



**E-COMMERCE FRAMEWORK FOR SUSTAINABLE DEVELOPMENT: A CASE
STUDY OF SMMEs IN LIMPOPO, MPUMALANGA, AND NORTHERN CAPE**

BY

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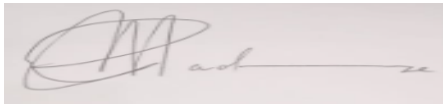
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Declaration

I, Solomon Madzvamuse, student number 11630078, hereby declare that this thesis for Doctor of Philosophy in Business Information Systems (PhDBIS), is my original work and has not been previously submitted to any other university for the award of a degree either in part or in its entirety. I also declare that this work complies fully with the University of Venda Policy on plagiarism. All reference materials contained therein have been duly acknowledged.

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Dedication

I dedicate this work to my late father, David Madzvamuse. He was an inspiration for hard work and perseverance. I also dedicate this work to my late son, Blessings Madzvamuse; may your soul continue to rest in peace.

Acknowledgement

Firstly, I want to thank my employer, the University of Venda, for financing my studies. I also want to thank my supervisors, Prof A. Kadyamatimba and Dr W. Munyoka, for their guidance. I would also like to thank all my colleagues for their support during my studies. Finally, I would want to thank my family for the encouragement they gave me during my studies.

ABSTRACT

Digital technologies have brought about a turnaround in business, with big companies in developed countries now depending on the internet to support their business activities. While Small, Medium, and Micro Enterprises (SMMEs) contribute much to the economies of developing countries, e-commerce has not been considered as a support for sustainable development by SMMEs, in post-colonial Southern Africa. E-commerce strategies have been established and implemented successfully by big businesses in the developed world, however, these strategies fail to address issues arising from the different contexts for SMMEs in developing countries, such as South Africa. This research will contribute to the discipline of Business Information Systems by establishing a framework for implementing e-commerce for SMMEs in South Africa. Underpinned by the pragmatism philosophy, the study takes an in-depth case study approach, in which SMMEs in three provinces of South Africa were used as the population of the survey, to champion an e-commerce framework for SMMEs in South Africa. A mixed-methods research approach was applied, and both secondary and primary data were used in this study. The secondary data aided in establishing the research gap on advancing e-commerce frameworks, while quantitative data were collected using structured questionnaires, from SMMEs in Limpopo, Mpumalanga, and Northern Cape Provinces. The quantitative data was used to test the causal effect of identified factors of e-commerce in SMMEs. The SPSS software was used to analyse the quantitative data. The qualitative strand of the mixed-methods approach using semi-structured interviews, served the purpose of method triangulation with the quantitative strand enabling the gathering of further insights on how e-commerce in SMMEs can foster sustainable development. The ATLAS.ti software package was used to code and interpret the qualitative data collected from interviews, using thematic analysis. Based on the findings, an e-commerce framework for SMMEs was established, tested, and refined. The framework is intended to contribute to the formulation of government policies that will facilitate sustainable development, through e-commerce in SMMEs.

KEYWORDS: Electronic Commerce; Digital Technologies; Informal sector; Small, Medium, and Micro Enterprises; Sustainable development.

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1 CHAPTER ONE: INTRODUCTION

1.1 Background of Study

Digital technologies and e-business have brought about a turnaround in conducting business, with big businesses worldwide now depending on digitalization to support their business activities (Berger, 2018). While informal Small and Medium Enterprises (SMMEs) have proved to be a relevant contributor to the economies of developing countries, consideration for e-commerce as a potential contributor to sustainable development in Southern Africa remains limited (Farid, 2018). In developed countries, industries and businesses have benefitted from adopting e-commerce. Electronic commerce is used interchangeably in various literature as e-commerce; this research uses the term 'e-commerce' throughout.

The Brundtland Report (1987) defined **Sustainable Development** as the present-day's development that meets the current needs whilst guaranteeing the ability to meet the needs of future generations (Burns, 2012). The 2030 Agenda for Sustainable Development (2015), adopted by United Nations, set out 17 Sustainable Development Goals (SDGs) (see *Table 3.2*). In the spirit of promoting the agenda for sustainable development, all developmental activities should align with the SDGs.

The 21st century has witnessed tremendous technological advancements, accompanied by the widespread use of the internet, web technologies and their applications. As part of the information technology revolution, e-commerce, in general, has become common in the world of trade (Sarode, 2015). Companies adopt e-commerce as a means of doing business that can reduce the levels of inequality between the developing and developed world. The fact that e-commerce commonly uses the internet to conduct business reduces many physical impediments associated with doing business (Datta, 2011). E-commerce reduces transaction and coordination costs through the utilization of cheap, coordinative transactions, interconnected networks, and online databases that are accessible worldwide (Farid, 2018).

Walcott (2007) identified the features of e-commerce that are vital for business. These features are - global reach, ubiquity, richness, universal standards, information density, interactivity, and personalization. The literature review section of this research explores these features in detail.

The COVID-19 pandemic lockdown accelerated the sales and popularity of e-commerce around the world. Customers radically modified their shopping behaviour to focus on digital platforms. Finland has realized a 60% growth in e-commerce sales since the pandemic began (Marko, 2021; Vilkas, 2020). The improvement of web and mobile interfaces, together with the ever-increasing number of internet users, have seen an increased use of e-commerce. Increased subscriptions to social networks and the mass adoption of mobile devices are also accelerating this drive, further shaping the e-commerce trends for the business market. Based on this level of growth, therefore, it cannot be disputed that e-commerce offers vast opportunities for business growth, in general.

While developed countries could leverage the potential of information technologies to improve and become relevant players in today's information economy, others have lagged behind as producers of labour markets and products for wealthier nations (Ndou, 2004). Countries in Southern Africa are lagging in adopting IT solutions. As will be discussed in Sections 2.2 and 2.3, a compound of factors impedes this development.

1.2 Context of Study

World statistics indicate that the informal business sector is considered a primary source of employment worldwide (see Table 1:1). The informal sector in South Africa is small compared to other developing countries and sub-Saharan Africa (Fourie, 2018), however, its role in alleviating unemployment and uplifting the livelihoods of millions of people must be appreciated. Informal enterprises are those that may have employees or not; they are not incorporated and not registered for taxation. Fourie (2018) explains the 'informal business sector' as comprising all unregistered, owner-operated enterprises and may have employees that are paid or unpaid. Informal enterprises have representation in all sectors of the economy. Schneider (2005) and Darbi (2018) confirm that the informal economy constitutes all unreported income from businesses, both legal and illegal, hence, all economic activities that would have been taxable. The literature uses the term 'informal sector' to include businesses characterized by partial or non-compliance with employment regulations and business tax but which sell legal goods and services. While the informal sector can cover a wide variety of activities, for this study, SMMEs will refer to small business activities involving selling of goods and services in the informal economy. Informal employment constitutes a significant percentage of the global labor force (Roever, 2018). The region with most workers in the informal sector is the Sub-Saharan. Table 1.1 illustrates the composition of the informal sector by region.

Many developing countries have recognized the informal sector as a potential contributor to Gross Domestic Product (GDP). According to the Government Gazette (2017), small businesses and cooperatives should be at the centre of the fight to get South Africa's economy into a growth trajectory and eradicate poverty, inequality, and unemployment. Many business activities in African townships and rural areas fall under the informal sector. According to Roever (2018), research on informal employment in Africa shows that many government policies focus on promoting the growth of SMMEs, however, aligning sustainable development goals with SMME businesses in Southern Africa remains challenging.

Table 1:1: Informal employment workforce by region (Source: Sally Roever, (2018)).

Region	Informal employment
Sub-Saharan	89 %
Southern Asia	88%
East and South Eastern Asia (excluding China)	77 %
Middle East and North Africa	68 %
Latin America and the Caribbean	54 %
Eastern Europe and Central Asia	37 %

In their research, Ligthelm (2008) and Bhorat, (2018) identified several challenges confronting the development of the informal sector in South Africa. These challenges include the following:

- A high mortality rate, motivated by unemployment rather than recognizing promising opportunities;
- A stagnant business environment with limited opportunities for growth;
- New entrants manifest market growth, rather than increasing the existing business' turnover; and
- Lack of proper facilities for business operations.

Considering these challenges, developing strategies to achieve sustainable development, through SMMEs, remains a priority for post-colonial Southern Africa.

The colonial masters of Southern Africa, who were dominantly European, established policies that marginalised certain groups of people, based on their race. The Group Areas Act of 1950, in South Africa, by the apartheid government is one example of such policies. Amongst the previously marginalised are the black Africans, coloureds, and Asians. The colonial government's policies excluded these groups from fairly participating in certain economic activities (Moyo, 2021) with post-independence governments attempting to reverse the effects of the colonial era marginalisation. Foreign investors regard government policies that aim to promote the previously marginalized groups in Southern African Countries as hostile (Pike, 2018). Examples of such policies are, the Broad-based Black Economic Empowerment Act of South Africa (BBEE 2003) and the Equitable Economic Empowerment Bill of Namibia (NEEF 2015). The disinvestment in some of these countries, such as Zimbabwe, has resulted in high job losses in the formal sector resulting in the SMMEs being the effective alternative in sustaining the economy.

Munangagwa (2009) asserts that the informal sector sustains the Zimbabwean economy. According to the IMF (2018), Zimbabwe has the second largest informal sector in the world, with Bolivia being the first (Medina, 2018). Most Zimbabweans, excluded from formal employment, join the informal sector to make a living (Njaya, 2015).

South Africa has a post-colonial background like Zimbabwe. The country has constantly been battling to balance economic growth and efforts to address imbalances caused by the colonial era. To find all-inclusive solutions for addressing economic challenges, the government has turned towards growing the informal sector as one possible way of contributing to the economy in a way that includes the previously marginalized. For the South African government, besides the Blacks Economic Empowerment (BEE) policy which seems to have benefited a few, supporting informal sector growth is one way of promoting the inclusion of the previously-marginalized into the country's main economy (Brown, 2016). According to Rogerson (2015), South Africa has not established inclusive policies for the country's informal sector and suitable intervention strategies acknowledging the former's contributions to economic development.

Developed countries have had a well-implemented e-commerce initiatives contributing to economic development. Considering the e-commerce features to be discussed in Section 2.2, it becomes evident that the economic emancipation of the previously-disadvantaged in South

Africa might be championed through growing the SMMEs. An e-commerce framework for SMMEs can further contribute to sustainable development in South Africa. Vos (2007) characterises *sustainable development* as meeting the needs of the present without compromising future generations' potential to meet their needs. Non-growth is, therefore, not an option, but policies must be in place to allow growth and limit the negative impact of non-growth.

1.3 Statement of Research Problem

The sustainable development goals as identified by United Nations Assembly (Arjani, 2021; UN, 2015), place a need to identify ways of developing SMMEs in South Africa to achieve these goals. Through a review of pertinent literature, the study identified 13 SDGs that can possibly be achieved through using e-commerce by SMMEs (see Section 3.5). Bhattacharya (2019) states that SMMEs in developing countries remain limited in using ICTs to attain profitability. With that context, there is a need to develop an e-commerce framework for the SMMEs in South Africa that will promote sustainable development; for with the big digital revolution, there is a need to align the digital world with the challenges of SMMEs (Msuva, 2018). Recent studies have express the rising levels of unemployment in South Africa (Mfusi, 2017) and growing the SMMEs has become a relevant solution. Recent studies have stated limited response by the government and individuals in South Africa to leverage the digital revolution in pursuing the agenda for growing the SMMEs businesses. Against this backdrop, the bottlenecks to developing SMMEs in South Africa were explored as part of the research, advocating digital technologies and e-commerce as possible solutions.

Previous studies have identified several e-commerce frameworks (see Section 2.2). An analysis of these frameworks, however, reveals how these frameworks fall short in addressing the unique set-ups characterising post-colonial South Africa, hence, the motivation for undertaking this study. The marginalization of certain groups from the leading economy during the apartheid era in South Africa provides a unique context. There is hardly any specific e-commerce framework that addresses the implementation of e-commerce for SMMEs in South Africa with the aim of making them contribute toward sustainable development goals.

1.4 Aim of Research

This study aims to develop an e-commerce framework for SMMEs in South Africa that would promote sustainable development. The framework will inform government policy which would be aimed at growing the SMMEs. SMMEs, in post-colonial South Africa are helping achieve

the agenda of an all-inclusive economy that addresses the concerns of the previously-marginalised, while providing them with the much-needed employment and upliftment.

1.5 Research Objectives

This study established the following research objectives to achieve the aim of the research:

1. To assess the current challenges for e-commerce in SMMEs, in South Africa.
2. To evaluate the factors that influence the implementation of e-commerce in SMMEs in South Africa.
3. To determine how the key features of e-commerce contribute to sustainable development in South Africa.
4. To develop an e-commerce framework for SMMEs that contribute to sustainable development.
5. To evaluate the proposed e-Commerce Framework based on empirical findings.

1.6 Research questions

Based on the research objectives, the study posed the following specific research questions:

1. What are the current challenges for e-commerce in SMMEs in South Africa?
2. What factors influence the implementation of e-commerce in SMMEs in South Africa?
3. How can the features of e-commerce promote SMMEs in SA to contribute to Sustainable Development?
4. What e-commerce framework can be considered for SMMEs in SA to foster Sustainable Development?
5. How can the e-commerce framework be refined to ensure efficiency?

1.7 Study Approach

To achieve the objectives of this research, the researcher reviewed the literature on research methodologies and selected the most relevant approach (see Chapter 4). Guided by the reviewed literature, sequential mixed methods were deemed suitable for this research, hence, this study followed an explanatory sequential mixed-method design. The first phase applied quantitative research methods to test the causal effect of the identified factors on the adoption of e-commerce in SMMEs in South Africa. The researcher administered a questionnaire for a survey to a chosen sample of directors of SMMEs in Limpopo, Mpumalanga, and the Northern Cape Provinces of South Africa. Validity tests were applied to confirm the effectiveness of the tool and a pilot test was done on the questionnaire prior to its administration. For reliability, the test re-test technique was applied. The questionnaire also passed the Cronbach's alpha test for reliability. The researcher used IBM SPSS software for the quantitative data analysis

and Amos software for testing the resulting model. Descriptive statistics for demographic-related data were extracted. The proposed hypothesis was tested by applying regression analysis and structural equation modelling.

The second phase of the research involved applying qualitative research methods to establish the influence of e-commerce on SMMEs in achieving sustainable development goals in South Africa. The researcher interviewed administrators of relevant organizations and government departments and studied policy documents. The qualitative data collected were analysed using the qualitative research tool Atlas.ti. The research was finalized by refining the proposed framework using the qualitative and quantitative data analyses' results.

1.8 Justification of Study

Discussions of the literature review (Chapters 2 & 3) indicated various theories for e-commerce frameworks by previous researchers. An analysis of these frameworks revealed that an ideal business environment like that found in developed countries is always assumed, therefore, there is a need to examine e-commerce in other environments, particularly, with SMMEs. The development of SMMEs in South Africa it is hoped will promote the inclusion of the previously-marginalised into the leading economy. Development of the SMMEs will see the sector supplementing large enterprises and positively contributing to the South African economy.

Post-colonial Southern Africa has constantly been battling to address the economic imbalances of the colonial era. To find all-inclusive solutions to addressing challenges created by the exclusion of certain groups of citizens from the leading economy, governments have prioritized developing SMMEs as one way that could address the plight of the previously-marginalised. Roever (2018) alluded that developing African countries have established policies focusing on growing SMMEs, however, researchers must develop viable strategies to inform policy in that endeavour.

In addressing colonial-era imbalances, growing SMMEs is seen as one possible way of building an all-inclusive economy. Efforts by post-independence governments in Southern Africa have championed the inclusion of the previously-disadvantaged as crucial players in the economy to address the colonial era imbalances, although, Western foreign investors regard this as unfavorable for their investments.

Governments of developing countries regard SMMEs as a critical sector in empowering the previously-marginalised and contributing toward the goals of Sustainable Development (UN, 2015). This research collected empirical data from directors of selected categories of SMMEs in South Africa as well as stakeholders in the SMME sector. These stakeholders include South African government ministries responsible for finance and economic development, foreign affairs and international trade, industry and commerce, communication technology as well as officials responsible for courier services, legal affairs, public service, labor, social welfare, community development, and owners of small and medium enterprises.

