. The survey questions had a many-to-many relationship link with the constructs and so a descriptive statistical analysis was done based on combined mean value calculations. Prevailing themes were highlighted in the qualitative part of the study depicting a pattern which contributed to

the overarching findings of the existence of a knowledge gap related to BCT. The two results were then juxtaposed to comprehensively investigate the underlying reasoning behind each response.

This study managed to systematically highlight the associations made between all constructs through cross-element examination and mixed method result interpolation. The analysis of the results postulates that top management support is the dominating key construct found in the organization context and this construct coherently affects the dominating constructs in the other elements. Relative advantage and competitive pressure appeared to be the most prominent constructs in the technology element and environment element respectively.

This research contributes to the body of knowledge in the field of the adoption of blockchain technology in EDM organizations. Furthermore, it has a footprint in various domains -theoretical, methodological and practical. It provides theoretical insight into the utilization of the TOE framework in a cross-elemental examination and concurrently highlights a strategic approach to the complex nature of a mixed-method case study. Practically, this study establishes a systematic evaluation of an organization's position in determining if and how it should adopt an innovation, or not.

In conclusion, the research objectives have been successfully achieved by identifying the factors that influence the adoption of BCT in an EDM organization, the key construct being top management support. Whilst the purpose and aim of the study have been reached, further investigation is recommended to gain deeper insights into a multitude of constructs across multiple organizations

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For my parents Akthar Hasan Abubaker and Nasreen Abubaker, who always encouraged me to further my studies and complete my Masters. Your love and support have always and will always be my guidance in life.

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ACRONYMS

Acronym	Definition
AI	Artificial Intelligence
API	Application Programming Interface
BCT	Blockchain Technology
CEO	Chief Executive Officer
CTO	Chief Technical Officer
DOI	Diffusion of Innovation
DOSN	Distributed Online Social Networks
EDM	Electronic Document Management
EDMS	Electronic Document Management System
GIF	Graphic Interchange Format
HR	Human Resources
ID	Identification
IT	Information Technology
MAPS	Model of Acceptance with Peer Support
MB	Megabytes
MFA	Multi-Factor Authentication
MS	Microsoft
NFC	Near Field Communication
PAS	Policy Assembly system
PC	Personal Computer
QA	Quality Assurance
RFC	Request For Change
SOC	System and Organization Controls
SSL	Secure Socket Layer
SSO	Single Sign On
SVN	Subversion

Acronym	Definition
TLS	Transport Layer Security
TOE	Technology, Organization, Environment
UI	User Interface
UTAUT	Unified Theory of Acceptance and Use of Technology

GLOSSARY

Concept	Definition
Adoption Rate	The speed at which an actor adopts something.
Blockchain Technology (BCT).	A decentralised, peer-to-peer network that uses cryptography to track and secure all transactions within the network
Cryptography	A technique used to encrypt and decrypt code.
Electronic Document Management Systems (EDMS):	Systems that manage and process electronic copies of documents.
High Latency	In computers, it is a long period of time for data transfer
Innovation	A new idea or concept that practically produces a better product or process
Organisational Culture	The collective values, ethics and practices of an organisation.
Transactions	An exchange of goods between two or more actors.

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CHAPTER 1: INTRODUCTION

The adoption of innovation has been a research topic for decades, dating as far back as the nineteen-sixties when Everett Roger developed the Diffusion of Innovation Theory (DoI). With the advancement of innovation and technologies, researchers have been refining and developing new models and frameworks, contributing to a body of works that aim to understand technology adoption.

Blockchain technology (BCT) is an innovation which was developed to eliminate double-spending by bypassing financial institutes and introducing a peer-to-peer network solution (Nakamoto, 2008). BCT is the foundation of cryptocurrencies, which have been gaining exponential popularity since Bitcoin's introduction in 2009 (Farell, 2015). BCT's cryptographic security features have grasped the attention of researchers, cascading it into industries outside of finance (Ali *et al*., 2021). Opportunities for BCT have been identified in the medical industry for improving the integrity of patient records as well as introducing a level of transparency between medical operations (Siyal *et al*., 2019). While there is seemingly a lot of research being conducted on BCT, there still exists a high level of hesitation from organisations regarding the adoption of this radical innovation due to various factors (Akram *et al*., 2020).

Organisations who develop electronic document management systems (EDMS) software, to aid in maintaining and managing digitised documents, may also benefit from BCT research. A document can be viewed as an object which contains information, and the representation of that information can be in various forms (Ferilli, 2011). Ferilli (2011) further claims that documents are pervasive and that they form a foundation on which all social, administrative and scientific aspects of our civilisation are built. With the advancements in technology and life in general, the methods of managing and processing documents have been evolving. The digitisation of documents has promoted combining multiple modes of representing information (Buckland, 2017). Electronic document management systems have been developed in support of the digitisation of documents. The need for specialised software and human resources has surfaced to implement EDMS efficiently and effectively (Fernando *et al*., 2019).

Many risks are involved when utilising an electronic system for storing information, including data integrity and security. Hacking has been a significant concern and has led to organizations amassing costs comprising large amounts of money (Griffiths, 2016). Organisations that provide EDMS services or products may have to invest in ongoing security procedures and protocols to combat malicious hacks - the opportunity for BCT in EDM then arises. It can serve

as a security measure that can leverage a peer-to-peer network to verify all document transactions. Smart contracts are another BCT feature that executes a transaction based on predetermined logic rules (Tilbury *et al*.,2019). There is a growing body of knowledge which is set around the implementation of BCT in many industries; however, the rate of adoption of BCT in those relevant industries is slow (Mthethwa *et al*., 2018).

Therefore, this research aims to explore the factors that affect the adoption of blockchain technology in document processing.

1.1 Research Problem

This study expanded on the knowledge gap on the factors that influence the adoption of blockchain technology in electronic document management organisations.

According to Mthethwa *et al*. (2018), there is a seemingly slow adoption rate of blockchain technology in South Africa's document processing industry. Not only are the small to medium size enterprises (SMEs) hesitant to migrate to the blockchain, but it also seems to strike fear in the larger organisations (Mthethwa *et al*. 2018).

In the earlier research on document management, a study by Zantout and Marir (1999), implies that all companies rely on document management or document processing systems, which are either outsourced to specialised companies or use an internal software suite. With the evolution of software technology, it can be reasoned that so too did EDMS evolve. Document management companies, who are contracted to provide their services, deal with sensitive client information. As a third-party vendor, document processing services that are provided impact not only the client but also the client's client. Earlier research has also identified that the value chain of a document, casts a wide net (Meier & Sprague, 1993), This can also be seen in relevant times where a document containing valuable information is exchanged and transacted between multiple actors. For this reason, security policies and procedures are continuously reviewed and implemented to ensure document data integrity (Cram *et al*., 2017).

Software upgrades are a process which implements new features and simultaneously patches bugs. Bugs, in software, are inevitable and introduce vulnerabilities which hackers can exploit. South Africa, as a developing country, has been affected by cyber-attacks which are reported to set back the economy an estimated R5 billion a year (Griffiths, 2016). Furthermore, Van Niekerk (2017) says that the most common intention of a cyber-attack is to expose data about

an organisation or an individual. Information security is a significant concern for any organisation, which is why innovations like BCT, which posits a cryptographic security feature, should be considered to be adopted at a faster rate.

The fact that BCT is an ideal secure data transaction mechanism makes it appealing to many industries. Industries have provoked much investment in time and other resources to identify the means and methods of adopting this innovation, especially for Industry 4.0 (Akram *et al*., 2020). One of the benefits of BCT architecture is that it allows an organisation to bypass third-party actors (Nakamoto, 2008). This can effectively remove the need for services provided by document processing organisations, resulting in a potentially dying market share for these organisations. Suppose document processing companies are not quick to act in implementing new innovative solutions which leverage the idea of solid data security. In that case, their outdated processes could soon dampen their market presence. Ultimately if the method of document processing, internal and external, is slow to adopt a new blockchain strategy, it could very well continue experiencing vulnerabilities prone to attacks.

1.2 Rationale

A study on the adoption of blockchain technology in document processing could address the problem that has been identified.

1.3 Aim and Objectives

This study aimed to explore the factors that could influence the adoption of blockchain technology in an electronic document management organisation.

Three research objectives (RO1 to RO3) assisted in achieving the aim of the study. They were;

- **RO1**: To determine how the technical infrastructure of an EDM organisation influences the adoption of blockchain technology.
- **RO2**: To identify how the organisational culture of an EDM organisation influences the adoption of blockchain technology.
- **RO3**: To establish how the internal and external environment of an EDM organisation influence the adoption of blockchain technology.

1.4 Research Questions

RQ1 was the main research question of the study. Research objectives **RO1** to **RO3** linked respectively to research questions **RQ2** to **RQ4** as follows; **RO1** → **RQ2; RO2** → **RQ3;** and **RO3** → **RQ4.**

- **RQ1**: What are the factors that could influence the adoption of blockchain technology in an EDM organisation?
- **RQ2**: How does the technological infrastructure of an EDM organisation influence the adoption of BCT?
- **RQ3**: How does the organisational culture of an EDM organisation influence the adoption of BCT?
- **RQ4**: How does the internal and external environment of an EDM organisation influence the adoption of BCT?

1.5 Research Design and Methodology

The aim of this study was to investigate the nature of factors that drive the decision to adopt BCT in an EDM organization whereby an EDM organization was selected as a case study unit. The study unit has been selected based on the criterion that the organization's business model is built on and around an electronic document management product and service. A road map has been paved which outlined and identified the structure and design of this research and how the research methods used, helped achieve the objectives of the study, and by extension the goal. The TOE framework was used as a structural foundation for the study in the sense that each element of the TOE framework - technology, organization and environment – provided constructs which directed the study in its lifecycle.

1.5.1 Design

The design of this research is based on the research onion (Saunders *et al.* 2019) which provides a layered structure showing the enveloping relationship between each design aspect of the research. This study's design is as follows;

- **Philosophy**: This research ultimately used a pragmatic philosophy which stemmed from a foundational interpretivism. The reason why this research is classified as pragmatic is due to its practical approach in identifying the influencing factors based on predefined constructs.
- **Approach**: Deductive reasoning is the overarching approach of this study which posits a conclusion or realization of a small subset which is then extended theoretically to a larger scope of that subset in general.
- **Method**: Combining qualitative and quantitative methods has been postulated to provide deeper insight into a phenomenon (Caruth, 2013), therefore, this study used a mixed method where a mixture of a light quantitative method was employed along with a deep qualitative complementary part.
- **Strategy**: The strategy of the study is based on a mixed method-case study strategy which is suggested to provide critical analysis of research questions compared to case studies alone (Yin, 2009). A mixed method-case study is where a mixed method approach is defined using a case study for the qualitative part of the mixed method design (Guetterman & Fetters, 2018).
- **Time Horizon:** Since this study is done over a short period and isolates the case study within the current time, it is regarded as a cross-sectional study.

1.5.2 Methodology

The research methodology of this study is encapsulated by the mixed method-case study approach. This research utilizes an organization whose core business is based on EDM solutions and therefore has been chosen as a study unit. The sample of the participants chosen reflects and represents the organization as a whole, therefore the categories of participants were extracted from all levels of the organization.

The interview process was administered in accordance with the sequential design of the mixed-method approach. Survey questions were deployed to all participants via Microsoft Teams, and thereafter the interviews were scheduled according to the participants' availability

Data collection (interview recordings and survey answers) was done electronically and stored on two platforms, a laptop and a cloud service. This ensured the security of the data and the ability to analyze data at the very end of the data collection process to not introduce biases in the data.

1.6 Delineation

The research scope outlines a boundary for the study which translates in the following ways:

- The study is focused on one EDM organization whose size is regarded as a medium size organization.
- This study is constricted to the predefined constructs derived from the TOE framework.
- The use of a light quantitative method restricted the analysis to descriptive statistical analysis.
- The study unit is a South African organization which implies the study is within the South African context.

1.7 Ethical Considerations

The researcher followed the CPUT Research Code of Ethics. Before engaging with participants, a disclaimer was given which emphasized anonymity as well as the freedom to decline the invitation to partake in the study. The participants who willingly answered the survey questions, served as an indication of concession. Furthermore, before embarking on any data collection, a consent form was completed by the CEO of the organization, granting the researcher permission to conduct research using the organization as a study unit. Being one of the employees of the study unit, the researcher took careful consideration to not let any biases influence the data or the participants.

1.8 Contributions

The nature of contributions from this study is in three folds, theoretical, methodological and practical.

- **Theoretical contributions**: This type of contribution is aimed at providing further insight into the body of knowledge which encompasses the usage of the TOE framework. Commonly used constructs for each element in the TOE framework allowed the researcher to deliver an empirical understanding of the predefined construct within the context of this study.

- **Methodological contributions**: The design and execution of this research methodology put forth a body of knowledge which contributes to the existing knowledge in the mixed method-case study landscape. The vast intricacies in combining qualitative and quantitative methodologies, in the research, have been refined to a streamlined approach focusing on a sequential design and using a juxtaposing comparison integration method.
- **Practical contributions**: On a practical scale, organizations, within the ecosystem of EDM, can utilise the results of this study as a foundation to investigate the factors which influence the adoption of not only BCT but also any other type of innovation.

1.9 Structure of the Thesis

The structure of the thesis is as follows:

- **Chapter 1 Introduction**: This chapter introduces the research in its entirety by providing an overview of the key characteristics of the research. The problem statement, aim of the research, research objectives and research questions are the prominent aspects of this chapter which further develops into providing the flow and structure of the entire thesis.
- **Chapter 2 Literature Review**: In this chapter, the researcher dives deep into the current research which is available regarding BCT. This chapter outlines all industries which are currently investigating the use of BCT which includes the medical industry, financial industry, insurance industry and various others. This chapter aims to investigate the current state of BCT inclusiveness in industries and identify patterns within the literature. Furthermore, research on the TOE framework is done in this chapter to assist in structuring the design of the undertaken research.
- **Chapter 3 Context, Design, Methodology and Ethical Issues**: The chapter starts by exploring the various constructs of the study which translates to the study's context. Following this, the design phase is outlined and is based on the design onion which covers the inner dimensions of the research design. This chapter comprehensively discusses the techniques used for data collection and data analysis as well as outlining the population and sample of the research. The chapter concludes with ethical considerations that are employed by this research.
- **Chapter 4 Results**: Chapter 4 details the results obtained from the data collection. This chapter briefly analyses the results in isolation (qualitative and quantitative) and

then compares the two results. The data from the quantitative data collection were processed using a light descriptive statistical analysis and the qualitative data were processed using a thematic analysis.

- **Chapter 5 Analysis**: This chapter dives deeper into the nuances that emerge from the results. The predefined constructs guide the analysis in this chapter where results are initially analysed in isolation based on the TOE element and construct and then further extrapolated to a cross-element analysis. The review of the research objectives is also done in this chapter to verify the alignment of the results with the research goal.
- **Chapter 6 Conclusion**: The conclusion of the thesis is summarized in chapter six where the researcher points out the limitations which emerged during the course of the research. The mark-up of this chapter also includes the various contributions this research makes towards a larger body of knowledge as well as recommendations for further research.

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CHAPTER 2: LITERATURE REVIEW

This chapter addresses foundational literature sources in the following sub-sections:

- Blockchain technology is defined;
- Blockchain in finance;
- BCT in medicine;
- BCT in insurance;
- BCT in social media;
- BCT in document processing;
- Adoption of innovation;
- The Technology-Organisation-Environment Framework; and
- Document processing.

The subjections outline the usage of BCT in the relevant fields as well as identify various strengths and weaknesses which are highlighted. Looking at all the industries where BCT can be adopted, it is noticed that there is research being done, however, the literature provides a picture where BCT is yet to be fully accepted and adopted in these industries as a normal practice.

2.1 Blockchain Technology Defined

The term blockchain technology (BCT) has gained popularity over the last few years, not only in the finance industry but across other verticals as well. Its gain in popularity can be attributed to Bitcoin, a cryptocurrency which leverages BCT and has been a hot topic of discussion in the media (Bohme *et al*., 2015). BCT has been coined a disruptive technology, and the technology itself is still shrouded in mystery due to its lack of knowledge or exposure. BCT is essentially a decentralised digital ledger which utilises cryptography to ensure the immutability and integrity of transactions (Nakamoto, 2008).

Tapscott and Tapscott (2017) suggest the key BCT features which make it so desirable include:

- **Distributed database**: Each actor on a BCT has full access to the entire ledger (database) and its complete history.

- **Peer-to-peer transmission**: A decentralised network ensures that all network nodes get updated for every transaction on the network between peers.
- **Transparency**: The ability to view all transactions on the network provides a high level of transparency. Each actor on the BCT has a unique alphanumeric address, which is used to identify them.
- **Immutably of records**: Once a transaction has occurred, it cannot be reversed; this is achieved through the distributed consensus mechanism.
- **Computational logic**: Cryptography is the critical tool which securely packages each transaction in a block and, by extension, the chain. The computational algorithm used in the digital ledger automatically updates all nodes in the chain.

As far as research on BCT is concerned, numerous articles highlight the advantages and disadvantages of using BCT in various industry domains such as Finance, Medical, Insurance, Cyber security and many more. Although the purpose of implementing BCT overall is to achieve efficiency, increase data integrity and reduce transactional costs, each industry has its unique set of requirements and business models, which produces a unique set of challenges (Akram *et al*., 2020). An analysis of these challenges may uncover patterns which ultimately can contribute to identifying underlying themes of what factors influence the adoption of BCT.

