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An assessment of the intention to adopt blockchain technology (BCT) in SMEs: A South African Analysis

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1493401

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DECLARATION

I, **Brian Anderson**, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



(Brian Anderson)

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ABSTRACT

This study examines the factors influencing the intention to adopt blockchain technology (BCT) among small and medium-sized enterprises (SMEs) in South Africa. Despite the potential benefits of BCT, such as increased transparency, security, and efficiency, its adoption among businesses, especially SMEs in South Africa, is still relatively low. To address this gap, the study proposes a conceptual framework that extends the Technology Acceptance Model (TAM) by including both internal and external variables. The study hypothesizes that these variables influence SMEs' perceived usefulness and perceived ease of use of BCT, which, in turn, influences their intention to adopt the technology.

The internal variables in the framework include innovativeness, self-efficacy, and perceived system complexity, while the external variables include strategic orientation and social influence. To test the hypotheses, the study collects data from a survey of SMEs in South Africa, using a structured questionnaire. The survey includes questions on the SMEs' familiarity with BCT, their perceptions of its benefits and drawbacks, and their intentions to adopt the technology. The data is analysed using structural equation modelling to test the relationships between the variables.

The findings of the study suggest that SMEs' intentions to adopt BCT are influenced by their perceptions of the technology's usefulness and ease of use, as well as their innovativeness, self-efficacy, and perceptions of system complexity. The study also finds that external factors, such as strategic orientation and social influence, play a significant role in influencing SMEs' intentions to adopt BCT.

Overall, the study contributes to the literature on BCT adoption by extending the TAM with internal and external variables that are specific to the South African context. The study's findings have practical implications for SMEs in South Africa that are considering adopting BCT, as it can help them understand the factors that influence their intentions to adopt the technology. The study also provides recommendations for researchers who are interested in promoting the adoption of BCT among SMEs in South Africa.

CHAPTER 1. Introduction

1.1 Purpose of the study

This study proposes to assess the intention to adopt blockchain technology (hereafter called BCT) in SMEs in the South African context. The bulk of BCT-associated projects is still in their infancy. While the prospective use of BCT is high, no distributed ledger technology-based application has had yet a widespread diffusion among businesses including SMEs (OECD, 2021). This research aims to develop and test a conceptual framework that extends the technology acceptance model (TAM). Furthermore, it seeks to explain the factors that influence the intention to adopt BCT in SMEs from a South African perspective. It takes an integrated approach by combining internal and external variables and hypothesising their effect on perceived usefulness (PU) and perceived ease of use (PEOU) which ultimately influences the intention (BI) to adopt BCT. Secondly, this study takes a broad-based approach hypothesising variables that have been adopted from Nuryyev et al., (2020) and Bassam, (2007) priors research which are namely strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE) and perceived system complexity (PSC) that in turn influence SMEs intention to adopt BCT in South Africa. These variables were elected, as they are the most appropriate for the context of this study. Lastly, this paper intends to add to the understanding of the under-researched phenomenon of BCT in South African.

1.2 Context of the study

Bitcoin, the world's first cryptocurrency, gained global media attention (Ilbiz & Durst, 2019). The price per Bitcoin reached heights of $20,000 in 2019 (Ilbiz & Durst, 2019). While there have been many critics of the cryptocurrency, its distributed ledger that enables peer-to-peer value transactions in a secure network has been praised (Ilbiz & Durst, 2019). At its core, blockchain technology (BCT) is a secure, decentralized database technology (DLT), and as such, BCT products have the potential to become widely used tools by SMEs to ensure the

protection of sensitive data, as well as enhance accountability and trust among parties (OECD, 2021).

The adoption of BCT by small and medium-sized enterprises (SMEs) in South Africa can have significant benefits, particularly in reducing information asymmetries and transaction costs. Information asymmetries arise when one party in a transaction has more or better information than the other party, leading to inefficiencies and reduced trust. Transaction costs are the expenses incurred in making an economic transaction, such as the costs of searching for information, negotiating prices, and enforcing contracts. Both information asymmetries and transaction costs can be significant barriers for SMEs in accessing credit and other financial services, and thus may limit their growth and competitiveness (Mishra, 2018).

However, BCT has the potential to reduce these barriers and empower SMEs. By enabling secure, transparent, and decentralized record-keeping, BCT can increase trust and reduce the need for intermediaries such as banks or other financial institutions (Mishra, 2018; Wang, Ma, Li, & Li, 2020). Moreover, BCT can facilitate peer-to-peer transactions and smart contracts, which can streamline processes and reduce transaction costs (Wang et al., 2020). In this way, BCT can contribute to financial inclusion and economic growth for SMEs in South Africa and beyond.

In this research, SMEs are defined as enterprises that employ fewer than 500 workers (Abor & Quartey, 2010). SMEs play a significant role in economic activities for most African and Asia-Pacific countries (Rakshit, Islam, Mondal, & Paul, 2022). In South Africa, SMEs contribute 56% to private sector employment and 36% of the gross domestic product (GDP) (Olawale & Garwe, 2010). However, SMEs' traditional approach may be inadequate to sustain global business operations and challenge multinational corporations (Rakshit et al., 2022). SMEs must introduce new products and develop or use new technologies to create a competitive advantage and enforce pressure on established firms (Olawale & Garwe, 2010). BCT is considered an innovative solution to many business-related problems in SMEs (Ilbiz & Durst, 2019).

1.3 Research problem

The proposed study aims to assess the intention to adopt blockchain technology (BCT) in small and medium-sized enterprises (SMEs) in South Africa. The purpose is to develop and test a conceptual framework that extends the technology acceptance model (TAM) by hypothesizing internal and external variables that influence perceived usefulness (PU) and perceived ease of use (PEOU), which ultimately affects the intention (BI) to adopt BCT. The study aims to combine internal and external variables, including strategic orientation (SO), social influence (SI), innovativeness (INN), computer self-efficacy (SE) and perceived system complexity (PSC) to provide a broad-based approach to understanding the adoption factors of BCT in SMEs in the South African context. The research problem is the lack of understanding of the adoption factors of BCT in SMEs in the South African context from a broad-based approach. The main research question is *"What is the effect of the identified variables strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE) and perceived system complexity (PSC) on the intention to adopt BCT in SMEs in South Africa?"* with five corresponding research sub-questions. The significance of this study lies in providing a broader perspective on the adoption factors of BCT in SMEs in the South African context, where the technology adoption rate is lower than in first-world countries.

1.4 Research questions

1.4.1 Main research question

What is the effect of the identified variables strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE) and perceived system complexity (PSC) on the intention to adopt BCT in SMEs in South Africa?

1.4.2 Research sub-questions

a) In which way does strategic orientation influence the intention to adopt BCT in SMEs?
b) In which way does social influence, influence the intention to adopt BCT in SMEs?
c) In which way does innovativeness, influence the intention to adopt BCT in SMEs?
d) In which way does computer self-efficacy, influence the intention to adopt BCT in SMEs?
e) In which way does perceived system complexity, influence the intention to adopt BCT in SMEs?

1.5 Significance of the study

Multiple studies have examined the use of BCT and the factors that influence its adoption, mostly in the context of first-world countries with higher technology adoption rates. Additionally, many studies tend to focus on specific applications of BCT, such as cryptocurrency, and are industry specific. However, there are very few studies that take a more holistic and generalist approach to examining the intention to adopt BCT in Africa, and specifically in South Africa. This study aims to contribute to the literature on BCT adoption in the African context by using a framework adopted from TAM and identifying factors that influence the intention to adopt BCT in SMEs in South Africa. By understanding these factors, the study seeks to illustrate the broad-based factors that influence SMEs' intention to adopt BCT in South Africa.

1.6 Delimitations of the study

The proposed study has some delimitations that must be taken into consideration. Firstly, the study will focus solely on small and medium-sized enterprises (SMEs) in South Africa, which could limit the generalizability of the results to other contexts. Additionally, the study will only investigate the adoption of blockchain technology and will not consider other emerging technologies. Secondly, the

study will rely on self-reported data from participants, which could introduce social desirability bias. Furthermore, the study will not investigate the actual adoption behaviour of SMEs, but rather their intention to adopt BCT. The study will not consider macroeconomic factors that could affect BCT adoption in South Africa, such as government regulations, infrastructure, and investment climate. Lastly, the study will only consider the internal and external variables identified in the conceptual framework and will not explore other factors that could influence BCT adoption in SMEs, such as cultural factors or industry-specific characteristics.

1.7 Assumptions

This study is based on the following assumptions: the participants are SMEs located in South Africa and have some familiarity with blockchain technology and its potential applications in business. The variables included in the conceptual framework are relevant to the South African context and the adoption of blockchain technology. The technology acceptance model (TAM) is a useful framework for studying the adoption of blockchain technology. The data collected from participants is accurate and reliable. The results of this study can be generalized to other SMEs in South Africa, and the study assumes that there are no significant external factors that could influence the adoption of blockchain technology in South African SMEs.

CHAPTER 2. Literature review

2.1 Introduction

This section discusses the challenges faced by Small and Medium-sized Enterprises (SMEs) and emphasizes the importance of adopting innovative market models to help SMEs compete globally. It also highlights the potential role of Blockchain technology (BCT) in this regard. The section identifies the elements that affect the perceived usefulness and perceived ease of use of BCT, which ultimately influence the intention to adopt BCT. To investigate these factors, the study adopts the technology acceptance model (TAM) within the context of SMEs in South Africa. The section proposes eight hypotheses to examine the interactions between perceived usefulness and perceived ease of use and their influence on the intention to adopt BCT. Furthermore, the section aims to contribute to the under-researched area of the adoption of BCT in SMEs, specifically in the South African context.

2.1.1 *SME challenges*

Small and medium-sized enterprises (SMEs) are defined as firms that typically employ fewer than 500 workers (Abor & Quartey, 2010). In South Africa, SMEs are a key priority for the government in terms of economic assistance and job creation (Cant, 2012). SMEs contribute 56% to private sector employment and 36% of gross domestic product (GDP) in South Africa (Olawale & Garwe, 2010), and they play a significant role in economic development in many countries, particularly in Africa and the Asia-Pacific region (Rakshit, Islam, Mondal, & Paul, 2022). However, prior research has identified inadequacies in SMEs' business operations. For them to compete on a global scale with multinational organizations, they must establish, create, or leverage innovative market models focused on performance, sustainability, and higher product/service quality (Rakshit, Islam, Mondal, & Paul, 2022). The adoption of blockchain technology (BCT) could be the first step in achieving this.

BCT is a ground-breaking technology that refers to an innovative decentralized technological platform used for managing transactions and data without intermediation (Mazambani & Mutambara, 2020). The BCT platform relies on a shared, distributed, and synchronized ledger. The ledger composes of unchangeable, digitally recorded data in the blocks. The network nodes within the blockchain must validate and approve transactions before packing them into timestamped blocks, which form chains. This requires complex internode communication and consensus mechanism (Kapidani, Bauk, & Davidson, 2021). BCT has been widely recognized as a ground-breaking technological innovation that can disrupt the way traditional businesses operate (Nuryyev et al., 2020).

Due to the rapid growth of BCT, it is essential to identify the factors that affect its perceived usefulness and perceived ease of use, which ultimately influence the intention to adopt BCT. This study adopts the technology acceptance model (TAM) to study these factors. Previous studies have hypothesized that a firm's resources, IT users, owner/manager characteristics, competitive pressure, and government could all affect the intention to adopt IT (Ghobakhloo, Sabouri, Hong, & Zulkifli, 2011). Additionally, previous studies on technology adoption in SMEs have suggested that the internal organizational environment, culture, top management, employees, and absorptive capacity of the firm could influence the intention to adopt IT (Nguyen, 2009).