1.9 Operational Definitions

E-commerce: can be defined as the initiating, arranging, and exchanging of goods and services with the help of public or private telecommunication networks, including the internet (Andreas, 2009)

SMMEs: are defined as enterprises that are not formally registered, as such do not pay taxes or comply with labour and employment laws. Other characteristics that define businesses operating in SMMEs are atypical resources and management practices (Darbi, 2018).

Digital Technologies: these technologies are involved in the gathering and processing data for transmission, storage, and display of information. In the communication sectors, they facilitate the transfer of electronically-mediated information. Such technologies like the blockchain, Internet of Things (IoT), cloud computing and social media constitute Digital technologies (Berger, 2018).

Sustainable development: can be defined as growth that does not only meet the needs of the present, but also consider the ability of future generations to meet their own needs (Osterwalder, 2002).

A framework: is a basic structure that underlies a system or concept.

1.10 Structure of the thesis

The outline of the thesis is shown in Table 1.2

Table 1:2: Structure of the thesis

Chapter	Description
Chapter 1: Introduction	Introduction of the study, background of the problem, aim and the objectives of the study.
Chapter 2: Literature review	Literature Review on e-commerce and its features.
Chapter 3: Theoretical Framework	Systematic literature review of e-commerce in SMMEs and analysis of established frameworks as well as a proposed framework model.
Chapter 4: Methodology	Research methodology and insight into the philosophical underpinnings of the research. Discussion of the research design, data collection techniques and sampling techniques for the research. Design of data collection tools (questionnaire and interview guide).
Chapter 5: Presentation and Analysis of Quantitative Data	Presentation and analysis of quantitative data
Chapter 6: Analysis of Qualitative Data	Qualitative data analysis.
Chapter 7: Research Findings	Endorsing of framework and refining of proposed SMMEs framework.
Chapter 8: Research Overview and conclusions	Research overview, conclusions, delimitations, and considerations for future research.

2 CHAPTER TWO: REVIEW OF LITERATURE FOR E-COMMERCE IN SMMEs

This chapter provides literature review on e-commerce in business and the development of SMMEs in South Africa. The chapter begins with discussions on e-commerce, leading to identifying knowledge gaps, hence, there is a presentation of a preliminary review of literature on the topic of study, dealing with critical themes useful for the study. The review begins by defining e-commerce in subsection 2.1, followed by an analysis of e-commerce in business in subsection 2.2 which identifies e-commerce categories and revenue models. The subsection continues by discussing the features of e-commerce before concluding by outlining its merits and demerits. Subsection 2.3 discusses the issues arising from e-commerce while subsection 2.4 gives a systematic review of e-commerce in SMMEs. The methodology that guided the review and its contents are summarized in the final part.

2.1 E-commerce in Business

Digital technologies have brought about a turnaround in the way business is conducted. Successful businesses now depend on various business information systems to support their business activities. The Internet has eliminated geographical barriers that once hindered the exchange of goods and services between businesses and consumers (Mohammeda, 2017). The utilization of digital technologies in business brings about many benefits, hence, the reviews focuses on the benefits of ICTs to modern businesses, mainly on e-commerce. The success story of the digital revolution, as seen in large firms worldwide, should be considered in developing strategies for growing SMMEs in South Africa. In this subsection, it is essential to broadly assess the various features of e-commerce and identify how the business leverages these features to promote growth.

For businesses, e-commerce involves all the trading activities, such as online ordering, marketing, payment, goods delivery, and customer support. The future will see an increase in internet use and mobile applications in business as these are opportunities to leverage ICT to advance economic development (Sila, 2019).

2.1.1 Key features of Internet for Business

This research needs to explore the attributes of e-commerce that make it vital for business. Mishra (2020), Traver (2014 and Walcott (2007) listed seven features of e-commerce that benefits the user in a business. These features are - global reach, ubiquity, universal standards, interactivity, richness, personalization, and information density. According to

Junglas, 2017, e-commerce extends the business marketplaces beyond traditional boundaries thereby, removing temporal and geographic location confinements. It eliminates the restrictions of physical market space and allows consumers to shop from their desktops. From the consumer's point of view, e-commerce reduces transaction and market participation costs.

Globally, the use of technology allows business activities to penetrate beyond national boundaries hence, allowing businesses and consumers to be independent of geographical confinements. Players residing in separate geographical areas can conduct businesses with one another, therefore, any business establishment can consider the whole world for market opportunities. E-commerce technology permits cost-effective and convenient business transactions across cultural and national boundaries; it stretches traditional local markets into global ones, increasing a company's customer base. The market size for e-commerce businesses matches the world's online population, which is estimated to be above two billion (Naseri, 2021), and involves millions of businesses worldwide. Opportunities for global reach include a global product market, a global supply chain, support of multiple languages, and franchising (Guercini, 2015).

One prominent feature of e-commerce as a technology is that the internet's technical standards are international, therefore, e-commerce facilitates universal technical standards for conducting business. All nations share internet standards worldwide as the Internet Protocol provides a universal standard for sharing data (Laisuzzaman, 2010). It has become easy for businesses to use data mining technologies to obtain essential data. It is now easy for marketing companies to obtain statistics about different market segments throughout the world, thus making it easy for businesses to penetrate global markets. The internet have universal technological standards.

According to Meeds (2016), multimedia enables dealing with and delivering information in several formats. These formats include video, sound, text, and graphics. Multimedia facilitates the integration of marketing messages and consumer experiences. E-commerce allows consumers to interact dynamically, sharing individual experiences, making the consumer co-participants in delivering goods to the market.

Digitization, a feature of e-commerce from a societal perspective, is defined as "the economic and social transformation triggered by the massive adoption of digital technologies to generate, process, share and transact information" (Chaudhuri, 2015). More business transactions are now happening in the information space, even where physical products are involved. Using networks bring about enriched interactivity and improved customer service affordability. Networks have introduced open market concepts such as virtual communities and third-party marketplaces and big businesses have leveraged these features to promote growth, expand their markets, and establish their brands using networks.

2.1.2 Categories of E-commerce Businesses

When considering e-commerce business, we do not discuss only online commercial or sales transaction between the supplier and the consumer. The Electronic Trading environment constitutes the primary entities present in the business network. These entities are businesses, consumers, and governments (Figure 2.1). Recognition of these entities and the vital relationships among them enable e-commerce business transactions to occur (Gupta, 2014; McGann, 2002). The Electronic Trading Infrastructure (ETI) in Figure 2.1 elaborates on the business environment by providing a comprehensive list of components needed to execute a specific set of business models. Understanding the entities involved in e-commerce will assist in exploring contextual issues since the information makes it easier to categorize sampled participants in this research.

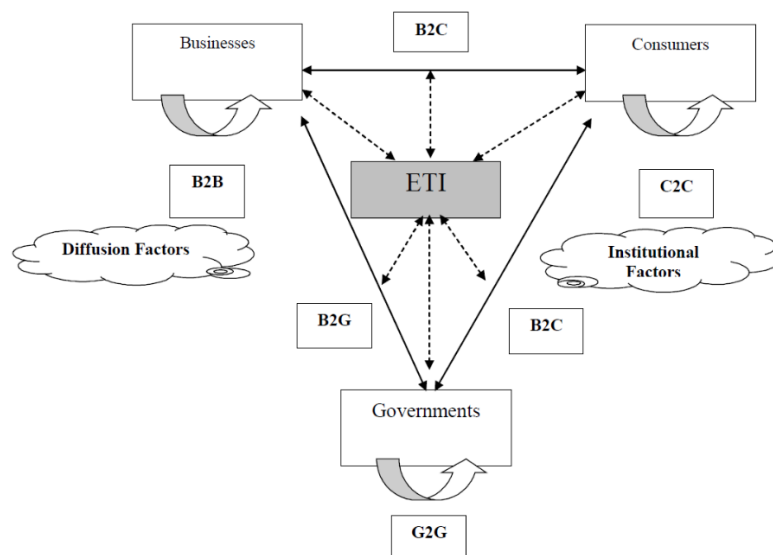


Figure 2.1: The e-Business Environment and the Electronic Trading Infrastructure (ETI) (Sean T. McGann, 2002)

The following e-commerce categories arise from the various business relationships amongst the entities as illustrated in Figure 2.1.

a) Business-to-Business (B2B)

Business-to-Business (B2B) consists of all electronic transactions and dealings related to the goods and services conducted between companies and includes conventional wholesalers and producers dealing with retailers (Cassia., 2019, Brennan., 2020, Ocloo., 2020).

b) Business to Consumer (B2C)

Business-to-Consumer (B2C) consists of transactions and relationships between businesses and end consumers. It constitutes mainly the retail commerce trade that takes place online (Drigas., 2013, Kang., 2021). Nowadays, we find many online shopping sites and virtual stores which sell various products, ranging from clothing items, electronic gadgets, to other necessities, directly, to the consumers. Online shopping is convenient to the consumer, who can now easily compare prices from the comfort of their homes and enjoy quick deliveries together with the product support.

c) Consumer to Consumer (C2C)

Consumer-to-Consumer (C2C): consists of electronic transactions of products and services between two consumers, although, a third party can provide an online platform to facilitate the transactions (Choi., 2019, Santoso., 2020)). There are many third-party sites on the web where consumers can sell their old items to other consumers

d) Consumer to Business (C2B)

Consumer-to-Business (C2B) is a reversal of the selling and buying process between Business and Consumer in B2C. In this case, individuals make their items or services and sell them to companies (Liang., 2019, Huang., 2021).

e) Business to Administration (B2A)

Business-to-Administration (B2A) involves dealings between companies and public administration (Krah., 2020). It encompasses services such as social security, fiscal measures, legal documents, employment, and others.

f) Consumer to Administration (C2A)

Consumer-to-Administration (C2A) involves electronic transactions between individuals and public administration. Some examples are distance learning, information sharing, and electronic tax filing. The B2A and C2A types of eCommerce aim to increase flexibility, efficiency, and transparency in public administration (Bilhara., 2020, Goyal.,2022).

An understanding of the eCommerce business models will assist this research in choosing the participants of the research. While most of the SMMEs players fall under the consumer category in the e-commerce business environment, it is essential to note that they anticipate becoming registered businesses in the future. This development will result in the sustenance of the economy of the country.

2.1.3 Ecommerce Revenue Models

As big businesses worldwide adjust their business models in line with digitalization, new models for generating revenue have emerged. This study takes an insight into the revenue models to identify those that fit into the studied context. The revenue models for businesses in developed countries might differ from those expected for the SMMEs in developing countries like South Africa. Many factors differ, as such, there is a need to consider how SMMEs in South Africa can also consider the existing revenue models or even come up with new revenue models that would suit their environment and infrastructure.

The revenue model for a business determines how the company will make its profits, while a business model describes the value a company offers to its customers. It involves the firm's architecture and network of partners for doing business to generate profit and sustainable revenue streams (Osterwalder, 2002).

According to Osterwalder (2002), the four main pillars of a business model are - the products and services a firm offers, the relationship it maintains with its customers, the infrastructure necessary to provide this, and the financial expression of business success or failure. In business, revenue typically consists of the total amount of money the company receives for goods sold or services provided during a specific period, therefore, revenue models are a part of the business model. Many online companies generate revenues from multiple income

streams such as advertising, subscription, and affiliate marketing. Besides selling goods and services, online models can also generate revenue through selling information.

Multiple revenue model variations can be derived from the primary revenue models for e-commerce and many companies usually adopt more than one revenue model by combining models. The main revenue models, as identified by Hoffman (2005), are as follows:

2.1.3.1 Advertising Revenue Model

The advertising model generates revenue through fees paid by advertisers in exchange for showcasing their advertisements (Shang., (2022). Advertising subscriptions are the ultimate among the revenue models, besides sales. While representatives of major media companies complain about earning less money with online advertising than with advertising in print or on TV, the figures indicate steadily rising revenues. Advertisers are charged a periodic subscription fee that does not depend on transactions.

2.1.3.2 Transaction Fee Revenue Model

In this model, a company receives commissions based on volume for enabling or executing transactions. The business generates revenue by charging transaction fees to the customer using the payment platform (Meybodi., 2022). The company is a marketplace operator providing customers with a platform to place their transactions. Customers must register to participate in this e-market actively. The amount of the transaction fee can be both – fixed and calculated as a percentage of sales.

2.1.3.3 Sales Revenue Model

Businesses sell goods and services online to get revenue (Chung., 2023). Customers benefit from the convenience of buying goods and services wherever they are, therefore, it is time savings. The prices of goods and services are competitive. Online sales include marketplaces, live shopping, e-tailers, web catalogues, and shopping clubs; examples of sales revenue model businesses include - Buy.com, Etsy, iBood, brands4friends, Amazon, and Otto.

2.1.3.4 Affiliate Revenue Model

The affiliate program is an online distribution solution based on the commission principle whereby merchants advertise and sell their products and services through links to partner websites (Suman.,2022). It is a pay-for-performance model with commission paid for actual revenue or measurable success. An affiliate link includes a code that identifies the affiliate to track clicks, leads, or sales. The affiliate, therefore, acts as the interface between merchants and customers. This model creates a win-win situation: the merchants sell their products or services, and the affiliates get their commissions. Variations for the affiliate model include banner exchange, pay-per-click, and revenue sharing programs. The affiliate model is well-suited for the web and, therefore, prevalent, examples include Amazon and Affilinet.

2.1.3.5 Other Revenue Models

As identified by Hoffman (2005), other revenue model exist. These include sponsoring, content syndication, and data mining. It is anticipated that e-commerce will continue witnessing the creation of new kinds of revenue models in the future (Jeong & Kim., 2022). Big internet companies such as Amazon, eBay, Google, and Facebook are showing great potential to develop new revenue models by combining and constantly improving them. Monetizing virtual goods has already started to become a potential revenue earner. With targeted marketing and personalized goods and services, e-commerce seems the future of all business models.

Amongst the concerns of e-commerce, for companies, is the need to realize the legal complexity, for example, the data protection debate, open-source software, attacks by hackers, and illegal downloads. Businesses can successfully overcome future challenges through a deep knowledge of the target groups and markets, operational excellence, and flexible business models.

2.1.4 Merits of e-commerce

Gupta (2014) outlined some benefits of e-commerce. The most significant benefit of e-commerce is its global reach which supports access to the global market with minimum investments. It enables sellers to sell to the global market and gives consumers a wide range of product choices. E-commerce also reduces challenges due to geographical boundaries, while virtual stock gives customers access to many products.

The e-commerce process cuts the product distribution chain significantly by allowing direct interaction between wholesalers and the final consumers of the product. There is direct and transparent communication between the final product consumer and the producer or service provider, which allows the customization of products and services that benefit consumers by satisfying the individual preferences of the target market.

E-commerce draws sellers closer to consumers, resulting in increased productivity and perfect competition. The consumers have access to a wider variety of choices in terms of goods and services which meet their specific preferences and budget, also consumers now always have access to virtual stores. Generally, e-commerce significantly reduces all costs involved in acquiring the products and services, by the consumers.

2.1.5 Challenges of e-Commerce

Despite all the benefits that come with e-commerce, it also has its share of the following demerits:

- The strong dependence of e-commerce on network connectivity and information technology brings challenges when technology fails. Developing countries have challenges with network connectivity and IT technology infrastructure, hence, this can affect business.

There is a great need to synchronize legislation internationally to regulate e-commerce transactions since different countries have different laws controlling business activities. The different laws can impact business between players in different countries.

- The market culture is not favorable to electronic commerce. Usually, consumers prefer a natural feel for the service or product before committing to purchase. Physical contact is impossible in e-commerce since the product producer might be far from the prospective consumer.
- E-Commerce might also disregard issues such as privacy, culture, and economic identity of the customers. Some cultures are very reserved and will not readily welcome the idea of having personal information shared across global networks. With e-

commerce, customers lose control of their data uploaded onto another company's servers, compromising privacy. E-Commerce has resulted in various cultural conflicts, in which individuals get castigated by their ethnic groups after certain activities were displayed on the internet.

- Internet fraud is another primary concern for e-commerce. There are always chances of fraudulent financial transactions perpetrated through the internet. Participants are also susceptible to losing sensitive financial information on the internet

2.2 E-commerce Issues

With good planning and proper frameworks in place, the merits of e-commerce could outweigh the demerits. It is, therefore, essential to remain cognisant of the issues of concern in e-commerce for businesses to be able to circumvent problems that might arise from these. Figure 2.2 summarises the issues in e-commerce, identifying them as either drivers or challenges of e-commerce.