2.2 Blockchain in Finance

Financial industries were the initial domain for which BCT found its use. The finance industry's centralised structure created an ecosystem susceptible to attacks and inefficiencies. Too many paper-based processes cause time delays and room for human error, which as a result, increases transactional costs, which are then filtered down to burden the consumer (Chen & Bellavitis, 2020). Intermediaries are utilised for business logic – contracting, clearing, settling and record keeping; all of which can now be replaced with technology. Financial Technology (FinTech) has constantly been advancing, though its advancements were in the direction of improving systems in the current financial industry paradigm. Manual processes were substituted with digital ones developed by FinTech companies, replacing one intermediary with another (Chen & Bellavitis, 2020). What was once a monopolised economy, where many people were excluded from essential financial tools, can be decentralised and remove intermediaries to reduce transactional costs with the means of BCT (Tapscott & Tapscott, 2017). Businesses can now seed funding without using an intermediary through a peer-to-peer network (Kowalski *et al*., 2021). BCT seems to have many advantages and opportunities for a new financial model; however, the risk of this change is why BCT has not yet fully

absorbed the market. Financial firms have been showing interest in investing in BCT; however, the success of BCT lies within the masses. Given the adolescence of BCT, companies seem hesitant to take the risk of migrating to a new paradigm.

2.3 BCT in Medicine

BCT capabilities have caught the attention of the medical industry, which sees the opportunity to utilise them in many divisions of the industry. Hussein *et al*. (2021) suggest that one of the most prominent and perhaps the most widely used systems in the medical industry are databases that keep patients' records. Electronic medical records (EMR) systems are currently being utilised. However, there are still gaps in this process which can make it susceptible to attacks, creating a monopolised ecosystem and duplication of records (Hussein *et al*., 2021). With BCT, patients can keep track of their records and share them with any healthcare provider on the network (Belmonte *et al*., 2018). Another feature of BCT is Smart contracts, a set of predetermined computerised protocols, and if all the conditions have been met, then certain transactions are executed (Vardhini *et al*., 2021). This allows for a transparent process which removes intermediaries and facilitates peer-to-peer agreements. The uses of BCT in medicine are not only limited to patient records. It can also extend to medical research because distributed storage of valuable medical data can promote data integrity and allow for innovative growth in medical research when concepts are shared openly (McBee & Wilcox, 2019).

While BCT may bring many solutions to the medical domain, it does have its limitations. One of the setbacks of having a distributed database is that even though it is transparent, it allows all network actors to access all the records, nullifying privacy. To some extent having a hybrid blockchain which comprises a public and private network, helps with the privacy issue, though regulations around the blockchains in medicine are still not concrete (Hussein *et al*., 2021). Another major drawback to the BCT is the complexity of the amounts of data that need to be recorded, which further feeds into the scalability and speed of the system. The computational power required to update the chain with records takes longer than the traditional database methods, and the space limitation can prove to be a hurdle. Each block in a chain contains 1 MB of data, which may seem small on its own; however, with the increase in records over time, it becomes overbearing (Perumal *et al*., 2021). One of the advantages of using BCT is its ability to reduce transactional costs; however, paradoxically, the migration onto this system can prove to be costly in terms of infrastructure and upskilling of medical professionals to utilise the system effectively.

2.4 BCT in Insurance

Much like finance, insurance firms are heavily associated with monetary transactions, which is not their business model. The insurance industry focuses on assessing and evaluating risks, which are then monetised by payers contributing towards insurance coverages if a risk occurs (Kar & Navin, 2021). This model has various avenues in which BCT can be implemented, one of the most prioritised being combating fraudulent claims (Gera *et al*., 2020). A few studies on this topic have shown promising results where the claim processes undergo vigorous refinement through the BCT platform (Gera *et al*., 2020). Aside from combating insurance claims, this industry can also benefit from increasing its efficiency in servicing clients from the point of sale to the point of a claim (if any) (Grima *et al*., 2020). Insurance is a service industry in which BCT could potentially substitute intermediaries which enable data transactions from the source to the end consumer. Based on country laws and legislations, insurance companies use agents to sell their insurance and perform all the administrative work of capturing data and servicing clients. In return, agents receive revenue from growing their database of clients. Smart contracts are one of the critical features BCT can offer to insurance firms to automate their processes by removing intermediaries and simultaneously combat fraudulent claims (Gera *et al*., 2020).

Some literature has found that a challenge of utilising BCT in insurance is the high latency in the system when subjected to high-volume transactions. This has been identified before in other industries. Although it may be a hurdle now, it is claimed to be soon addressed with a quantum computer which, on the contrary, is the kryptonite for data security in BCT (Grima *et al*., 2020).

2.5 BCT in Social Media

Over the last decade, social media has transformed societies around the world. Social media platforms have been increasingly bombarded with content which can be translated as a subset of “Big Data” (Ahmad Salleh *et al* 2015), and this information is accessed by millions worldwide if not billions of people. New trends are being published on various platforms, followed by the young and old. Social media has made it easier to connect with people and found its way into business sales and marketing (Guidi, 2020). Individuals who build up an extensive network based on the content they create are termed influences and become ambassadors for specific brands. With all the hype of social media, there are also darker elements to it cyberbullying, fake news, stalking and, ironically, data privacy, to name a few. A large corporation that has monopolised the market has access to all the data that runs through its channels. This centralised structure allows companies to inject their

self-interest ideologies into society without most people even realising it (Choi *et al*., 2020). What may have started as an innocent humorous graphical interchange format (GIF) or meme has been misleading content with no validity. Distributed Online Social Networks (DOSN) have been introduced previously, yet it has not succeeded in overcoming many of the challenges that Social Media faces. With the advent of BCT, there seems to be an opportunity to combat fake news and utilise a decentralised platform to secure data privacy in social networks (Chakravorty & Rong, 2017). The BCT architecture can be enforced in many variations; however, it is still in its early stages to have a complete social media migration. According to the literature, BCT has a high potential for notarisation in social media. The major drawback is that the notarisation process is done by third-party tools before being entered into a block on the blockchain (Song *et al*., 2019). Concepts and frameworks have been proposed in various literature, but there is yet to be a concrete BCT-based platform for social media. Social media is complex in its intent and nature; unlike other industries, it does not conform to one business model; instead, it evolves and is shaped according to the masses. BCT has not yet made strides in social networking; however, by identifying where the resistance lies, it can soon be adaptable.

2.6 BCT in Document Processing

Thus far, it can be deduced that the potential implementation of BCT in selected industries is aimed at securing documented records of some sort. In the Insurance industry, using BCT to potentially combat fraudulent claims (Gera *et al.,* 2020) is essentially utilising BCT as a documents management system. The use of smart contracts in the healthcare industry to facilitate peer-to-peer agreements is also a form of document management. It is reported that real estate also benefits from BCT by orchestrating real estate transactions. Propy (a property technology company) executed its first BCT transaction in October 2017 (Tilbury *et al*., 2019).

Document Management and processing are in some way incorporated in all industries. It is reported that in an organisation, there are three categories in which a document can exist: 1) Reference documents 2) Collaboration documents 3) Transaction documents (Koulopoulos & Frappaolo, 1995). Reference documents are static text-based documents used to retrieve information, for example, minutes from meetings. Collaboration documents pertain to a group-wide authoring scenario where more than one person works on a document, for example, policy documents. Transaction documents are variable and are processed in a workflow management system, for example, payslips and invoices (Zantout & Marir, 1999).

After exhausting available resources, the researcher has yet to find academic articles which examine a standalone, all-purpose BCT-driven EDM tool. Instead, all available literature that the author has researched postulates the implementation of BCT as an industry-specific security feature. Notwithstanding, a few "off-the-shelf" BCT EDM products have been recognised. DocFlow is a blockchain-powered document management system which provides an all-in-one solution that stores, manages and processes documents (pixelplex, 2022). Cipher is another product which is part of a megaproject that focuses on cyber security. Cipher has gained many awards in cyber security and is leveraging blockchain technology in a few of its products (Cipher, 2022). This indicates that technology consulting companies have adopted blockchain technology in EDM tools and software. The factors that influence the adoption of this innovation in an EDM-specific organisation provide further insight to other companies whose business model is to provide EDM solutions.

2.7 Adoption of Innovation

Many theories have been developed to realise the factors influencing the adoption of technology/innovation (Oliveira *et al*., 2011). This domain is quite mature in research, as it has been evolving since 1960 when Everett Rogers first introduced the Diffusion of Innovation Theory (Oliveira *et al*., 2011). DOI is a process-oriented model that identifies a criterion as to how innovation is adopted and the rate of adoption (Rogers, 1995). DOI theory identifies five categories of adopters, all of which have their own set of characteristics and beliefs; further, Roger (1995) suggests that that are five main factors that can predict the adoption of an innovation 1) Relative Advantage 2) Compatibility 3) Complexity 4) Trialability 5) Observability. Roger's theory further postulates that there are six categories of users: innovators, early adopters, early majority, late majority laggards and leap-froggers. As a whole, DOI portrays a well-grounded theory implemented over many years and is still in use today (Sharma *et al*., 2014). Many other theories have since been developed to complement the rapid evolution of technology. There are two main streams which these theories are associated with, adoption of innovation on an individual level or adoption of innovation on an organisational level (Sharma *et al*., 2014). Some theories may relate to individual and organisational levels, for example, the Technology Acceptance Model (Davis, 1989), which is popular for its simplicity and, ironically, perceived ease of use. Table 2.1 depicts the evolution of models and technology adoption theories reviewed by Sharma and Mishra (2014). It can be seen that the evolution of models and theories is accompanied by new constructs which may arguably be related to predecessors but formulated based on the context of the state of technologies.

Table 2.1: Theories relating to the adoption of technological innovation (Sharma & Mishra, 2014)

Theory/Model	Factors Influencing Adoption
Diffusion of Innovation Theory (Rogers, 1960)	• Nature of innovation • Communication networks • Time • Society
Theory of Reasoned Action (Ajzen & Fishbein, 1975)	• Behavioural intent • Attitude • Subjective norm
Theory of Planned Behaviour (Ajzen, 1985)	• Behavioural intent • Attitude • Subjective norm • Perceived behavioural control
Social Cognitive Theory (Bandura, 1986)	• Affect • Anxiety
Technical Adoption (Davis, 1989)	• Perceived usefulness • Perceived ease of use
The Model of PC Utilisation (Thompson *et al*., 1991)	• Job fit • Complexity • Long-term consequences • Affect towards use • Facilitating conditions.
The Motivation Model (Davis *et al*., 1992)	• Extrinsic motivation • Intrinsic motivation
Extended TAM2 model (Venkatesh & Davis, 2000)	• Social influence processes • Cognitive instrumental processes
Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003)	• Performance expectancy • Effort expectancy • Social influence • Facilitating conditions

Theory/Model	Factors Influencing Adoption
Model of Acceptance with Peer Support (MAPS) (Sykes *et al*., 2009)	• Behavioural intention • System use • Facilitating conditions • Network density • Network centrality • Valued network centrality • Valued network density

2.8 The Technology-Organisation-Environment Framework

Tornatzky and Fleisher (1990) describe how an organisation adopts an innovation using the TOE theory. This framework posits that three elements in a firm guide the decision to adopt the innovation. The elements are the Technological context, Organisational context and Environmental context. Some argue that this framework is advantageous due to its scalability and is not limited to organisational size (Al-Hujran *et al*., 2018). In addition, TOE has been employed in many previous studies involving Blockchain technology (Malik *et al*., 2021), which indicates its suitability for this study. One thing that has been noted is the various outcomes amongst the previous studies, where some highlight that top management and organisational readiness are the most influential factors for BCT adoption (Clohessy Action, 2019). Others suggest that the other elements have a greater weight in deciding innovation adoption; for instance, Wong *et al*., (2020) report that environmental factors such as competitive pressure significantly persuade an organisation to adopt BCT. This sparsity in results indicates that underlying factors may drive the decision-making process and could be seen as an opportunity to investigate further.

Technology context describes the technologies that an organisation uses for its operations. It also refers to the technologies that are outside of the organisation which are relevant to the organisation's operations and are available to the organisation (Oliveira *et al*., 2011). The importance of analysing the technologies inside and outside the organisation gauges the firm's progress. Salma (2020) hypothesised that security concerns impact negatively on adopting innovation. This relates to SMEs with outdated network security, which dampers their decision to adopt social commerce, which requires a more secure network infrastructure. Technologies/innovations outside of the organisation are categorised into three groups, incremental, synthetic, or discontinuous changes (Tushman &

Nadler, 1986). Incremental innovations are most desirable as they introduce new changes to existing technology used in the organisation; an incremental innovation can be viewed as a new system version (Baker, 2011). Synthetic innovations utilise existing technologies orchestrated to produce a new product (Tushman & Nadler, 1986); an example would be transactions between point-of-sale devices and mobile devices. Discontinuous innovations are 'radical' technologies which depart significantly from the existing processes (Baker, 2011). This can be seen in Blockchain technology, where it can be disruptive to the current technological processes.

Organisation context describes its structure, including its size, policies, procedures and business model (Tornatzky & Fleisher, 1990). Many constructs within the organisational context can affect the adoption process. Communication channels between subunits in the firm, top management support, company culture and company learning capabilities have been identified in previous studies to have a higher impact on the adoption decision (Malik *et al*., 2021). Organic and decentralised organisations are more susceptible to being adopters of innovation due to their fluidity and transparency; however, it is suggested that mechanistic and structured organisations are more equipped to implement an innovation (Baker, 2011).

Environmental context outlines the ecosystem in which the organisation operates. This could relate the government policies, competitors and even geographical location. (Tornatzky & Fleisher, 1990). The organisation's industry contributes to innovation adoption through competitive stimulation or synergising a value chain (Baker, 2011).

2.9 Document Processing

Document Management and processing are in some way incorporated in all industries. It is reported that in an organisation, there are three categories in which a document can exist: 1) Reference documents 2) Collaboration documents 3) Transaction documents (Koulopoulos & Frappaolo, 1995). Reference documents are static text-based documents used to retrieve information, for example, minutes from meetings. Collaboration documents pertain to a group-wide authoring scenario where more than one person works on a document, for example, policy documents. Transaction documents are variable and are processed in a workflow management system, for example, payslips and invoices (Zantout & Marir, 1999).

Research on electronic management systems has been ongoing for many years. Many techniques have been developed for implementing and executing EDMS in respective industries. Scott and Williams (2009) conclude in their report that the deployment of an EDMS in the healthcare industry

provides a full episodic summary of a patient's history which could positively impact the healthcare service being provided. It is also reported by Finch *et al*., (1996) that adopting an EDMS as a standard within the construction industry effectively increases productivity. Bjork (2003) furthermore suggests that by supporting the adoption of EDMS in construction, the use of EDM has the potential to become a standard within the industry due to its positive impact.

Security features of EMDSs have also been evolving along the EDM solutions over the years. A study in Malaysia by Abidin *et al*., (2018) posits the effectiveness of using Near Field Communication (NFC) technology to secure document transactions; however, their theoretical framework is still yet to be tested. Other literature on EDMS in education outlines the efficiency and effectiveness of EDMS. In a study based on universities in Russia, EDMS like "Delo" and "EOS for Sharepoint" have increased student data confidentiality. However, it is also reported that these systems are still prone to cyber-attacks (Kruchinin *et al*., 2019). Although EDMS have matured in their security features, network vulnerabilities allow for malicious attacks to occur outside of the EDMS application, which could then weaken the integrity of EDMS security protocols.

CHAPTER 3: CONTEXT, DESIGN, METHODOLOGY and ETHICAL ISSUES

This chapter aims to outline the architecture of this study and the flow process. It first starts by defining the constructs that were identified according to the TOE framework and its context and then it moves on to the research design. The research design section explores the research onion by Saunders and identifies the flow of the research by indicating the key components that are associated with this study from each layer of the onion. The next section introduces the methodology of the research and answers pertinent questions on who the population is and what is the sample, as well as how data was collected and analysed. Lastly, the chapter ends by outlining the ethical considerations of the study.

Chapter 3 provides an outline of the study as follows:

- Context of the study (Section 3.1);
- Design (Section 3.2);
- Methodology (Section 3.3); and
- Ethical issues (Section 3.4).

3.1 Context of the Study

Research methodology maps an approach or path to solve or find a problem (Jamshed, 2014). There are many research methodologies, and knowledge of which methodology to follow is arguably dependent on the research problem (Noor, 2008). This research is exploratory because it aims to explore a phenomenon seemingly with a knowledge gap. Research on the factors influencing the adoption of blockchain technology in a document processing organisation using a mixed-method approach is reasonably limited within South Africa. The author employed the TOE framework as a lens through which this study can identify the influential factors in adopting BCT. The three elements in the TOE framework (Technological, Organisational and Environmental) defined a broad scope of exploration and the strategy which provided the direction for the research. Key constructs in each element assisted in refining the scope of the TOE framework which allowed the researcher to identify the magnanimity of a construct in the context of adopting BCT in an EDM organization.

3.1.1 Technology context

Relative advantage – Relative advantage is a construct that is widely used in many studies that adopt the DoI framework. Rogers suggests that relative advantage is how a technology is regarded as being greater than the technology it replaces. Perceived benefit is the degree to which an organisation sees the technology as beneficial to the business (Malik *et al*., 2021).

Complexity – A factor contributing to the adoption of innovation could be the complexity of the technology (Gutierrez *et al*., 2015). To speed up the adoption rate of innovation, the innovation itself should be easy to use and manage (Berman *et al*., 2012).