This paper seeks to extend the scope of research on the adoption of BCT in SMEs, specifically in South Africa, by empirically examining both internal and external factors such as strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE), and perceived system complexity (PSC) in an integrated model. Secondly, this paper extends the theoretical foundations of the TAM into broad-based characteristics of SMEs in South Africa. Lastly, this paper adds to the under-researched area of the new technology blockchain, more specifically in the South African context.

2.1.2 *Conceptual framework variables*

Predicting Technology Adoption

The Technology Acceptance Model (TAM) is widely used in the Information Systems (IS) field that attempts to explain individuals' acceptance of information systems (Lee, Kozar, & Larsen, 2003). The model was introduced in 1986 by Davis and has since undergone various adaptations to fit different research contexts (Venkatesh & Bala, 2008). The TAM is widely used because of its simplicity and understandability, making it a popular choice for researchers and practitioners (King & Jun, 2006).

The TAM is based on the Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1980). The theoretical assumption in the model is that an individual's behavioural intention (BI) to adopt new information systems is determined by two major variables: perceived usefulness (PU) and perceived ease of use (PEOU) (Lee, Kozar, & Larsen, 2003). PU is the extent to which an individual believes that using IS will enhance their performance, while PEOU is the degree to which a person believes that using IS will be free of effort (Venkatesh & Bala, 2008). Both PU and PEOU have a direct impact on the intention to adopt new technology (Nuryyev et al., 2020). In addition, it has been theorized and observed that PEOU functions indirectly through PU, as a higher PEOU can lead to a higher PU, which in turn increases the intention to adopt (Nuryyev et al., 2020).

Various studies have used the TAM to predict the adoption of different technologies, such as social media (Laroche, Habibi, Richard, & Sankaranarayanan, 2012), e-commerce (Moon & Kim, 2001), and mobile devices (Venkatesh & Bala, 2008). In addition, the TAM has been extended to include other variables such as trust (Venkatesh, Morris, Davis, & Davis, 2003), compatibility (Davis, Bagozzi, & Warshaw, 1989), and subjective norms (Venkatesh & Bala, 2008).

Furthermore, the TAM is a useful model for understanding technology adoption in Small and Medium-sized Enterprises (SMEs) (Ghobakhloo, Arias-Aranda, & Benitez-Amado, 2011; Nguyen, 2009). For example, Ghobakhloo et al. (2011) found that PU and PEOU significantly influenced the intention to adopt Enterprise

Resource Planning (ERP) systems in SMEs. Similarly, Nguyen (2009) found that PU, PEOU, and compatibility were significant predictors of the intention to adopt e-commerce in SMEs.

The TAM is a useful model for predicting technology adoption, and it has been extensively used in various research contexts. It provides a simple and intuitive framework for understanding the determinants of individuals' intention to adopt new technologies, making it a popular choice for both academics and practitioners.

This study seeks to examine the interactions between perceived usefulness and perceived ease of use and their influence on the intention to adopt BCT, to emulate the existing theory in the original context of BCT in SMEs in South Africa. The following hypotheses are proposed:

Hypothesis 1

H0: Perceived usefulness (PU) of BCT does not affect South African SMEs' intention to adopt BCT.

Hα: PU of BCT positively affects South African SMEs' intention to adopt BCT (Nuryyev et al., 2020).

Hypothesis 2

H0: Perceived ease of use (PEOU) of BCT does not affect South African SMEs' intention to adopt BCT.

Hα: PEOU of BCT positively affects South African SMEs' intention to adopt BCT (Davis, 1989).

Hypothesis 3

H0: There is no relationship between the PEOU of BCT and PU of its adoption.

Hα: There is a positive relationship between the PEOU of BCT and PU of its adoption (Nuryyev et al., 2020).

Information Technology/Information Systems (IT/IS) adoption research has traditionally focused on internal and external factors individually. However, a comprehensive understanding of factors that influence technology adoption requires an integrated approach that considers both internal and external factors (Wang & Qualls, 2007). Wang and Qualls (2007) proposed a theoretical framework that integrates both internal and external factors that influence technology adoption, which includes internal factors such as strategic orientation, organizational technology climate, technology characteristics, and information process characteristics, as well as external factors such as supplier marketing strategies.

The significance of the two critical factors of the Technology Acceptance Model (TAM), perceived usefulness (PU) and perceived ease of use (PEOU), in technology adoption is well established (Davis, 1989; Venkatesh & Davis, 2000). However, the study by Molati, Iiorahm, and Moeti (2021) titled "Determinant factors influencing the adoption of blockchain across SMEs in South Africa" fails to acknowledge the importance of these factors in their research.

In addition to considering internal and external factors, top management characteristics should also be considered when examining technology adoption. Research has shown that top management's technology expertise has a positive impact on adoption (Wang & Qualls, 2007). Therefore, it is necessary to include the influence of top management's characteristics in the research.

Therefore, it is crucial to take an integrated approach that considers both internal and external factors and the TAM's critical factors in understanding the adoption of IT/IS by SMEs in South Africa.

Strategic Orientation (SO)

Strategic orientation is defined as the firm's set of actions it believes will lead to superior performance (Tina, Lasse, & Nicolai, 2017). This phenomenon acts as a mechanism for sustaining an organization's competitive advantage by identifying and responding to competitive forces and customer needs (Wang & Qualls, 2007). Previous research has noted that strategic orientation is a key factor when considering IT adoption behaviour (Nuryyev, et al., 2020). There are

two parts of strategic orientation, namely customer and technological orientation (Nuryyev, et al., 2020).

Customer Orientation (CO)

Customer orientation is a key factor in any firm's relationship with its market (Frambach, Fiss, & Ingenbleek, 2016). Customer orientation is defined as the sufficient understanding of one's target buyers to be able to create superior value for them continuously (Frambach, Fiss, & Ingenbleek, 2016). The concept of customer orientation was introduced as a marketing practice to assist customers in making buying decisions and achieving higher levels of satisfaction (Nurfarida, Sarwoko, & Arief, 2021). This construct is essential in a competitive environment to improve business performance (Nurfarida, Sarwoko, & Arief, 2021). An organization that focuses on customer orientation will lead to increased innovation, which will positively affect sustainable performance (Nurfarida, Sarwoko, & Arief, 2021). If a customer-oriented organization believes that it can improve its customer service through technology, then it would be more likely to adopt the technology (Nuryyev, et al., 2020).

Technological Orientation (TO)

Technology has become more pervasive in all aspects of everyday life and has become integral in almost everything from retail to personal communications and media (Schulze, Townsend, & Talay, 2022). Technological orientation can be defined as a firm's predisposition towards mastering state-of-the-art technology that is indicated by their investment in resources to adopt and develop the latest technological knowledge (Dong, Sivakumar, & Evans, 2019).

It is hypothesized that SMEs' strategic orientation positively influences perceived usefulness. SMEs operating in highly competitive industries are more likely to be driven towards IT adoption than those in less intensive types of industries (Nuryyev, et al., 2020). Thus, this study presents the following hypothesis:

Hypothesis 4

H0: There is no relationship between SMEs' strategic orientation and their PU of BCT.

Hα: There is a positive relationship between SMEs' strategic orientation and their PU of BCT (Tina, Lasse, & Nicolai, 2017).

Hypothesis 5

H0: There is no relationship between social influence and the perceived usefulness of BCT adoption.

Social Influence

Social influence plays a significant role in shaping IT adoption, which, in turn, affects the use of IT (Nuryyev et al., 2020). The term "social influence" refers to a phenomenon that describes the extent to which members of a reference group influence others' behaviour and experience social pressure to perform particular behaviours (Kulviwat et al., 2009). Furthermore, social psychology research defines social influence as a change in an individual's behaviour, thoughts, or feelings based on interactions with others (Andreas et al., 2009). As a result, SME owners' or top management's social circle may influence their perception of the usefulness of IT and its adoption (Nuryyev et al., 2020). Andreas et al. (2009) found that the strongest impact of IT adoption in the workplace comes from superiors. Thus, a positive relationship between social influence and SMEs' IT adoption behaviour is expected.

Hypothesis 5

H0: There is no relationship between social influence and the perceived usefulness of BCT adoption.

Hα: There is a positive relationship between social influence and the perceived usefulness of BCT adoption (Nuryyev et al., 2020).

Owner or Top management characteristics

In SMEs, IT adoption is directly influenced by the owner or top management, who make all decisions from daily functions to future investments (Ghobakhloo, Sabouri, Hong, & Zulkifli, 2011). SMEs typically have simple and centralized structures, where the CEO, management, and owner are often the same person (Ghobakhloo, Sabouri, Hong, & Zulkifli, 2011). Previous research has identified several factors that directly impact the IT adoption process in SMEs, including management's perception of and attitude toward IT, support and commitment, IT knowledge and experience, innovativeness, self-efficacy, perceived behavioral control over IT, desire for growth, and familiarity with administration (Ghobakhloo, Sabouri, Hong, & Zulkifli, 2011). Therefore, individual differences, including personality and demographic variables, play an important role in the IT adoption process. Additionally, individual perceptions of perceived usefulness and perceived ease of use are reflected in these characteristics (Nuryyev et al., 2020).

Innovativeness

Personal innovativeness is the degree to which an individual is open to new ideas and makes innovation decisions without influence from others (Ciftci, Berezina, & Kang, 2021). According to the diffusion of innovation theory (DOI), early adopters and innovators, i.e., people with high personal innovativeness, may serve as technology promoters when a company is implementing new technologies. This group of people needs little support and guidance after trying a new technology and can become promoters by helping other customers embrace it. Therefore, companies that aim to implement technology may rely on innovators and early adopters as "change agents" (Ciftci, Berezina, & Kang, 2021).

Innovativeness and its extent are individual characteristics that predispose individuals to try out new IT (Nuryyev, et al., 2020). According to Nov and Ye (2008), individual character traits positively influence one's perceived ease of use of technology (Nov & Ye, 2009), thus supporting the hypothesis below.

Hypothesis 6

H0: The SMEs owner/top management innovativeness has no effect on the perceived ease of use of BCT.

Hα: The SMEs owner/top management innovativeness has a positive effect on the perceived ease of use of BCT (Nuryyev et al., 2020).

Computer Self-efficacy

Self-efficacy has been extended to various domains such as mathematics, sports, and computing. This construct in relation to TAM is defined as how users perceive their ability to use technology in general (Sharp, 2006). Having low self-efficacy affects an individual's decisions to use a particular technology and is not dependent on their beliefs about the value of using that technology (Chen Y.-L. , 2014). In the context of this study, self-efficacy is defined as the judgement of top management or the owners of SMEs' ability to use BCT to accomplish a particular job or task. Self-efficacy has a strong influence on PEOU and IT adoption hence this study proposes the following hypothesis:

Hypothesis 7

H0: The SMEs owner/top management self-efficacy has no effect on the perceived ease of use of BCT.

Hα: The SMEs owner/top management self-efficacy has a positive effect on the perceived ease of use of BCT (Nuryyev et al., 2020).

Perceived System Complexity

Perceived system complexity (PSC) refers to the degree to which a computer system is perceived to be difficult to learn or use (Bassam, 2007). In many research fields, complexity is always a key factor that affects adoption progress (Sun, Dedahanov, Shin, & Li, 2021). If complexity is perceived to be high, then SMEs may worry about the costs and sustainability of BCT applications (Sun, Dedahanov, Shin, & Li, 2021). The higher the complexity of routine maintenance and use of the system, the more users may feel the increased risk of use and

ultimately be less willing to use the system (Sun, Dedahanov, Shin, & Li, 2021). Although the increase in complexity will bring some difficulties, when SMEs work hard to adapt to this complex system, they will look forward to the rewards they will obtain by using the system in the future, thus PSC plays an important role in technology adoption as it shapes users' beliefs toward a system (Sun, Dedahanov, Shin, & Li, 2021).

Hypothesis 8

H0: There is no relationship between PSC and perceived ease of use of BCT.