Figure 2.2: E-commerce drivers and challenges

2.3 E-commerce in SMMEs and sustainable development

This study carried out a systematic literature review to establish the status of research on adopting e-commerce by SMMEs. According to Xiao and Watson (2019), a systematic

literature review involves the following significant steps: firstly, literature search and evaluation, and secondly, data extraction and analysis. The literature search and evaluation starts with establishing an inclusion criterion to enable the researcher to conduct a relevant search based on the research topic. The search spanned online databases, such as - Google Scholar, ProQuest, EBSCOhost, and Emerald for literature in English published from 2010 to 2021. The literature review focused on answering the following research questions:

- What are the issues involved with e-commerce adoption in SMMEs in developing countries?
- What specific factors affect the adoption of e-commerce by SMMEs?
- How does e-commerce in SMMEs contribute toward the goals of sustainable Development?

Search terms included - “e-commerce,” “informal sector,” “sustainable development,” “SMMEs,” and “micro enterprises.” The search resulted in the initial identification and selection of 438 articles relevant to the study. Table 2.1 illustrates the search terms and the number of relevant publications found.

Table 2:1: Summary of literature search results

Keywords used for the search	Articles found
“ecommerce”	32900
“ecommerce” + “framework”	19700
“ecommerce” + “SMMEs”	11000
“ecommerce” + “sustainable development”	11000
“e-commerce” + “adoption” + “developing countries”	17000

Several articles were considered based on their relevancy to the objectives outlined for the literature review. An eight-column table was designed to capture relevant details of the studied research articles. These details included: Title of the research, Authors and year, concept under study, dependant variables, independent variables, referenced theories, research method, and conclusions.

Table 2:2 : Summary of previous study on e-commerce adoption factors and sustainable development

Title	Author(s)	Concept	Independent Variable	Dependent Variable	Theory	Research Method	Conclusions
Examining privacy concerns and e-commerce adoption in developing countries: The impact of culture in shaping individuals' perceptions toward technology Impact of organizational learning and knowledge management factors on e-business adoption	Zareef A. Mohammed, Gurvirender P. Tejay (2017)	Adoption of e-commerce in developing Countries	Culture, perceptions	Ecommerce, technology	Hofstede's theory of cultural differences, technology	Quantitative Methods	Multiple factors identified, cultural influence inform decisions to adopt e-commerce, privacy concern is independent of the society's cultural

Table 2:3 : Continued....

Impact of organizational learning and knowledge management factors on e-business adoption	Hsiu-Fen Lin; Gwo-Guang Lee (2005)	Factors on e-business adoption	Organisational Learning, and Knowledge management	E-business	Innovation diffusion theory	Quantitative Methods	Technical knowledge available and training support is expected to promote successful e-businesses' systems adoption
Hybridizing an Extended Technology Readiness Index with Technology Acceptance Model (TAM) to Predict E-Payment Adoption in Ghana	Patrick Acheampong, Li Zhiwen, Henry Asante Antwi, Anthony Akai Acheampong Otoo, William Gyasi Mensah 2017	E-Payment Adoption	Technology Readiness Index (TRI: innovativeness, optimism, discomfort, insecurity and convenience), Perceived convenience, PE, PU	E-payment	Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), DOI theory	Quantitative Methods	Personal innovativeness, perceived usefulness and perceived ease of use; high perceived convenience and significant relationship influences e-payment adoption.

Table 2:4 : Continued....

Infrastructure A Major Barrier to Ecommerce Development and Adoption	Charles Ooko Akelloh, George Raburu, Samuel Liyala and Lucy Arvin Onditi (2017)	Ecommerce Development and Adoption	Technology	E-commerce	TAM	Mixed Methods	Infrastructure is a barrier to implementation and adoption of e-commerce
Managerial, Organizational and Technological Determinants of ICT Adoption: Survey of Academic Staff In Bauchi State	Ahmad A, Ibrahim K. M. and Ahmad A. (2017)	Determinants of ICT adoption	Top Management Support, Organizational Competence, PU and PEOU	Determinants of ICT adoption	Innovation Diffusion Theory (IDT)	Quantitative Methods	This research suggests technological and organizational factors are determinants of ICTA in the context of HEIs in Bauchi State
Adoption of multimedia technology for learning and gender difference	ChongWoo Parka, Dong-gook Kimb, Sunyoung Choc, Hyo-Joo Hand (2019)	Adoption of multimedia technology	PU, PEOU, Attitude toward use, Intention to use	Technology adoption	Task technology fit, TAM	Quantitative methods	Task technology fit influences perceived usefulness in using multimedia technology. Knowledge of technology use positively influences multimedia use.

Table 2:5 : Continued....

<p>Factors affecting e-commerce potential of any country using multiple regression analysis</p>	<p>Ansar Waseem, Yasir Rashis, Muhamad Akibwarrach, Imran Sadiq, Zeeshan Shaukat (2019)</p>	<p>E-commerce potential</p>	<p>Technological factors, social factors and economic factors</p>	<p>E-Commerce Potential Score,</p>		<p>Quantitative methods</p>	<p>Demographics such as knowledge of social media, education level and urbanization were found to be significantly associated with e-commerce potential. Paper concludes with few suggestions for government and policy makers to increase e-commerce growth in the country.</p>
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Table 2:6 : Continued....

Analysing the determinants of e-commerce in SMEs: A cognition-driven framework	Ricardo M. R. Barroso, Fernando A. F Ferreira, Ieva Meidute Kavaliausikiene, Nerija Banaitiene, Pedro F Falcao, Alvaro A Rosa (2019)	E-commerce adoption	Entrepreneur-profile market, operational management, marketing and promotions, website and digital platform, and products	E-commerce practices	TRA, TAM, IDT, TOE,	Cognitive mapping, FCMs	The decision-makers perspectives on significant determinant of SMEs' e-commerce
Uncertainty Avoidance, Individualism and the Readiness of Business-to-Consumer E-commerce	Jun Xu, Chen Cheng (2021)	Readiness of Business-to-Consumer E-commerce	Individualism culture	Business-to-Consumer E-commerce	Hofstede's (2011) theory on national culture	Quantitative: Multiple Linear Regression	High individualism score is directly proportional to higher B2C e-commerce value index

Table 2:7 : Continued....

Diffusion of Innovation Theory: An Effective Approach to Accelerate Adoption of Information and Communication Technology in Twenty-First Century Knowledge Society	Ogbonnaya Esther Abosedo (2020)	Adoption of Information and Communication Technology	Communication channels, attributes of the innovation, the characteristics of the adopters and the social system	IT Adoption	Diffusion of innovation DOI	Contextual analysis	Determinants of diffusion of innovation in the DOI theory need to be seriously considered for the feasibility of the adoption of an innovation in any social system.
The Impact of Mobile E-Commerce on GDP: A Comparative Analysis between Romania and Germany and how Covid-19 Influenced the e-Commerce Activity Worldwide	Florin-Valeriu Pantelimon, Tiberiu-Marian Georgescu, Bogdan-Ştefan Posedar (2020)	Impact of Mobile E-Commerce on GDP	E-commerce and m-commerce	GDP		Quantitative methods	E-commerce and m-commerce growth not directly proportional to the Gross Domestic Product in the analysed countries

Table 2:8 : Continued....

XBRL Adoption Process in Malaysia Using Diffusion of Innovation Theory	Azleen Ilias, Erlane K. Ghani, Zubir Azhar (2021)	XBRL Adoption Process	Relative advantage, compatibility, complexity, information technology challenge, organization's need, and motivation	XBRL adoption	Diffusion of Innovation Theory	Qualitative Case Study	Technological context factors that influenced the XBRL adoption process were complexity, relative advantage, IT challenge, compatibility, organization's need, and motivation
A new framework for the sustainable development goals of Saudi Arabia	Ali AlArjani, Umar Muhammad Modibbo, Irfan Ali, Biswajit Sarkar (2021)	Sustainable development	Employment, Energy, Green House Gas Emissions and Gros Domestic Product	Sustainable development goals	Fuzzy set theory	Fuzzy goal programming	Analysis of the modelled SDGs of Saudi Arabia showed that only 47% GDP related goals, 67%

Table 2:9 : Continued....

<p>What Hinders SMEs from Adopting E-commerce? A Multiple Case Analysis</p>	<p>Salma Dahbi, Chihab Benmoussa (2019)</p>	<p>Adoption of e-commerce</p>	<p>Organisational factors, Technological, socio-cultural, Financial, External factors.</p>	<p>E-commerce</p>		<p>Qualitative methods</p>	<p>Technological, organisational, financial, and cultural factors were found to be associated with e-commerce. Technological and financial categories hinder the degree of e-commerce adoption among Moroccan SMEs</p>
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Table 2:10 : Continued....

Factors affecting International Finance Corporation	Hassan Mahmood Aziz, Sarhang Sorguli, Pshdar Abdalla Hamza3, Bawan Yassin Sabir, Khowanas Saeed Qader, Bayar Ali Ismeal, Govand Anwar, Bayar Gardi (2021)	Causal effect	Legal, environmental, Political, Social, Technical, and economic factors	International Finance Corporation			
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2.3.1 Literature review findings

In October 2016, The African Union Commission (AUC) converged to review the SME Strategy and Master Plan (2017-2021) aimed to improve the continental business environment by forming more businesses. Part of the plan to achieve this was to support the formalization of growth-oriented informal enterprises. The plan also targeted increasing entrepreneurship initiatives that would contribute to regional and global value chains by promoting innovative financing. SMMEs are the backbone of developing countries' economies and can utilize e-commerce platforms to reduce marketing costs and boost sales. The SMEs' strategy Master Plan highlights the efforts by developing countries in Africa to promote sustainable development by supporting SMEs (AU Directorate of Communication, 2016).

One of the root challenges of digital economy development in developing countries, besides infrastructures, logistics, and financial support, is the behaviour of entrepreneurs who are reluctant to change (Damuri, 2021; Ndayizigamiye, 2019; Rawash, 2021). With the recent lockdowns forced by the Covid-19 pandemic, activities requiring direct physical contact had an inherent risk of infection. Under similar circumstances, the digital economy is an essential factor in the developing countries' economies. Generally, the pandemic dramatically enhanced the digital economy industries in developing countries, for example, according to Damuri (2021), the demand for groceries through e-commerce has risen significantly, and food deliveries have balanced the negative growth of the transportation and travel sectors. E-commerce enables SMMEs to expand their businesses into new markets, however, the lack of knowledge of IT applications needed to make e-commerce more appealing and relevant to their businesses, remains a reality. The small size of SMMEs' enterprises and the relatively limited budgets further impact their development (Kebonye, 2010; Ndayizigamiye, 2019).

2.3.1.1 Transition to E-commerce

Ndayizigamiye (2019); Day (2017) and SagePay (2017) view the pervasive nature of information technology (IT) as having an enabling effect for small and medium enterprises to expand their market reach, enhance their business relationships with suppliers and provide convenient means to conduct business transactions. In South Africa, there is an increase in revenues generated through e-commerce (Smith, 2017), however, there have been limited investigations on technology-related factors that may enable SMMEs to adopt e-commerce, fully (Ndayizigamiye, 2019). Munu (2019), contends that one of the variables for measuring e-commerce readiness is internet penetration, which is still a challenge in Africa.

Several studies document reasons new ventures are less receptive to adopting e-commerce; these include - poor IT infrastructure, high costs, no interest from business partners, inadequate human resources training, lack of government support, and security issues (Gupta, 2020; Jones, 2013; Kotelnikov, 2007). Most SMMEs in South Africa are new ventures, therefore, they face similar challenges.

2.3.1.2 Internal factors impacting the transition to e-commerce by SMMEs

Matsinhe (2019) identified the following internal factors as impacting the transition to e-commerce by SMMEs in developing countries:

- trading partners' perceptions on e-commerce
- the business sector of the SMMEs
- demographic factors of the managers (gender, level of education, knowledge of the internet),
- imitation of foreign organizations, in the same industry which are at higher levels of e-commerce adoption
- networking with business organizations that are at higher levels of e-commerce status and access to financial resources.
- levels of penetration of social media technologies

The transition to e-commerce is also influenced by external contextual factors such as:

- limited government support for SMMEs e-commerce adoption,
- limited readiness of financial institutions to support e-commerce,
- lack of IT expertise available locally.
- declining consumers' purchasing power,
- sociocultural factors and issues (Matsinhe, 2019).

Implementing a robust and reliable ICT infrastructure is essential to e-commerce adoption (Ahluwalia, 2020; Okoli, 2010; Dholakia, 2008; Mbarika, 2005), therefore, the lack of telecommunication infrastructure is hindering e-commerce's adoption (Ahluwalia, 2020; Kaba, 2009). With developing countries still behind in terms of technology and infrastructure, it means that they still struggle to compete with the developed countries whose infrastructure is well developed.

2.4 Rationale for adoption SMME E-commerce Frameworks

Rabayah (2021), contends that e-commerce has become an influential internet application in the business world, although its use is biased toward western societies' culture and traditions as these are known to impact the adoption of e-commerce. As confirmed by previous studies, some cultures tend to be resistant to change and are likely to be reluctant to adopt new technologies. Adoption frameworks that address the cultural challenges should, hence be put in place to address them.

There are differences in the political environments in which businesses operate worldwide. Internationalization has become the drive for success in every business and is only achievable within a conducive business and political environment. Gupta (2020) also alluded that, based on a literature survey, adoption of e-commerce by new ventures and its successful implementation, require support from various stakeholders, such as directors, managers, and governments who also influence the business and political environments of countries.

3 CHAPTER THREE: CONCEPTUAL MODEL AND HYPOTHESES DEVELOPMENT

This chapter builds up on the previous chapter that summarises the findings from a literature review on e-commerce in SMMEs. Chapter 3 discusses critical issues related to e-commerce adoption in SMMEs. Section 3.1 of this chapter gives an analysis of e-commerce frameworks. Section 3.2 summarizes findings from various e-commerce frameworks. Section 3.3 discusses theories related to adopting and implementing new technologies, focussing on those applicable to this study. In Section 3.4, the study establishes the factors influencing e-commerce adoption in SMMEs and establishes hypotheses for testing these factors in this study's context. Section 3.5 discusses e-commerce and sustainable development while also listing the goals of sustainable development. Section 3.6 proposes a theoretical framework and hypotheses to test relationships amongst components. The chapter concludes by discussing how qualitative and quantitative techniques were used to test the framework components in Section 3.7.

3.1 E-commerce Frameworks

To establish the critical features in formulating the best framework for e-commerce implementation by the SMMEs in South Africa, the researcher found it necessary to review established e-commerce frameworks from the literature. These will form the basis for an improved framework that is suitable for the South African SMMEs' context.

3.1.1 The Culture, Policy, and Technology Framework

The Culture-Policy-Technology (CPT) framework by Bajaj (2004), extended by Park (2014), presents a comprehensive framework for e-commerce adoption by addressing the following three dimensions: a) the culture of the participants in an economy, b) policies by governments in charge of an economy, and c) the technological infrastructure within the economy (See Figure 3.1).