Compatibility – A technology can be compatible if it aligns with the organisation's values and structure (Rogers, 2003). Gutierrel *et al.* (2015) suggest that compatibility is essential for an organisation to adopt an innovation.

3.1.2 Organisational context

Top Management Support – Top management can nurture innovation through effective communication and creating an environment that embraces change and innovation (Baker, 2011). Alkandi (2022) suggests that many scholars have emphasised the importance of management support and that the management role facilitates the technology adoption process by defining authority, roles and responsibilities.

Firm size – According to Gutierrez *et al*. (2015), results obtained from experiments indicate that the relationship between innovation adoption and firm size is biased, meaning a mixture of positive and negative correlations has been identified. However, Roger (2003) states that the organisation's size is one of the most crucial determinants of innovation adoption.

3.1.3 Environmental context

Competitive pressure – This construct highlights the degree to which a competitor in the same industry influences the adoption of an innovation (Alkandi, 2022). Furthermore, Malik *et al*. (2021) conducted a study which concluded that competitive intensity, amongst other constructs, positively influences the adoption of BCT in organisations in Australia.

Trading partner pressure – Many organisations leverage trading partners to assist with business processes. The compatibility of technological infrastructure and collaboration between trading

partners is vital to the success of both businesses (Gutierrez *et al.*, 2015). EDM organisations are the vendors that provide their services to others. This implies that their IT solutions should align with their client's needs.

3.2 Design

The research design of the study was informed by the guidelines offered by the Research Onion (Saunders *et al.,* 2019, p. 108). Figure 3.1 outlines the layers of the Research Onion, exploring:

- Philosophy;
- Approach.
- Methodological choice;
- Strategy;
- Time horizon; and
- Techniques and procedures.

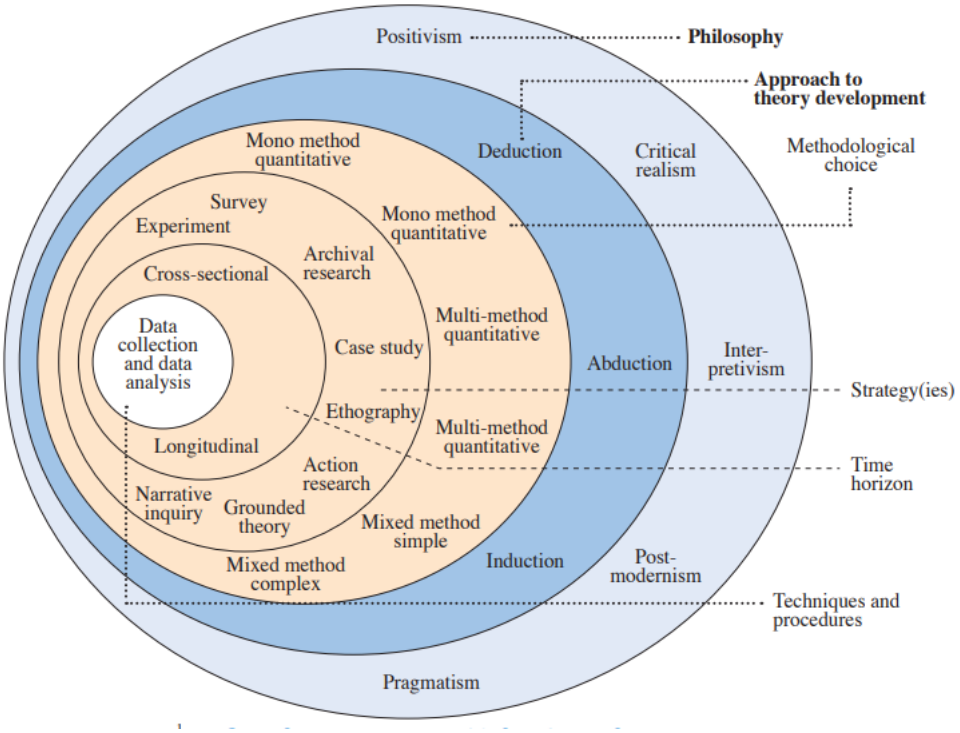

Figure 3.1 Research Onion (Saunders *et al.* 2019, p. 108)

3.2.1 Philosophy

Positivism is a philosophical position that postulates the use of scientific procedures and practical observation to achieve knowledge. It is based on the idea that social science research can be conducted similarly to that of the natural sciences, to identify objective, broadly applicable facts (Saunders et al.,2019).

The research philosophy of interpretivism differs from positivism. Interpretivism is concerned with comprehending the subjective meanings and interpretations people ascribe to their experiences, whereas. This method stresses context and the researcher's role in guiding the study process while acknowledging the complexity of social processes and human behaviour (Saunders et al.,2019).

This research starts with the philosophy of positivism, whereby the idea of a gap existing in the EDM environment is based on literature. Essentially, the positivism philosophy guided the researcher to highlight the issue of the slow adoption of BCT in EDM organizations, through literature reviews. The study then evolved into an interpretivism paradigm by means of conducting the research as a mixed-method case study and deriving insight into the underpinning nuances of an EDM organization based on the perceptions of the participants

Overall, this research can be viewed in its entirety as a pragmatic research philosophy in the sense that, it takes a middle ground between positivism and interpretivism. It is distinguished by a flexible and practical approach to research, emphasizing the application of theories and methodologies that are most efficient in addressing a given research question or issue. The basis of pragmatism is an assumption that information is best applied and effective in real-world situations.

3.2.2 Approach

Deductive reasoning is referred regarded as a “top-down” approach, whereas inductive reasoning is commonly understood as a “bottom-up” approach. This refers to the method and direction by which an understanding of a phenomenon is obtained. Deductive reasoning is predicated on comprehending the whole and formulating a prediction based on a subset of the whole, whereas inductive reasoning bases predictions about the entire on knowledge about a subset of the whole.

TOE framework is deductive in nature because it starts with a general theory about the factors influencing technology adoption and moves towards specific themes that can be tested empirically. The deductive process involves collecting and analyzing data to either support or refute the initially

posited relationships, allowing researchers to draw conclusions and generalize based on the findings.

3.2.3 Methodological choice

A mixed-method-case-study has been identified as a suitable method to conduct this study. It is suggested that a combination of qualitative and quantitative techniques can yield greater insight into a given phenomenon (Caruth, 2013). According to Cronholm (2011), some scholars promote the combination of qualitative and quantitative approaches to minimise weaknesses and maintain the strengths of both methods. Some of the shortcomings that may be prevalent in qualitative research are; that results may be difficult to generalise, results are not objective and not transparent. Weaknesses found in quantitative research comprise irrelevant hypotheses and superficial descriptions (Cronholm et al., 2011). These weaknesses are critiques that have been made from the perspective of the researchers who favour one method over the other (Cronholm et al., 2011).

It is common to see studies which use the TOE framework to adopt a quantitative approach and develop a hypothesis which is then tested against the collected data (Abed, S.S., 2020; Hiran, K.K. & Henten. A., 2020). However, this research uses a light quantitative approach and utilizes the qualitative component, which is a case study (Guetterman & Fetters, 2018). It is suggested that a mixed-method case study can unpack complicated research questions compared to case studies alone (Yin, 2009). Guetterman and Fetters (2018) have postulated two approaches to integrating mixed methods and case studies; mixed methods-case study and case study-mixed methods. A mixed-method-case study is a process where the researcher employs a mixed-method study and uses a case study for the qualitative component. The case study-mixed method has an over-arching approach of a case study with a nested mixed method design (Guetterman & Fretters, 2018).

3.2.4 Strategy

This study aimed to use a mixed method-case study, where an organisation was taken as a case study unit, and a mixed method approach was conducted within the organisation. A selected study unit is an organization whose core business model is based on electronic document management, either by means of providing he software suite alone or accompanying the product with their service. Another factor the researcher considered was how qualitative and quantitative methods are integrated over and above how case studies and mixed methods are integrated. Various scholars have mapped out ways to merge the methods, categorised as a level of integration, sequence of integration and emphasis of components (Leech et al., 2009).

This research integrates the two methods by emphasising more on qualitative with a light implementation of quantitative. Given the time constraints and resources, this study employed a convergent design based on the mixed-method design typology of Creswell and Plano Clark (2011). The convergent method enables the author to conduct both qualitative and quantitative methods concurrently and to compare the two results (Guetterman & Fretters 2018). A noted disadvantage is that the two methods, by nature, conflict with each other (Cronholm et al., 2011), which is why the author is conservative in the quantitative approach.

With the adoption of the TOE framework, the research design was compartmentalised into three elements: technological, organisational, and environmental (Baker, 2011). The constructs within these elements were identified and can be viewed in Figure 3.2. Open-ended interview questions were designed according to the constructs.

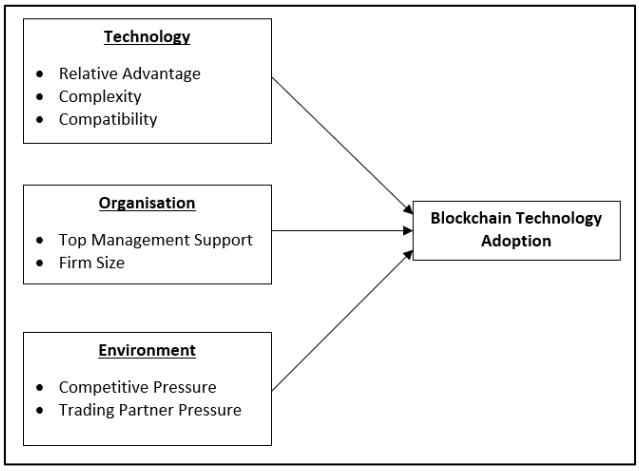

Figure 3.2 Constructs of the TOE framework model linked to BCT adoption

3.2.5 Time horizon

This study has a cross-sectional time horizon since it is being undertaken in a slice of time duration over a period of four months from the time of data collection to the time of analysis of results.

3.2.6 Techniques and procedures

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3.3 Methodology

The methodology underpinning how this study was conducted is outlined below and expands on the nature of the study unit. It explains the population and the selection strategy used to choose

participants. Justification is provided for sample size and techniques used for data collection and data analysis.

3.3.1 Case study

Salleh *et al*., (2015) utilised the TOE framework and mixed method in a sequential design, where quantitative data was collected in the first phase using a questionnaire survey. The second phase consisted of a case study which served as the qualitative component that included interviews and document observations. The outcomes of the study emanated from primary data sources collected via interviews (qualitative method) and questionnaires (quantitative method). The level of integration of the two methods favoured the qualitative approach with a light implementation of the quantitative. Hence, the sample size of the study was influenced more by the qualitative aspect and determined by the point of data saturation. The sample comprised participants within the case study unit who were most likely to understand BCT, this sampling technique was based on purposive sampling (Sharma, 2017). The mixed-method-case-study converged quantitatively and qualitatively.

The study unit identified for this research is based on meeting the research goals and providing the necessary contextual depth to answer the research questions. The case study involves a South African-based organization, whose core business is based on a priority electronic document management system. The organization provides electronic document processing cloud services to over 100 clients, most of which are American-based. The company comprises multiple divisions, though, this study is directed at one particular division since it resonates the most with the research objectives. The division in question has multiple teams which focus on supporting clients, rendering services as well as upgrading proprietary software and technologies

3.3.2 Population and sample

The population of the study aimed at EDM organizations in South Africa, more definitively, organizations that process electronic documents in their entirety. The TOE framework has predefined constructs which help investigate key factors of an organization. The study unit for this case study serves as a sample of the population whereby the findings from this study induce insight into the broader landscape of EDM organizations. Moreover, the organization was identified as a convenience to the researcher since the researcher is employed by the organization therefore making it easier to gain access to participants for interviews.

Furthermore, the study unit in and of itself served as a population where a generalization is made based on a sample of employees from the organization. The sample comprised of participants within the case study unit who were most likely to understand BCT, this sampling technique is based on purposive sampling (Sharma, 2017). The TOE framework provides a concise guideline as to the type of sample that is needed for this study. The technology context requires individuals of a technical background and therefore software engineers and technical operation engineers were identified to participate in the study. The organization context requires personnel who understand the business operations and structure of the company, relevant managers were selected for this. Finally, The environmental context needs individuals who are experienced in understanding the eco system in which the organization exists and hence sales representatives and operational managers were selected. In order to maintain unbiasedness, a few participants were selected based on their job functions who, on paper, did not align with the TOE constructs. The exact number of participants was determined based on data saturation and therefore the result was ten participants who represented the organization.

3.3.3 Data collection

Salleh et al., (2015) utilised the TOE framework and mixed method in a sequential design, where quantitative data was collected in the first phase using a questionnaire survey. The second phase consisted of a case study which served as the qualitative component that included interviews. This study leverages primary data sources collected via interviews (qualitative) and questionnaires (quantitative). The level of integration of the two methods favours the qualitative approach with a light implementation of the quantitative. The mixed-method-case-study converged by following both quantitative and qualitative data collection techniques.

Quantitative aspect– The nature of the quantitative data was light and minimal. Likert scale questions were used to allow for a more straightforward analysis. The questions reflected each element's constructs and supported the interview questions. In the interviewing process, interviewees were issued a short Likert scale survey that was completed before the interview. The survey comprised statements whereby the respondent chose their response based on a five-point Likert scale measure. This data was then used in quantitative analysis.

Qualitative aspect - The interview data adopted an inductive reasoning strategy, highlighting patterns and themes based on a coding process. Semi-structured questions ensured a thematic framework with room for subjectivity. Individuals who were interviewed selected options based on their relationship to each element of the TOE framework. IT managers and technically inclined

positions represented technological factors. Directors, financial managers and general staff closely represented the organisational factors. Operation managers and general staff corresponded to the environmental factors. The time of the interviews was subject to the interviewee's availability; however, a convenient time such as lunch or tea breaks was considered. All interviews were recorded as well as documented to optimise data integrity. Recordings and documentation were stored on a laptop and uploaded to a secure online platform until such a time when the process of data analysis needed to be conducted. Interviewing methods included face-to-face meetings, online chats (MS Teams, Skype or Zoom) and telephonic. The interviewees remained anonymous and were asked to sign a consent form. This step contributed to good research ethics. The researcher interviewed as many respondents as needed until the point of saturation occurred.

In the data collection process, interviewees are issued a short rating scale survey that was completed before the interview. The survey comprises statements whereby the respondent chooses their response based on a five-point agreement scale. This data is then used in the quantitative analysis. The use of Microsoft Forms aided in administering the questionnaire across the organization. All participants were sent a link to the form and were allowed to answer only once with no time limit, thereafter the results were extracted into Excel for further analysis.

The steps for the interview – qualitative data collection, were as follows;

1. **Send participants meeting invites via E-mail** – many of the meetings had to be rescheduled according to participants' availability.
2. **Create an environment where participants would feel comfortable** – online Teams meetings allowed the participants to partake in the interviews in accordance with their comfort. Private meeting rooms were booked for any face-to-face interviews which seeded confidence in the interviewee to answer all questions unbiasedly.
3. **Conduct interview** – sufficient time was allocated to allow participants to provide in-depth, thoughtful answers to all eight questions. TEAMS meetings were recorded and saved to a local file location, and face-to-face interviews were recorded on a mobile device and stored on a laptop.
4. **Analysis** – the recorded interviews were then transcribed to text using voice-to-text software which then enabled the researcher to visually identify themes and patterns through word recognition.

Steps for the survey questionnaire process – quantitative data collection, included:

1. **Create an online form using Microsoft Forms** – this required an introduction to the objective of the survey as well as the process around answering the survey and the follow-up interview questions.
2. **Send the online forms link to the sample** – communicated via Microsoft Teams chats.
3. **Collect responses** – using the "Open in Excel" option provided in Microsoft Forms.
4. **Analyse of the results** – done once all responses were downloaded to Excel.

3.3.4 Analysis techniques

The data analysis phase was conducted once all data had been collected in the stipulated time frame. Analysis of qualitative data yielded a thematic hypothesis which was then used to compare against the findings in the quantitative data. This gave the author a holistic understanding of the problem, which can contribute to a broader scope of the knowledge gap in this field.

Quantitative analysis - The employment of a light quantitative method translated into the data being analysed using descriptive statistical techniques. To measure the magnitude of each construct, an average value for each question indicated the weighting of the associated construct. All constructs were then compared to identify the construct with the most influence, based on the highest value, and by extension highlighting the influencing element of the TOE framework

Qualitative Analysis – A thematic analysis was done on the qualitative data set. Each response was transcribed and the transcription was analysed using a deductive thematic approach. The researcher read through the responses multiple times to get acquainted with the data and to familiarize themselves with the content. Thereafter the predefined constructs from the TOE framework helped guide the researcher in identifying codes in the data. These codes were then explored further to identify any nuances which existed within the codes and constructs. Lastly a thematic mapping was administered where codes were matched to the constructs and then further to the TOE framework.

Once both data analyses were done in isolation, the researcher then analysed both results in a juxtaposing fashion to compare the results side by side. This allowed for pattern recognition and identifying deviations within the data, also it was used as a mechanism to justify each result with the other.

3.3.5 Trustworthiness

According to Lincoln and Guba's (1988) conceptualization, trustworthiness in qualitative research is an essential element that assesses the validity and precision of the study findings. The framework consists of four interrelated criteria: credibility, transferability, dependability, and confirmability.

The extent to which the research findings precisely and accurately capture the experiences or phenomena being studied is referred to as credibility (Lincoln et al 1988). The credibility of this research is rooted in the basis that the researcher is an employee of the study case organization. On the contrary, this may be viewed as not credible since this study could be manipulated for the researcher’s benefit. However, the credibility lies in the observations made by the researcher about the participants and their roles and credibility within the organization.