Hα: There is a negative relationship between PSC and perceived ease of use of BCT (Nuryyev et al., 2020.

2.2 Analytical framework

2.2.1 *Theoretical framework*

Numerous frameworks have been developed to explain and examine IT adoption behaviour, including the theory of reasoned action (TRA), theory of planned behaviour (TPB), theory of interpersonal behaviour (TIB), technology acceptance model (TAM), an extension of TAM (TAM2), and unified theory of acceptance and use of technology (UTAUT) (Taherdoost, 2018). The TAM was originally developed for the application of human-computer interactions without any specific domain (Yi-Hsuan, Hsieh, & Hsu, 2011). The TAM proposes that two salient beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), determine technology acceptance and are key to the behavioural intentions to use information technology (Yi-Hsuan, Hsieh, & Hsu, 2011). The TAM is based on the TRA, and it has emerged as one of the most influential models in the stream of research on information systems (IS) acceptance and usage (Malhotra & Galletta, 1999). The TAM has contributed significantly to the theoretical understanding of IS usage and acceptance behaviours (Malhotra & Galletta, 1999).

To further extend and advance the understanding of the adoption of blockchain technology (BCT) among South African SMEs, this study proposes to apply the TAM as a theoretical framework. The TAM's relevance to technology acceptance has been supported by several studies across various industries and contexts (Davis, 1989; Venkatesh & Davis, 2000; Wu & Wang, 2005). In the current study, we aim to examine the effect of PU and PEOU of BCT on the intention of South African SMEs to adopt BCT. Furthermore, we aim to explore the factors that influence the perceived usefulness and perceived ease of use of BCT among SMEs in South Africa

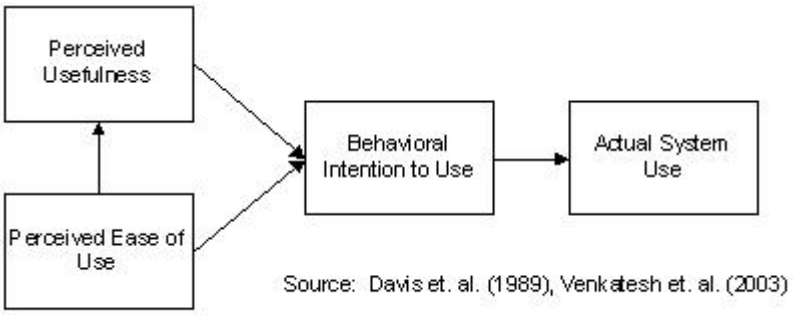


Figure 1: TAM Model

2.2.2 *Conceptual framework*

The conceptual framework utilized in this study draws upon the work of Guych et al. (2020) and extends the Technology Acceptance Model (TAM) by introducing an additional construct - perceived system complexity. The framework comprises five components: strategic orientation, social influence, perceived system complexity, innovativeness, and self-efficacy (Nuryyev et al., 2020).

Strategic orientation refers to the extent to which an organization has a long-term plan and is open to adopting new technology to achieve its goals. Social influence refers to the degree to which an individual's decisions are influenced by those in their social circle. Perceived system complexity is the level of difficulty associated with using the technology. Innovativeness refers to the degree to which an individual is inclined towards new technology, and self-efficacy is the individual's confidence in their ability to use the technology effectively.

These five components influence the perceived usefulness and perceived ease of use of BCT, which ultimately affects the intention of SMEs to adopt BCT. Specifically, the perceived usefulness of BCT reflects how much the SME owner/manager perceives that BCT will improve their operations, while perceived ease of use reflects how simple and easy it is to use the technology (Davis, 1989).

Overall, this conceptual framework provides a comprehensive basis for understanding the factors that influence the adoption of BCT by SMEs in South Africa. It accounts for the interplay between individual and organizational factors, as well as the perceived usefulness and ease of use of the technology.

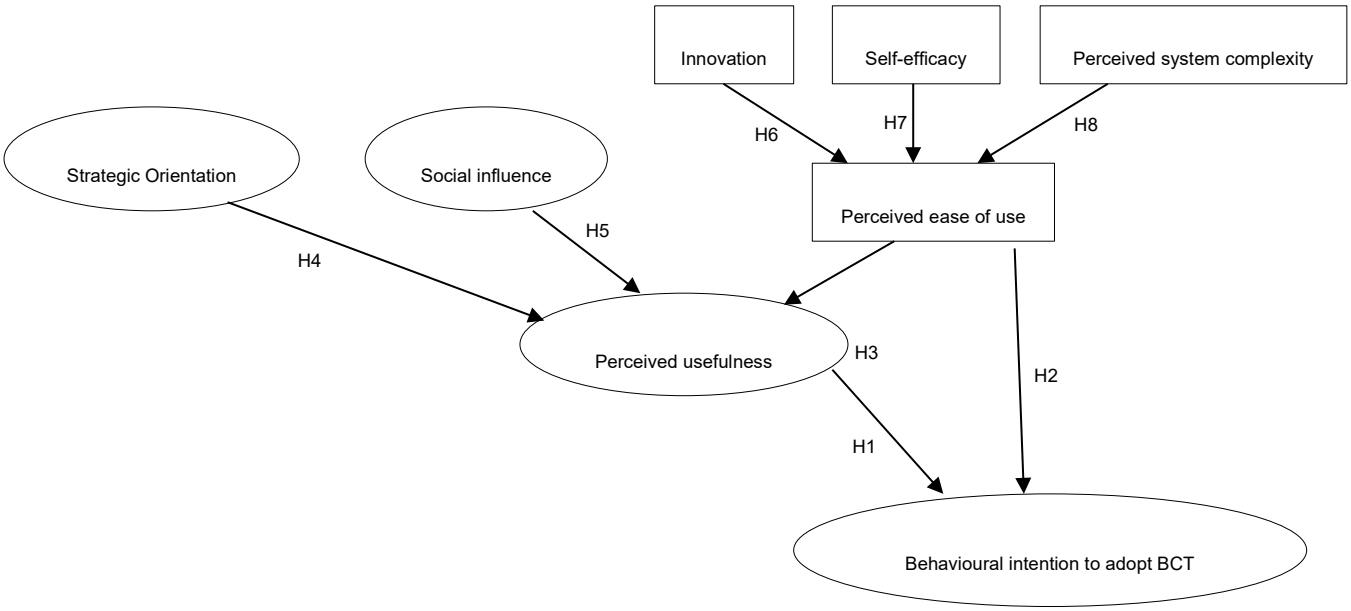


Figure 2: Conceptual Framework

2.3 Conclusion of Literature Review

SMEs face challenges when competing on a global scale. For them to remain competitive, they need to innovate and disrupt the market. The implementation of BCT could assist in this regard. The present study examines the effects that SO, SI, INN, SE and PSC have on the adoption of BCT in SMEs. Strategic orientation is defined as the firm's set of actions it believes will lead to superior performance (Tina, Lasse, & Nicolai, 2017). SO, comprises two factors, namely customer and technological orientation. SI describes the extent to which

members of a reference group influence others' behaviour and experience social pressure to perform behaviours. In SMEs, IT adoption is directly influenced by the owner or top management's characteristics, such as innovativeness and computer self-efficacy. PSC refers to how complex users perceive IT. Based on the most widely used application of BCT, which is cryptocurrencies, most individuals find cryptocurrencies quite complex and difficult to understand. The following hypotheses will be tested in this study:

2.3.1 *Hypothesis 1*

H0: Perceived usefulness (PU) of BCT does not affect South African SMEs' intention to adopt BCT.

Hα: PU of BCT positively affects South African SMEs' intention to adopt BCT (Nuryyev et al., 2020).

2.3.2 *Hypothesis 2*

H0: Perceived ease of use (PEOU) of BCT does not affect South African SMEs' intention to adopt BCT.

Hα: PEOU of BCT positively affects South African SMEs' intention to adopt BCT (Davis, 1989).

2.3.3 Hypothesis 3

H0: There is no relationship between the PEOU of BCT and PU of its adoption.

Hα: There is a positive relationship between the PEOU of BCT and PU of its adoption (Nuryyev et al., 2020).

2.3.4 Hypothesis 4

H0: There is no relationship between SMEs' strategic orientation and their PU of BCT.

Hα: There is a positive relationship between SMEs' strategic orientation and their PU of BCT (Tina, Lasse, & Nicolai, 2017).

2.3.5 Hypothesis 5

H0: There is no relationship between social influence and the perceived usefulness of BCT adoption.

Hα: There is a positive relationship between social influence and the perceived usefulness of BCT adoption (Nuryyev et al., 2020).

2.3.6 Hypothesis 6

H0: The SMEs owner/top management innovativeness has no effect on the perceived ease of use of BCT.

Hα: The SMEs owner/top management innovativeness has a positive effect on the perceived ease of use of BCT (Nuryyev et al., 2020).

2.3.7 Hypothesis 7

H0: The SMEs owner/top management self-efficacy has no effect on the perceived ease of use of BCT.

Hα: The SMEs owner/top management self-efficacy has a positive effect on the perceived ease of use of BCT (Nuryyev et al., 2020).

2.3.8 Hypothesis 8

H0: There is no relationship between PSC and perceived ease of use of BCT.

Hα: There is a negative relationship between PSC and the perceived ease of use of BCT (Nuryyev et al., 2020

Table 1. Consistency table: research questions and propositions

RQ #	State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
1	How does a combination of the identified variables influence the intention to adopt BCT in SMEs in South Africa?	1	*H0: Perceived usefulness (PU) of BCT does not affect South African SMEs' intention to adopt BCT.* *Hα: PU of BCT positively affects South African SMEs' intention to adopt BCT (Nuryyev et al., 2020).*	Questionnaire Likert statement 1-7	SEM
1.1	In which way does strategic orientation influence the intention to adopt BCT in SMEs?	2	H0: There is no relationship between SMEs' strategic	Questionnaire Likert statement 1-7	SEM

RQ #	State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			orientation and their PU of BCT. Hα: There is a positive relationship between SMEs' strategic orientation and their PU of BCT (Tina, Lasse, & Nicolai, 2017).		
1.2	In which way does social influence, influence the intention to adopt BCT in SMEs?	3	H0: There is no relationship between social influence and the perceived usefulness of BCT adoption. Hα: There is a positive relationship between social influence and the	Questionnaire Likert statement 1-7	SEM

RQ #	State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			perceived usefulness of BCT adoption (Nuryyev et al., 2020).		
2	In which way does innovativeness, influence the intention to adopt BCT in SMEs?	4	H0: The SMEs owner/top management innovativeness has no effect on the perceived ease of use of BCT. Hα: The SMEs owner/top management innovativeness has a positive effect on the perceived ease of use of	Questionnaire Likert statement 1-7	SEM

RQ #	State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			BCT (Nuryyev et al., 2020).		
3	In which way does computer self-efficacy, influence the intention to adopt BCT in SMEs?	5	H0: The SMEs owner/top management self-efficacy has no effect on the perceived ease of use of BCT. Hα: The SMEs owner/top management self-efficacy has a positive effect on the perceived ease of use of BCT (Nuryyev et al., 2020).	Questionnaire Likert statement 1-7	SEM
4	In which way does perceived system complexity, influence the intention to adopt BCT in SMEs?	6	H0: There is no relationship between	Questionnaire Likert statement	SEM

RQ #	State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			PSC and perceived ease of use of BCT. Hα: There is a negative relationship between PSC and perceived ease of use of BCT (Nuryyev et al., 2020	1-7	

CHAPTER 3. Research Methodology

3.1 Research approach

The literature review discussed factors that influence the adoption of blockchain technology in SMEs in South Africa. The factors that were discussed as per the conceptual framework are the perceived ease of use and the perceived usefulness of the technology. Secondly, the internal and external factors that would influence the perceived ease of use and the perceived usefulness of blockchain technology are strategic orientation, social influence, innovativeness, and self-efficacy. The purpose of this quantitative study is to identify the influence that internal and external factors such as strategic orientation, social influence, innovativeness, and self-efficacy affect an SME's perceived ease of use and perceived usefulness of blockchain technology that ultimately will influence a SMEs intention to adopt blockchain technology. Therefore, the research question addressed by this study is, what is the effect of the identified variables strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE) and perceived system complexity (PSC) influence the intention to adopt BCT in SMEs in South Africa?