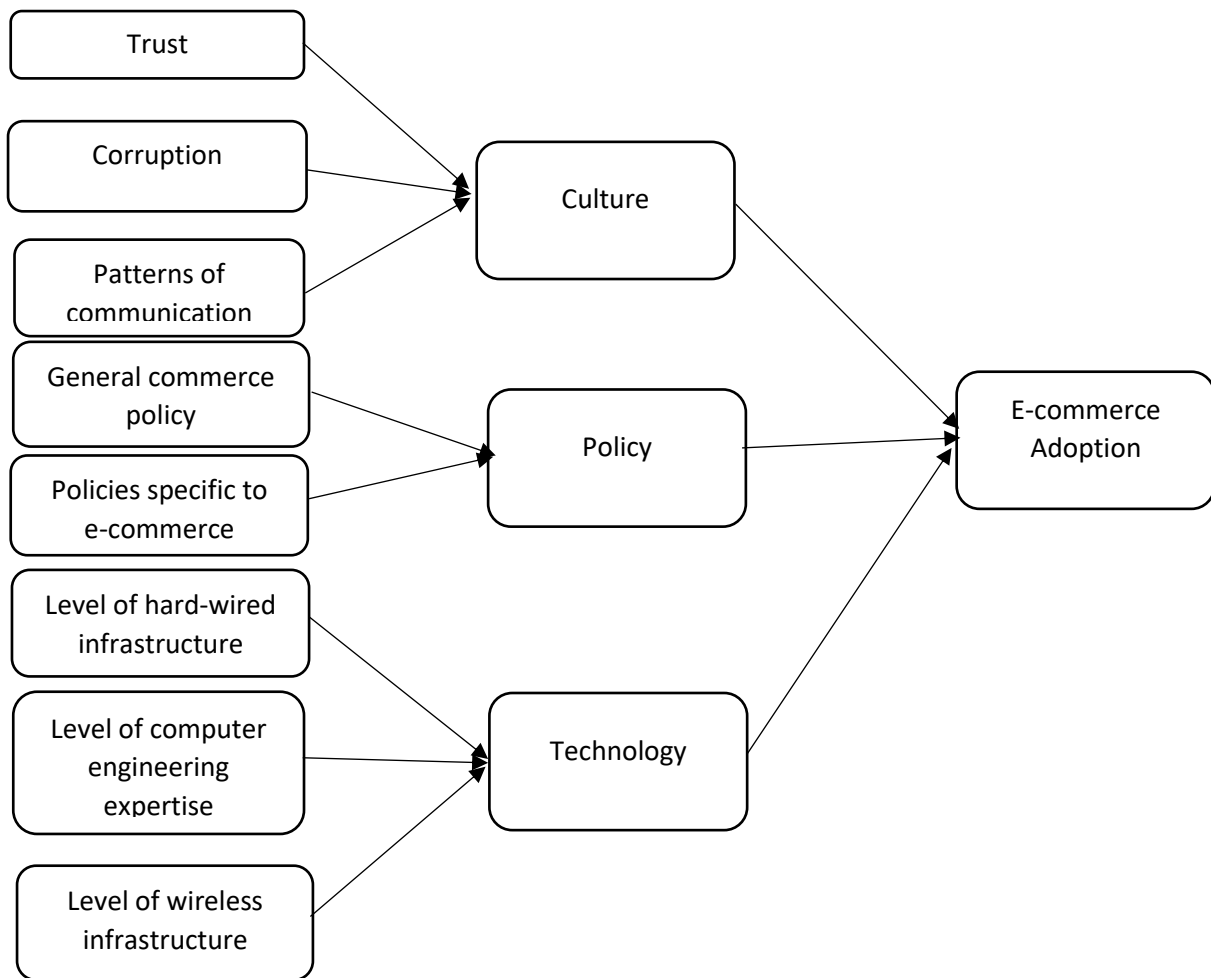


Figure 3.1: Dimensions of the CPT Framework (Punit Ahluwalia, 2020)

In looking at culture, Bajaj (2004), Park (2014), and Ahluwalia (2020) considered the national factors that need to be considered as the national economy advances towards e-commerce adoption. This includes - level of trust, patterns of communication and levels of corruption. The trust factor involves analysing the level of reliability participants place in a transaction within an economy. It covers the overall trust players have in the economy's institutions, such as banks, governmental institutions, and corporations. Institutionalized corruption in developed countries includes corporate corruption and its influence on dealing with government policy. The commonality of tax evasion and insider trading is also highlighted, together with certain nationalities' corruption in tendering practices. The other aspect of culture in the CPT framework is the communication patterns within the society. Some communities consider the internet as leading to communication which is not desirable. Table 3.1 summarises the various factors that impact the three main categories of e-commerce.

Table 3:1: The Impact of CPT factors on B2B, B2C and C2C commerce (Punit Ahluwalia, 2020, Bajaj 2004)

CPT Dimensions	E-commerce type		
	B2B	B2C	C2C
Culture			
Trust	Limited relationships, Lack of trust in Government involvement	Culture and physical distance promote distrust, Lack of infrastructure may prevent relationships	Consumers in developed countries do not trust developing countries' consumers
Corruption	Sentiments of deceitfulness and mistrust limit relationships.	Consumers of developing countries distrusted by developed countries' business	Developing countries have certain levels of fraud
Pattern of communication	No proper communication between developed and developing countries; cultural disparities; developed countries do not trust other cultures.	Cultural and physical distance promotes distrust; lack of infrastructure may prevent relationships all together	Consumer support and marketing to developing countries is challenged
Policy			
General Commerce	Policy difference for countries; different laws for tax, intellectual property, and lack of information sharing across borders.	Differing policies in different countries; Different tax laws, intellectual property, and trans-border information sharing	Challenges for money transfers and products' shipment across international borders; tax laws are not consolidated
Specific to E-Commerce	Poor funding for developing infrastructure; different policies on dealing with defaulters; the public have no information on policies	Concerns regarding receiving payment or products; Lack of funds available for infrastructure development; Country policies on copying/stealing	No consolidated arbitration mechanisms; Poor coordination of relationship policies.

Continued next page...

Table 3:2: The Impact of CPT factors on B2B, B2C and C2C commerce (Punit Ahluwalia, 2020, Bajaj 2004)

Technology			
Level of Hard-Wired Infrastructure	Poor infrastructure; poor network connections;	Disadvantaged developing countries' businesses and consumers are prevented from buying and selling with developed countries; this disturbs successful completion of transactions	Businesses with consumers in developing countries are disadvantaged. This prevents developing countries' consumers from selling to developed countries' consumers; limitations of the digital divide.
Level of Computer Engineering	Lack of competence to maintain efficient networks; No capacity to sustain needed exchanges; Challenged by evolving e-commerce	Lack of capacity to sustain needed exchanges; education limited on use of technology infrastructure	Ability to create exchange mechanism
Level of Wireless infrastructure	Limited capacity to deliver efficient wireless opportunities	Capacity to maintain efficient wireless technologies.	Capacity to maintain efficient wireless technologies.

3.1.2 Adoption Barriers Framework

In investigating the barriers to e-commerce in Egyptian SMEs, Zaied (2012) referred to an Adoption Barriers Framework (Figure 3.2). The framework identifies the following key barriers to adopting e-commerce: social and cultural, technical, economic, political, organizational, legal, and regulatory issues. An analysis of this framework shows relationships between the barriers' framework and the CPT framework. The same factors influencing e-commerce adoption are confirmed (Lawrence (2010)).

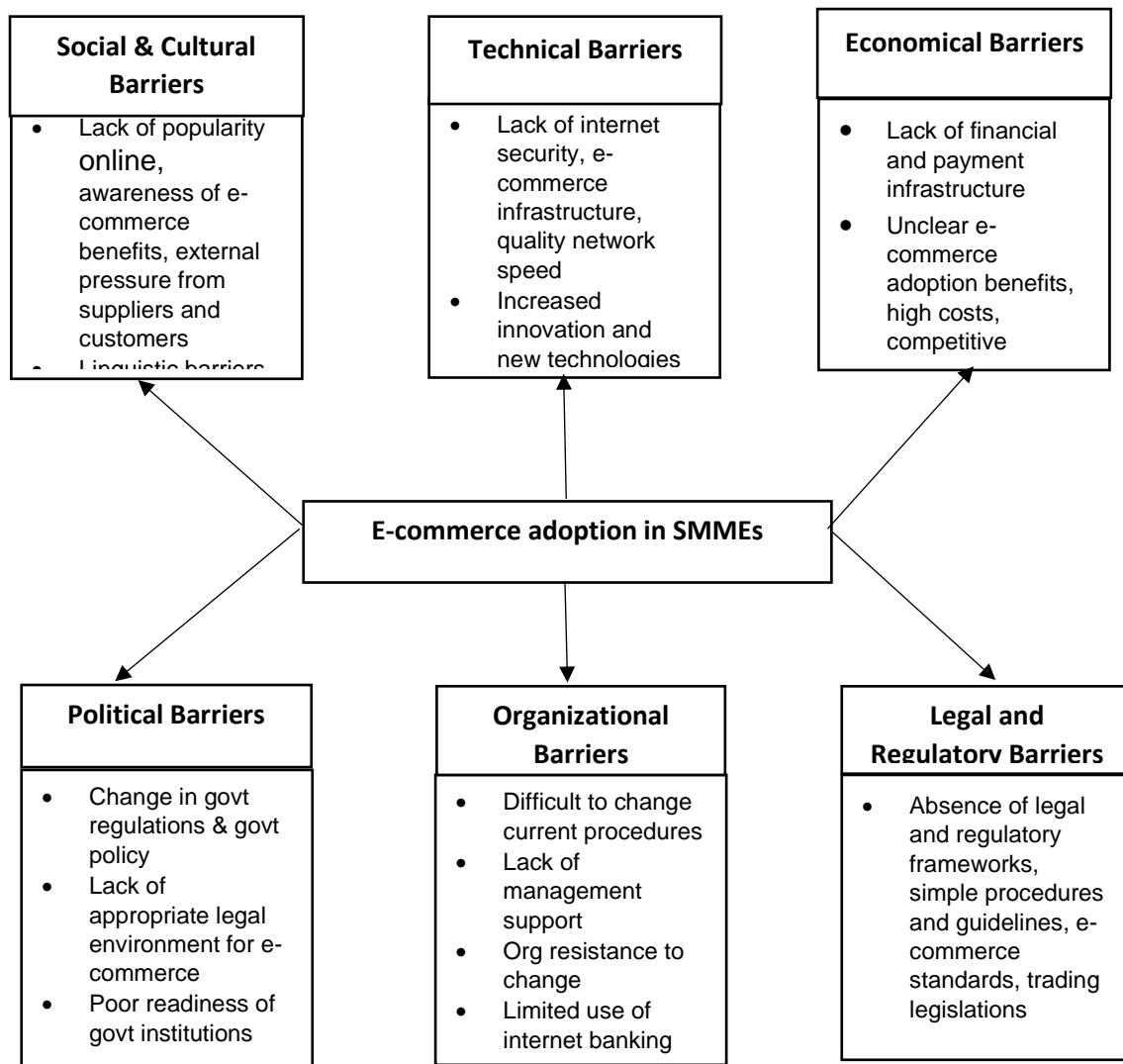


Figure 3.2: SMEs e-commerce adoption barriers; conceptual framework (Zaied, 2012)

3.2 Discussions arising from E-commerce Frameworks

In developing a framework for SMMEs in South Africa, that promotes the goals for sustainable development, this research identified factors influencing SMMEs' e-commerce practices in two steps. The first step involved ascertaining the relevant determinants using previously developed frameworks and available literature. The second step involved testing the determinants through an empirical method, such as the statistical data analysis using SPSS and modelling with Amos. Considering the CPT framework by Bajaj (REF??) and the barriers to adoption framework by Zaied (2012), this study established that Technology, Culture, and Policy are core issues in e-commerce frameworks. Zaied (2012) expanded the scope further by including organizational, economic, legal, and regulatory issues. Developing an e-commerce strategy for SMMEs in South Africa that supports sustainable development should be guided by these factors in the studied context.

3.3 Theoretical background

A theory is used to gain deeper insights into practice and helps to understand a phenomenon in research (Fuhse, 2022). Research has established several theories related to adopting and implementing new technologies and these theories can guide further research related to the topic. It is essential to refer to established theories for consistency and to investigate further where the findings contradict facts on the ground. This section will discuss some of the theories considered in similar studies.

3.3.1 The Technology Acceptance Model

Davis (1989) proposed the Technology Acceptance Model, (TAM) that comprises of core variables motivating users, which are: perceived usefulness (PU), perceived ease of use (PEU), and attitudes towards the technology. TAM also considers outcome variables such as, technology use and behavioural intentions. PU relates to the degree of the technology's usefulness in enhancing the performance of the task at hand. The PEU theory relates to the ease with which the user can implement the technology for the task at hand. These variables are often accompanied by external variables, explaining variations in perceived usefulness and ease of use (Scherera, 2019). The prominence of TAM and the availability of previous research studies resulted in several other studies that synthesized the relations within the TAM theory in different contexts. The varying contexts and the technology specificity, hence, are considered powerful moderators of TAM effects, with the various contexts presenting varying relationship matrices amongst the variables (Acheampong, 2017). The SMMEs in South Africa present a unique context due to the cultural, organizational, political, and technological factors. This research used this unique context to further synthesize the relations and paths within the TAM model. The TAM model, besides determining the factors influencing the acceptance of technology by users, also helps in identifying the cause for users to reject a system. A strategic SMMEs e-commerce framework for sustainable development should also address any issues that would lead to rejection of a technological solution by the community (Scherera, 2019).

3.3.2 Diffusion of Innovation theory (DOI)

Technology diffusion is a process that occurs over time in which the use of a new technology can become part of an organization's processes. The process is essential in analysing technology adoption by considering the Diffusion of Innovation (DOI) theory. The DOI theory focuses on creating - new ideas (innovations), continuity of technology, and communication,

vital in disseminating the innovation to society. Acceptance of an innovation is subject to an individual's attitude towards the innovation (Makovhololo, 2017).

The time factor is considered in exploring the diffusion of adoption in the adoption-decision process, which moves from the knowledge phase of adoption to the decision-making phase - determining adoption or rejection (Azleen, 2020). Rogers (1960) first introduced the Diffusion of Innovation (DOI) in the 1960s to study the propagation of innovation to society. The DOI theory classifies individuals into five categories based on their innovativeness: early adopters, innovators, early majority, late majority, and laggards (Albeshier, 2015)

For this study, the question was - *How can the DOI theory be used to diffuse e-commerce to influence and guide business activities within SMMEs, with the long-term goal of contributing to sustainable development?* In answering this question, we first examined what factors within our SMMEs' context impact the implementation of e-commerce. Secondly, we employed DOI to view and understand how e-commerce can be diffused within SMMEs in South Africa to contribute to sustainable development.

In applying the DOI theory, it is vital to understand factors influencing adoption, potential adopters, and their decision-making process. Critical decision-making factors include - who makes the decision and how these decisions are made (Makhovhololo, 2017). This research, therefore, requires a thorough study and understanding of the environment within which SMMEs in South Africa operate and to identify the factors influencing their adoption of e-commerce, hence, the two theories, TAM and DOI, were considered for this study.

3.4 Determinant factors for e-commerce in SMMEs

Guided by the literature review on e-commerce frameworks and adoption theories discussed in Sections 3.1.1 and 3.1.2, the study identified and classified the determinant factors for e-commerce under four significant categories - Socio-Cultural Factors, Technological Factors, Political Factors, and Organisational Factors. This list of factors is not limited to these four, however, for this study, only these four were found relevant to the SMMEs context in South Africa. Each of the four factors are discussed in the following sections.

3.4.1 E-commerce and culture

Cheng (2020) and Hofstede (1988) define 'culture' as a cognitive process that distinguishes the members of one community of people from the other. Culture consists of values that shape an individual's behaviour and perception of the world and it directly influences values and beliefs and guides attitudes and behaviour. In support of this view, empirical studies have shown that a country's culture persists over time, even when the country's economic conditions change (Cheng, 2020).

Increased global reach due to e-commerce may benefit organizations (Marko,2021), while concerns on privacy impedes the maximization of these benefits (Mohammed,2017). Nevertheless, since cultural perceptions determine the impact of information privacy, their influence vary globally. As reported in a global survey, adoption rates for e-commerce differs from one country to another (Tejay, 2017 and Nielsen,2014). Research has revealed that culture impacts the adoption of e-commerce while information privacy concerns influence the implementation of innovative information and communications' technologies. According to Tejay (2017), information privacy is perceived to be associated with culture and, therefore, can vary from community to community. E-commerce involves the passing of private information between individuals and organizations, therefore, while information privacy is of great importance amongst societies and organizations, it also impacts the adoption of information technologies. Information technology benefits organizations in addressing business issues, however, the issues on information privacy can significantly impede technologies such as e-commerce. Privacy threats impede organizations, individuals, and countries from leveraging technology to their benefit.

3.4.1.1 *Dimensions of culture (Hofstede's theory)*

Researchers have adopted Hofstede's theory of cultural differences in exploring the cultural influence on information privacy for various societies (Minkov, 2022, Tejay, 2017; Cullen,

2009; Dinev et al, 2006; Bellman et al, 2004; Milberg et al., 1995. Six dimensions are proposed by Hofstede's theory that distinguish cultures. These dimensions are - Collectivism versus Individualism (IDV), Power Distance Index (PDI), Femininity versus Masculinity (MAS), Short Term Normative versus Long Orientation Term Orientation (LTO), Uncertainty Avoidance Index (UAI), and Restraint versus Indulgence (Rabayah, 2021; Tejay, 2017; Hofstede, 2010).