The degree to which the findings are relevant to different populations or contexts is known as transferability. To promote transferability, the scope of the study unit is explained and the eligibility of the participants is outlined in their quantitative response questions, which question their knowledge and experience on certain topics. This can be utilized to transfer this study to a larger sample size with similar experience and background.

Dependability is the ability of the research process and results to remain steady and consistent over time. The employment of the TOE framework ensures a well-grounded framework which guides this research and is the foundation of its dependability. The use mixed-method case study in this context has provided critical knowledge on the adoption of BCT in EDM organizations.

Confirmability emphasizes the impartiality and objectivity of the study, stressing that conclusions should be based on the data rather than the prejudices of the researcher. This has been achieved by isolating the data sets and only analysing all the data once all participants have completed the interview. The mixed method approach also assisted in verifying the data when patterns would emerge when comparing the results from the qualitative and the quantitative.

3.4 Ethical Considerations

The case study of the organisation needed permission from directors and all relevant stakeholders. Ethical clearance from the "Faculty of Informatics and Design's Research Ethics Committee" was obtained before collecting data. The manner in which the data was collected met the following criteria:

Informed consent – All relevant parties included in this research were informed in advance of what the study is on and how their data contributed towards achieving the research aim.

Volunteer – Participants were free to participate in surveys, interviews or decline. No individual was forced to sign a consent form.

Confidentiality – A confidentiality agreement ensured that all information remains between the researcher and the respondent.

Anonymity – All respondents remained anonymous, including the organisation. No personal information was documented, and online surveys were sent in bulk via the organisation's HR manager.

Moreover, the researcher is an employee of the study unit organisation and therefore certain measures need to be set in place to avoid any conflict of interest. The relationship the researcher might have with any of the participants should not play a role in pressuring any participant to be part of this research. All potential participants had the right to decline being interviewed, withdraw from the interview at any stage without giving a reason and, as a co-employee, report any offensive actions to the relative authorized personnel (Human Resources). The researcher does not hold any type of senior position within the study unit organization and therefore none of the participants, in their job function, report directly or indirectly to the researcher. Finally, a clear road map of the research needs to be demonstrated to both the host organisation and the host educational institute, in order to identify the rights that each party has of the research data.

CHAPTER 4: RESULTS

4.1 Introduction

Chapter 4 details an exploration of the results contributing to unveiling the intricate web of factors that influence the decision-making process to adopt Blockchain technology in an electronic document management organization. The structure of the research is grounded in a mixed-method-case-study approach which cultivates a holistic understanding by leveraging both qualitative and quantitative data sources. The road map of this research is guided through the lens of the TOE framework (Technology, Organization, Environment), which defines a structure that compartmentalizes key constructs. This chapter aims to outline the process of culminating the results with the intent to pave the way for Chapter 5, an in-depth analysis of the results.

The chapter presents the results of the study in four sections as follows:

- Key constructs and TOE elements (Section 4.2);
- Quantitative results - surveys (Section 4.3);
- Qualitative results - interviews (Section 4.4); and
- Comparative results (Section 4.5).

The chapter concludes with a comparison summary.

4.2 Key constructs and TOE elements

The table below (Table 4.1) outlines the summary of the key constructs derived from the TOE framework, through literature, that have been identified as factors contributing to the adoption of BTC in an EDM organization. These constructs assisted in highlighting the characteristics of an organization which contribute the most to the decision-making process to adopt BCT into the organization. Interview questions and questions from the questionnaire were categorized according to these constructs.

Table 4.1: Summary of constructs per element of the TOE Framework

TOE Element	Key Construct
Technological	***Relative advantage*** – Relative advantage is a construct that is widely used in many studies that adopt the DoI framework. Rogers suggests that relative advantage is how a technology is regarded as being greater than the technology it replaces. Perceived benefit is the degree to which an organisation sees the technology as beneficial to the business (Malik *et al*., 2021). ***Complexity*** – A factor contributing to the adoption of innovation could be the complexity of the technology (Gutierrez *et al*., 2015). To speed up the adoption rate of innovation, the innovation itself should be easy to use and manage (Berman *et al*., 2012). ***Compatibility*** – A technology can be compatible if it aligns with the organisation's values and structure (Rogers, 2003). Gutierrel *et al.* (2015) suggest that compatibility is essential for an organisation to adopt an innovation.
Organizational	***Top Management Support*** – Top management can nurture innovation through effective communication and creating an environment that embraces change and innovation (Baker, 2011). Alkandi (2022) suggests that many scholars have emphasised the importance of management support and that the management role facilitates the technology adoption process by defining authority, roles and responsibilities. ***Firm size*** – According to Gutierrez *et al*. (2015), results obtained from experiments indicate that the relationship between innovation adoption and firm size is biased, meaning a mixture of positive and negative correlations has been identified. However, Roger (2003) states that the organisation's size is one of the most crucial determinants of innovation adoption.
Environmental	***Competitive pressure*** – This construct highlights the degree to which a competitor in the same industry influences the adoption of an innovation (Alkandi, 2022). Furthermore, Malik *et al*. (2021) conducted a study which concluded that competitive intensity, amongst other constructs, positively influences the adoption of BCT in organisations in Australia. ***Trading partner pressure*** – Many organisations leverage trading partners to assist with business processes. The compatibility of technological infrastructure and collaboration between trading partners is vital to the success of both businesses (Gutierrez *et al*., 2015). EDM organisations are the vendors that provide their services to others. This implies that their IT solutions should align with their client's needs.

4.3 Quantitative Results

The survey questions were designed to allow a response based on a scale of one to five. Each question in the survey corresponded to one or many constructs which enabled the weighting of the answers to be used to determine the influence of a construct in the decision-making process.

4.3.1 Descriptive Statistics

The survey questions were as follows:

Q1 How knowledgeable are you of data security systems?
Q2 How involved are you in workflow decision-making processes?
Q3 How well do you understand BCT?
Q4 How often have you experienced data threats in your day-to-day operations?
Q5 How often do you receive training on processes?
Q6 What would you rate your experience in your current job function?
Q7 What level of exposure have you had to software/process migration and change management?
Q8 Rate your frequency of engagement with customers.
Q9 How well do you know the market which the organization is in?
Q10 How well do you know the business model of the organization?

Figure 4.1 below illustrates relationships between survey questions, TOE elements and constructs. Table 4.2 aligns survey questions, categorized TOE elements and constructs.

Table 4.2: Survey questions categorized into TOE elements and constructs

Question	TOE Elements	Key Constructs
Q1 How knowledgeable are you of data security systems?	Technology	• Relative advantage • Complexity
Q2 How involved are you in workflow decision-making processes?	Organization	• Top management support • Firm size
Q3 How well do you understand BCT?	Technology	• Relative advantage • Complexity • Compatibility
Q4 How often have you experienced data threats in your day-to-day operations?	Organization	• Top management support • Firm size
Q5 How often do you receive training on processes?	Technology	• Complexity • Top management support
	Organization	• Firm size
Q6 What would you rate your experience in your current job function?	Organization	• Firm size
	Environment	• Competitive pressure • Partner pressure
Q7 What level of exposure have you had to software/process migration and change management?	Technology	• Compatibility • Complexity
	Environment	• Partner pressure • Competitive pressure
Q8 Rate your frequency of engagement with customers.	Environment	• Competitive pressure
Q9 How well do you know the market which the organization is in?	Organization	• Top management support
	Environment	• Partner pressure • Competitive pressure
Q10 How well do you know the business model of the organization?	Organization	• Top management support
	Environment	• Partner pressure • Competitive pressure

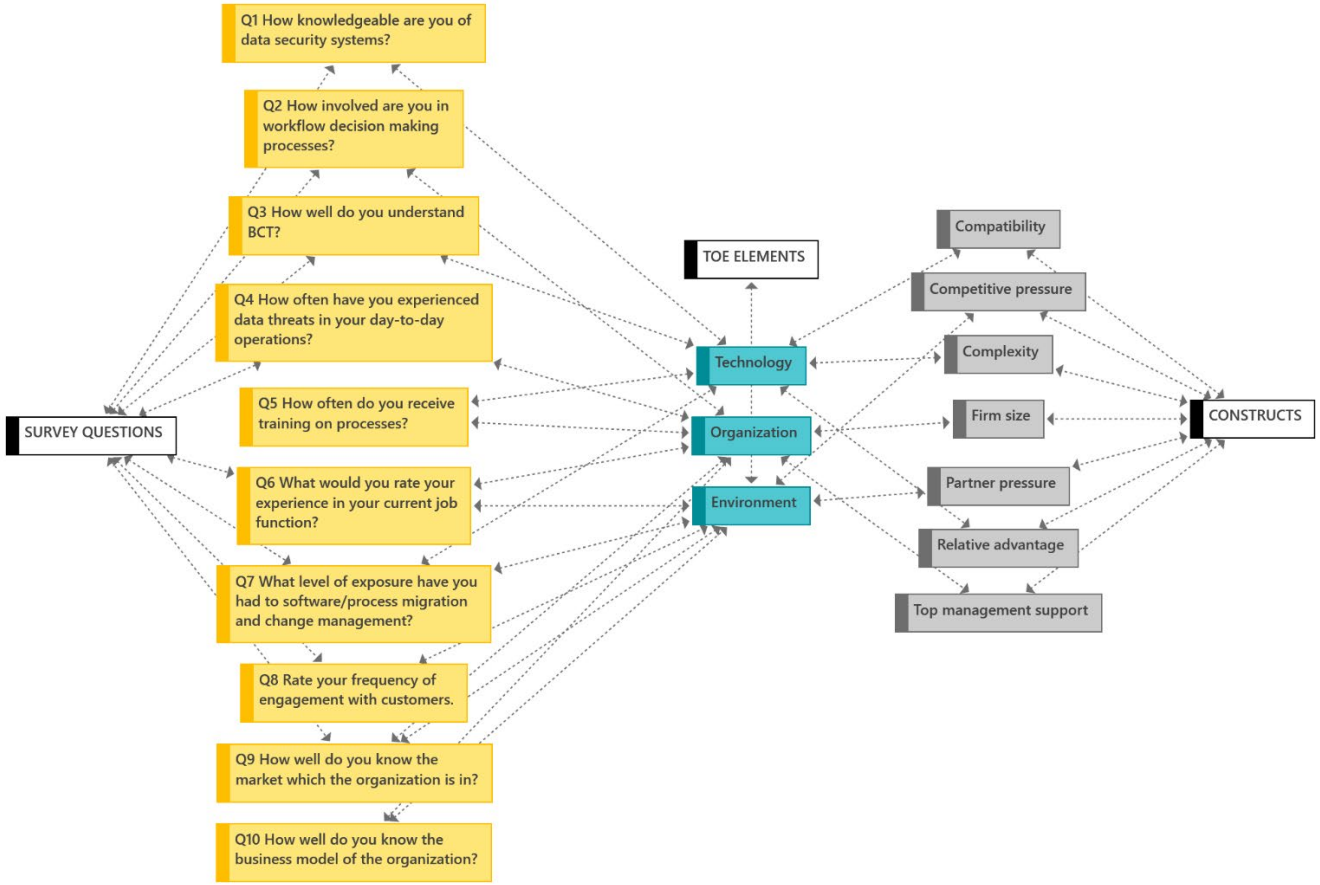

Figure 4.1 Quantitative Results: Relationship between Survey Questions, Elements and Constructs

Table 4.3: Results from quantitative data collection

Respondents	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	3	2	1	1	1	2	4	2	2	3
2	4	4	1	3	3	5	5	5	5	5
3	3	3	2	1	2	4	3	2	3	4
4	1	2	1	3	2	4	3	2	2	2
5	1	1	1	1	1	4	1	1	3	2
6	4	2	1	3	5	3	1	2	3	1
7	4	1	1	2	4	4	3	5	3	2
8	2	1	1	1	4	4	2	3	4	2
9	4	1	3	4	4	4	5	1	4	4
10	3	3	2	2	1	3	3	3	4	5

Table 4.3 provides tabulated results from quantitative data collection. It provides feedback from ten participants to ten questionnaire items.

The following table summarizes the statistical analysis done on the data.

Summary	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Complete Responses	10	10	10	10	10	10	10	10	10	10
Blank Responses	0	0	0	0	0	0	0	0	0	0
Number of Responses	10	10	10	10	10	10	10	10	10	10
Sum of responses	29	20	14	21	27	37	30	26	33	30
Response average	2,9	2	1,4	2,1	2,7	3,7	3	2,6	3,3	3
Variance	1,4	1,1	0,5	1,2	2,2	0,7	2,0	2,0	0,9	2,0
Response Count										
1(least in value)	2	4	7	4	3	0	2	2	0	1
2	1	3	2	2	2	1	1	4	2	4
3	3	2	2	2	2	1	2	4	3	1
4	4	1	0	1	3	6	1	0	3	2
5 (Highest in value)	0	0	0	0	1	1	2	2	1	2
Total	10	10	10	10	10	10	10	10	10	10
Response %										
1(least in value)	20%	40%	70%	40%	30%	0%	20%	20%	0%	10%
2	10%	30%	20%	20%	20%	10%	10%	40%	20%	40%
3	30%	20%	20%	20%	20%	10%	20%	40%	30%	10%
4	40%	10%	0%	10%	30%	60%	10%	0%	30%	20%
5 (Highest in value)	0%	0%	0%	0%	10%	10%	20%	20%	10%	20%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

4.3.2 Subgroup Analysis (if applicable):

This section refines the descriptive analysis of the individual elements in the TOE framework. Furthermore, to yield a more accurate representation of the data, the combined mean for each key construct within each element was calculated using a combined mean method. The formula is as follows:

$$Combind\ mean = \frac{n_1 * m_1 + n_2 * m_2}{n_1 + n_2}$$

Where:

$$n_1 = Group\ 1\ sample\ size$$
$$m_1 = Group\ 1\ mean\ value$$
$$n_2 = Group\ 2\ sample\ size$$
$$m_2 = Group\ 2\ mean\ value$$

For combining more than two means, the above formula is invoked on the first two groups and thereafter the result of which is combined to the subsequent group.

Technology

Table 4.4 lists seven technology-oriented survey questionnaire items, indicating combined mean, median and mode values for constructs' relative advantage, complexity and compatibility.

Table 4.4: Combined mean value calculation for Technology element

	Relative Advantage		Complexity		Compatibility	
Question 1	Mean	2.9	Mean	2.9		
	Median	3.0	Median	3.0		
	Mode	4.0	Mode	4.0		
Question 3	Mean	1.4	Mean	1.4	Mean	1.4
	Median	1.0	Median	1.0	Median	1.0
	Mode	1.0	Mode	1.0	Mode	1.0
Question 5			Mean	2.7		
			Median	2.5		
			Mode	1.0		
Question 7			Mean	3.0	Mean	3.0
			Median	3.0	Median	3.0
			Mode	3.0	Mode	3.0
Combined Mean	**2.15**		**2.5**		**2.2**	

Organization

Table 4.5 below provides seven technology-oriented survey questionnaire items, indicating combined mean, median and mode values for top management support and firm size.

Table 4.5: Combined mean value calculation for Organization element

	Top Management Support		Firm Size	
Question 2	Mean	2.0	Mean	2.0
	Median	2.0	Median	2.0
	Mode	1.0	Mode	1.0
Question 4	Mean	2.1	Mean	2.1
	Median	2.0	Median	2.0
	Mode	1.0	Mode	1.0
Question 5	Mean	2.7	Mean	2.7
	Median	2.5	Median	2.5
	Mode	1.0	Mode	1.0
Question 6			Mean	3.7
			Median	4.0
			Mode	4.0
Question 9	Mean	3.3		
	Median	3.0		
	Mode	3.0		
Question 10	Mean	3.0		
	Median	2.5		
	Mode	2.0		
Combined Mean	**2.62**		**2.63**	

Environment

Table 4.6 lists survey questionnaire items, indicating combined mean, median and mode values for constructs of competitive pressure and trading partner pressure.

Table 4.6: Combined mean value calculation for Environment element

	Competitive Pressure		**Trading Partner Pressure**	
Question 6	Mean	3.7	Mean	3.7
	Median	4.0	Median	4.0
	Mode	4.0	Mode	4.0
Question 7	Mean	3.0	Mean	3.0
	Median	3.0	Median	3.0
	Mode	3.0	Mode	3.0
Question 8	Mean	2.6		
	Median	2.0		
	Mode	2.0		
Question 9	Mean	3.3	Mean	3.3
	Median	3.0	Median	3.0
	Mode	3.0	Mode	3.0
Question 10	Mean	3.0	Mean	3.0
	Median	2.5	Median	3.0
	Mode	2.0	Mode	2.0
Combined Mean	**3.12**		**3.25**	

4.4 Qualitative Results

The interview questions in the same manner as the survey questions have been categorized according to the constructs found in each element.

4.4.1 Interview Data Overview:

The qualitative data source for this research is based on primary data which was cultivated through one-on-one interviews. The participants were selected to cast an unbiased net across the organization in order to obtain meaningful insight to contribute to this research. The job functions of the participants ranged from the Chief Executive Officer (CEO) to Content Developers.

4.4.2 Interview Questions

Eight interview questions were posed as listed below:

Q1 Do you feel that the organization is utilizing the current state of technology in terms of data security and integrity? And can you explain why you feel this way? This can apply to both customer data and employee data.

Q2 Can you try explaining the mechanics of how BCT works? and if not, can you try explaining any data security feature that you are aware of?

Q3 Can you explain the rigidity of your current workflow process in terms of technology utilization? How adaptable is the process for software integration?