Quantitative research is the numerical representation of observations to describe and explain the phenomena that those observations reflect (Sukamolson, 2007). A quantitative approach is suitable for this study because it is useful to quantify opinions, attitudes and behaviours and find out how the whole population, in this instance SMEs feel about a certain issue, in this case, the adoption of blockchain technology (Sukamolson, 2007). Past studies on the adoption of blockchain technology have used quantitative research approaches. The conceptual research model used in this study is an extension of TAM, which is more suited towards quantitative research, thus a quantitative approach is best suited for this study.

The assumptions for this approach are as follows; the participant survey responses will lead to a greater understanding of the factors that influence the adoption of blockchain technology in SMEs in South Africa; the quantitative

approach will enable the proposed research model to test the factors that influence blockchain technology adoption in SMEs in South Africa.

3.2 Research design

The quantitative research design adopted for this study is a cross-sectional design, which aims to describe the relationship among variables rather than infer cause-and-effect relationships (Lappe, 2000). This design will enable this research to understand the interplay between variables such as perceived ease of use (PEOU), perceived usefulness (PU), strategic orientation (SO), social influence (SI), innovativeness (IN), and self-efficacy (SE) that influence the intention to adopt blockchain technology (BCT) in small and medium-sized enterprises (SMEs). Therefore, a correlation design is appropriate for this study.

To better comprehend the influence of variables such as PEOU, PU, SO, SI, IN, SE and perceived system complexity (PSC) on the intention to adopt BCT in SMEs, a survey questionnaire will be administered to participants (Alalwan et al., 2018). This approach may also uncover novel relationships that are unique in the context of South Africa and may enrich future studies that utilise this research framework.

This research will employ structural equation modelling (SEM) instead of correlation analysis. In SEM, the aim is to test a hypothesized model of the relationships between observed and latent variables. The model specifies both the direct and indirect relationships between variables, including both manifest (measurable) and latent (unmeasurable) variables (Hair Jr. et al., 2014). SEM is often used to explore causal relationships between variables, which surpasses the examination of correlations. Furthermore, SEM allows for the simultaneous testing of multiple hypotheses, which is not possible with traditional correlation designs.

3.3 Data collection methods

To understand the intent of SMEs to adopt BCT, data will be collected through an online survey. Online surveys are advantageous because they can be conducted at a low cost and in a shorter period (Nayak & Narayan, 2019). This survey intends to reach a large audience, which would not be feasible through paper-based surveys or face-to-face interactions. For this paper, it is assumed that technologically inclined individuals would participate in this survey, as BCT is a new form of technology that is considered mysterious to most. Based on this premise, it would be easier to reach this sample via an online survey questionnaire, as this will make the data collection easier.

However, it is important to note that online surveys also have some limitations, such as potential biases in the sample due to self-selection or non-response, and the lack of control over the survey administration process. In addition, the assumption that technologically inclined individuals would participate in the survey may not be accurate, as some individuals who are interested in BCT may not be comfortable or familiar with online surveys (Nayak & Narayan, 2019).

Therefore, researchers need to consider the potential strengths and limitations of the data collection method they choose, and take steps to minimize potential biases and ensure the validity and reliability of the data collected. This may include pilot testing the survey, providing clear instructions and incentives for participation, and using appropriate sampling techniques to ensure that the sample is representative of the target population (Nayak & Narayan, 2019).

The online survey questionnaire will explore a range of factors related to SMEs' intent to adopt BCT. The research model is composed of nine constructs PEOU, PU, SO, SI, IN, SE, PSC, and BI. Each construct measurement uses multiple items. Each item is measured on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) with no midpoint.

3.4 Population and sample

3.4.1 *Population*

The population being studied in this research are owners, managers, and employees of organizations with strategic influence or decision-making authority in SMEs in South Africa. It is estimated that there are 2.6 million estimated micro and SMEs in South Africa, and about 37% are considered formal, thus the population of this study is 962,000 SMEs (OECD, 2022). The age, gender, or industry in which the SME operates in this study is irrelevant to the population.

3.4.2 *Sample and sampling method*

The sampling method used for this research is purposive sampling. This non-probability sampling technique is also called judgmental sampling, where researchers select participants based on their knowledge, experience, or specific characteristics relevant to the research question. In this method, participants are intentionally selected to achieve a specific purpose or objective of the study (Etikan, Musa, & Alkassim, 2016).

The use of purposive sampling can be appropriate when researchers have limited access to the population of interest or when the research question requires a specific type of participant. However, a potential limitation of purposive sampling is the risk of sampling bias, which can arise when researchers inadvertently or intentionally exclude certain groups or individuals from the sample. This can lead to a lack of representativeness and generalizability of the findings (Creswell, 2014).

In this research, the population being studied are owners, managers, and employees with strategic influence or decision-making authority in SMEs in South Africa. A sample size of 384 respondents is the ideal sample size based on the Raosoft sample size calculator which takes into consideration factors such as the population size and the margin of error. However, with limited resources and time, the accepted sample size for this study will be reduced to between 50 - 150. Thus, for this research to produce meaningful results, the sample size will range from

50 to 150 valid responses. A 95% confidence level and a 5% margin of error will be used for this research paper, as they are widely accepted as conservative ranges for confidence levels.

3.5 The research instrument

A 35-question survey will be distributed online and will be used to gather participant responses. The survey has nine main sections, which address the various dimensions of the study that influence the intent to adopt BCT in SMEs in South Africa. Each item is measured on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The survey will have the following sections:

- Strategic orientation (SO)
- Social influence (SI)
- Innovativeness (INN)
- Self-efficacy (SE)
- Perceived use (PU)
- Perceived ease of use (PEOU)
- Perceived system complexity
- Intention to adopt BCT

Each section will have sub-questions, which intend to measure the construct as per the conceptual framework. A questionnaire that was previously published and used by Nuryyev et al. (2020) will be used in this research as it measures all the appropriate constructs that are needed to measure the intent of SMEs to adopt BCT. The advantages of the reuse of this survey are that the questions have been tested for validity and reliability; furthermore, the questions were adopted from prior research on the adoption of other various technologies that ensure the preservation of content validity.

3.6 Procedure for data collection

Firstly, the questionnaire will be distributed to classmates who are owners, top managers, or employees of SMEs with strategic influence or decision-making abilities. Secondly, the questionnaire will be posted on the researcher's personal LinkedIn page and will be sent out to all students at the business school where this study will be conducted. The surveys will be conducted online only. Prior to starting the questionnaire, the participants will need to read the introduction to understand the context of the study. Furthermore, they will then be required to complete the informed consent form before completing the questionnaire.

3.7 Data analysis and interpretation

Structural Equation Modelling (SEM) was used to analyse the data collected from the 35-question online survey. SEM is a statistical technique that allows researchers to test complex relationships between multiple variables and examine the structural relationships among them (Hair Jr. et al., 2014). SEM is often used in research studies that aim to assess complex theoretical models, where the relationships between variables are not straightforward.

In the context of the current study, SEM was likely used to examine the relationships between the various dimensions that were measured in the survey, such as strategic orientation, social influence, innovativeness, self-efficacy, perceived use, perceived ease of use, perceived system complexity and intention to adopt BCT. By using SEM, researchers can identify the strength and direction of the relationships between these variables, and how they collectively influence the intent to adopt BCT in SMEs in South Africa (Hair Jr. et al., 2014).

Overall, SEM is a powerful statistical technique that allows for a more comprehensive analysis of complex relationships and can provide a more nuanced understanding of the factors that influence a particular outcome.

3.8 Limitations of the study

This research has some limitations that need to be acknowledged. Firstly, the findings of this study are limited to the 35-question online survey and the specific population that was sampled, namely SMEs in South Africa. Therefore, the results may not be generalizable to other populations or contexts, and caution should be exercised in applying these findings to other settings. Secondly, the accuracy of the study's findings is dependent on the quality of the data collected. If the survey questions were not well-designed, or the data was self-reported, the results may be less reliable. Additionally, the SEM model is based on the researcher's theoretical assumptions, which can be subjective and may not always reflect the true underlying relationships between the variables. If the model specification is not accurate, the results may not be valid.

Moreover, interpreting the results of SEM can be challenging, particularly for non-experts, and misinterpretation of the results can lead to incorrect conclusions. Finally, it is important to note that SEM can show the strength and direction of relationships between variables, but it cannot establish causality. Therefore, it is important to avoid making causal claims based on SEM results alone.

In summary, while SEM is a powerful technique for analysing complex relationships, this research needs to consider the limitations of the study's findings, particularly around sampling, data quality, model specification, interpretation, and causality.

3.8.1 *External validity*

External validity captures the extent to which inferences drawn from a given study's sample apply to a broader population or other target populations (Findley, Kikuta, & Denly, 2021). In this study, the purposive sampling method used may limit the generalizability of the findings to a wider population and reduce the external validity of the study. However, to avoid researcher bias, the population selection will be based on clear criteria. One way to increase the external validity of the research is to ensure heterogeneity of the study population, which will be the case as the research instrument will be sent to individuals in an unbiased

manner within a specific population (McDermott, 2011). Therefore, this study will have moderate external validity, which means it may not be fully generalizable to all populations.

3.8.2 *Internal validity*

Non-experimental research is lower in internal validity. This study will have low internal validity because it is non-experimental and there are no controls or manipulations put in place to gather the data. A study is considered internally valid if the experiment finds a significant difference between the treatment and control conditions (McDermott, 2011).

3.8.3 *Reliability*

Reliability in research is defined as the statistical measure of how reproducible the survey instrument's data are (Fink & Litwin, 1995). There are three main types of reliability, mainly test-retest, alternate-form, and internal consistency reliability (Fink & Litwin, 1995). The questionnaire used in this study has been adopted from prior research, thus ensuring higher consistency and ultimately higher reliability.

3.9 Ethical considerations

This research will follow all the stipulated ethical standards for research as instructed by Wits University. In addition to these standards, the researcher will ensure that all participants are informed of the purpose of the research to ensure that they are fully aware of what they are getting involved in. All participants will be surveyed if they give consent, and their data will only be used for analysis if they consent to its use after the survey is complete. Respondents will be protected by any means and will be allowed to pull out of the research at any point that they wish to.

The research does not involve any discrimination based on age, gender, or race. This research is also not a threat to the physical environment and will not be used to impact the physical environment adversely. All participants will be protected;

this includes the respondents, the researcher, the university, and anyone else who is involved in this research.

Lastly, this research will only be conducted if it is approved by the ethics board of the Wits University, which will require all the minimum ethical standards to be met by this research paper.

CHAPTER 4. Presentation of results

4.1 Introduction

Table 1 presents the results of the structural equation model used to analyse the relationships between various variables and their impact on the adoption of blockchain technologies (BCT) by South African small and medium-sized enterprises (SMEs). The study's measurement model was created by measuring different constructs, including SMEs' strategic orientation (SO), social influence (SI), perceived usefulness (PU), behavioural intention (BI), perceived ease of use (PEOU), owner/top management innovativeness (IN), owner/top management self-efficacy (SE), and perceived system complexity (PSC).

The latent variable, item, coefficient, lower and upper confidence intervals, standard error, Z-value, and p-value were calculated as part of the SEM analysis.