Power Distance Index (PDI)

The power distance index (PDI) dimension is the extent to which those without power expect and accept an unequal distribution of power among members of organizations and institutions. Some cultures have a lower PDI than others (Tejay (2017). In cultures with a lower PDI, power relations are more democratic, therefore, subordinates can contribute to decisions and openly criticize those in power. Some literature refers to these as 'collectivistic cultures' that encourage strong links among members of a social group. In cultures with a high PDI, the relations are more autocratic; leaders dictate, and the subordinates acknowledge decisions based on the leadership level, without any questions.

Collectivism versus Individualism (IDV)

Personal achievements and individual rights gratify individualistic societies. Members of individualistic cultures regard themselves as independent agents motivated by their goals and preferences (Tejay, 2017); a social contract or universal rights, principles, and responsibilities govern relationships with others (Waterman, 1984). Xu and Cheng (2020) found the individualistic culture dimension to influence the preparedness of B2C e-commerce in different ways. In his study on national culture and consumer trust in e-commerce, Hallikainen (2018) concluded that individuals with a high individualist orientation have no trust in public information websites. Lack of trust in websites would then influence the performing of a business transaction through a website. According to research by Cheng (2021), high

individualism scores promote the adoption and development of e-commerce, and those with low individualism scores do not appreciate e-commerce.

Femininity versus Masculinity (MAS)

Masculinity versus femininity refers to the difference in gender and the values associated with each, by tradition. Highly masculine societies have values of materialism, competitiveness, ambition, power, and assertiveness while feminine cultures value love and caring for the weak, better standards of living, collaboration, and humility (Tejay, 2017). In a society with a high MAS index, males assume more assertive roles, and there is a division in roles by gender while a low MAS index results in a gender balance in teams.

Uncertainty Avoidance Index (UAI)

The uncertainty avoidance index (UAI) refers to society's acceptance of uncertainty. The UAI corresponds to the desire to minimize societal anxiety and uncertainty, as reflected through the index, (Cheng, 2020; Hofstede, 2010). Members of cultures with high uncertainty avoidance manifest the trait by being very emotional. They always try to reduce risky situations with well-laid-out procedures and planning being the approach to dealing with change, however, cultures with low uncertainty avoidance are comfortable with unstructured situations or changes. Such pragmatic cultures are more tolerant to change, while hesitance to use new technologies can reflect high uncertainty avoidance levels (Rabayah et al., 2021). Information and Communication Technologies come with many random changes in ways of doing things and any delays in adoption by any society may result in a loss of business opportunities regarding e-commerce.

Long-term-oriented (LTO)

Societies with Long-term-oriented (LTO) are preoccupied with the future and foster realistic principles oriented to persistence, rewards, and opportunities for adaptation. On the contrary,

short-term-oriented societies are concerned with sticking to traditions and truthfulness, focusing on achieving immediate results, self-preservation, fulfilling social obligations, and reciprocating, (Tejay, 2017; Hofstede et al, 2010). An analysis of these opposing cultures reveals that each has pros and cons when adopting technology and e-commerce. While LTO societies might consider a well-calculated approach with considered future benefits, it might also result in them lagging behind and losing out on opportunities. On the other hand, STO might be quick in adopting technologies, but obtaining quick results might compromise effective strategies' thorough planning.

Restraint versus Indulgence

A society with indulgent members believes in satisfying human's basic natural desires and having fun (Tejay (2017) while in a high-restraint society, members restrict gratification of needs through strict social values. A country's scores for each dimension are provided by the Hofstede Centre based on surveys done worldwide with measurement items on each dimension (Minkov, 2022). A low IDV score of about 16 is associated with a very collectivist society; such a society has high levels of loyalty, overriding other rules, and regulations within the society. Strong member-relationships characterize societies where everyone is accountable to fellow group members and such societies use informal sanctions, such as shaming, as repercussions for offenses (Minkov, 2022)

3.4.2 Culture and Trust in e-commerce

Hallikainen and Laukkanen (2018) evaluated the relationship between national culture and trust. The study tested the impact of each cultural dimension on trust (Hofstede, 2010) for, since a society's willingness to use e-commerce depends on their trust in the technology, the study tested five hypotheses to evaluate the causal effect of national culture on trust, as illustrated in Figure 3.3.

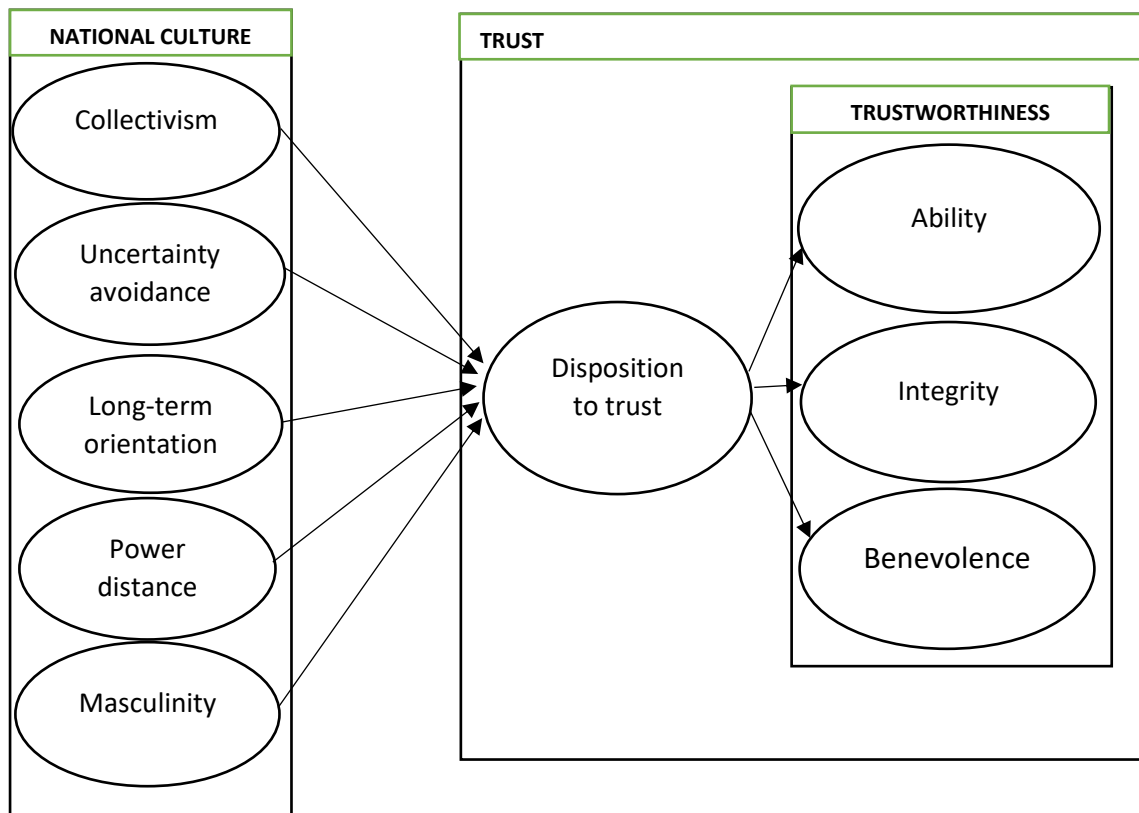


Figure 3.3: National Culture and Consumer trust on eCommerce (Hallikainen, 2018)

In their research titled - Cultural factors that influence the adoption of e-commerce - Rabayah (2021) applied a modified version of the TAM approach to establish the cultural dimensions that influence the adoption of E-commerce in Palestine. The researcher concluded that the cultural dimensions of uncertainty avoidance, long-term orientation, and power distance influence the intention to transact online.

Based on these findings, this study will propose the following hypotheses:

H1: Socio-cultural factors influence e-commerce in the SMMEs in SA.

3.4.3 E-commerce and Technology

Rashid (2019) explicates 'Information Communication Technologies; (ICT) as a set of technological resources and tools to generate, store, distribute, add value, and administer information. He also identified ICT infrastructure for a country as an essential national factor contributing to the increased implementation of e-commerce. Previous research identified poor ICT infrastructure as a significant factor contributing to poor dissemination of e-commerce

in third-world countries (Onditi, 2017, Rashid, 2019). In considering the causal effect of technology penetration on e-commerce, assessing the available infrastructure within a community is relevant, for without proper infrastructure, it becomes difficult for a community to adopt any solution that requires using that technology.

3.4.3.1 Determinants of technological factor

Previous research (Chandra, 2018; Mäki, 2021; Aziz, 2021; Rabayah, 2021; Twinomurunzi, 2019) guided this study in establishing the technological factor for the research. Various factors determine the technological aspect of a society. These factors range from accessibility of technology to establishing technological skills within the community. The technological index of a country also relates to this. Technology Readiness Index (TRI) theory is a scale with many items used to gauge individuals' readiness for new technology. The willingness of an individual to accept and use new technologies for various activities in home life and at work is assessed through the TRI (Acheampong, 2017; Parasuraman et al., 2000).

Maturity and Reach of Internet Technologies (MRIT)."

In their research titled "Understanding Country Level Adoption of E-Commerce: A Theoretical Model Including Technological, Institutional, and Cultural Factors," Ahluwalia et al., (2020) identified the technology drivers in the composite index called "Maturity and Reach of Internet Technologies (MRIT)." The MRIT examines the penetration of mobile networks, accessibility, adequate bandwidth, and implementation of protocols for security. The MRIT considers the government's emphasis on IT adoption policies measured through the following:

- expenditure by government on ICT proportional to GDP,
- strategy for digital development,
- e-government strategy,
- online procurement,
- accessibility of public services online for businesses and citizens,
- UN index-based e-participation.

Technology efficacy (TE)

Technology efficacy (TE) is one of the factors for measuring the technological factor. TE includes dimensions such as:

- level of education
- knowledge of the internet
- the workforce's technical skills
- the current level of innovation

This research will consider some of these drivers, where applicable, in the context of SMMEs in South Africa.

The technological factor is a crucial aspect of the business architecture, and its impact on e-commerce adoption needs to be analysed. The study, therefore, establish the following hypothesis:

H2: *Technological factors influence e-commerce adoption in the SMMEs in SA.*

3.4.4 E-commerce and political factors

One of the impediments to international business is government policies, tax rates, and political instability in the country where the business is located (Finger et al., 2018). Generally, in business trading, equitable transactions, fair trade, fair competition, open access to information, and just relations, are considered guiding values for good business. The concrete trade settings (transportation of goods and presentation to customers, legal environments, information systems supporting trade, and cultural norms), however, may permit or constrain the enforcement and adherence to these values (Cecez-Kecmanovic, 2004). Considering the South African SMMEs' context, the political environment of SMMEs needs to be evaluated in terms of its capability to promote fair trade as the same political issues observed above are likely to impact these SMMEs.

A stable and favourable business' political climate will positively impact the development of a commercial enterprise, therefore, the development of South African SMMEs will also depend on their political environment (Aziz et al., 2021). E-commerce adoption is most likely to be impacted by the political environment of the business enterprise. Political instability and frequent changes in governmental officials expose business enterprises to risky and unstable

political connections. The business climate, thus, is affected by political connections. (Gentjan, 2019).

3.4.4.1 Emancipatory political dimensions

Based on the study by Kecmanovic (2004), this research adopted the following *emancipatory political dimensions* for e-commerce to study the political environment of SMMEs in South Africa:

- *enterprises constraints such as unequal access to information and illegitimate privileges for connected enterprises*
- *inequity, oppressiveness, unjust power, unjustifiable authority and exploitative relationships*
- *unjustified domination of one group of dealers over customers' choices*
- *controlled decisions (for important life choices) for the majority by certain groups. (no freedom of choice and informed decision)*
- *non-promotion of equality amongst dealers and customers*
- *no empowerment of dealers and customers to achieve goals through collaborative efforts*

Given the findings from the research by Cecez-Kecmanovic, (2004), the structural changes in conditions of trade and competitive advantage due to e-commerce, force dealers to concentrate more on customers' needs and desires, customers' satisfaction with goods, services, and support, as well as with the efficiency and fairness of the buying process. Rather than aiming for favour by the political environment, dealers put more resources into improving the products and services for customer satisfaction, benefiting dealers and consumers. Based on the findings from previous research, political factors have had an impact on business performance. Guided by these findings, the research proposed the following hypothesis:

H3: Political factors influence e-commerce in the SMMEs in SA.

3.4.5 Ecommerce and organisational factors

Lin (2005) reiterated that technological innovation has become more complex, expensive, and risky resulting from the associated changes in business processes, intense competitive pressure, and fundamental technological changes. Previous studies have identified organizational capabilities facilitating information technology (IT) diffusion and innovation performance.

The technology-organization-environment framework (TOE) model acknowledged three variables that impact the adoption of specific technologies. These variables are technological factors, the firms' organizational factors related to their capability to adopt technologies, and environmental factors relating to external pressures that influence decisions for adoption (Barroso, 2019). For this research, the environmental factors consist of political, socio-cultural, legal, regulatory, and economic factors. The diversified nature of a population under investigation, regarding these aspects, made it possible to evaluate these factors independently to establish if there could be some significant variance across the country.

3.4.5.1 Organisational factors impacting adoption of technology

Previous research has proved that business processes must be adjusted to adopt complex technologies, successfully. An organization must also consider modification and mastering of the technical aspects of the technology. Lin (2005) identified two organizational factors influencing an organization's capability to adopt new technologies - organisational learning and knowledge management. Organizational learning includes training availability, technical level, and knowledge level while - knowledge sharing, knowledge acquisition, and knowledge application - constitute knowledge management. While the organizational structures of SMMEs are not that sophisticated and well structured, it is essential to analyze these factors to establish their possible impact on e-commerce adoption. Figure 3.4 illustrates the various organizational factors and their relationship in adopting e-business systems and e-commerce is part of these systems.

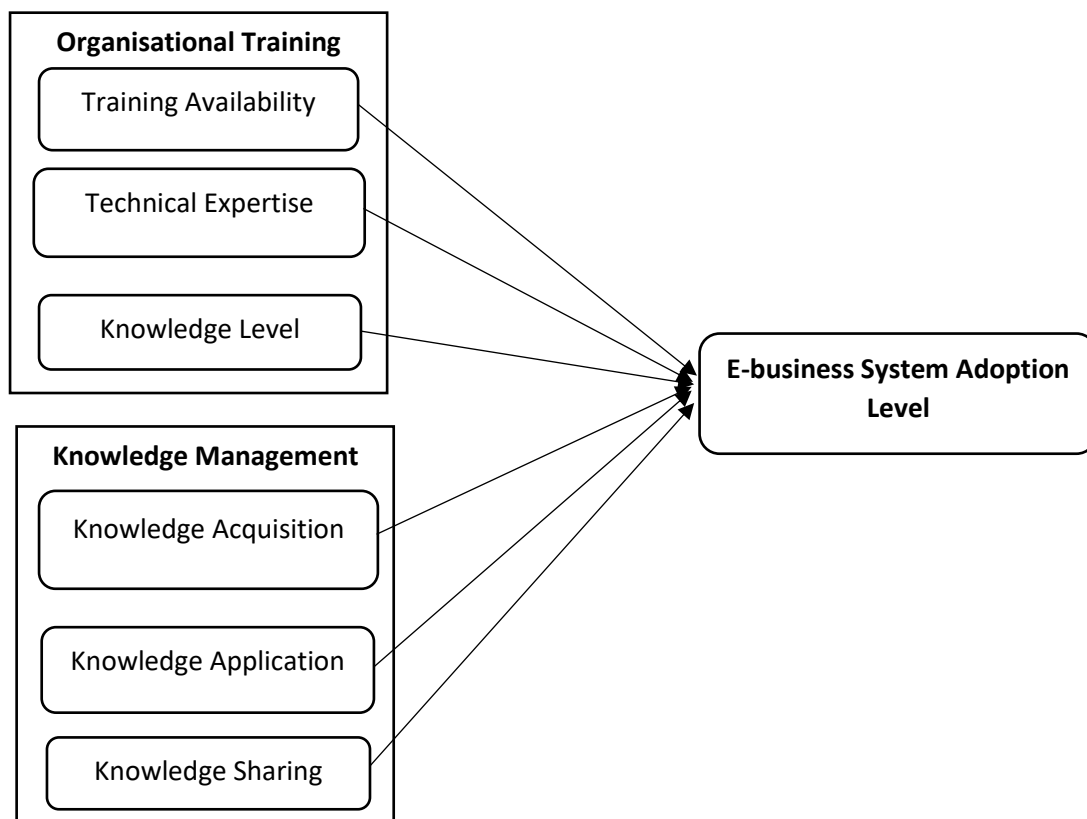


Figure 3.4 : Organisational factors Impacting adoption of technology (Lin, 2005).