Q4 How often do you have team meetings/ team building sessions where ideas are shared? Do these ideas manifest?

Q5 Hypothetically, if you found a way to improve data integrity using BCT in your organization (not to say that there currently are data integrity issues). How would you implement the BCT solution in terms of change management?

Q6 Do you feel the customers of the organisation are aware of BCT? Can you explain why?

Q7 Do you feel the partners of the organisation are aware of BCT? Can you explain why?

Q8 How well-established do you think the organization is in the market? Can you explain why?

Table 4.7 maps interview questions to TOE elements and key constructs. The technology element is addressed by interview questions Q1 to Q3. Interview questions Q4 and Q5 link to the organization element of the TOE framework. The final interview questions, Q6 to Q6 relate to the environment element.

Table 4.7: Interview questions categorized into TOE elements and Key Constructs

Questions	TOE Elements	Key Constructs
Q1 Do you feel that the organization is utilizing the current state of technology in terms of data security and integrity? And can you explain why you feel this way? This can apply to both customer data and employee data.	Technology	• Relative advantage
Q2 Can you try explaining the mechanics of how BCT works? and if not, can you try explaining any data security feature of which you are aware?	Technology	• Complexity
Q3 Can you explain the rigidity of your current workflow process in terms of technology utilization? How adaptable is the process for software integration?	Technology	• Compatibility
Q4 How often do you have team meetings/ team building sessions where ideas are shared? Do these ideas manifest?	Organization	• Top management support • Firm size
Q5 Hypothetically, if you found a way to improve data integrity using BCT in your organization (not to say that there currently are data integrity issues). How would you implement the BCT solution in terms of change management?	Organization	• Top management support • Firm size
Q6 Do you feel the customers of the organisation are aware of BCT? Can you explain why?	Environment	• Partner pressure
Q7 Do you feel the partners of the organisation are aware of BCT? Can you explain why?	Environment	• Partner pressure

Questions	TOE Elements	Key Constructs
Q8 How well-established do you think the organization is in the market? Can you explain why?	Environment	• Competitive pressure

Figure 4.2 sets out and visualizes the relationships between interview questions, TOE elements and seven constructs.

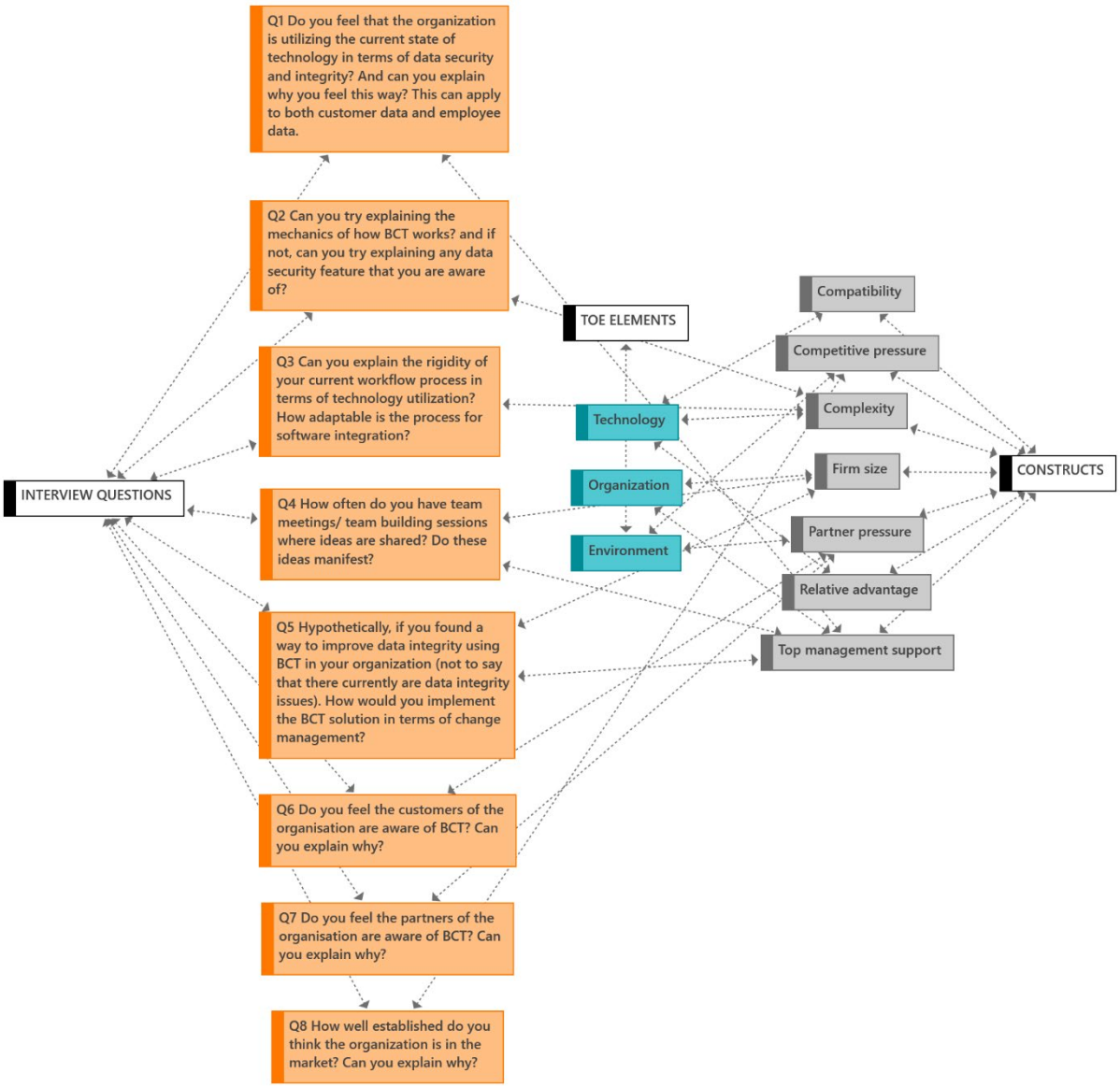

Figure 4.2 Qualitative Results: Relationship between Interview Questions, Elements and Constructs

Sections 4.4.3 to 4.4.5 below respectively tabulate participant responses to the technological, organizational and environmental elements that constitute the TOE Framework. Detailed responses are captioned as Tables 4.8, 4.9 and 4.10 which present actual transcriptions of interview sessions with seven interview participants (R1 to R7)..

4.4.3 Technological Element

Table 4.8: Responses to questions in the technology context

	Response for Question 1	Response for Question 2	Response for Question 3
R1	The company is always striving to adopt the prevailing technologies. However, because of factors like legacy code it is not always possible to move at the pace of other companies. In terms of data security, we rely on Azure cloud services, though in terms of our proprietary software, it is secure even though it is not cutting-edge technology. The data is encrypted and in transient so there is no possibility of data breaches because we do not store client data.	My knowledge of blockchain is not that good. As far as I understand, the data is encrypted using cryptography and stored in blocks of data and each block is encrypted based on the following block. We use TLS – Transport Layer Security and is the successor to SSL in which the data uses private key and public key. I am not sure how it differs from SSL other than its stronger form of cryptography. All our communications are through TLS. The data is not stored anywhere, so it is used for the purpose needed. Like I said we are dependent on a service provider, so if there is a breach on the provider's side then that is the only form of entry. As far as complexity you do need knowledge of setting it up and maintaining	The services that are in Azure all have APIs, so they are Web services. If you want to integrate another piece of software in the chain, then you need the API's provided by our servers. It is loosely coupled in that sense. Example even though mapping server can run on its own, it has no real benefit without the composition server and they both can be reached through API calls. So, you can introduce new technology into the system because of the loose coupling.
R2	As a service provider and a SOC compliance organization we need to meet the latest security standards. We are audited regularly to make sure that we are meeting the requirements and if we are not then we are given recommendations in order to keep up with the standards for SOC compliance.	I have not heard about blockchain technology until you asked me about it. In terms of our security processes we have a secure portal which clients access using their accounts. And now with SSO and the HUB, it gets integrated with all proxy tenants and so in that sense when the connection is established it is very secure	We do have many clients who integrate their own front-end UI with our software by means of API methods. It does tame a bit of technical skill in order to do that so they would need to have an in-house developer that would take their code and make the necessary changes in order to facilitate the end goal of using our product.

	Response for Question 1	Response for Question 2	Response for Question 3
R3	We make use of many cloud hosting technologies and we kind of rely quite heavily on their security setup and their security practices to make sure that our data and our work is secure. When we went through that whole SoC compliance process, apart from our internal process technology wise, we relied heavily on other people to do that for us.	I talk about something like the hub just because we worked there most often. I mean the hub is secured with like I said Microsoft Active Directory Azure Active Directory. So, we use Msal which is like the Microsoft Authentication Library to authenticate. And we with every request we make to the back end, we include your access token. So, if we do not have an access token then you do not get any response from the back end, you will immediately get an unauthorized or forbidden response. All our back-end endpoints are protected by that token.	So, it is fairly flexible, I mean particularly with the hub. It is fluid with its development. We are still finding ways to interface with other systems like for instance, we currently working on features to do with smart searching like AI (Artificial Intelligence) type searching to find similar language and documents and ways to integrate with Microsoft Word so we can bring our features into word while you are working there. We are heavily Microsoft.
R4	At an organizational level, I would expect TechOps to be the managers of that and to enforce certain policies and processes by which that is maintained and monitored. As a general feeling of where we are and if our technology is up to date with regards to that, I would say it is within the norms of any professional organization.	I do not know enough about BCT to comment on it. Moreover, based on our current product offerings, I do not consider it necessary to invest in this product. Given the nature of the data we handle, I am not sure whether the product's security features would be suitable for our needs. However, from the limited information I have, I think Exchange Docs could benefit from this technology to ensure the validity of documents. For instance, when filing documents with various bodies.	Ja integration is feasible and possible if there is business value. We do integrate with other PAS vendors and various other accelerators. We have written a code to integrate with our systems within the industry.
R5	I think so, from what I experienced. Because accessing customer data is hard for me and only the people that need the access do have the access.	Not being able to explain BCT. Knows about the process of being able to access secure information. Very secure in terms of username and password utilization for different platforms.	Definitely use other software for improving productivity and efficiency. E.g., QA forms are created using one note and Trello for project management.

	Response for Question 1	Response for Question 2	Response for Question 3
R6	They are, from all the policies that we have to read and SOC compliance. They have an elaborate system that enforces the security data that goes through many hands before a user has rights to data. As far as what technology is used, I cannot say, but the SSO is a plus. RFC process is quite intense and it seems that everything is quite secure from seeing the permissions I have and I cannot access thins.	Not aware of BCT but knows how SVN works. SVN works by keeping track of changes to a project and updates records of who did what and when they did it. If something goes wrong it is easy to roll back to a previous version. SSO also allows to link your account to all platforms and signs in with a single password. IF something goes wrong it is easily traceable to the user. SVN also gives you the ability to go back to and records.	The way it is working now is fine, and our software integration with SVN is current fine. Though we all has issues with user accounts and logins but with regards to our software and integrating with SVN then I would say it is fine. Sometimes it may act faulty for certain users which might not make it so robust at the end of the day.
R7	I would like to think so given our SOC compliance that we implement. Though having policies that we read does not mean that it is implemented. I am not exposed to many technologies that implement data security. We have an RFC process which ensures that people have limited rights to sensitive data if and when needed. We provide an online service prologue which houses sensitive data which can only be access by specific users.	Do not know about blockchain. I am aware of multifactor authentication and it is very secure. I currently cannot access my Apple ID ever since I do not have my old iPhone and I do not have access to my old number and this is the reason it is very secure in terms of multifactor authentication. SVN does have a very small sense of data security feature in the revision log,	No one solution will suite all workflow processes and the process are very agile. I feel like there is room for improvement and we are flexible in terms of introducing new software though it needs to be tested as some processes are set in stone by people higher up in the food chain. The complexity of these processes is not really complex though there is a lot of red tape around the usage of these software. We are still in the infant phases of certain propriety software in terms of HUB, though teething phase only for user interface and not accessibility.

4.4.4 Organizational Element

Table 4.9: Responses to Questions in the Organization Context

	Response for question 4	Response for question 5
R1	Officially it is once a year on our corporate getaway and it is more for business in general. Though we do have more regular sessions where people present technologies or something they have learned in something called “Amplify” session which is usually on a Friday afternoon. As far as those ideas being carrying forward or put into practice, it would depend on the team and what is being introduced	Any new ideas and new technology would have to go through the CTO and the product owner before getting it implemented. I personally had discussed things with them and they were not implemented
R2	We have team meeting everyday which is more of a touch base with regards to your daily work, and if you are having any challenges or issues. When comes to actual road mapping and strategy, that happens once a month. There is an annual conference where it is used as a strategy session that aligns with the overall vision of the company. In terms of ideas materializing, it does not always materialize. This might be because some way during the journey you may realize that there might be a better way or a newer technology will come out which would make your original idea obsolete.	Well, first and foremost, you mentioned at your team meeting it gets noted down in our road map. Whether the idea gets pursued depends on latest industry standards and deemed to be a viable option. Your next thing is to investigate how invasive it is. Can you make the necessary changes where here are not any noticeable ramifications to the services, you are offering Any kind of change or update always brings an element of failure with it?
R3	We get together often, not so much for team building, but we are always available. But in terms of meetings where we are encouraged to share suggestions, that's sort of few and far between, that's more of like a Once or twice a year sort of scenario. A percentage of them, like a handful of those things, will be carried through later in the year. But uh, I know we have those pages up on the wall in our office and I can see a couple of things that we said would be done in July that have not been done yet.	Noticed that we some people are reluctant to share those ideas just because they like the more junior team members, where they're reluctant to share an idea with the with senior management, even though you can freely bump into them in the kitchen while having a cup of coffee, they feel like it's not their place to share those ideas, so they kind of wait for the formal opportunities which happen few and far between.

	Response for question 4	Response for question 5
R4	Yeah, I think I do not know on an informal basis. So, like internal process and internal to the dev team for example, we are fairly fluid in terms of raising ideas to change either tool set or process where applicable but at a team level. But to raise common points between other teams only really happens a few times a year.	People are generally receptive to ideas, and I would follow a chain of command if I had to think of a new way to do something different with the idea of bringing value.
R5	Once a month for QA and then once a month for authors league. They more often than not manifest. Although it depends on the department. We do have a yearly team building session across all teams, where we go on a conference. I have not been to one yet, so I do not know if ideas manifest	First would go line manager and then follow the change of command. If there is a roadblock in terms negative feedback then I would go to the next line of manager. I would not overstep my role and based on my personality would not want to cause any uncomfortable scenarios.
R6	It depends on the subject; I suppose we do have the opportunity we can give suggestions. Though in some circumstances we can give a suggestion and nothing will really transpire because the company seems to be set in their ways. I do give my suggestions in my check-ins but I feel like I normally would keep my suggestions to myself based on my personality and the fact that I may not know enough about a topic. I did once suggest a process for a workflow as per my experience, and it did not transpire which I felt should have been implemented. Overall, there are processes in place that have been there for a long time and are not willing to change. I feel that a standard as already been set and it is difficult to change it though I feel if I were a senior then my suggestions would carry more weight. We do have a fair amount of team buildings which we can benefit from if it is aligned to your day-to-day operations.	I would go through the ranks, first I would mention it to the principal solution architect or a senior team member. If I do not get joy from any of my line management then I would not take it up further, that is just based on my personality. Given my role and position, I do not think I would be taken seriously. I would assume that the people in charge know what they are doing.
R7	Things get brought up in check ins and sometimes they do manifest in terms of my ideas being implemented. In terms of projects, I have regular meetings where there is a lot of top management support where the ideas	I generally follow the process that is defined in my contract, so first line of action is my line manager where they would escalate it to the relevant parties. In my experience I have informal interactions with top

	Response for question 4	Response for question 5
	directly impact me. With regards to team buildings where ideas are shared have been at a minimal which I assume is because of COVID. We do have quarterly GD sessions with the CEO where shares the vision of the company and where we are going and questions are more than welcome. We also have product reviews where product information is shared and questions can be asked.	management level where I could talk to the managers and would feel comfortable. I also would not want to go the top management when ideas might have been tested before and failed.
R8	Every day we have meetings and ideas are shared and manifested. A lot of my ideas are shared and manifested based on my experience and not so much my title. Anyone can contribute regardless of title.	I would go directly to the product owner, and the reason is that my direct line manager would not be able to understand my idea. So, I would go directly to someone that I feel that would understand and make a difference. No one is not approachable and the workspace encourages open door policy.

4.4.5 Environmental Element

Table 4.10: Responses to Questions in the Environment Context

	Response for question 6	Response for question 7	Response for question 8
R1	Unfortunately, I do not deal with the customers directly. I do feel that they are aware of it because some of them do hold a large market share and it would surprise me if they have not heard about BCT.	The partners that we have are typically the vendors selling their systems to the clients, so in respect they enable the clients to do what they want to do. I am not sure if they are implementing it but I am sure they are aware if BTC. As a system they are calling on us, so if we change our processes and architecture then they would need to adapt to us though we rely on them in terms of how the data is given to us and how we need to adapt to it. So, we are mutually dependent on each other on some level.	Again, form what the executives tell us, we are competitive. We are gaining market share in America though locally here in South Africa we are not yet that established. I am not show how we would get that type of information here in SA. I do not know or do not think our competitors use BTC because if they were we would have been aware of it and looking into it a bit more as well as I guess since we are gaining market share, BTC is not really featured in our competitors.
R2	It depends on the client. We have clients that have resources available to them, staff members. Or a big organization who have been around for quite some time and who have been exposed to blockchain technology or blocks of data and. Cryptography and so forth. They have been around, but it is a small subset. Overall, our clients know little. They know more about cloud computing and how to share data securely through a central authority.	Regarding our partners, it would be slightly different for them in terms of their knowledge of BTC. They are inclined to know a bit more about data security since they are data warehouse and data management vendors. Their data security is more intense as they withhold the data, whereas we do not keep client data.	Not being a sales representative and basing my input on what I have gleaned from our quarterlies is that we have a good foothold. We are starting to make a big impact. Our product offering is an is an excellent one. In a certain respect it is ahead of our competitors. We have been around in various forms for about 41 years but in terms of cloud computing, only the last 15 years.