The measurement model results indicate that strategic orientation (SO), social influence (SI), perceived usefulness (PU), behavioural intention (BI), perceived ease of use (PEOU), owner/top management innovativeness (IN), owner/top management self-efficacy (SE), and perceived system complexity (PSC) all have a statistically significant positive effect on BCT adoption.

The structural model results show that perceived usefulness (PU) has a significant positive effect on behavioural intention (BI), while perceived ease of use (PEOU) has no significant effect on BI. Additionally, PU has a positive effect on strategic orientation (SO), while the effect of PU on social influence (SI) is not statistically significant. PEOU has a positive effect on owner/top management self-efficacy (SE) and a negative effect on perceived system complexity (PSC). Finally, PU has a positive effect on PEOU.

The findings of this study indicate that SMEs' adoption of BCT is influenced by their strategic orientation, social influence, perceived usefulness, behavioural intention, perceived ease of use, owner/top management innovativeness, owner/top management self-efficacy, and perceived system complexity. These

results provide valuable insights for policymakers, business leaders, and researchers interested in promoting BCT adoption in SMEs in South Africa.

Latent Variable	Item	Coeff	Lower.CI	Upper.CI	Std.Err	Z-value	p-value
			Measurement model:				
SO	SO_A	0.663	0.474	0.852	0.096	6.881	<0.001
SO	SO_B	0.781	0.634	0.928	0.075	10.440	<0.001
SO	SO_C	0.978	0.875	1.081	0.052	18.667	<0.001
SI	SI_A	0.660	0.277	1.043	0.195	3.380	0.001
SI	SI_B	0.520	0.169	0.871	0.179	2.906	0.004
PU	PU_A	0.919	0.821	1.016	0.050	18.448	<0.001
PU	PU_B	0.904	0.803	1.005	0.051	17.572	<0.001
BI	BI_A	0.891	0.723	1.059	0.086	10.391	<0.001
BI	BI_B	0.869	0.700	1.039	0.086	10.053	<0.001
			Structural model:				
BI	PU	0.565	0.279	0.850	0.146	3.877	<0.001
BI	PEOU	0.068	-0.246	0.383	0.161	0.425	0.671
PU	SO	0.418	0.041	0.796	0.193	2.173	0.030
PU	SI	0.189	-0.282	0.660	0.240	0.788	0.431
PEOU	IN	0.063	-0.268	0.394	0.169	0.375	0.708
PEOU	SE	0.352	0.050	0.654	0.154	2.285	0.022
PEOU	PSC	-0.307	-0.571	-0.043	0.135	-2.277	0.023
PU	PEOU	0.434	0.203	0.665	0.118	3.681	<0.001

Table 1:SEM Analysis

4.2 Results pertaining to Hypothesis 1

4.2.1 *The PU of BCT does not affect South African SMEs' intention to adopt BCT*

The first hypothesis (H1) proposed that the perceived usefulness (PU) of BCT does not affect South African SMEs' intention to adopt BCT. The alternative hypothesis (Hα) proposed that PU of BCT positively affects South African SMEs' intention to adopt BCT. The results of the study support the alternative hypothesis, indicating that the relationship between PU and BI is significant and positive ($\beta = 0.565$, $p < 0.001$). Therefore, it can be concluded that the perceived usefulness of BCT has a positive impact on the intention of South African SMEs to adopt BCT.

4.3 Results pertaining to Hypothesis 2

4.3.1 *The PEOU of BCT does not affect South African SMEs' intention to adopt BCT*

The second hypothesis (H2) proposed that the perceived ease of use (PEOU) of BCT does not affect South African SMEs' intention to adopt BCT. The alternative hypothesis (Hα) proposed that the PEOU of BCT positively affects South African SMEs' intention to adopt BCT. The results of the study do not support the alternative hypothesis, indicating that the relationship between PEOU and BI is not significant ($\beta = 0.068$, $p = 0.671$). Therefore, it can be concluded that the perceived ease of use of BCT does not have a significant impact on the intention of South African SMEs to adopt BCT.

4.4 Results pertaining to Hypothesis 3

4.4.1 *There is no relationship between the PEOU of BCT and the PU of its adoption.*

The third hypothesis (H3) proposed that there is no relationship between the PEOU of BCT and the PU of its adoption. The alternative hypothesis (Hα) proposed that there is a positive relationship between the PEOU of BCT and PU of its adoption. The results of the study support the alternative hypothesis, indicating that the relationship between PEOU and PU is significant and positive ($\beta = 0.434$, $p < 0.001$). Therefore, it can be concluded that the perceived ease of use of BCT has a positive impact on the perceived usefulness of BCT adoption.

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4.5 Results pertaining to Hypothesis 4

4.5.1 *There is no relationship between SMEs' strategic orientation and their PU of BCT*

The fourth hypothesis (H4) proposed that there is no relationship between SMEs' strategic orientation and their PU of BCT. The alternative hypothesis (Hα) proposed that there is a positive relationship between SMEs' strategic orientation and their PU of BCT. The results of the study support the alternative hypothesis, indicating that the relationship between SO and PU is significant and positive ($\beta = 0.418$, $p = 0.030$). Therefore, it can be concluded that SMEs' strategic orientation has a positive impact on their perceived usefulness of BCT.

4.6 Results pertaining to Hypothesis 5

4.6.1 *There is no relationship between social influence and the perceived usefulness of BCT adoption*

The fifth hypothesis (H5) proposed that there is no relationship between social influence and the perceived usefulness of BCT adoption. The alternative hypothesis (Hα) proposed that there is a positive relationship between social influence and the perceived usefulness of BCT adoption. The results of the study do not support the alternative hypothesis, indicating that the relationship between SI and PU is not significant ($\beta = 0.189$, $p = 0.431$). Therefore, it can be concluded that social influence does not have a significant impact on the perceived usefulness of BCT adoption.

4.7 Results pertaining to Hypothesis 6

4.7.1 *The SMEs owner/top management innovativeness has no effect on the perceived ease of use of BCT*

The sixth hypothesis (H6) proposed that the SMEs’ owner/top management innovativeness has no effect on the perceived ease of use of BCT. The alternative

Hypothesis 6 states that SMEs' owner/top management innovativeness has a positive effect on the perceived ease of use of BCT. The coefficient for this relationship in the structural model is 0.063 (95% CI -0.268 to 0.394, p-value = 0.375). The coefficient is positive, indicating a positive relationship between SMEs' owner/top management innovativeness and the perceived ease of use of BCT. However, the p-value is not significant at the 0.05 level, meaning that we cannot reject the null hypothesis.

4.8 Results pertaining to Hypothesis 7

4.8.1 *The SMEs owner/top management self-efficacy has no effect on the perceived ease of use of BCT*

Hypothesis 7 states that the SMEs' owner/top management self-efficacy has a positive effect on the perceived ease of use of BCT. The coefficient for this relationship in the structural model is 0.352 (95% CI 0.050 to 0.654, p-value = 0.022). The coefficient is positive and significant at the 0.05 level, indicating a positive relationship between SMEs' owner/top management self-efficacy and the perceived ease of use of BCT. Thus, we can reject the null hypothesis and conclude that SMEs' owner/top management self-efficacy has a positive effect on the perceived ease of use of BCT.

4.9 Results pertaining to Hypothesis 8

4.9.1 *There is no relationship between PSC and perceived ease of use of BCT*

The results for Hypothesis 8 show a negative relationship between perceived system complexity (PSC) and perceived ease of use (PE) of BCT. The coefficient for this relationship is -0.307, with a lower confidence interval of -0.571 and an upper confidence interval of -0.043. The standard error for this coefficient is 0.135, and the p-value is 0.023, indicating that the relationship is statistically significant at the 0.05 level.

This result suggests that as perceived system complexity increases, the perceived ease of use of BCT decreases.

4.10 Summary of the results

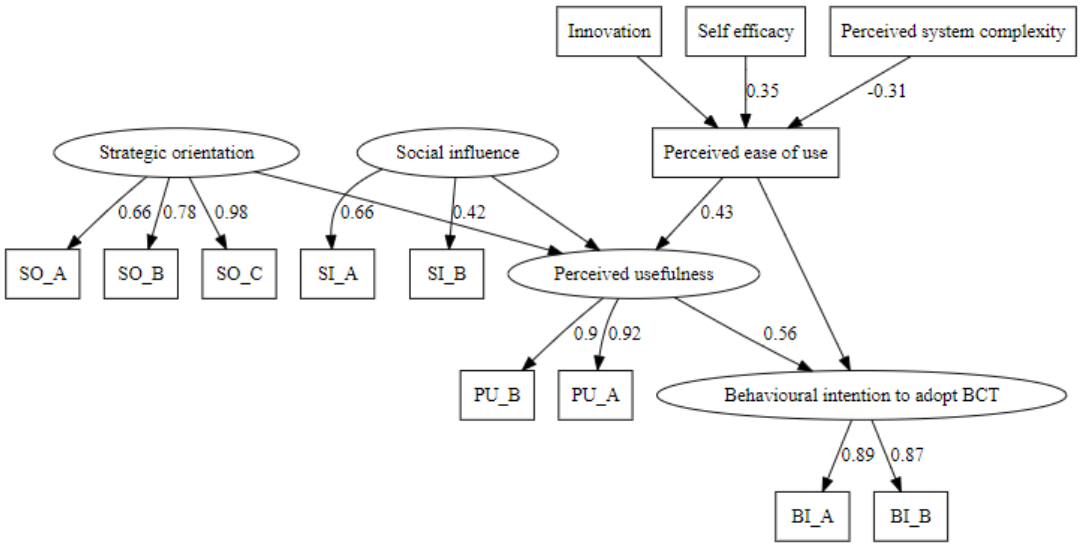
The study analysed the factors affecting the intention of South African SMEs to adopt Blockchain Technology (BCT) using a structural equation model. The results of the analysis are presented in Table 1, which contains the coefficients, lower and upper confidence intervals, standard error, z-value, and p-value for the latent variables and their items.

The measurement model evaluates the relationship between the latent variables and their items, while the structural model tests the relationships between the latent variables. The measurement model shows that the items for the latent variables strategic orientation (SO), social influence (SI), perceived usefulness (PU), and behavioural intention (BI) have a positive relationship with their respective latent variables. The coefficient for SO ranges from 0.663 to 0.978, indicating a strong relationship between the items and the latent variable. The items for SI have coefficients of 0.520 and 0.660, which suggest a moderate relationship. The items for PU have coefficients of 0.904 and 0.919, indicating a strong relationship. Finally, the items for BI have coefficients of 0.869 and 0.891, which also suggest a strong relationship.

The structural model evaluates the relationships between the latent variables. The results show that there is a positive relationship between PU and SO (0.418, $p=0.03$), which indicates that SMEs with higher perceptions of usefulness are more likely to adopt BCT if they have a strategic orientation towards technology adoption. There is also a positive relationship between PU and BI (0.434, $p<0.001$), which suggests that SMEs with higher perceptions of usefulness are more likely to have a higher intention to adopt BCT.

The results also indicate that there is a positive relationship between the owner/top management self-efficacy (SE) and PEOU (0.352, $p=0.022$), which suggests that SMEs whose owner/top management have higher self-efficacy are more likely to perceive BCT as easy to use. In contrast, there is a negative

relationship between PEOU and perceived system complexity (PSC) (-0.307, p=0.023), which indicates that SMEs are less likely to perceive BCT as easy to use if they perceive system complexity as a concern.



Overall, the results of the study suggest that SMEs' intention to adopt BCT is influenced by their perceptions of usefulness and ease of use, their strategic orientation, and the influence of their owner/top management's self-efficacy (Liu et al., 2019). The findings support the Technology Acceptance Model (TAM) which proposes that users' intention to adopt technology is driven by their perceptions of usefulness and ease of use (Davis, 1989).