Guided by the literature on organisational factors discussed above, this study proposed the following hypothesis:

H4: *Organisational factors influence e-commerce adoption in the SMMEs*

3.5 E-commerce and sustainable development

Technological innovations are new strategies for the resourceful and smart individuals, and the best use of scarce resources (Cancino, 2018). E-commerce in SMMEs can promote sustainable development by concentrating on the objectives of “business excellence and environmental excellence”. This can be done by creating a bridge through which corporate behavior can support sustainable development, the integration of economic growth and environmental development (Sherfudeen, 2020). The General Assembly of the United Nations (UN), in September 2015, came up with an agenda for 2030, known as ‘Sustainable Development Goals’ (SDGs). The agenda comprises of 17 goals (see Table 3.2), 169 targets, and 244 indicators (AlArjani, 2021).

Table 3:3: Sustainable Development Goals (Ali AlArjani, 2021, UN 2015).

UN General Assembly's September 2015 Sustainable Development Goals	
1	end poverty in all its forms everywhere;
2	end hunger, achieve food security and adequate nutrition for all and promote sustainable agriculture;
3	attain healthy life for all, at all ages;
4	provide equitable and inclusive quality education and life-long learning opportunities for all;
5	achieve gender equality, empower women and girls everywhere;
6	secure water and sanitation for all for a sustainable world;
7	ensure access to affordable, sustainable and reliable modern energy services for all;
8	promote robust, inclusive and sustainable economic growth and decent work for all;
9	promote sustainable industrialization;
10	reduce inequality within and among countries;
11	build inclusive, safe and sustainable cities and human settlements;
12	promote sustainable consumption and production patterns;
13	promote actions at all levels to address climate change;
14	attain conservation and sustainable use of marine resources, oceans and seas;
15	protect and restore terrestrial ecosystems and halt all biodiversity loss;
16	achieve peaceful and inclusive societies, rule of law, competent and capable institutions;
17	strengthen and enhance the means of implementation and global partnership for sustainable development

Munu (2019), asserts that a supportive e-commerce policy framework is essential for realizing the United Nations Sustainable Development Goal (The UN SDG) Goal 9, which focuses on building resilient infrastructure, promoting inclusive and sustainable industrialization, and

fostering innovation. Internationalisation, digitalisation, and sustainability are three critical growth paths for firms for this goal.

3.5.1 Poverty alleviation

One of the primary goals of sustainable development is poverty alleviation (Ali AlArjani, 2021). Easy access to the internet through mobile devices has facilitated e-commerce, reducing poverty by improving access to education, health, government, financial and many other services (Kwak & Jain, 2016). E-Commerce allows businesses to reach new markets with billions of consumers and provides access to various products and services to the population at the bottom of the pyramid; the cost benefits help in alleviating poverty (Kwak, 2016)

3.5.2 Food Security

Sustainable development goals also emphasise food security. The Covid 19 lockdown in 2020 threatened food security in developing countries. The lockdown policies disrupted food industry firms' supply chains and e-commerce became pivotal for deliveries to reach consumers (Bakalis, 2020). E-procurement facilitated businesses reaching processors and farmers. Besides the Covid19 lockdown challenges, similar changes to the consumer environment will likely prevail in the future. As food firms adjust business strategies, e-commerce presents opportunities for food security (Reardon, 2021) Research is currently exploring the impact of technology in improving food security, and the contribution of e-commerce is noticeable (Burlacu, 2018).

3.5.3 Healthy lifestyles

Healthy lifestyles closely relate to the food people buy and consume. Consumers should be able to continually access healthy food, with relevant education on diet issues. Guidelines on healthier food shopping habits for e-commerce consumers are available to assist consumers (Adaji, 2017). The competitive environment with e-commerce leads to a growing commodification of services offered, and firms now focus on quality service and creating memorable experiences. Besides healthy foods, e-commerce has also brought health services to consumers' desktops. A range of nutritional products and services are now accessible to the majority within their living environments (Chang, 2010).

Major pharmaceutical companies now run social media platforms and create communities collecting and sharing essential health data. Data mining techniques make it possible to collect and analyse data on health conditions, thereby assisting research to further health discoveries and solutions while consumer patterns on medical products also help distributors with demand and supply issues (Azimovna, 2022).

3.5.4 Equitable Inclusive quality education

The modern world assumes a positive relationship between education and economic development that views education as an investment in human capital. Many countries formulate their educational policies around this understanding (Chabbott, 2000), and amongst the sustainable development goals is equitable and inclusive quality education, the advent of e-commerce has, thus, contributed significantly to this. Researchers now have access to reputable repositories of knowledge worldwide at reasonable charges. E-commerce infrastructure has facilitated the establishment of competitive knowledge management systems (Bose, 2016). E-learning platforms and other social media platforms have allowed the dissemination of knowledge to the grassroots through mobile devices.

Padmannavar (2011) alludes that, female entrepreneurs are setting up networks and integrating into platforms to participate in regional and international online forums that provide information to new and established women business owners. Considering the historical sidelining of women in most business ventures, this shows inclusivity as aspired by sustainable development goals.

3.5.5 Gender equality

The virtual nature of business contacted through e-commerce platforms makes it impossible for players to discriminate against any gender (Padmannavar, 2011). With gender equity being one of the goals for sustainable development, e-commerce in SMMEs will play an important role in achieving the goal. The use of ICTs in business has facilitated women penetrating into business environments previously dominated by men. E-commerce removes the previous intimidating physical environments that were men dominated; the same business sectors can now include women, operating virtually (Mishra, 2015). E-commerce has also been commended for empowering the rural women in some patriarchal-structured communities who have been seen the former as providers of cheap, and docile labour. E-commerce has made

it easier for women to access competitive markets and get fair earnings for their labour (Yu & Ciu, 2019).

3.5.6 Secure water and sanitation

E-procurement, part of e-commerce, has resulted in safe water and sanitation for some communities. Sustainable development aims to achieve safe water and sanitation for all global citizens. E-commerce has brought about efficient and reliable procurement that ascertains the availability of resources to secure water (Karimi, 2014). Through e-commerce, various solutions to secure water and sanitation are available on various platforms, and communities now have access to relevant knowledge specific to their needs (Hossen, 2014).

3.5.7 Affordable, sustainable, and reliable energy

The emergence of cloud computing solutions has seen the coordination of computer resources across various terminals to perform collaborative tasks. Efficient algorithms are used to achieve efficient utilization of processors and energy. With the world facing challenges regarding accessibility, affordable, sustainable, and reliable energy, cloud computing platforms have become favourable (Zhou, 2019). E-commerce business models can easily adopt cloud computing technologies for efficient utilization of energy.

3.5.8 Robust, inclusive, and sustainable economic growth

Research in recent years has established a positive impact of e-commerce in stimulating economic growth (Ediriweera, 2021; Ilias, 2020; Farid, 2018; Junglas, 2017; Zel, 2017; Brown, 2016; Datta, 2011; Bajaj, 2004). The various characteristics for e-commerce promote sustainable growth through conservation and efficient utilisation of resources (Zhou, 2019). E-commerce allows inclusion of the previously disadvantaged groups, such as women, children and the disabled in the economy (Yu & Ciu, 2019; Mishra, 2015).

3.5.9 Sustainable industrialisation

Industrialisation is related to economic development. As society attempts to improve products and services that make life easier, sustainability must be considered (Suma, 2019). Based on that, one goal of sustainable development is sustainable industrialisation. Technological solutions have become an essential resource in industrialisation due to the increasing complexity of data required by modern industries. With e-commerce being part of the new

technologies, industrial development benefits from e-commerce, facilitating efficient procurement, sharing of market information, logistics, customer support, transaction processing and many other business-related activities. E-commerce has become an essential feature in the value chain for many industries (Revinova, 2021; Eames, 2001).

3.5.10 Inclusive, safe, and sustainable cities and human settlements

Urbanisation and the movement of people in cities for business purposes contribute to environmental pollution. The increased number of vehicles on the streets results in air pollution and road accidents but with e-commerce, consumers and businesses can transact online, therefore, businesses and consumers do not have to travel to a central business area. Logistics companies will use the road network to deliver goods, reducing pollution and promoting sustainable cities (Cheba, 2021).

3.5.11 Address climate change

Reduced movement of people from doing business online also reduces environmental pollution, which causes climate change (Cheba, 2021). As witnessed during the Covid 19 lockdown, restrictions on the movement of people resulted in people depending on e-commerce to do business. Web technologies and mobile technologies have reduced carbon emissions that contribute to climate change (Masele, 2011).

3.5.12 Peaceful and inclusive societies, rule of law, competent and capable institutions

E-commerce businesses make it easier to police business activities, with every business transaction leaving digital footprints. It becomes easy to track those who disregard the rule of law and bring them to book. Poor legal rules and enforcement are a major threat to the global spread of e-commerce, however, good coordination of business activities and global partnerships have resulted in an improvement in enforcing the rule of law (Ndubizu, 2002).

3.5.13 Enhancing global partnership for sustainable development

Enhancing global partnerships was identified as one of the goals for sustainable development. One of the critical features of e-commerce is global reach, as identified in Chapter 2. Global reach has facilitated companies from different continents forming business partnerships to all parties' advantage. Online retailers can use partnerships to tackle industry dynamics and break into foreign markets (Hånell, 2020).

3.6 Digital transformation

Digital transformation is at the centre of driving innovation and business renewal, especially for established SMMEs (Stefano, 2021). Based on the e-commerce features discussed in subsection 2.2.1, the significance of e-commerce to internationalization, digitization, and sustainability is evident. Technology has the sole purpose of increasing economic and social standards, however, scientific evidence has proved that the development that started from the industrial revolution can no longer continue with little or no regard for its potential negative impact on the environment. There is, hence, a need to couple every aspect of development with issues of sustainability. Rethinking business strategy and actions along the lines of sustainable development do require a change in corporate cultures, therefore, it opens new opportunities to reassess other aspects of business (Ulhoi, 1994). This research not only proposes a framework for the implementation of e-commerce in SMMEs in the South African context but also deals with sustainability issues within the context. Qualitative methods were applied to assess how e-commerce in SMMEs promotes sustainable development. Guided by the 17 Goals for sustainable development and the respective indicators, interviews were structured and analysed using qualitative methods.

After testing the causal effects of the various factors on e-commerce implementation for SMMEs, this research also evaluated the impact of e-commerce on SMMEs, on fostering sustainable development. Considering the goals of sustainable development established by the UN in Table 3.2, goals aligned to e-commerce in SMMEs, can be established.

3.7 Demographics variables

Besides testing the impact of the identified factors on e-commerce in South African SMMEs, it is essential to consider some independent variables that were likely to affect the study's results. Control variables are factors, that researchers include in their work to rule out alternative explanations for their findings (Becker, 2005; Schmitt, 1991). According to Berker (2005), there are two primary means of controlling variables in a study. The experimental design deals with control variables by manipulating the sample, making sure it is identical across participants (for example, having one gender in all samples). Statistical control can also be used, whereby the relevant variables are measured and included in the primary analysis, however, improper handling of control variables can result in misleading results. The following controlling variables were considered for this research: age, gender, education level, and internet experience.

3.7.1 Age

Many studies have tested the relationship between age and willingness to adopt new technologies. Berkowsky et al., (2018), Ariyawardana., (2022), Granić, A. (2022)., Giua., (2022) maintain that older adults are less likely to adopt new and emerging technologies and reap their potential benefits; the opposite is true with young adults, who embrace new technologies and are willing to adopt them. As this research considers e-commerce adoption in SMMEs, the effect of age was also considered.

3.7.2 Gender

Previous research on technology adoption and gender have indicated that men are more likely to adopt new technology than women. In their research titled - Adoption of multimedia technology for learning and gender difference - Parka et al., (2019), concluded that men are more likely to believe in technology improving their performance where the task is appropriate for it (Granić., 2022), (Skare & Blažević.,2022). This belief leads to men's desire to adopt technology; this necessitates this research including gender as a control variable.

3.7.3 Level of Education

An individual's education level may influence their ability to learn new technologies. People with a higher level of education find it easy to understand the usefulness of technology and, as such, are most likely to adopt the technology, given the opportunity; previous research has also confirmed that. In that regard, this study will also consider the level of education as a control variable (Huang.,2019, Fayed.,2022, Hooks., 2022).

3.7.4 Internet Experience

For anyone to be able to use an e-commerce platform, a certain level of internet experience is required; someone with no internet experience might not be able to perform an e-commerce transaction. Adopting e-commerce, therefore, can only be considered by people with experience with the internet, although, most e-commerce platforms and applications might be very user-friendly, only people with some internet experience can appreciate that. Due to this, the internet experience level was considered a control variable for his research (Wyant., 2019, Robison.,2021, Matsepe.,2022).

Having considered these control variables, the research design thereafter identified ways of handling them - either the experimental design approach or the statistical control method was considered as able to cushion the effects of the control variables on the findings.

3.8 E-commerce Conceptual Framework and Hypothesis Development

Guided by the studied frameworks and literature review in sections 3.1, 3.2, and 3.3, this study identified the following factors as having a causal effect on e-commerce in SMMEs - socio-cultural, technological, political, and organisational. Implementation of e-commerce in the South African SMMEs has the potential to foster sustainable development. Based on these relationships, this research proposed four hypotheses and tested them quantitatively to establish the significance of each relationship using structural equation modelling. The influence of demographical variables was also analysed. The research, however, used qualitative analysis to explore the capacity of e-commerce in SMMEs to contribute to sustainable development.

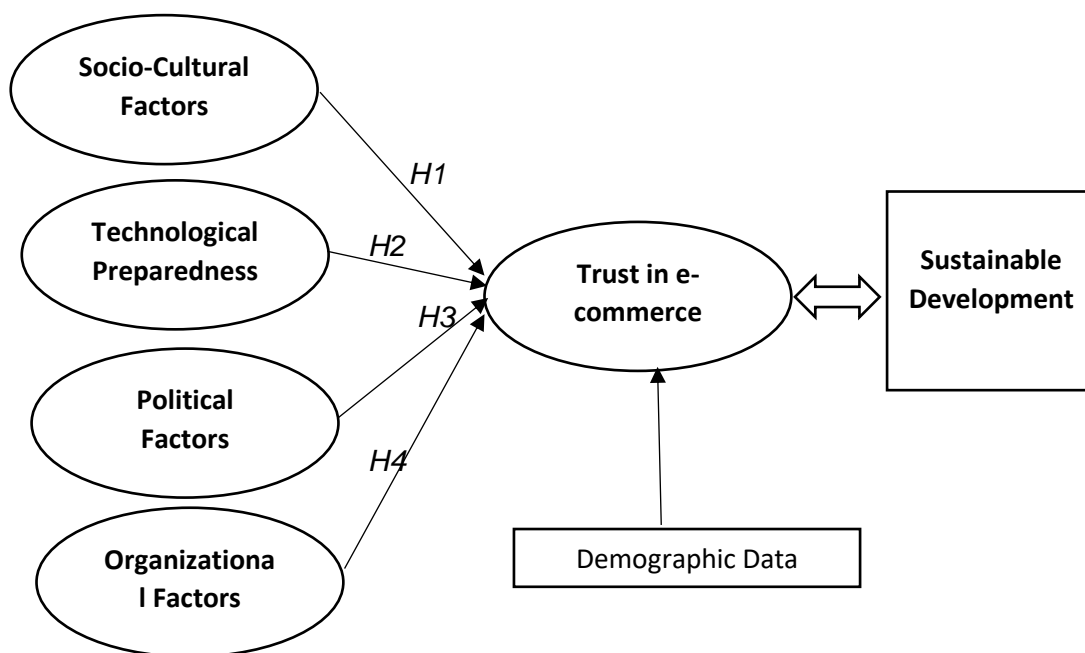


Figure 3.5: Proposed SMMEs E-commerce Conceptual Framework

Based on these identified factors, this study established a conceptual framework for e-commerce in the SMMEs in South Africa (see Figure 3.5), as stated in section 3.4. The study used a quantitative analysis to test the impact of these factors on e-commerce for SMMEs;

Chapter 5 discusses the significance of each factor as determined by the collected data. Structural equation modelling was applied to model the relationships. Table 3.3 represents the summary of the hypotheses tested in Chapter 5 of this study.