	Response for question 6	Response for question 7	Response for question 8
R3	They probably are. Aware that it exists, but I think traditionally like. Our customers are of like primarily insurance companies and banking institutions and things like that. And they are not the. Most like technologically forward companies, so they might be aware of there is a thing called blockchain, but I do not think they would automatically see how that would fit into their product at all. They are kind of old fashioned and a. Bit more risk averse.	Our partners are more technology savvy. So, I would assume that they have heard about BTC, though whether they have researched means of using it is really a different ball game. I think since our partners are quite well established, they might have investigated securing data using BCT but I do not think it would be their main focus.	I think certainly if you consider it like the size of the organization, like we are relatively small and relatively young in the industry, but we compete with much bigger, more established companies. So, we compete upon contracts for these big like multi $1,000,000 insurance companies. When if you think about it with. Like the Dev team is like a small group of people in Cape Town, so it is like. I feel like we are punching above our weight a bit and I feel like based on our most recent updates that we are starting to kind of accelerate our growth. So, we have been doing all right up until this point, but we are really starting to get a lot of interest now with our, with our workers guide where and our some of the new contracts that have. Been signed recently. We are really bringing in some of the big customers and winning contracts over some other fairly well-established document automation.

	Response for question 6	Response for question 7	Response for question 8
R4	Yeah, I tend to agree with that. Uh, I think the, the, the, the notion is still that, uh, well, I am speaking subjectively, I think that. That most of these partners and clients and so forth, they stick to what they know and blockchain seems like something a buzzword. And if you do not understand it, then it is new. It is risky it seems. So, I do not think that. There is a push to adopt it very quickly and then also because it is not understood, it is seen as unsafe sometimes.	In the same respect our partners are looking into BCT though they would have a bit more technical knowledge on it. They may not be willing to invest either since it is painted in a bad light in the media.	At least from the sessions where they share like company updates. But it seems like they project us to be in a positive light and being quite competitive, not to the extent that we are one of like the uh, the biggest names out there, but definitely that we are contending with the biggest guys now like I do not know top three or something. In terms of competitive offerings for automated document production? UM, so I would say that we are the image that is portrayed to us internally is that we are being competitive with the big players at the moment.
R5	The customers are not aware of BCT on basis that I do not know from a QA perspective. May some customers but not all.	They will have more knowledge of the technology, because they are people in the IT field that need to be updated on newest technology and need an understanding of what is available.	They are quite well established because we have an international footprint and we are still growing.
R6	I suppose it depends on our customers, some customers may seem quite knowledgeable based on my interaction with them and others are not clued up. I can see from customer responses some of them seem quite innovative and others not so much. I would assume the market that we are in that the customers would have looked at all avenues to secure data but it is difficult to say from my perspective.	I would think I partners are reputable companies and they are up to speed with everything and they should be aware of BCT. This is assumption I would like to make and I would think that the partners are also SOC compliance and everyone should be on the same standard. I would think that I service is influenced by our partners since we get many customers from them and their pedigree.	We are quite well established if you listen to our town hall meetings and our business strategy for the next financial year. We have a very large customer base; I would also say that we are on par and that we are quite trusted. If somebody from outside had to ask us what companies we are affiliated with that should be an indication of our authenticity.

	Response for question 6	Response for question 7	Response for question 8
R7	I would say that given the IT field that we are in that I feel that multiple people I amongst partners customer would have at least heard about BCT.	A number of our partners deal with financial data which is why I feel that they might be more aware of BCT.	It is pretty well established; I follow a lot of our competitors linked-in profiles and see many infographics which depict our market share presence. We are essentially in the top tier of the market share. Although we do not have a lot of influence of over the market. I think our customers would be susceptible to adopt any software that we introduce in our proprietary software.
R8	I would say yes because we primarily service in the technology environment and the fact that they are using sensitive data. And current clients would be happy with any improvements made to data security systems used in our software.	Yes I do because of the same reason our customers are aware. Although they have more control over the technologies being implemented and we would have to follow suite.	We are one of the top contenders in our field in the American market but not in south African market, though we could be more innovative.

4.4.6 Thematic Analysis

This section identifies and addresses the major themes, patterns, and insights that emerged from the qualitative interviews, expressed in three categories namely, technology context, organization context and environment contexts. This approach is in keeping with the structure of the TOE Framework.

The outcomes of the thematic analysis of the technology context element included relative advantage, complexity and compatibility.

- **Relative Advantage –** SOC compliance, Azure Cloud Service, data security;
- **Complexity –** Knowledge gap (BCT), multifactor authentication; and
- **Compatibility – f**lexibility.

Table 4.11 below sets out emergent codes linked to technology elements elicited during thematic analysis.

Thematic analysis of responses to the organization element encompassed top management support and firm size,

- **Top Management Support** – frequent informal team meetings, position dependency and chain of command; and
- **Firm size** – annual conference and team dependencies.

Table 4.12 presents emergent codes associated with the organization element.

The study identified two aspects namely trading partner support and competitive pressure linked to the third element of the TOE Framework, environment.

- **Trading Partner Pressure** – relative customer awareness (BCT), strong partner awareness (BCT), customer risk aversity and partners' technical knowledge; and
- **Competitive Pressure** - extremely competitive and well-established environments.

Table 4.13 represents codes identified during the thematic analysis of participant responses to interview questions 5, 6 and 7 regarding the environment.

Technology Content – Emergent Codes

With respect to the *technology context*, Table 4.11 sets out identified codes emerging from participants responses to interview questions R1 to R3.

Table 4.11: Codes from the Responses in the Technology Context

	Response for Question 1	Response for Question 2	Response for Question 3
R1	• Strive to adopt latest technology\Constraints • Azure Cloud Services Data Security • Data Encryption • Transient Data	• Lack of knowledge on Blockchain • Transient Data • Service Providers Dependant • Medium Complexity	• Easy integration • API • Loose Coupling • Flexibility
R2	• SOC Compliance • Latest Security standards • Regular Audits • Azure Cloud Services	• Lack of knowledge on Blockchain • Secure Portal • SSO • Proxy integration	• UI integration • API • Medium level of technical skill
R3	• Cloud Hosting Technologies • Azure Cloud Services Data Security • SOC Compliance • External resources	• Lack of knowledge on Blockchain • Multi Factor Authentication • Tokenization • Endpoint Security	• Flexible • Easy System integration. • Microsoft Reliant
R4	• Industry standards • Technical Operations management	• Lack of BTC knowledge • Nature of Data • BCT not applicable	• Feasible integration • Flexible • Business model
R5	• Affirming security standards	• Lack of BCT knowledge	• Diversification of Software

	Response for Question 1	Response for Question 2	Response for Question 3
	• Access control	• Multifactor authentication	• Productivity Enhancement • Flexible
R6	• SOC Compliance • Data Security Enforcement • SSO • RFC • Access Control	• Lack of BCT knowledge • SVN • Record keeping database	• Adequate software Integration • General Issues
R7	• SOC Compliance • RFC process • Access Control • Data Sensitivity	• Lack of BCT knowledge • Multifactor Authentication • SVN revision Log	• Agile Workflow • Flexible • Software testing • Upper Management
R8	• SOC Compliance • Policies • SVN • Room for improvement	• Lack of knowledge on BCT • Multifactor Authentication • SVN	• Flexible • Room for improvement

Organization Context – Emergent Codes

Table 4.12 presents the code results collected from seven interviewees during the thematic analysis of the organization context element relative to interview questions R4 and R5.

Table 4.12: Codes from responses in the Organization context

	Response for Question 4	Response for Question 5
R1	• Annual Conference • Regular Knowledge sharing sessions • Team dependant	• CTO • Production Owner • Ideas not implemented
R2	• Daily operations meeting • Monthly Road mapping • Annual Conference • Ideas not always materializing • Continuous change in technology	• Team meeting • Industry Standards • Idea investigation
R3	• Regular Internal Informal meetings • Encourage suggestions • Annual Conference • Lack of follow through	• Lack of confidence in Junior team • Formal platforms
R4	• Regular internal informal meetings • Annual Conference	• Chain of Command • Value of idea
R5	• Monthly Meetings • Ideas Manifest frequently • Department/Team dependant • Annual conference	• Chain of command • Would not overstep
R6	• Suggestion opportunity • Resistance to change • Lack of confidence • Standard workflow process • Authority dependant	• Chain of command • Rank dependant • Escalation
R7	• Regular project meetings • Top management support • Quarterly session	• Chain of command • Lack of confidence • Informal top management interaction
R8	• Daily meetings • Ideas manifestation based on experience • Open communication	• Product owner • Open door policy • Relatable idea

Environment Themes – Emergent Codes

With respect to the *environment context*, Table 4.13 suggests codes identified during thematic analysis of participants responses to interview questions R6,R7 to R8.

Table 4.13: Themes from the Environment context

	Response for question 6	Response for question 7	Response for question 8
R1	• Minimum customer Engagement • Large market share • Awareness of BCT	• Aware of BCT • Mutually dependent • Process Adaptation	• Competitive • Gaining Market Share • Lack of BCT implementation • No Value
R2	• Client Dependent • Well Established organization aware of BCT • Small Subset	• Partners more aware of BCT • Data Security Knowledge • Data processing	• Information sharing • Competitive • Excellent product offering • Company longevity
R3	• Possibly Aware • Not Technology Companies • Risk Averse • Resistance to change	• Partners Technology knowledge • Aware of BCT • Not data security implementation •	• Really competitive • Company size • Getting big customers • Signing big contracts •
R4	• BCT negative connotation • Rick averse • Sceptical •	• Aware of BCT • Data security awareness • Not implemented	• Extremely competitive • Contending with big names •
R5	• Few customers aware •	• Aware of BCT • Technology knowledge •	• Well Established • International footprint •
R6	• Self-doubt • Some awareness of BCT • Customer dependant	• Aware of BCT • Technology Knowledge • Assumption • Compliancy standards	• Well Established • Large Customer base • Trusted • Authentic
R7	• Heard of BCT at the least	• More awareness of BCT • Financial Data	• Competitive • Strong market share presence • Influential
R8	• Awareness of BCT • Customer satisfaction	• Aware of BCT • Technology knowledge	• Top contenders • Lack innovation

4.5 Comparative Results

Table 4.14 juxtaposes three framework elements and seven key constructs indicating qualitative (column 4) and quantitative (column 4) outcomes alongside each other.

Table 4.14: Comparison of results from qualitative data and quantitative data

Elements	Key Constructs	Qualitative (themes)	Quantitative (combined mean)
Technology	Relative advantage	• SOC Compliance • Azure Cloud Service Data security	2.15
	Complexity	• BCT Knowledge Gap • Multifactor Authentication	2.5
	Compatibility	• Flexible	2.2
Organization	Top Management Support	• Position Dependent • Chain of command • Regular Informal Meetings	2.62
	Firm size	• Annual Conference • Team Dependent	2.63
Environment	Trading Partner Pressure	• Relative Customer awareness (BCT) • Strong partner awareness (BCT)	3.12
	Competitive Pressure	• Very Competitive • Well Established	3.25

4.6 Comparison Summary

By juxtaposing the two results obtained from the qualitative and the quantitative data, we can now derive further insight into the results and unpack factors affecting the decision to adopt BCT in an EDMS organization., While an overarching breakdown of this comparison is provided here, An in-depth analysis is covered in Chapter 5.

4.6.1 Technology Element

The current state of technology utilized in the organization which enforces data security has been commonly identified as SOC compliancy and Azure Cloud Services Data Security. Associating these themes with the combined mean value of 2.15, it appears that BCT does not have much of a relative advantage over the current data security mechanisms.

The actual knowledge of the concept of BCT is poor which is evident by the theme BCT Knowledge Gap furthermore the combined mean of 2.5 postulates that the complexity of the system in and of itself may be the reason for the lack of understanding. Respondents did however touch on Multifactor Authentication which is what some of the respondents refer to as a means of data security.

The combined mean value for compatibility is 2.2 which may indicate that the current system is not very compatible with other software. However, the major theme which transpired from the responses was that the system is Flexible. The disparity between the two results is analyzed further in the following chapter.

4.6.2 Organization Element

Chain of Command and Position Dependent themes associated with top management support posit the idea of it being a structured hierarchy which conforms to an authoritarian ideology. Regular Informal Meetings and the combined mean value of 2.62 promote the counterintuitive notion of the organization having an open-door policy and accepting new ideas.

The size of the organization is noted to be a medium size company, which is deduced from the themes of Annual Conference and Team dependent. The combined mean value of 2.63, in comparison to the themes, highlights its influence over the other constructs.

4.6.3 Environment Element

The overall perception is that customers have at most heard of BCT though not, whereas the organization's partners may have a bit more knowledge about BCT than customers. The combined mean value of 3.12 indicates a high level of dependency between the organization, its customers and partners.

Achieving the highest combined mean value is the organization's establishment in the market with a mean value of 3.25. The organization appears to be ranked quite high by its employees based on management feedback and customer database.

The case study mixed method approach postulates a well-rounded perception of the organization and its position with respect to BCT. This, coupled with the TOE framework, probes into various nuances which illuminate the elements within the organization that influence the decision-making processes with respect to adopting a new technology. The following chapter further explores the results and provides links to the aim of this study.

CHAPTER 5: ANALYSIS

Chapter Five comprises the following seven sections:

- Introduction (Section 5,1);
- Analysis of technology element results (Section 5.2);
- Analysis of organization element results (Section 5.3);
- Analysis of environment element results (Section 5.4);
- Cross element analysis (Section 5.5);
- Achievement of objectives (Section 5.6)' and
- Summary (Section 5.7)

5.1 Introduction

Leveraging the TOE framework design, in this section the researcher defines a structured analysis of the results obtained from this case-study-mixed-method approach that explores the factors influencing the adoption of BCT in an EDM organization. The identified key constructs for each element in the TOE framework assist in refining the analysis process, and as a result, this chapter derives insights for each construct on an individual basis first. Thereafter, cross-element examination presents answers to the research questions. Finally, integration enabled the meeting of the research objectives.

Three key elements and associated constructs which emanated from the TOE framework are delineated below:

- **Technology element**
  - Relative Advantage;
  - Complexity; and
  - Compatibility.

- **Organization element**
  - Top Management Support; and
  - Firm Size.

- **Environment element**
  - Trading Partner Pressure: and
  - Competitive Pressure.

The objectives of this study (Chapter 1, Section 1.3) were:

- **RO1**: To determine how the technical infrastructure of an EDM organisation influences the adoption of blockchain technology.
- **RO2**: To identify how the organisational culture of an EDM organisation influences the adoption of blockchain technology.
- **RO3**: To establish how the internal and external environment of an EDM organisation influence the adoption of blockchain technology.

The associated research questions were initially set out in Chapter 1, Section 1.4 where RQ1 was deemed to be the main research question of the study.

- **RQ1**: What are the factors that could influence the adoption of blockchain technology in an EDM organisation?
- **RQ2**: How does the technological infrastructure of an EDM organisation influence the adoption of BCT?
- **RQ3**: How does the organisational culture of an EDM organisation influence the adoption of BCT?
- **RQ4**: How does the internal and external environment of an EDM organisation influence the adoption of BCT?

Each construct was scrutinized against the qualitative and quantitative results in a manner which would yield new inferences and discover deeper nuances. To formulate an interpretation of the results, the researcher dissects each element in the TOE framework by triaging among the survey question, interview question and the respondents' response to both. This triangulation method allows for a more robust analysis whereby the answers from the survey questions could justify the reasoning behind interview answers. The questions in and of themselves guide the researcher in identifying the element to which the question relates.

5.2 Analysis of Technology Element Results

The concept of technology within the TOE framework is based on the characteristics of the technology itself that influence the decision to adopt it. Amongst many of the constructs associated with the technology element, there were three key constructs identified for this research, namely;

- **Relative Advantage** – Does the proposed technology have any relative advantage over the current state of technology?
- **Complexity** – How complex is the innovative technology to understand in terms of its operation?
- **Compatibility** – Is the technology compatible with the organization's technological infrastructure?

5.2.1 Relative Advantage

Examining the survey questions links to the Relative Advantage construct provides context to the combined mean value of 2,15 that is associated with Relative advantage. This value indicates the perception of BCT having an advantage over the current state of technology is 43%, which postulates that the current state of technology within this EDM organization is more favourable. The survey questions probe the respondents' knowledge about data security systems as well as knowledge of BCT on a scale of one to five, one being the least in value and five being the highest. The respondents' understanding of data security is at an average of 2,9 and their understanding of BCT averages at 1,4. These values indicate that the lack of knowledge of BCT and the adequate knowledge of data security systems collectively invokes a perception that BCT does not have a relative advantage.