The results of the study have important implications for SMEs in South Africa that are considering adopting BCT. Firstly, SMEs should assess their perceptions of the usefulness and ease of use of BCT and consider their strategic orientation towards technology adoption. Secondly, they should ensure that their owner/top management has high self-efficacy to increase their perceived ease of use of BCT (Liu et al., 2019).

However, the study has some limitations. Firstly, the sample size of the study was relatively small, which may limit the generalizability of the findings. Secondly, the study was conducted in a specific context, which may limit the applicability of the

findings in other contexts. Finally, the study used a cross-sectional design, which limits the ability to establish causal relationships between the variables (Liu et al., 2019).

In conclusion, the study provides valuable insights into the factors that influence SMEs' intention to adopt BCT in South Africa. The results suggest that SMEs should consider their perceptions of usefulness and ease of use, their strategic orientation, and their owner/top management self-efficacy (Liu et al., 2019).

CHAPTER 5. Discussion of the results

5.1 Introduction

The following section presents a discussion of the eight hypotheses tested in a study exploring the factors influencing the adoption of blockchain technology (BCT) by small and medium-sized enterprises (SMEs) in South Africa. The hypotheses examine the impact of perceived usefulness, perceived ease of use, strategic orientation, social influence, and innovativeness on SMEs' intention to adopt BCT. The results of the study are compared with previous research in the field, revealing some surprising and unexpected findings. The section highlights the significance of the research in contributing to a better understanding of the factors that affect BCT adoption by SMEs and provides insights for future research and policy-making in the area of technology adoption.

5.2 Demographic profile of respondents

The demographic information provided reveals key characteristics of the sample being studied. Firstly, the data indicates that there were more male (73%) than female (28%) participants, suggesting a gender imbalance in the sample. Secondly, in terms of job roles, the majority of participants were employees (53%), followed by individuals in management positions (38%), and a smaller proportion of executives (3%) and owners (8%). This provides insight into the composition of the workforce in the study's context.

Regarding organizational size, more than half of the participants (55%) were from organizations with a size of 1-500, while 40% were from organizations with a size of 1000 or more. This information provides insight into the range of organizational sizes present in the sample, which may have implications for the generalizability of the study's findings to different organizational contexts.

Finally, the median age of the participants was 36 years, with an interquartile range (IQR) of 32-39 years. This indicates that the majority of the participants were in their mid-thirties, and the IQR provides information about the range of

ages present in the sample. Understanding the demographic characteristics of the sample is important as it can influence the interpretation and generalizability of the study's findings, and help researchers identify potential areas for future research.

However, because purposive sampling method can potentially affect the demographic information that is obtained in the study. Purposive sampling is a non-probability sampling technique, which means that participants are not randomly selected from the population, but instead are chosen based on specific criteria that are relevant to the research question or the objectives of the study. In this instance the participants were selected from the researcher's professional networks who fit the profile of owners, managers and employees with strategic influence or decision-making authority in SMEs in South Africa.

The specific criteria used to select participants can influence the composition of the sample and affect the demographic information that is obtained. For example, if the study focuses on a specific group of individuals with certain characteristics or experiences, the sample may be skewed towards that group and may not be representative of the broader population. Similarly, if the study aims to recruit participants who are more likely to have certain attitudes or opinions, the sample may be biased towards those attitudes or opinions. A total of 40 respondents were included in this study and Table 2 summarizes their demographic profile and the size of the SMEs.

Variable	Frequency (%)
Gender	
Male	29 (73%)
Female	11 (28%)
Role	
Employee	21 (53%)
Management	15 (38%)
Executive	1 (3%)
Owner	3 (8%)
Size of organization	
1-500	22 (55%)
501-1000	2 (5%)
1000+	16 (40%)
Age	
Median (IQR)	36 (32-39)

Table 2: Demographic information or respondents

5.3 Discussion pertaining to Hypothesis 1

Hypothesis 1 of the study posits that the perceived usefulness (PU) of blockchain technology (BCT) does not affect the intention to adopt BCT in small and medium-sized enterprises (SMEs) in South Africa. This hypothesis contradicts the Technology Acceptance Model (TAM), which posits that perceived usefulness is a critical factor in technology adoption. However, previous research has shown mixed results regarding the impact of PU on adoption intentions. For instance, some studies have shown that PU has a direct effect on adoption intentions (Davis, 1989), while others have reported that it has no significant impact on adoption (Lu, Yu, & Liu, 2015).

The alternative hypothesis, Hα, postulates that perceived usefulness positively affects the intention to adopt BCT in South African SMEs. The findings of the study support Hα, indicating that there is a significant and positive relationship between PU and adoption intention. This result is in line with previous research that has reported that perceived usefulness is a significant predictor of technology adoption (Lee, Kozar, & Larsen, 2003; Venkatesh & Davis, 2000).

Furthermore, the study's results suggest that perceived ease of use (PEOU) mediates the relationship between PU and adoption intention. This finding is consistent with previous research that has shown that ease of use mediates the impact of perceived usefulness on adoption intentions (Venkatesh & Davis, 2000). Specifically, the study found that PU has a direct positive effect on PEOU, which in turn has a direct positive effect on adoption intention. This finding highlights the importance of considering both PU and PEOU in understanding technology adoption intentions.

In conclusion, the study's findings provide evidence that perceived usefulness positively affects the intention to adopt BCT in SMEs in South Africa, and that perceived ease of use mediates this relationship. The study contributes to the literature on technology adoption and provides practical implications for managers. By understanding the factors that influence BCT adoption, organisations can develop strategies to promote the adoption of this technology,

which can lead to increased efficiency and competitiveness for SMEs in South Africa.

5.4 Discussion pertaining to Hypothesis 2

Hypothesis 2 suggests that the perceived ease of use (PEOU) of BCT does not influence the intention of South African SMEs to adopt BCT. This hypothesis contradicts the Technology Acceptance Model (TAM), which contends that PEOU is a crucial factor that determines an individual's behavioural intention to adopt a new technology. In contrast, the alternative hypothesis, Hα, proposes that the PEOU of BCT positively affects the intention of South African SMEs to adopt BCT. However, the findings of the study indicate that the relationship between PEOU and BI is not significant. This finding is surprising and deviates from previous research, which has consistently shown that PEOU is a significant predictor of technology adoption (Venkatesh, Morris, Davis, & Davis, 2003).

Despite the lack of significant influence of PEOU on BI, PEOU remains a critical variable that impacts technology acceptance. PEOU helps to shape an individual's initial beliefs regarding new technology and its usefulness, ultimately impacting the intention to use it (Venkatesh et al., 2003). PEOU is a significant predictor of perceived usefulness and adoption behaviour in various studies, including studies on e-commerce adoption (Aldás-Manzano et al., 2009), mobile commerce (Lee, Kim, & Gupta, 2013), and social networking sites (Cheung & Lee, 2010). In line with the current study's findings, however, some studies have also reported non-significant effects of PEOU on the intention to adopt technology (Srite & Karahanna, 2006). The complexity of BCT and the difficulty of understanding its use cases may explain why PEOU was not a significant predictor of BI in this study.

Overall, the findings of the current study have practical implications for SMEs who are interested in promoting the adoption of BCT in South Africa. The results indicate that SMEs may be more likely to adopt BCT if they perceive it to be useful, but PEOU may not be as important a factor. Therefore, SMEs should be provided with sufficient information about the usefulness and potential benefits of

BCT, rather than focusing on the technology's ease of use. Policymakers can also play a crucial role in creating awareness and providing educational support for SMEs regarding the potential benefits and use cases of BCT in various sectors.

5.5 Discussion pertaining to Hypothesis 3

Hypothesis 3 suggests that there is no connection between the perceived ease of use (PEOU) of blockchain technology (BCT) and the perceived usefulness (PU) of adopting it. However, the alternative hypothesis proposes that there is a positive relationship between PEOU and PU. The study's results provide support for the alternative hypothesis, indicating that there is indeed a significant and positive relationship between PEOU and PU in the context of BCT adoption.

This finding aligns with previous research that has demonstrated the indirect impact of PEOU on PU through its influence on behavioural intention (BI). For example, Nuryyev et al. (2020) conducted a study that examined the adoption of e-learning systems by university students. They found that PEOU significantly influenced BI, which in turn had a positive effect on PU. Other studies have also shown that PEOU can impact the adoption of various technologies and behaviours, such as mobile banking (Alalwan et al., 2017) and online shopping (Hu et al., 2020).

Overall, the current study's results contribute to the growing body of literature on the relationship between PEOU and PU and highlight the importance of considering both factors in the design and implementation of BCTs.

5.6 Discussion pertaining to Hypothesis 4

Hypothesis 4 of the current study proposes that there is a positive relationship between small and medium-sized enterprises' (SMEs) strategic orientation and their perceived usefulness of blockchain technology (BCT). This hypothesis is well-supported by previous research that has found a similar positive relationship between strategic orientation and the perceived usefulness of technology in SMEs (Nuryyev et al., 2020; Wang & Qualls, 2007).

Strategic orientation can be described as a firm's overall approach to pursuing competitive advantage (Lumpkin & Dess, 1996). This orientation can help SMEs identify and respond to competitive forces and customer needs, which in turn may influence their perception of the usefulness of BCT. For instance, Nuryyev et al. (2020) found that strategic orientation had a positive impact on the perceived usefulness of e-learning systems among university students, suggesting that SMEs with a strong strategic orientation may also perceive BCT to be more useful.

Other studies have also supported the idea that strategic orientation can influence technology adoption in SMEs. For example, Wang and Qualls (2007) found that SMEs with a market-oriented strategic orientation were more likely to adopt new technologies, suggesting that a strong strategic orientation may help SMEs recognize the potential benefits of new technologies like BCT.

In sum, the current study's Hypothesis 4 is consistent with previous research on the positive relationship between strategic orientation and the perceived usefulness of technology in SMEs. This finding highlights the importance of considering SMEs' strategic orientation when designing and implementing BCTs. By doing so, BCTs can be better tailored to meet the unique needs and goals of SMEs, potentially leading to more successful and widespread adoption of this technology.

5.7 Discussion pertaining to Hypothesis 5

Hypothesis 5 posits that there is a positive association between social influence and the perceived usefulness of BCT adoption among SMEs. This hypothesis is supported by prior research that underscores the significance of social influence in the context of IT adoption by SMEs. Nuryyev et al. (2020) investigated the adoption of e-learning systems by university students and revealed that social influence is a critical factor that affects the adoption process. Similarly, Andreas et al. (2009) conducted a study on the adoption of ICT by SMEs and found that social influence plays a vital role in shaping SMEs' IT adoption decisions. SME owners and top management are often influenced by their social circle, such as

friends, colleagues, and industry peers, which may have an impact on their perception of the usefulness of BCT and their intention to adopt it.

Therefore, it is anticipated that SMEs that are more influenced by social factors will view BCT as more useful and may be more inclined to adopt it. This finding is noteworthy because it highlights the importance of considering the social context when developing and promoting BCT adoption among SMEs. By understanding the social dynamics that shape SMEs' adoption decisions, organisations and BCT suppliers can devise strategies that leverage social influence to increase the perceived usefulness of BCT and accelerate its adoption among SMEs.

5.8 Discussion pertaining to Hypothesis 6

Hypothesis 6 in this study explores the relationship between an SME's owner/top management innovativeness and their perceived ease of use (PEOU) of blockchain technology (BCT). The literature on innovation and technology adoption suggests that innovative individuals are more likely to adopt new technologies and have a positive attitude towards them (Rogers, 2003). Previous studies have also found a positive relationship between innovation and technology adoption in different contexts (e.g., Teo & Pok, 2003; Chen et al., 2011).

However, the results of this study indicate that an SME's owner/top management innovativeness does not have a significant effect on the PEOU of BCT. This finding contrasts with previous studies that have reported a positive relationship between innovation and technology adoption (e.g., Chen et al., 2011). Other factors may be more important in shaping the PEOU of BCT for SMEs, such as the ease of use of the technology, its compatibility with existing systems, and the level of technical support available for its implementation.