Table 3.3 Summary of Research Hypotheses

Hypothesis Number	Research Hypothesis
H1	Socio-cultural factors influence e-commerce in the SMMEs in SA.
H2	Technological factors influence e-commerce in the SMMEs in SA.
H3	Political factors influence e-commerce in the SMMEs
H4	Organizational factors influence e-commerce in the SMMEs

Qualitative research techniques were applied to test the second part of the framework which portrayed the relationship between e-commerce in SMMEs and sustainable development for South Africa.

3.9 Summary

An analysis of the various frameworks led to the assumption that context considerations are vital in all e-commerce frameworks. Based on that assumption, the need to study the South African SMMEs context became apparent. Unique cultures exist in South Africa, where people belong to different ethnic groups and this had to be taken into consideration. Post-apartheid South Africa also presented a unique political environment for SMMEs, that could also benefit from the positive aspects of e-commerce. SMMEs in South Africa have unique organizational structures characterized by the unique environment in which they operate. Data were collected and analysed based on the key themes identified from the studied frameworks, leading to a customized e-commerce framework for SMMEs in South Africa. E-commerce frameworks have worked for big businesses worldwide, however, this research focused on the unique South African context, where there is a need to include the previously-marginalised in the leading economy by empowering them, through developing SMMEs; a customized e-commerce framework will assist in achieving this goal.

4 CHAPTER FOUR: METHODOLOGY

4.1 Introduction

This chapter details the research methodology concepts and various research approaches to identify the appropriate research approach for the study. The review assisted with coming up with an appropriate research plan, design, and the most effective data collection and analysis techniques. In the chapter, research methods used in information systems research were discussed, therefore, research approaches involving e-commerce and the adoption of IT are reviewed in this chapter. In the process, an analysis of how these approaches have been used before was undertaken.

The development of the data collection instruments (survey and interview), the data collection process together with measures to ensure reliability and validity of the data were discussed in this chapter. With the hypotheses already proposed, data was collected to test them in relation to the factors identified.

This study adopted an explanatory sequential mixed methods approach, and this chapter discussed the two main phases involved in the approach. The first phase focused on the quantitative empirical study, and the second focused on the relevant qualitative empirical study. Tests associated with data and measures preparation for each of these approaches were also discussed.

4.2 Philosophical Paradigms in Research

Research paradigms guide scientific discoveries through their assumptions and principles. Understanding paradigm-specific assumptions help illuminate the quality of findings that support scientific studies and identify gaps in generating sound evidence (Artino, 2020). It was, therefore, essential to review the research paradigms to establish how they relate to this research. According to Creswell (2018), Positivism and Interpretivism are the main philosophical paradigms commonly used in research.

4.2.1 Positivism

Positivism is aligned with the hypothetic-deductive model of science that builds on verifying a priori hypothesis and experimentation by operationalizing variables and measures. Results from hypothesis testing inform and advance science. Studies aligned with positivism generally focus on identifying explanatory associations or causal relationships through quantitative approaches, where empirically based findings from large sample sizes are favoured, (Park et

al., (2020). Positivism is associated with quantitative approaches, which apply experiments, surveys, and questionnaires.

4.2.2 Interpretivism

Creswell (2018) explains that interpretivism depends on constructivist ontology and assumes that social reality is formed by constructed explanations and mobilized by social actors. Facts are fixed in their existence but interpreting these facts can be complex. Interpretivism dismisses realism because they view facts as socially designed claims. For interpretivists, human action is the one that shapes the external world. The ontological claim for the interpretive paradigm is to focus on relativism in constructing meaning, which prompts the absolute dismissal of static reality, (Irshaidat, 2019). Interpretivists achieve an adequate understanding of a phenomenon through interaction with the context that embeds it. Equally, with research in Information Systems, empirical evidence from one or more organizations is used to study the subject matter in context.

4.2.3 Ontology

The selection of research methodology depends on the paradigm that underpins the research activity. The methodology will guide on how to achieve the research objectives. Creswell (2018) identifies a set of assumptions that essentially characterise research, and these are:

- beliefs about the nature of reality and humanity (ontology),
- the theory of knowledge that informs the research (epistemology),
- how that knowledge may be gained (methodology).

Ontologically, positivism assumes reality to be singular, objective, and separate from the researcher, while interpretivists assume reality to be subjective and dependant on the researcher. Epistemologically, positivists believe that knowledge is solely based on observable facts outside the human mind whilst interpretivists believe knowledge to be determined by people rather than by objective external factors (Creswell 2018).

Positivism research methodology is characterized by the following elements:

- confirmatory
- theory testing

- deductive approach
- cause and effect
- quantitative approach
- statistical analysis

Interpretivism research methodology, on the other hand, is characterized by the following:

- exploratory research
- inductive approach
- theory generation
- qualitative approach
- observation of individuals and interpretations of phenomenon

(Creswell, 2018; Bryman, 2012; Lewis, 2007).

4.2.4 Pragmatism

Creswell (2018) identifies pragmatism as a worldview arising out of actions, situations, and consequences, rather than antecedent conditions. There is a concern with applications or what works and solutions to problems (Creswell, 2018; Patton, 1990). Instead of focusing on methods, researchers outline the research problem and use all approaches available to understand and solve the problem (Creswell, 2018; Rossman, 1985). Pragmatists do not see the world as an absolute unity, rather, they choose the methods, techniques, and procedures that best resolve their research objectives (Creswell (2018)).

The pragmatic approach was selected for this study since the researcher deemed it appropriate to apply mixed methods in resolving the problem. The need to grow the SMMEs in South Africa has arisen from actions, situations, and consequences rather than antecedent conditions. The actions of colonial-era governments have created the current imbalances, resulting in most citizens being side-lined from the leading economy. Developing a suitable e-commerce framework for the SMMEs in South Africa is guided by the success story of e-commerce, as discussed in the literature review (Chapter 2). Based on the pragmatic belief that considers an external world independent of the mind, this study draws from the South African context to establish what works at the time.

4.3 Research Approach: Qualitative, Quantitative and Mixed methods

Creswell (2018, p 44) defined quantitative research as “a means for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures”. Quantitative studies use deductive methods to test theories. It involves using present knowledge to develop hypothetical relationships and testing them to produce results that will help establish scientific discoveries (Creswell, 2018).

Contrary to quantitative research, qualitative research explores the meaning social groups ascribe to a social or human problem to understand it. The process of qualitative research involves emerging questions and procedures, with data typically collected in the participants’ setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data (Creswell, 2018).

4.3.1 Qualitative versus Quantitative

To distinguish quantitative and qualitative approach, Albeshar (2015) used a table to list their distinct characteristics (See Table 4.1)

Table 4:1: Qualitative versus quantitative research (Source Albeshar 2015)

Qualitative Research	Quantitative Research
<ul style="list-style-type: none"> • interpretivist associated • explores new phenomenon • uses inductive approach • moves from data collection to development of hypothesis • use smaller sample size for in-depth analysis • more appropriate for social sciences and not very scientific • interpretation can be biased, results are usually not generalizable, and repeatability cannot be guaranteed. 	<ul style="list-style-type: none"> • positivism associated • tests theories • uses deductive approach • first sets hypotheses then use collected data to confirm significance for a causal relationship • involves statistical analysis of large samples • most appropriate for scientific research • the accuracy in data analysis is considered unrealistic and showing disregard for the societal realities of the world.

The contrasting views of interpretivists versus positivists result in differences in their research approaches. Quantitative research was initially the most elementary method for conducting research. One research strategy that is becoming popular across the disciplines is integrating qualitative research into intervention studies (Pathak, Jena, Kalra, 2013). Pragmatism permits qualitative and quantitative research methods to complement each other in one research project; the use of mixed methods considers what is best for the research project at any given moment. Johnson and Onwuegbuzie (2004) acknowledged the promotion of epistemological and methodological pluralism in educational research. Epistemological and methodological considerations promote effective research. Figure 4.1 illustrates the research processes regarding the differences between positivism and interpretivism.

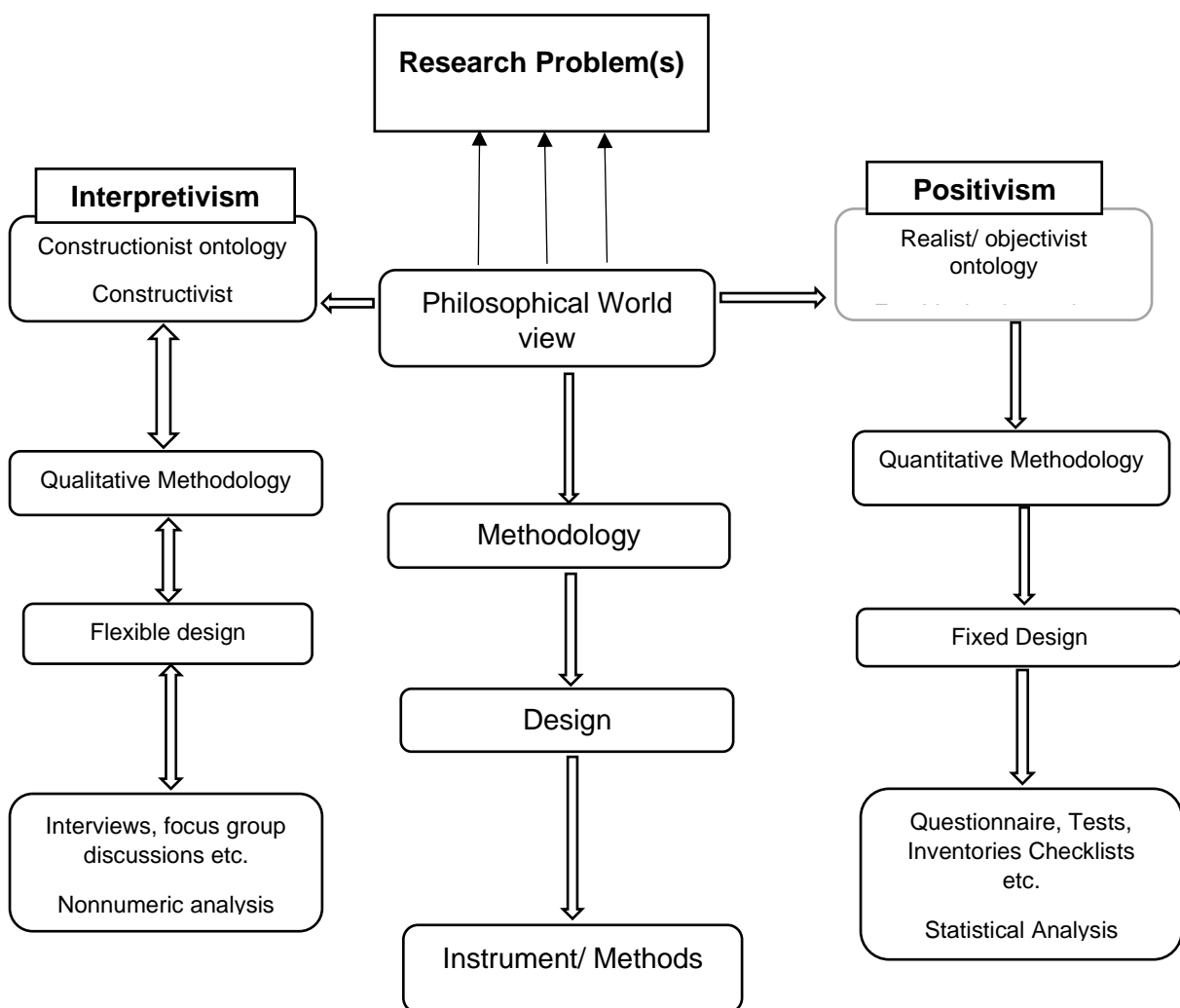


Figure 4.1 Foundation of Research (Tuli, 2010)

4.3.2 Mixed Methods

Mixed methods research is a strategy that combines quantitative and qualitative research methods, concepts, techniques, approaches, or language into one study, according to Creswell (2018). The pragmatism philosophy is used by mixed research methods, (Johnson, 2004). Various works of literature have identified merits for mixed methods, for example, complex research questions can be answered by mixed methods research as compared to qualitative or quantitative research alone. Given that, qualitative methods are more suitable for generation of hypothesis while quantitative methods are perfect for testing hypothesis; the two complement each other in mixed methods to both produce and confirm the theory, in one investigation, therefore, complex research problems related to causal description and explanation can be undertaken in the same project. With quantitative and qualitative results relating to different objects of the phenomenon, viewpoints provided by both methods may produce a broad depiction of the domain under study. Convergence of the results from entirely different strategies, - qualitative and quantitative - increases the validity of the findings and conclusions rather than when using one strategy. Where qualitative and quantitative results lead to contradictory results in mixed methods research, further reflection, research and revision of hypotheses may be considered. New theoretical insights might arise if the data have been well collected and correctly analysed when using a mixed-method approach (Lowe, 2019; Attimore, 2019; Lund, 2011).

4.3.3 Mixed Methods Approach Strategies

Researchers adopting mixed methods should create designs that effectively answer their research questions (Creswell, 2018). Various mixed research designs exist, from which the researcher may choose the design that best suits their project. Table 4.2, Illustrates the various types of mixed method designs. The order in which the researcher will apply quantitative and qualitative methods in responding to research questions guides the design for mixed methods research. In sequential design, the researcher conducts the qualitative phase first and sequentially followed by the quantitative phase or vice versa; the first phase guides and informs the second phase. Concurrent design undertakes both quantitative and qualitative concurrently and integration of the findings is done during the interpretation of the findings (Restivo, 2019; Creswell, 2018; Johnson & Onwuegbuzie, 2004). More specific designs can easily be created from these two significant designs. Table 4.1 also illustrates some possible combinations that can come from these two significant designs.

Table 4:2: *Mixed Methods Design Types (Albesher 2015; Creswell et al (2003))*

Design	Implementation	Priority	Stage of integration	Theoretical perspective
Sequential explanatory	Quantitative followed by qualitative	Usually quantitative but can be qualitative or equal	Interpretation phase	May be present
Sequential Exploratory	Qualitative followed by quantitative	Usually qualitative but can be quantitative or equal	Interpretation phase	May be present
Sequential Transformative	Either Quantitative followed by qualitative or qualitative followed by quantitative	Quantitative, qualitative, or equal	Interpretation phase	Definitely present (conceptual framework for advocacy or, empowerment)
Concurrent Triangulation	Concurrent collection of quantitative and qualitative data	Preferably equal, can be quantitative or quantitative	Interpretation phase or analysis phase	May be present
Concurrent Nested	Concurrent collection of quantitative and qualitative data	Quantitative or qualitative	Analysis phase	May be present
Concurrent Transformative	Concurrent collection of quantitative and qualitative data	Quantitative, qualitative, or equal	Usually analysis phase or can be interpretation phase	Present (conceptual framework for advocacy or empowerment)

As explained by Pardede (2019) for sequential procedures, results from one method are confirmed by applying another method to seek better elaboration. In the exploratory sequential procedure, the qualitative method is first applied to explore, and then the quantitative method follows up with a large sample to generalize the findings to a population (see Figure 4.2).

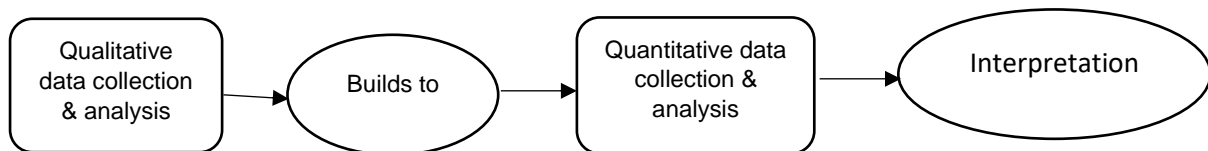


Figure 4.2 Exploratory Sequential Mixed Method (Pardede, 2019)

With explanatory sequential, the quantitative method is first applied to test hypotheses built from an analysis of theories or concepts. For in-depth details the qualitative method follows as the next stage, testing a few cases or individuals (see Figure 4.3).