The themes derived from the qualitative results also favour the current state of technology being advantageous, in the form of the organization being SOC compliant and the utilization of Azure Cloud Services Data Security. The interview question posed to the respondents elucidates their feelings towards the organization's data security measures. SOC compliancy is the common theme which is an indication (to the respondents), that the organization has a prominent level of data security. Azure Cloud Services Data security has also been a common theme, where respondents justify the organization being up to date since a well-established platform hosted their product.

Interpreting the two results holistically, illuminates the reasoning behind the notion of the organization's current state of technology in data security being advantageous over BCT. The

respondents' knowledge in both data security and BCT is evident in the quantitative results. Supporting this interpretation is the fact that the respondents explicitly say they do not know about BCT. Their confidence in the organization being SOC compliant and associated with Azure cloud services cultivates a perceived benefit in their current state of technology over BCT. Overall, there is no deep technical understanding of BCT or data security systems for that matter, which makes sense that a lack of knowledge of modern technology and its benefits would not manifest a sense of relative advantage which aligns with the organization's technical infrastructure.

5.2.2 Complexity

Complexity as a construct is ironically quite complex in its nature, where, the adoption of an in and of itself should not be complicated to understand. Furthermore, a criterion worth considering is knowledge of other systems in data security to examine how complex is too complex. The result obtained from relative advantage has already provided insight into the knowledge about BCT complexity as well as current data security systems. The questions relating to complexity in the survey all aim to focus on aspects which indicate some form of knowledge towards the complexity of BCT and data security systems.

The relative advantage outlines questions one and three from the survey in the construct which also cascades into the complexity construct. The knowledge gap in BCT, highlighted in relative advantage, indicates that it is either too complex or there is no benefit to knowing about it. For this construct the former concept is applied. Questions five and seven give some understanding as to the level of engagement the respondents have with the technical architecture of the current systems in the organization. Understanding how often training is received was used as an indicator to determine how complex processes are within the organization which is aligned with question five. Question seven probes deeper into the experience of the respondent with regards to software migration, this exposes the latent knowledge of the respondents towards the complexities of the technical infrastructure. The mean values for questions five and seven are 2,7 and 3, respectively. This proves that there exists some deeper knowledge amongst the respondents about the complexity of the current systems in place. The combined mean value across all four survey questions is 2,5 which showcases the perception that BCT is complex enough to lack knowledge thereof, and this complexity compares to respondents' knowledge of current systems.

The themes of BCT Knowledge Gap and Multifactor Authentication (MFA) derive from the interview question of explaining BCT or alternatively explaining exposure to any other data security process. In lieu of understanding BCT, many respondents explained MFA, a security feature offered by Azure

Cloud Services. Some respondents could explain the process of how MFA executes from the end user perspective rather than actually explaining the technical details of how it works. A few others could expand more on the inner workings of using the Azure Cloud Services features and how it actually integrates with the organization's infrastructure. Regardless of the variance between the two types of explanations, the interpretation of this knowledge leads towards the idea that the current process used is not complicated or complex which makes it more desirable and user-friendly.

An explanation behind the overarching outcome of BCT being too complex emerges when triaging between the two responses of qualitative and quantitative results. The respondents in general seemed to get frequent training as evidenced by the mean value of 3, however the type of training is unknown. The explanation provided by respondents with regards to how MFA works, seems to indicate that the designed training is more for how to use processes rather than how processes work on a technical level. The assumption emerges that the frequency of these training is in unison with keeping to SOC compliancy policies. The number of respondents who have a stronger understanding of software migration is fewer than that of respondents who have little exposure to software or process migration. This could imply, that types of training vary between individuals which is directly proportional to their understanding of how to use a system versus how a system works behind the scenes. To conclude, BCT appears to be too complex, more so than current processes used within the organization.

5.2.3 Compatibility

Questions three and five of the survey examined in the previous constructs manifested insight into the results from the perspective of relative advantage and complexity. In terms of compatibility, the knowledge of BCT and knowledge of migration processes helps identify whether implementing BCT would be invasive to the technical infrastructure as a whole. The overall combined mean value of compatibility is 2,2 which assumes a low expectancy of BCT being compatible with the current systems in place. To reiterate the point of lack of BCT knowledge contributes to not fully understanding how BCT works and therefore not being able to assess its compatibility.

The interview question related to compatibility indicates that the core software suite, an EDM system, is flexible and many of the clients already have their proprietary software integrated with the organization’s software. According to respondent one, the EDM system that the organization developed has various isolated and loosely coupled applications. This emphasizes the flexible nature of the system which suggests that a technology like BCT integrates with the EDM system.

There exists a disparity between the results obtained from the qualitative data and the results obtained from the quantitative data. The former suggests that there is a prominent level of integrability, since the EDM system is flexible whereas the latter portrays BCT does not possess the characteristics of being compatible with the EDM system. An explanation of this contradictory aspect in the results comprises an understanding that the survey questions do not directly question the compatibility of BCT, rather the mean results are derived from an amalgamation of questions that query concepts based on compatibility. The low combined mean of 2,2 does not directly translate to the perception that BCT is not compatible, rather it is a reflection of the lack of knowledge about BCT which leads to the idea that it is not compatible. In conclusion, the EDM system is highly flexible and supported by the concurrent theme of flexibility, and the low combined mean value does not directly describe the compatibility of BCT with the organization's EDM system.

5.2.4 Comparison of Constructs

The research question aimed at identifying the factors influencing the adoption and evaluation of blockchain technology in an EDM organization within the context of the technical infrastructure is feasible. The technical infrastructure of this EDM organization seems to leverage on a cloud platform, specifically Azure Cloud Services. According to the results, this is a well-established cloud hosting environment and in doing so, it has a fairly robust data security architecture. This architecture along with the SOC compliance policies ensures that an organization is up to date with industry standards. Since Azure hosts the EDM system, the complexity of the data security system is not a concern to the organization, as they solely rely on Azure to maintain their security. Consequently, there are some technical experts within the organization who do know about the security of using the Azure platform, which may result in a lack of motivation to explore other security systems to replace the current system. This further leads to the fact that there is a large knowledge gap in BCT within the organization and this may be a by-product of the organisation's core software secured by Azure Cloud Services. This ripple effect spans through all constructs where since there is a small understanding of BCT, the current state of technology seems more advantageous. The complexity of the current security process is straightforward and well-defined whereas BCT is unknown and therefore complex. Finally, flexibility and compatibility of the EDM system imply BCT integration into the software. However, proponents of BCT should consider the complications of cloud-hosted software.

In conclusion, the researcher interprets that the relative advantage construct is the most dominant characteristic in the technology infrastructure in determining the adoption of BCT. The evident lack of knowledge of BCT and its data security possibilities amongst most respondents also indicates that

there are no data security threats requiring remediation. The technological infrastructure of the organization relies heavily on a competitive cloud hosting platform (Azure), whose offerings align with the EDM organization's needs and therefore adopting BCT does not seem likely.

5.3 Analysis of Organization Element

The organization element formed the basis for answering the research question of how an organization's culture influences the adoption of BCT. The two constructs listed below highlight aspects of the organization's structure and values, included in the TOE Framework.:

- **Top Management Support** – Does management foster an environment for creative thinking and innovation?
- **Firm size** – Does the size of the organization allow ideas to be shared and manifested?

5.3.1 Top Management Support

Four questions from the survey were associated with top management support. These questions derive a high-level understanding, based on scaling value, of the various aspects that correlate to top management support. Question 2 entails the respondent's involvement with workflow decision-making processes. This touches on top management support in the sense of empowering employees and giving opportunities to add value. The average value of 2 indicates that employees in general have little influence in the workflow decisions, although this value may not imply that there is a lack of top management support. It could simply be that a workflow structure is already in place. Question 4 queries exposure to day-to-day job activities and resultant data threats. The average result for this is 2,1 which deduces the fact that there is a low frequency of data threats and could be a product of the nature of the respondent's role or top management intervention. Top management may have introduced policies and procedures that combat data threats. Question 5 previously examined in the technology context; shares roots in the organization context as well, in the sense that top management support showcases frequent training. Questions 9 and 10 explore the knowledge the respondents have about the market in which the organization exists, and the business model of the organization, respectively. Top management support connects to these questions in terms of open communication channels within the organization. The average understanding of the markets and the business model is 3,3 and 3 respectively which substantiates an effective communication network within the organization. This knowledge sharing in the organization could foster trust amongst

subordinates and superiors and therefore promote a healthy organization culture. Overall, the combined mean value for top management support is 2,62 which is

Results from the qualitative approach yield three major themes; Position Dependent, Chain of Command and Regular Informal Meetings. The questions posed to the respondents aimed to explain the frequency of meetings and the fruitfulness of these meetings as well as how are ideas escalated and via which channels. The theme of position dependence infers a hierarchical structure where the position held in the organization holds weight and value to one's opinions and suggestions. This position dependency notion could link to experience, or lack thereof, in the organization and therefore contributes to the perception of authority being the underlying driver. Regular informal meetings could be the result of the workflow structure rather than micromanagement. The general sense of these informal meetings is to share the focus of faced issues (if any) and to outline the completed work for the day. This regular informal meeting viewed as a general practice involves respondents who have any ideas to share These meetings facilitate approaching their line managers. This ties in with the final major theme being Chain of Command. While it does seem that the organization advocates an open-door policy based on several responses, it is out of workplace ethics and mutual respect that escalation points for ideas run through a chain of command.

Top management support is a critical aspect in terms of transpired and adopted ideas. Regular informal meetings and the respondent's well-rounded knowledge of the business model and the markets, indicate a firm and open communication between and amongst managers and staff. This is highlighted by both the qualitative and quantitative results. Position dependence correlates to survey question 2 in a manner that emphasises the relation between decision-making processes and experience. The overall combined mean value of 2.62 highlights the influence that top management has on the decision-making process to adopt an innovation.

5.3.2 Firm Size

The overall combined mean value for the firm size is 2.63 which bodes this construct as a good indicator as a factor that influences the adoption of BCT. Questions 2, 4 and 5 have already examined the perspective of top management support, however, they also are related to firm size. Involvement in decision-making processes determines the respondents' position within the company. This determining assumption is the fact that question 6 asks about the respondents' experience in their current role. With the highest mean of 3,7 respondents who are well versed in their roles though are not entirely involved in the decision-making processes, the organization has multiple well-skilled individuals who do not make decisions in terms of workflow processes. This

implies the organization is large enough to hire multiple experienced individuals, who are not entry-level but are also not in an authoritative position. The integration of regular training occurs as the organizational employment rate increases or new processes evolve. This construct indicated the organization was not small in size.

The Themes of Annual conference and Team dependent highlight the fact that the organization is not a small firm. On the contrary large firm is not large since there is not enough evidence to prove this based on these results alone. An annual conference or a getaway, where the entire organization goes for a day or two to some location to discuss the business in its totality is a feasibility. When asked about the escalation points for idea sharing, a popular opinion amongst the respondents is that it is team-dependent and this stipulates that there exists a number of teams. Although the size of the teams is unknown, this organization is not small.

5.3.3 Comparison of Constructs

We can now make a comparison between the results of the two constructs to determine which construct has more influence in adopting BCT in the organization context. The size of the organization is not exactly clear; however, the combined results suggest that it is not small. An annual conference getaway suggests a large event that hosts multiple teams. Annual conferences could also amplify top management's involvement across the entire organization. The frequency of informal meetings coupled with regular training sessions suggests that the work culture of the organization promotes process decisions. The cross-pollination of the survey questions that touch on both constructs, may have resulted in a higher combined mean value for Firm size. Though, nuances in the results identify underlying reasons which point to top management support having more of an influence on the decision to adopt a recent technology. Regular informal meetings showcase a move to relay ideas. The manifestation of an idea is primarily based on business value, and upper management establishes this value.

5.4 Analysis of Environment Element

This section addresses the inquiry into how an organization's environment impacts the adoption of BCT with a focus on the environment aspect. The Environment element within the TOE framework encompasses the surroundings and ecosystem in which the organization operates. This includes the following two constructs:

- **Competitive Pressure**: Does the organization have a competitive advantage in the market?
- **Trading Partner Pressure**: How dependent is the organization on its partners in terms of technology coherence?

5.4.1 Competitive Pressure

The respondents' understanding of the organization's business model and the market in which it operates is fairly adequate, where the average level for knowing the market is 3,3 and the mean level of business model knowledge is 3. This is associated with the idea that respondents are aware of the competitors and as a result, have an idea of how well the business is doing, or not well, in comparison to the competition. The customer engagement is fairly low at 2.6 which concludes that the respondent's knowledge of the market is via channels other than customers. The experience in the current job function of the respondent links to the competitive pressure in the sense that, the organization itself withholds a high intellectual property and domain knowledge distributed amongst its employees. This domain knowledge could make the organization quite competitive in the environment in which it exists. The overall combined mean of 3,12 substantiates that the organization is competitive in the market based on the context of the survey questions.

The themes, Very Competitive and Well-established, are quite straightforward in their interpretation. According to the responses, the organization has a strong foothold in the marketplace and offers a popular EDM system. The belief in the organization being so competitive stems from the communication sessions within the organization which present how well the business is doing based on budgets. Some respondents actually follow competitors on social media platforms and derive their opinions based on that.

The results co-ordinate outcomes from both qualitative and quantitative data. Respondents have a fairly reasonable understanding of the market and the business model. This perception supports the notion of a well-established organization. The understanding of the market showcases the knowledge of product offering and comparing that to the knowledge of the business model draws a conclusion that the organization is well established. Though, something to note, is the fact that the respondents have an extremely low customer interaction rating and their knowledge of the market and business model might be based on management communications alone. This could result in a biased opinion since the source of knowledge might primarily be internal.

5.4.2 Trading Partner Pressure

In this study, this construct focuses on the relationship between customers and partners and this understanding partially emerges from the quantitative results. The survey questions aimed at this construct questions 6, 7, 9 and 10; via a different lens. The level of experience the respondents have in their current role could indicate that they are able to comprehend the trading partner pressure by means of interacting with them or being long enough in the role to see how decisions a made based on the partner's needs. This leads to knowledge of software migration experience, which could be experience gained from migrating software to accommodate customers or partners. Market and business model knowledge help identify trends in the technology used as well as understanding the needs of customers which provide insight for partners and the organization itself. This expectation fosters mutual trust and dependence between the organization and its partners. The overall combined mean of 3,25 is high in this context. This observation suggests an elevated level of knowledge shared between partners and there seems to exist a mutual dependency relationship.

The qualitative results derived themes which indicate that both partners and customers have at minimum heard of BCT, even if it is as a "buzzword". The general belief is that the partners are more knowledgeable about BCT, in a technical sense than customers. This indicator implies that the partners have the technical expertise whereas customers simply need the services provided by the organization and its partners. The fact that the organization feel that partners have heard about BCT concludes that they might have considered the possibility of adopting this technology. Another noted nuance concerns the way in which the organization actually processes the data. A few respondents highlighted the fact the organization does not store any customer data, rather the organization processes and returns data to the customer in the form of documents – transient data. The stored and managed data handled by the partners who are the data management vendors implies partners have found value in adopting BCT, they would have done so already or invested in it in some form.

The overall relationship between trading partners and the organization seems to be mutually inclusive and beneficial, which is ideally what one would expect in a business partnership. The core business model for each organization is different and the relevant expertise is in different fields. The EDM system requires data to process, and the partners provided this data. This is why the system labels data for the EDM organization as transient data. Survey results substantiate the knowledge of trading partners about BCT. High ratings of experience in the respondent's current role link to the longevity in the company and therefore the interaction with partners. The combined mean value of 3,25 supports the themes of Strong Partner Awareness and Relative Customer Awareness, in the sense that the respondents know the partners well enough to make that inference.

5.4.3 Comparison of Constructs

The grounded establishment of the organization is quite evident and therefore it makes them quite competitive in the market. This may influence the decision to adopt BCT by means of the organization not being willing to invest effort in migrating to BCT, due to their strong presence in the market already. It is still unknown whether their market presence drew partners towards the organization, or whether it was partnering up with the partners that promoted their presence. Knowing this would support the idea of being mutually inclusive in providing the service and therefore further justify the decision-making process of adopting another technology. However, as it stands, the construct with more influence on the decision to adopt BCT would be the competitive pressure. Thus, the organization appears to be one of the bigger names in the industry, it helps set the tone for the market and there are few competitors to compete against.

5.5 Cross-Element Analysis

The TOE framework enabled the study to analyse the main elements of an organization. The study further deconstructed into key constructs which gave guidance on how to achieve the research objectives. The cross-element analysis enabled the researcher to compare and explore if there exist any dependencies between the elements.

It is quite evident that the knowledge gap of BCT is prominent among the respondents, which forms part of the reason why the results reflect the way they do. Many factors explain the cohesion between all elements, though, the focus was primarily on the dominant constructs identified in each element. There is a lack of knowledge of the technology to critique the relative advantage of BCT. The current security features are only known at an important level from an end-user perspective. The knowledge of the technical inner workings of the MFA provided by Azure Cloud services does not appear to be relevant knowledge in the context of the organization since it is an already provided service. The SOC compliancy is not a technical implementation, rather it is a policy set in place to make sure that all processes are up to expectations. The idea of utilizing Azure cloud Services along with being SOC compliant could have stemmed from the *environment* in which the organization exist. Granted the lack of collection of historical data or secondary data, it still plays a role in understanding the complexities which link the elements together. Considering that competitive pressure may have previously forced the organization to adopt these policies and resources in order to gain a strong foothold in the market (which is what they currently have). Reversely, a currently well-established

organization in the market and having a competitive name could influence the belief of their current state of technology in data security being advantageous to BCT.