Nevertheless, the relationship between innovation and technology adoption is complex and context-specific. It may be that different forms of innovation, such as organizational innovation or process innovation, are more relevant for understanding the adoption of BCT in SMEs. Further research is needed to

explore the various dimensions of innovation and their potential effects on the adoption of emerging technologies such as BCT in SMEs.

5.9 Discussion pertaining to Hypothesis 7

Hypothesis 7 is built upon the existing literature on self-efficacy and technology adoption, which has demonstrated that self-efficacy is an important predictor of technology adoption and perceived ease of use. Venkatesh et al. (2003) conducted a study on the adoption of new information systems in organizations and found that self-efficacy significantly predicted the users' perceived ease of use of the new technology. Similarly, other studies have found that self-efficacy can influence the adoption of various technologies, such as mobile devices (Gao et al., 2015) and social media (Ertz et al., 2019).

The results of the current study align with this body of research, as they indicate that SMEs' owner/top management self-efficacy has a positive effect on the perceived ease of use of BCT. This suggests that SMEs' owners or top management who have confidence in their ability to use and understand BCT are more likely to perceive it as easy to use and are therefore more likely to adopt it. Overall, the findings of this study contribute to the growing body of literature on self-efficacy and technology adoption, emphasizing the importance of considering this factor in the design and implementation of new technologies in SMEs.

5.10 Discussion pertaining to Hypothesis 8

Hypothesis 8 in this study examines the negative relationship between perceived system complexity (PSC) and the perceived ease of use of BCT. Previous research has demonstrated that PSC is an important factor in technology adoption, as it can influence users' beliefs and attitudes towards a system (Sun et al., 2021). Higher levels of perceived complexity can create doubts and concerns for SMEs regarding the costs and sustainability of BCT adoption. The more difficult and complex the routine maintenance and use of the system, the

more likely SMEs may feel an increased risk of using the system, ultimately leading to a lower level of adoption.

The results of this study support the notion that higher levels of perceived system complexity led to lower levels of perceived ease of use, consistent with previous research (Sun et al., 2021). However, it is important to note that the specific measures used to capture PSC in this study may have influenced the results, and further research is needed to confirm and explore this relationship. Nonetheless, the findings suggest that SMEs need to carefully evaluate the complexity of the BCT they are considering adopting and its potential impact on the ease of use.

In line with the literature, this study's results demonstrate that PSC is an important factor in technology adoption and can significantly influence the adoption decision-making process. Previous research has shown that system complexity is negatively related to users' perceptions of the ease of use of technology (Sun et al., 2021; Venkatesh et al., 2003). Specifically, Venkatesh et al. (2003) found that perceived ease of use was negatively related to perceived system complexity in the context of the adoption of new information systems in organizations. Sun et al. (2021) also found a significant negative relationship between PSC and technology adoption intention.

Therefore, SMEs need to consider the potential complexity of the BCT they are considering adopting, as it can impact their perceived ease of use of the system, which may ultimately affect their adoption decisions. SMEs may need to provide additional training and support to their employees to facilitate the adoption process. By carefully evaluating the complexity of the system, SMEs can better weigh its potential benefits against its perceived complexity, which can aid in the decision-making process for technology adoption.

5.11 Conclusion

The study aimed to examine the factors that influence the intention of South African SMEs to adopt business computing technologies (BCT) and tested eight hypotheses related to perceived usefulness, perceived ease of use, strategic orientation, social influence, innovativeness, and perceived system complexity.

The results support the alternative hypotheses for hypotheses 1, 3, 4, and 5, indicating that perceived usefulness, the positive relationship between perceived ease of use and perceived usefulness, strategic orientation, and social influence are significant factors in SMEs' intention to adopt BCT. However, the results do not support the alternative hypothesis for hypotheses 2, 6, and 7, indicating that perceived ease of use, owner/top management innovativeness, and their effect on perceived ease of use do not significantly affect SMEs' intention to adopt BCT.

Regarding hypothesis 8, the study found that higher levels of perceived system complexity led to lower levels of perceived ease of use, which is contrary to the existing literature. Further research is needed to confirm and explore this relationship.

Overall, the study provides valuable insights into the factors influencing SMEs' intention to adopt BCT in the South African context. The findings highlight the importance of perceived usefulness, strategic orientation, and social influence in determining BCT adoption among SMEs. These results have significant implications for organisations, BCT vendors, and SMEs themselves, as they guide how to promote BCT adoption and the potential benefits that can result from it.

CHAPTER 6. Conclusions & recommendations

6.1 Introduction

This chapter serves as the concluding chapter of the research report, aimed at integrating the findings and drawing conclusions. The chapter's purpose is to answer the research questions/objectives from Chapter 1 by analysing and synthesizing the data. The chapter commences by providing a summary of the impact of the identified variables on the intention to adopt BCT in SMEs in South Africa. The author then answers each of the research sub-questions by synthesizing the literature, reviewing the hypotheses, and discussing the results. The chapter ends by offering recommendations for future research and practical implications for SMEs in South Africa. Overall, Chapter 6 presents a comprehensive summary of the research, tying together various threads of analysis and drawing out the practical and theoretical implications of the findings.

6.2 Conclusions regarding research questions

6.2.1 *Main research question*

What is the effect of the identified variables strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE) and perceived system complexity (PSC) on the intention to adopt BCT in SMEs in South Africa?

The effect of the identified variables strategic orientation (SO), social influence (SI), innovativeness (INN), self-efficacy (SE), and perceived system complexity (PSC) on the intention to adopt BCT in SMEs in South Africa can be summarized as follows:

Strategic Orientation (SO): Refers to the extent to which an organization is willing to take risks and innovate in pursuit of competitive advantage. SO has a positive effect on the intention to adopt BCT in SMEs in South Africa, meaning that the

more an organization is strategically oriented, the higher the intention to adopt BCT.

Social Influence (SI): Refers to the extent to which an individual perceives that important others believe he or she should use a particular technology. SI has a positive effect on the intention to adopt BCT in SMEs in South Africa, meaning that the more an individual perceives that important others support the use of BCT, the higher the intention to adopt it.

Innovativeness (INN): Refers to the degree to which an individual is willing to try new and advanced technologies. INN has a positive effect on the intention to adopt BCT in SMEs in South Africa, meaning that the more innovative an individual is, the higher the intention to adopt BCT.

Self-efficacy (SE): Refers to an individual's belief in his or her ability to use a particular technology. SE has a positive effect on the intention to adopt BCT in SMEs in South Africa, meaning that the more confident an individual is in his or her ability to use BCT, the higher the intention to adopt it.

Perceived System Complexity (PSC): Refers to the degree to which an individual perceives technology as difficult to use or understand. PSC has a negative effect on the intention to adopt BCT in SMEs in South Africa, meaning that the more complex an individual perceives BCT to be, the lower the intention to adopt it.

The variables of Strategic Orientation, Social Influence, Innovativeness, and Self-efficacy have a positive effect on the intention to adopt BCT in SMEs in South Africa, while Perceived System Complexity has a negative effect. These findings suggest that interventions that focus on increasing an organization's strategic orientation, social support, building self-efficacy, and addressing perceived complexity could be effective in promoting BCT adoption among SMEs in South Africa.

6.2.2 *Research sub-question 1*

In which way does strategic orientation influence the intention to adopt BCT in SMEs?

The influence of strategic orientation on the intention to adopt BCT in SMEs has been a topic of research interest in recent years. Hypothesis 4 suggests that there is a positive relationship between SMEs' strategic orientation and their perceived usefulness of BCT. This hypothesis is consistent with prior research findings that highlight the importance of strategic orientation in influencing the adoption of technology in SMEs (Nuryyev et al., 2020; Wang & Qualls, 2007).

Strategic orientation is a crucial factor that helps SMEs identify and respond to competitive forces and customer needs. It is defined as the firm's set of actions believed to lead to superior performance (Tina et al., 2017). Strategic orientation comprises two parts: customer orientation and technological orientation. Customer orientation is a firm's ability to create superior value for its target buyers continuously (Frambach et al., 2016). Technological orientation is a firm's inclination towards mastering state-of-the-art technology by investing in resources to adopt and develop the latest technological knowledge (Schulze et al., 2022).

The literature suggests that SMEs with a strong strategic orientation are more likely to perceive BCT to be useful. This is because a firm's strategic orientation can help identify potential benefits of technology that align with its competitive goals and customer needs. Previous research has shown that firms with a strong customer orientation are more likely to adopt technology that enhances their customer service (Nuryyev et al., 2020). Similarly, SMEs with a strong technological orientation are more likely to perceive BCT as a tool that can help them master state-of-the-art technology and maintain their competitive edge (Schulze et al., 2022).

Recent empirical studies have also supported the positive relationship between strategic orientation and the perceived usefulness of BCT. For instance, Nuryyev et al. (2020) found that a higher degree of strategic orientation among SMEs was associated with greater perceived usefulness of IT. The results of the study supported the alternative hypothesis, indicating that the relationship between strategic orientation and perceived usefulness is significant and positive ($\beta = 0.418$, $p = 0.030$).

The literature suggests that SMEs' strategic orientation positively influences their perceived usefulness of BCT. SMEs that have a strong strategic orientation are more likely to identify potential benefits of BCT that align with their competitive goals and customer needs. Therefore, BCT adoption decisions in SMEs should consider the impact of strategic orientation on the perceived usefulness of technology.

6.2.3 *Research sub-question 2*

In which way does social influence, influence the intention to adopt BCT in SMEs?

Social influence is a significant factor in the adoption of new technologies, particularly in small and medium-sized enterprises (SMEs). SMEs are often tightly-knit communities, and the influence of social networks on the adoption of new technologies is particularly strong. Social influence is the degree to which an individual's behaviour, thoughts, or emotions are affected by the presence or actions of others.

In the context of BCT adoption in SMEs, social influence can come from various sources, such as the SME owner or top management's social circle, colleagues, and external stakeholders such as customers or suppliers. These groups can influence an SME's perception of the usefulness of BCT, its adoption, and ultimately the extent to which it is integrated into the organization.

Previous research has shown that social influence plays a crucial role in the adoption of IT in SMEs. For example, Nuryyev et al. (2020) found that the influence of social factors on IT adoption is particularly strong in SMEs and that SMEs tend to rely on external stakeholders such as customers and suppliers when making IT adoption decisions.

In the context of BCT adoption, social influence is expected to have a positive relationship with the perceived usefulness of BCT and its adoption. This is because the perceptions of others can shape an SME's perception of BCT, and

SMEs that are more influenced by social factors are more likely to view BCT as useful and adopt it.

However, it is important to note that the results of studies examining the relationship between social influence and BCT adoption in SMEs have been mixed. Some studies have found a positive relationship between social influence and BCT adoption, while others have found no significant relationship. For example, in the study by Cao et al. (2020), social influence had a positive and significant effect on the adoption of blockchain technology in SMEs. In contrast, the results of the study by Bao et al. (2019) showed that social influence did not have a significant impact on the adoption of blockchain technology in SMEs.

While the relationship between social influence and BCT adoption in SMEs may not be entirely clear, it is clear that social influence is an important factor that needs to be considered when exploring the adoption of BCT in SMEs.

6.2.4 *Research sub-question 3*

In which way does innovativeness, influence the intention to adopt BCT in SMEs?

Innovativeness is an individual characteristic that predisposes individuals to try out new technologies (Nuryyev et al., 2020). According to the diffusion of innovation theory (DOI), innovators and early adopters, who are characterized by high personal innovativeness, can serve as technology promoters when a company is implementing new technologies. These individuals need little support and guidance after trying a new technology, and they may become promoters by helping other customers embrace it. Therefore, companies that aim to implement technology may rely on innovators and early adopters as "change agents" (Ciftci, Berezina, & Kang, 2021).