The organization element is a pivotal point of this analysis. In a sense the technology element and the environment element link to, and via, the organization itself. The communication from top management to all other staff members is regular, enough to question if the meetings benefit the team, more so than their managers. In this context, looking at the data and results, it seems like the annual conference meeting and quarterly sessions are platforms for the managers to update everyone on the business. The mention of SOC complacency occurred in these business communication sessions, indicating the possible value it would bring the company. The regular meetings, on the other hand, aimed more at touching base with the team so that everyone is aware of what the next person is doing and aid when necessary. The sharing of ideas and an unspoken open-door policy where managers are approachable prevailed. However, junior team members felt intimidated to not share any innovative ideas due to inexperience or otherwise. Top management support may have also in a sense contributed to the knowledge gap which exists in BCT since their core business does not involve storing data, rather it is a middleware that translates the data from one form to another.

5.6 Achievement of Objectives

The technical element of the TOE framework addresses the research question of, how does the technological infrastructure of an EDM organisation influences the adoption of BCT? The results indicate that the *relative advantage* of BCT primarily influences the decision to adopt it. The current technical infrastructure of this EDM organization is based on a cloud platform which is hosted by Azure cloud services. This platform is seen as being quite stable and secure since it is well-established and is quite credible. The security features provided by this service provider, whatever they may be, are perceived by the organization to be more advantageous.

Top management support appears to be the major construct within the organization element which determines the decision to adopt BCT which is also supported by Malik *et al*., (2021). This construct addresses the research question of, how does the organisational culture of an EDM organisation influence the adoption of BCT? Top management support has a strong impact on many aspects of the organization, in a sense that it has been identified to link directly to the technical and environmental elements of the TOE framework.

Competitive pressure is pegged as the leading construct in the environment element of the TOE framework. This links to the final research question of, how does the internal and external environment of an EDM organisation influences the adoption of BCT? The competitive nature of the organization and its establishment in the market, has seemed to mark it as a trendsetter as opposed to a follower. This promotes the idea that there is a need to adopt BCT since the organization holds a competitive advantage.

5.7 Summary

To summarize, analysing the results further has unearthed nuances which promote the concept of top management support being a major factor in the decision of whether to adopt BCT or not. Relative advantage and competitive pressure are also considered to be determinant influencing factors, though, these constructs are seen to be linked to top management support in some shape or form. Top management support in this context does not necessarily imply a dictatorship, instead, it portrays strong leadership and structure. The responses also reveal a sense of pride amongst the interviewees when mentioning the fact that the organization is SOC compliant, this again showcases the technical infrastructure for services being rendered by the organization is certified. Having a deeply rooted name in the market points out that the organization also does not need to adopt a new technology due to market or competitor pressure. To conclude, top management support does not see a value in adopting BCT since their current state of technology has more of a relative advantage and, there is no competitive pressure to push for the adoption.

CHAPTER 6: CONCLUSION

This chapter concludes the study, addresses limitations and offers recommendations derived from this study. Additionally, this chapter summarizes the researcher's thoughts on the overarching contributions this study makes towards the current body of knowledge concerning factors that could influence the adoption of BCT in an EDM organization.

6.1 Limitations

The researcher identified several limitations associated with the study, namely: time, study unit, current literature, sample size, and data analysis.

6.1.1 Time

Throughout this study, there have been notable limitations which may have hindered the results or rather, without these limitations, the results would have been more robust. The very first limitation, and one that all other limitations may be derived from, is time. Bounded by the constraints of time, this study has been limited in its research design whereby in this mixed-method-case study, a light quantitative approach was employed. The descriptive statistical analysis, therefore, was limited to translating the raw data into meaningful insight utilizing only the mean values. Furthermore, the survey questions were developed in consideration of the time it takes to be completed by respondents. The availability of respondents was a major factor to consider when executing the data collection phase of the study. Accommodating all respondents' schedules had proven to be time-consuming task in both the quantitative and qualitative data collection methods. The survey questionnaire had been distributed via Microsoft Teams by means of a link to an online form and the interviews were scheduled as Microsoft Teams meetings whenever respondents indicated their availability. Many follow-ups were needed since the respondents were otherwise preoccupied and therefore prolonged the phase of collecting the data.

6.1.2 Study unit

Outside of time, another limitation was the impact of the researcher being employed by the organization study unit. On a positive note, this limitation contributed effectively when setting up meetings and distributing the questionnaire via the organization's communication infrastructure. Reversely, this could have contributed to the prolonged interview process since the sense of urgency

was lost, due to it being an internal interviewer that was conducting these interviews. To remove any form of bias from the equation, a set of guidelines needed to be adhered to, some of which included the confidentiality of respondents, conducting interviews outside of working hours, and not unconsciously collecting data outside of the stipulated research methodology.

6.1.3 Sample size

During the interview process, pattern recognition emerged which prompted a sense of data saturation. This concept of data saturation may have been premature due to time constraints experienced throughout the research process. Since there were no set sample sizes for this research, the researcher gaged the sample based on the number of survey responses versus the number of interview responses. The number of responses for the survey questionnaire exceeded that of the interview responses, this is since the time frame in which the questionnaire could be administered is more appealing than that of the interviews. The staggered nature of the interviews prompted a change in approaching the interviewees. The migration of the interview process from one-on-one interviews to a focus group consisting of two people was administered. This however only deemed successful for one focus group which included respondent 3 and respondent 4 bearing in mind that the respondent numbering is not based chronologically. The sample size of the interviews also indicates one less respondent than the survey results, this was considering respondent's not being able to accommodate interviews in their schedules. Over and above the sample size of the respondents, the case study focused on one study unit as a sample size. This creates a generalizability which casts the idea of top management support being the motive behind adopting a new technology across the market industry.

6.1.4 Current literature

Whilst identifying a knowledge gap provided a research topic, it concurrently became a limitation in the sense that this study, according to the author's limited resources and research, is the first of its kind in utilizing the TOE framework to analyze the factors which influence the adoption of BCT in an EDM organization. This is seen as a limitation, tied in with time, on the researcher's part in the sense that guidance for developing survey and interview questions based on the decision framework needed to be extrapolated from literature outside the domain of BCT in EDMS systems. While this may seem to be standard in the research process as a whole and showcases the insight of the researcher on the topic itself, it did inadvertently create delays in the research process.

The usage of limited and predefined constructs was based on the commonality of the construct and its prevalence in previous literature. Using these constructs may have directed the research away from other, what may have been, dominating constructs that could have swayed the results into a different outcome.

6.1.5 Data analysis

The aftermath of the sample size limitation ripples into results and data analytics. The quantitative results were easy to process, however, there existed a knowledge gap on how to analyze the sub-sections (constructs) in isolation and thereafter merge the sub-section results into their relevant categories (TOE element). The intricate web which combines the questions with the constructs in a many-to-many relationship added to this complex analysis process. Ceiling the sample size of the quantitative data to ten respondents provided a fair insight into the overall understanding of each element, though it does bring about a factor of generalizability which could be avoided in a larger sample size. Whilst the survey data was processed earlier in the research, the interview questions could only be processed at the end of the data collection process to avoid any bias. Analyzing the results derived from the two separate data sets had its own set of limitations as mentioned, moreover, comparing the two results was limited in the sense that the qualitative results had one less response than the quantitative results.

6.2 Delimitation

The study was restricted to a particular population and sample. It explored the influence of the adoption of blockchain technology in one particular, medium-sized electronic document management organisation. Furthermore, the study applied descriptive statistics in a mostly qualitative manner, excluding detailed quantitative data analysis strategies. Finally, although blockchain technology has widespread applicability in several disciplines, the study explored blockchain technology with a specific focus on data security perspectives.

6.3 Recommendations

The process of research methodology along with the decision framework (TOE) guides the study into evaluating the defined objectives which further answers the research questions. This study suggests that top management support is a major contributing factor affecting the decision to adopt BCT in an EDM organization. Other featuring constructs include relative advantage and competitive

pressure. Outlining the limitations of the study postulates the areas where improvements can be made. The following recommendations are made in accordance with the limitations and furthermore to contribute effectively to the body of work that is currently available.

Compartmentalizing the EDM organization assisted in refining the process of identifying and contextualizing the multitude of factors which exist in an organization that can influence its decision-making process. However, the scope of the research embodies only a small subset of constructs within the TOE framework which have been identified based on previous works. Further research into a broader range of constructs can assist in developing a better understanding of what factors could contribute to a decision to adopt BCT in an EDM organization. These constructs guided by the TOE framework make for possibly a comprehensive analysis of the workings of an organization and can therefore elucidate underlying aspects which may have been overseen.

Complementing the idea of increasing the number of constructs, is the enhancement of the quantitative analysis. The use of hypothesis testing could uncover a more precise indication from the data and what is the probability of a construct being a determining factor in the decision-making process. This inferential technique could contribute potentially yield greater insights into the research and can be more robust. In conjunction with this analysis process, a well-defined set of questions should be developed which is directly proportional to each construct. Cross-pollination of questions and constructs has been proven to complicate the analysis process and therefore should be avoided as much as possible. The use of Likert scale questions should be utilized which would provide an understanding of the sense of attitude and agreement to a statement rather than the rating scale questionnaire that was employed in this study. This approach contributes to the conciseness of the type of questions asked in the survey itself, which may provide deeper insight into the reasoning behind qualitative results. Categorizing the respondents into specific groups based on authority, job function and experience would be further beneficial in the contribution they make towards the overall results.

6.4 Contributions

The study contributed theoretically, methodologically and practically to the body of knowledge.

6.4.1 Theoretical contributions

The TOE framework has been employed numerous times in studies determining the adoption of an innovation into a specific industry. Constructs have been developed and studied over the years. The

TOE framework has previously been utilized in identifying the constructs that influence the adoption of BCT in an industry. Therefore, the theoretical contribution this study provides is aimed towards the empirical knowledge that top management support is a driving factor in the organization's decision-making process. The concept of this constructs dominant characteristic as a factor influencing the adoption of BCT also is linked to the organization's technical infrastructure already having the relative advantage, as well as the organization's competitive advantage.

6.4.2 Methodological contributions

The mixed-method-case study has proven to be a significant tool in unpacking the myriad of complexities which exist in and among the defined constructs. Mixed method research aims to understand phenomena from both a qualitative and quantitative point of view. This, combined with a case study and guidance of the TOE framework, contributes to the body of knowledge exploring the sequential design of mixed method case study. The integration and comparison of quantitative and qualitative results provide a level of transparency in the nuances that emerge between the two results. Any similarities, or discrepancies, between the two answer sets, unfolds a reason behind why the respondent answered the way they did.

6.4.3 Practical contributions

Organizations can leverage this study to investigate and gain an empirical understanding of how constructs are interlinked and which of these constructs have the most dominant influence on decisions to adopt an innovation. The holistic approach of the mixed method case study further provides companies and organizations alike to peer into the psychology being.

6.5 Conclusion

The multitude of factors that may influence the adoption of BCT in an EDM organization has been processed through a comprehensive framework (TOE framework), which resulted in identifying three main facets; Top Management Support, Relative Advantage and Competitive pressure. Top management support, according to this study, has the most dominating characteristics in influencing the decision to adopt an innovation. Relative advantage and competitive pressure also greatly contribute to the decision-making process, though it has been highlighted that these constructs may have been a byproduct of the decisions that were made previously by management in the organization.

The findings were achieved through a structured mixed-method case study approach, where a sequential design was done by first collecting the quantitative data and then proceeding with interviews for the qualitative data. There was a deviation from the initial questionnaire design, which was proposed to utilize Likert scale questions, instead a normal rating scale questionnaire was administered to maximize the many-to-many relationships between the questions and the constructs. Integrating the results from the two datasets was done in categories based on the elements of the TOE framework and thereafter an overall cross-element examination was to determine the dominant construct amongst all three elements.

The objectives of the study were successfully achieved by answering the outlined research questions. Each question was addressed by each element of the TOE framework (Technology, Organization and Environment) therefore contributing to the aim of the research. Further research is recommended where limitations experienced in this study can be avoided to examine more constructs at a granular level, providing more insight.

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ANNEXURES

ANNEXURE A CPUT Ethical Clearance Certificate

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11 April 2023

Mr Muhammed Shaheer Abubaker
c/o Department of Information Technology
CPUT

Reference no: 212260480/2023/6

Project title: Factors for the adoption of Blockchain Technology in an Electronic Document Management organisation

Approval period: 11 April 2023 – 31 December 2024

This is to certify that the Faculty of Informatics and Design Research Ethics Committee of the Cape Peninsula University of Technology approved the methodology and ethics of Mr Muhammed Shaheer Abubaker (212260480) for MICT: IT (Magister Technologiae: Information and Communication Technology).

Any amendments, extension or other modifications to the protocol must be submitted to the Research Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Dr Blessing Makwambeni
Chair: Research Ethics Committee
Faculty of Informatics and Design
Cape Peninsula University of Technology

ANNEXURE B Introductory Letter for the Collection of Research Data

Cape Peninsula University of Technology

Introductory letter for the collection of research data

Muhammed Shaheer Abubaker is registered for the MICT at CPUT (212260480). The thesis is titled “Factors for the adoption of Blockchain Technology in an Electronic Document Management organisation”, and aims to explore the factors that could influence the adoption of Blockchain Technology in an electronic document management organisation. The supervisor(s) for this research is/are:

Dr Errol Francke
+27 21 460 3685

In order to meet the requirements of the university’s Higher Degrees Committee (HDC) the student must get consent to collect data from individuals and organisations which they have identified as potential sources of data. In this case, the student will use surveys and questionnaires to gather data.

If you agree to this, you are requested to complete the attached form (an electronic version can be made available to you) and print it on your organisation’s letterhead (where possible).

Please note that no data will be gathered until the researcher has received ethics clearance from CPUT.

For further clarification on this matter, please contact either the supervisor(s) identified above, or the Faculty Research Ethics Committee secretary (Mziyanda Ndede) at 021 469 1014 or ndedem@cput.ac.za

Yours sincerely

Dr Errol Francke

14 December 2023

ANNEXURE C Company Consent Granting Data Collection Permission

Korbicom

31 January 2023

To: Cape Peninsula University of Technology

To whom it may concern,

I Richard Newton, in my capacity as CEO at Korbicom give consent in principle to allow Muhammed Shaheer Abubaker, a student at the Cape Peninsula University of Technology, to collect data in this company/from me as part of their MICT research. The student has explained to me the nature of their research and the nature of the data to be collected.

This consent in no way commits any individual person to participate in the research, and it is expected that the student will get individual consent from any participants. I reserve the right to withdraw this permission at any time.
In addition, the company's/my name may or may not be used as indicated below (tick as appropriate):

	Thesis	Conference paper	Journal article	Research poster
Yes	x			
No		x	x	x

Yours Sincerely,

Richard Newton
31 January 2023

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ANNEXURE D Interview Protocol

The interview questions used in this study are listed below;

1. Do you feel that the organization is utilizing the current state of technology in terms of data security and integrity? And can you explain why you feel this way? This can apply to both customer data and employee data.
2. Can you try explaining the mechanics of how BCT works? and if not, can you try explaining any data security feature that you are aware of?
3. Can you explain the rigidity of your current workflow process in terms of technology utilization? How adaptable is the process for software integration?
4. How often do you have team meetings/ team building sessions where ideas are shared? Do these ideas manifest?
5. Hypothetically, if you found a way to improve data integrity using BCT in your organization (not to say that there currently are data integrity issues). How would you implement the BCT solution in terms of change management?
6. Do you feel the customers of the organisation are aware of BCT? Can you explain why?
7. Do you feel the partners of the organisation are aware of BCT? Can you explain why?
8. How well established do you think the organization is in the market? Can you explain why?

ANNEXURE E Survey Questionnaire

The following form was generated using Microsoft Forms and was used to administer the survey questionnaire.

Survey

This survey is for my thesis data collection. My research is on the **Factors that influence the adoption of Blockchain Technology in an Electronic Document Management (EDM) organization**. The data collection is in two parts 1) This survey, 2) Follow up interview. Please can I ask for your participation in completing this survey as part of my data collection process, your identification will remain anonymous to the organization and academic institute. The follow up interview will be administered at your earliest convenience. All questions are rating based questions on a scale of 1 to 5 (1 being the least in value and 5 being the most value). It will take less than 5 minutes to complete. Thanks!

* Required

* This form will record your name, please fill your name.

1. Rate your overall knowledge of data security and data security systems. *

2. Rate your involvement in your organization's operation workflow decision making process. E.g. resourcing, process design and implementation, product enhancements etc. *

3. Rate you understanding of Blockchain Technology. *

4. Rate your exposure to data threats in your day to day operation. *

5. How often do you receive training on processes? 1 being not very often and 5 regularly - Processes could be anything from product training to security training. *

6. Rate your experience in your current job function. *

7. Rate your experience/exposure to software/process migration and change management. *

8. Rate the frequency of interaction you have with customers. *

9. Rate your understanding of the market in which your organization operates in. *

10. Rate your knowledge about the business model of your organization. *

ANNEXURE F Editor's Certificate

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B.Sc Information Systems Software Engineering, B.Sc Information Systems (Hons)
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Editing Certificate

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To Whom It May Concern

This document certifies I have copy-edited the following mini dissertation by Muhammed Shaheer Abubaker

FACTORS FOR THE ADOPTION OF BLOCKCHAIN TECHNOLOGY IN AN ELECTRONIC DOCUMENT MANAGEMENT ORGANISATION

Please note this does not cover any content, conceptual organisation, or textual changes made after the editing process.

Best regards

Dr Patricia Harpur

28 November 2023