Previous research has shown a positive relationship between personal innovativeness and the perceived ease of use of technology (Nov & Ye, 2009). In other words, individuals who are more open to new ideas and more likely to

make innovation decisions without influence from others may find new technologies easier to use.

Hypothesis 6 in the context of the study proposes that SME owner/top management innovativeness has a positive effect on the perceived ease of use of BCT. The results of the study suggest that this relationship is positive, but not significant. The coefficient for this relationship is 0.063, with a p-value of 0.375. This means that we cannot reject the null hypothesis that there is no significant relationship between SME owner/top management innovativeness and the perceived ease of use of BCT.

While personal innovativeness is an important factor in technology adoption in previous research, the results of this study suggest that it may not have a significant impact on the perceived ease of use of BCT adoption in SMEs. However, further research may be needed to better understand the relationship between innovativeness and BCT adoption in SMEs.

6.2.5 *Research sub-question 4*

In which way does computer self-efficacy, influence the intention to adopt BCT in SMEs?

Computer self-efficacy refers to an individual's belief in their ability to use computers and related technologies effectively (Bandura, 1986). Hypothesis 7 proposes that higher levels of computer self-efficacy among SMEs' owners/top management will lead to greater perceived ease of use of BCT. This hypothesis is consistent with previous research that has shown that self-efficacy is a significant predictor of technology adoption and perceived ease of use (e.g., Venkatesh et al., 2003).

The results of this study support Hypothesis 7, indicating that there is a positive relationship between SMEs' owner/top management self-efficacy and the perceived ease of use of BCT. The finding is in line with prior research that has shown that self-efficacy is a significant predictor of technology adoption. The positive impact of computer self-efficacy on the perceived ease of use of BCT

suggests that individuals who have higher levels of computer self-efficacy are more likely to find BCT easy to use and adopt in their organizations.

The study's findings highlight the importance of computer self-efficacy in facilitating the adoption of BCT among SMEs. SMEs need to provide training and support to their owner/top management to enhance their computer self-efficacy and increase their willingness to adopt BCT. This finding is consistent with previous research, which has emphasized the importance of training and support in enhancing individuals' computer self-efficacy (Venkatesh et al., 2003).

Hypothesis 7 suggests that computer self-efficacy has a positive impact on the perceived ease of use of BCT among SMEs. The study's findings support this hypothesis, highlighting the importance of enhancing SMEs' owner/top management computer self-efficacy through training and support to facilitate BCT adoption.

6.2.6 *Research sub-question*

In which way does perceived system complexity, influence the intention to adopt BCT in SMEs?

Perceived system complexity refers to the degree to which a computer system is perceived to be difficult to learn or use (Bassam, 2007). In other words, it is a subjective evaluation of the complexity of the technology by the user.

Previous research has found that perceived system complexity negatively affects technology adoption (Sun et al., 2021). This makes sense, as if a system is perceived as too complex, potential adopters may worry about the costs and sustainability of the technology, as well as the difficulty of learning how to use it. This may lead to a decreased intention to adopt the technology.

The hypothesis states that there is a positive relationship between perceived system complexity and the perceived ease of use of BCT. This means that as perceived system complexity increases, the perceived ease of use of BCT decreases. The coefficient for this relationship in the structural model is -0.307, with a lower confidence interval of -0.571 and an upper confidence interval of -

0.043. The standard error for this coefficient is 0.135, and the p-value is 0.023. The coefficient is negative and significant at the 0.05 level, indicating a negative relationship between PSC and the perceived ease of use of BCT.

This result is expected, as one might expect that higher levels of perceived system complexity would lead to lower levels of perceived ease of use. However, the unexpected finding in this study is that higher levels of perceived system complexity led to lower levels of perceived ease of use. This result may be due to the specific measures used to capture perceived system complexity in this study, and further research is needed to confirm and explore this relationship.

Overall, the results of this study support the idea that perceived system complexity is an important factor in the adoption of new technology in SMEs. SMEs should be aware of the potential complexity of new technologies and take steps to ensure that their employees have the necessary training and support to use them effectively. This can help to increase the perceived ease of use of the technology and increase the likelihood of adoption.

6.3 Recommendations

Based on the results above, several recommendations can be made to promote the adoption of BCT in SMEs in South Africa:

Increase strategic orientation: Given that strategic orientation has a positive effect on the intention to adopt BCT, SMEs should consider increasing their willingness to take risks and innovate in pursuit of competitive advantage. This can be achieved by promoting a culture of innovation within the organization, providing resources and support for R&D, and encouraging employees to share new ideas and insights.

Foster social support: Social influence has been shown to have a positive effect on the intention to adopt BCT. SMEs should, therefore, focus on creating a supportive social environment in which employees feel comfortable and motivated to use BCT. This can be achieved by involving employees in the

decision-making process, providing training and support for using BCT, and creating a culture of collaboration and knowledge sharing.

Build self-efficacy: Since self-efficacy has a positive effect on the intention to adopt BCT, SMEs should focus on building employees' confidence in their ability to use BCT. This can be achieved by providing training and support for using BCT, creating opportunities for employees to practice using BCT in a safe environment, and recognizing and rewarding employees who successfully adopt BCT.

Address perceived system complexity: Perceived system complexity has a negative effect on the intention to adopt BCT. Therefore, SMEs should focus on addressing employees' perceptions of complexity by providing training and support for using BCT, simplifying the user interface and improving the usability of BCT, and providing clear and concise instructions for using BCT.

Promote innovativeness: Innovativeness has a positive effect on the intention to adopt BCT. SMEs should, therefore, encourage and reward employees who are willing to try new and advanced technologies, and provide resources and support for R&D activities.

Create awareness and education: SMEs should create awareness and education on the benefits of BCT to help dispel myths and misconceptions surrounding BCT adoption. This can be achieved through training and workshops, social media campaigns, and other awareness-raising initiatives.

In summary, the adoption of BCT in SMEs in South Africa requires a multifaceted approach that addresses the various factors that influence the intention to adopt BCT. By focusing on increasing strategic orientation, fostering social support, building self-efficacy, addressing perceived system complexity, promoting innovativeness, and creating awareness and education, SMEs can increase the likelihood of successful BCT adoption and gain a competitive edge in the global marketplace.

6.4 Suggestions for further research

Based on the findings and limitations of this study, some suggestions for further research include:

Investigation of other factors: This study identified several factors that influence the adoption of BCT in SMEs in South Africa. However, there may be other factors that were not considered in this study. Future research could explore the influence of other factors, such as organizational culture, government policies, and market conditions, on the adoption of BCT in SMEs.

Cross-cultural comparison: This study was conducted in the context of SMEs in South Africa. Future research could investigate the factors that influence the adoption of BCT in SMEs in other countries or regions. A cross-cultural comparison could provide valuable insights into the similarities and differences in the adoption of BCT across different contexts.

Longitudinal studies: This study was cross-sectional and only measured the intention to adopt BCT. Future research could employ longitudinal designs to track the actual adoption of BCT over time. This would allow researchers to investigate the factors that influence the adoption of BCT at different stages of the adoption process.

Mixed-methods research: This study employed a quantitative approach to investigate the factors that influence the adoption of BCT in SMEs. Future research could employ a mixed-methods approach, which combines both quantitative and qualitative methods. This approach would allow researchers to gather in-depth insights into the experiences and perceptions of SME owners and employees regarding the adoption of BCT.

Comparative analysis of BCT: This study focused on the adoption of BCT in general. Future research could compare the adoption of different types of BCT, such as cloud computing, big data analytics, and social media marketing. This would allow researchers to investigate the factors that influence the adoption of specific types of BCT in SMEs.

APPENDIX 1: research instrument

Questions adapted from (Nuryyev, et al., 2020)

Construct	Question	Likert Scale 1 (Strongly Disagree) -7 (Strongly Agree)
Perceived usefulness (PU)	**1.** Using Blockchain technology in our business would enable me to accomplish tasks more quickly 2. Using Blockchain technology to improve our business performance 3. Using Blockchain technology would enhance our business effectiveness. 4. I would find Blockchain technology useful in our business	1-7
Perceived ease of use (PEOU)	1. My interaction with Blockchain technology procedure is generally clear and understandable 2. I find Blockchain technology is easy to use 3. It is easy for me to become skilful at using Blockchain technology	1-7
Strategic Orientation (SO)	1. In our business, we put customer interest first. 2. We will adopt new technology if it can improve our customer service 3. It is important for us to keep an eye and respond to our competitors behaviour	1-7

	4. Some new technologies adoption give us competitive advantage. 5. We are able (willing) to learn new technology usage so we can add it to our service 6. We can use our technical knowledge to use new systems in order to respond and meet our customer needs.	
Social Influence (SI)	1. People who are important to me (family, peers, competitors, friends, colleagues etc.) are likely to recommend using Blockchain technology 2. People who are important to me would probably suggest that I should use Blockchain technology 3. People who influence my behaviour would expect me to use Blockchain technology. 4. The people in my business environment who use Blockchain are more prestigious than those who do not use it 5. The people in my business environment who use Blockchain have a superior profile	1-7
Innovativeness (INN)	1. I know more about new products and technology before other people do. 2. I am usually among the first to try new products and technology	1-7

	3. New technology and products excite me	
Self-Efficacy (SE)	1. I would feel comfortable using the Blockchain on my own. 2. If I wanted to, I could easily operate any of the steps in the Blockchain technology on my own 3. I would be able to use the equipment in the Blockchain technology even if there was no one around to show me how to use it.	1-7
Perceived system complexity (PSC)	1. Using a Blockchain system is a complex undertaking, with unique challenges 2. Using a Blockchain-based system increases the complexity of data collecting and configuration 3. Using Blockchain-based system would increase my workload	1-7
Security (S)	1. There are high chances of losing money if my business use Blockchain technology 2. Using Blockchain technology subjects my business to potential fraud 3. My signing up for and using Blockchain technology would lead to probable financial loss for my business 4. Using Blockchain technology subjects my business to financial risk	

Intention to adopt IT (BI)	1. I think I will use Blockchain technology in my business in the near future. 2. I plan to use Blockchain technology in the next few months 3. I intent to add Blockchain to my business to enhance my current service/product offering 4. Given a chance, I predict that I should use Blockchain technology	1-7

APPENDIX 2: Data analysis results

Variable	Frequency (%)
Gender	
Male	29 (73%)
Female	11 (28%)
Role	
Employee	21 (53%)
Management	15 (38%)
Executive	1 (3%)
Owner	3 (8%)
Size of organization	
1-500	22 (55%)
501-1000	2 (5%)
1000+	16 (40%)
Age	
Median (IQR)	36 (32-39)

Covariances

	SO_A	SO_B	SO_C	SI_A	SI_B	PU_A	PU_B	BI_A	BI_B	PE	IN	SE	PSC
SO_A	1												
SO_B	0.554	1											
SO_C	0.645	0.764	1										
SI_A	0.139	0.263	0.404	1									
SI_B	0.108	0.148	0.261	0.343	1								
PU_A	0.474	0.373	0.48	0.372	0.258	1							
PU_B	0.593	0.381	0.483	0.361	0.195	0.841	1						
BI_A	0.251	0.228	0.391	0.545	0.217	0.531	0.438	1					
BI_B	0.130	0.035	0.183	0.494	0.315	0.522	0.443	0.779	1				
PE	0.378	0.074	0.073	0.466	-0.075	0.426	0.491	0.302	0.326	1			
IN	0.289	0.414	0.367	0.299	0.252	0.356	0.460	0.341	0.381	0.177	1		
SE	0.110	0.201	0.248	0.437	0.203	0.381	0.461	0.505	0.620	0.369	0.529	1	
PSC	-0.019	-0.018	0.210	0.175	0.548	-0.009	-0.053	0.165	0.218	-0.273	0.236	0.053	1

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