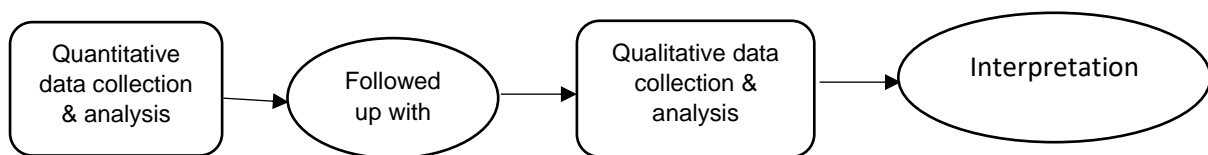


Figure 4.3 Explanatory Sequential Mixed Method (Pardede, 2019)

Concurrent procedures for mixed methods converge qualitative and quantitative data in analyzing the research problem. Qualitative and quantitative data are collected concurrently, and results are integrated before the overall interpretation. Concurrent procedures can also be nested, where one type of data - qualitative or quantitative - can still be considered within the other method, should there be a need (see Figure 4.4).

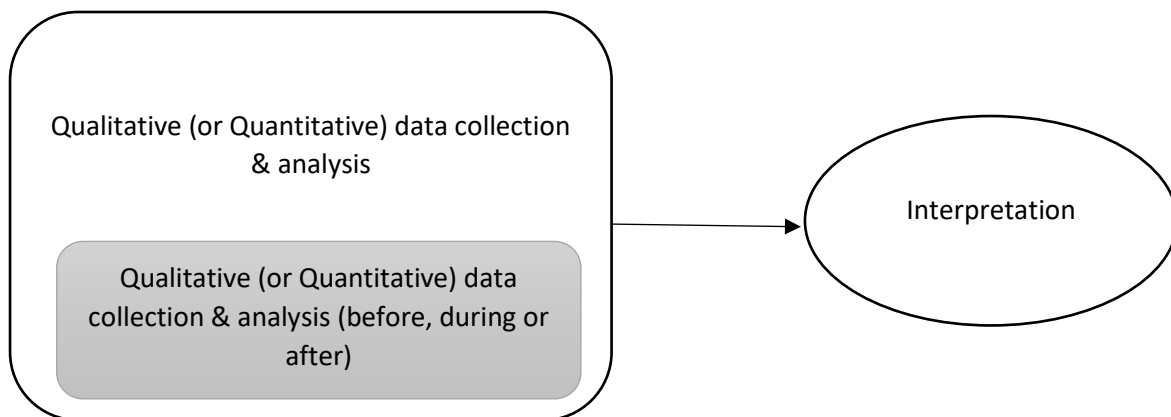


Figure 4.4 *Embedded Concurrent Mixed Method (Pardede, 2019)*

With concurrent transformative design, quantitative and qualitative data collection is concurrently done. If it is sequential transformative design, data collection is sequential, thus, either starting with qualitative then quantitative next or vice versa. At the end of the study, data from both methods are then combined and analysed.

4.3.4 Sequential Explanatory Design

According to Creswell (2013), Sequential Explanatory Design involves two major phases. Firstly, quantitative data is collected, followed by analysing the data using quantitative data analysis techniques. The second phase will apply qualitative techniques to collect and analyse data. The pragmatic approach of combining quantitative and qualitative gives more significance where research questions have unknown aspects of a phenomenon, which can be answered by information presented in numerical and narrative forms, therefore, a mixed methods study should at least have one quantitative research question and one qualitative research. For this study, research questions 1, 3 & 5 (see section 1.6) are dealt with quantitatively, while qualitative techniques were applied for research questions 2 and 4.

4.4 Research Design

Pragmatism is not confined to one system of philosophy and reality, therefore, researchers can freely align to quantitative and qualitative assumptions within their research (Creswell, 2014). This study will take the explanatory sequential mixed methods approach. Qualitative

versus quantitative philosophies can reduce the debate about singular or universal truths in viewing the world (as expressed by the Greek philosophers, Socrates and Plato) for quantitative. Multiple or relative truths (as expressed by the Sophists such as Protagoras and Gorgias) are qualitative. Mixed methods attempt to consider both viewpoints to establish workable solutions for research problems (Johnson, 2007); data is interpreted through triangulation techniques.

As discussed earlier in 4.3.4, the explanatory sequential mixed methods take a two-phase approach in which the first phase has the researcher collecting quantitative, analysing the data, and the results are then used to plan the second, qualitative phase (Creswell, 2018). Figure 4.5 illustrates the various stages involved with explanatory sequential mixed methods. This study adopted this design, in which a survey was used to collect quantitative data and interviews and document analysis were used for qualitative data.

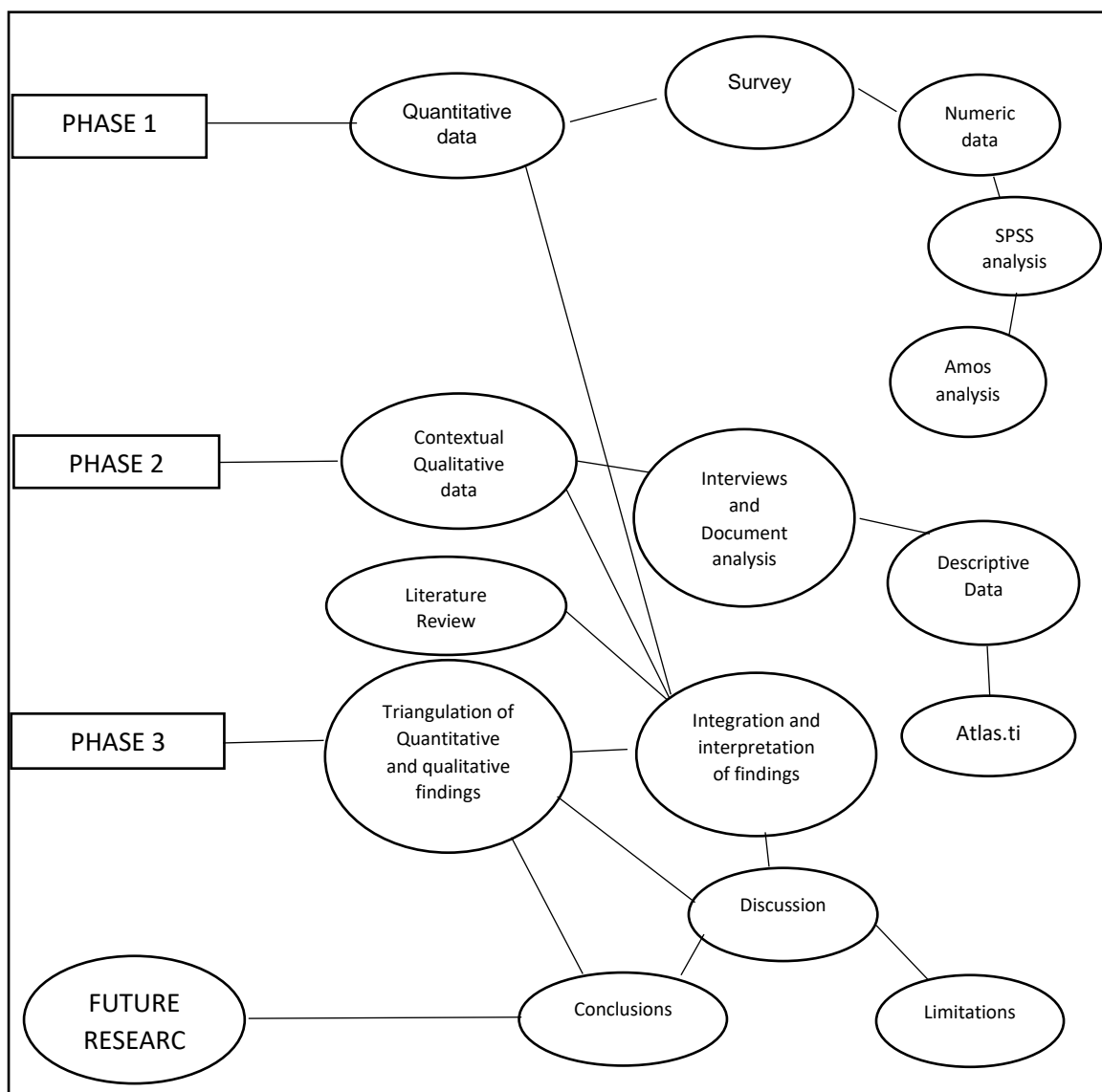


Figure 4.5: Explanatory Sequential Mixed Design Phases (Phillip Bowen, 2017)

In Phase 1, a questionnaire survey collected quantitative data responding to research questions 2 and 4. The quantitative data analysis confirmed the proposed determinant factors for e-commerce adoption by South African SMMEs. Quantitative data analysis techniques were used to evaluate the proposed model. The data were collected by a questionnaire distributed to the sampled SMMEs directors in Limpopo, Mpumalanga, and the Northern Cape Provinces of South Africa. The structural equation modelling technique and regression analysis were applied to evaluate the causal relationships between the dependent variable, (trust in e-commerce) and the independent variables (socio-cultural, technological preparedness, political and organisational factors). Structural equation modelling was used to test Hypothesis H1 to H4 (See Chapter 3). SPSS software and the Amos software were used to analyse data.

In phase 2 of the design, qualitative data was collected through document analysis and interviews. The collected data aimed to provide answers to research questions 1, 3 and 5. Qualitative data was also used to confirm the factors for trust in e-commerce as identified in Chapter 4. Interviews were carried out with sampled directors of SMMEs and other stakeholders, like heads of private organizations and government departments. These included officials from the telecommunications and networks department, the financial sector, the Ministry involved with small and medium enterprises, and the Ministry involved with trade and commerce. E-commerce-related policy documents from the departments, were retrieved, and considered for data collection using document-analysis techniques. ATLAS.ti software was used to analyse the qualitative data.

4.5 Potential Structure model

The literature study led to the conclusion that trust in the use of e-commerce, which would lead to the adoption of e-commerce by SMMEs in South Africa, depends on certain factors. From the review of literature, the factors identified were - socio-cultural, technological preparedness, political, and organisational factors; this study tested the structural model that explains how these factors discussed in chapter 3 relate to trust in e-commerce and in turn lead to its adoption.

4.6 Substantive research hypotheses

The main substantive research hypothesis proposed for the study, states that the abridged structural model shown in Figure 3.5 portrays a good presentation of how the four identified factors relate to trust in e-commerce, leading to its adoption.

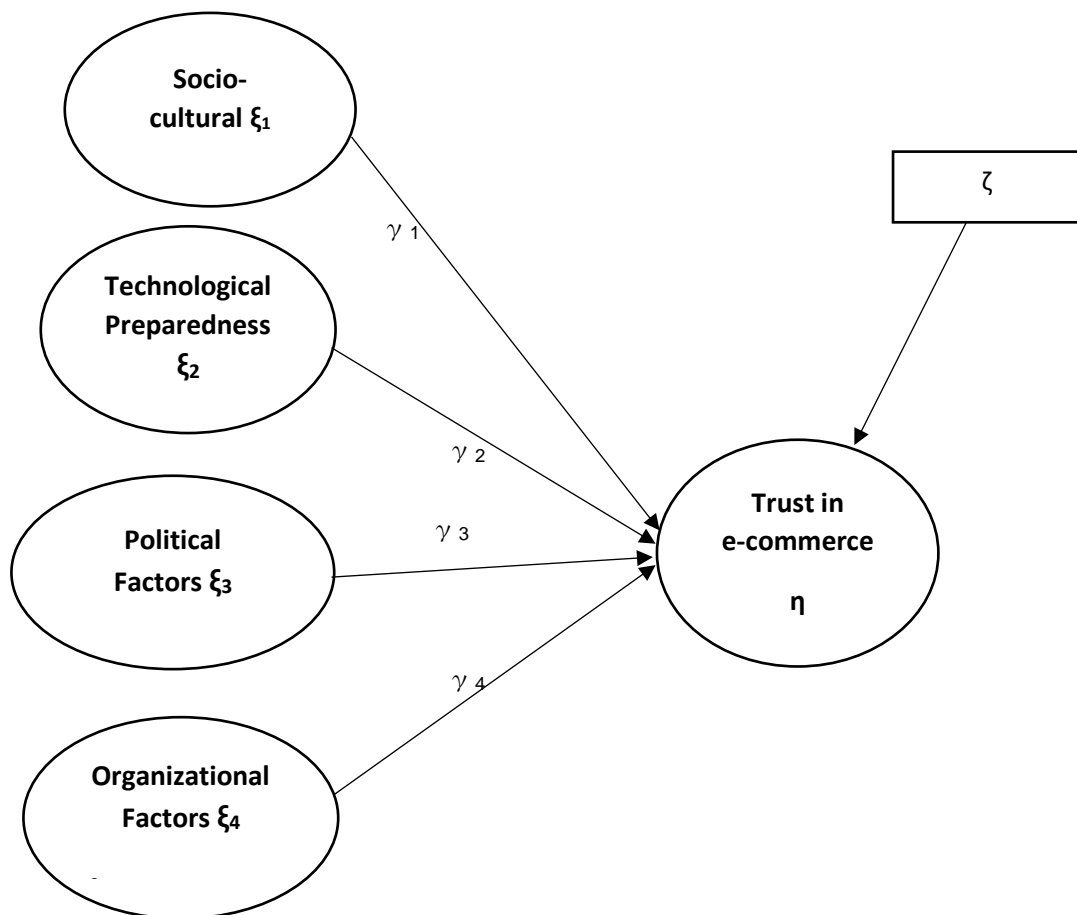


Figure 4.6: The proposed trust in e-commerce for SMMEs structural model

The principal substantive hypothesis was dichotomised into the following four detailed, path-specific hypotheses:

Hypothesis 1: Socio-cultural factors influence trust in e-commerce

Hypothesis 2: Technological preparedness influences trust in e-commerce

Hypothesis 3: Political factors influence trust in e-commerce

Hypothesis 4: Organisational factors influence trust in e-commerce

The structural model in Figure 4.7 explains the nature of the causal relationships hypothesising specific structural relations between the dependant and the independent variables contained in the model.

The following four structural equations, expressed as Equation 4.1 to Equation 4.4, were extracted from the main substantive research hypothesis:

$$\eta_1 = \gamma_1 \xi_1 + \zeta_1 \dots \dots \dots 4.1$$

$$\eta_2 = \gamma_2 \xi_2 + \zeta_2 \dots \dots \dots 4.2$$

$$\eta_3 = \gamma_3 \xi_3 + \zeta_3 \dots \dots \dots 4.3$$

$$\eta_4 = \gamma_4 \xi_4 + \zeta_4 \dots \dots \dots 4.4$$

Based on the correlational design logic, the structural relation hypotheses and the measurement relation represented by the model, are tested by an analysis of the indicator variables representing each of the latent variables in the proposed *trust in e-commerce* structural model and determining the variance-co-variance matrix.

4.7 Data Collection Strategy for the study

This section will discuss the data collection strategy, the data collection tools used, and the validation strategy.

4.7.1 Questionnaire development

Chapter 3 presented a conceptual model and four hypotheses were established from the conceptual model to test the role of various factors in implementing e-commerce in SMMEs. The systematic literature review carried out in Chapter 3 answers the first research question: *What are the current challenges for e-commerce in SMMEs in South Africa?* Issues in e-commerce adoption and the SMMEs context were discussed. An outline of challenges facing SMMEs' e-commerce in South Africa and a conceptual model of factors that influences the implementation of e-commerce for SMMEs in SA was given. The model partially responded to the research question: *What factors influence the implementation of e-commerce for SMMEs in South Africa?* A survey was carried out, guided by the methodology discussed in this chapter, to obtain responses to this research question. This section continued with a

discussion of the data collection tool used and how it was established. Fig 3.6 illustrated a potential model for the proposed relationships.

The target population's characteristics, resources available, and sensitivity of the topic of interest determine the data collection method to be used in a research project. Guided by the conceptual model in Chapter 3, which was established through literature review in Chapter 2, a questionnaire survey was developed to collect empirical quantitative data. Table 4.3 illustrate how the questionnaire items were derived from the identified variables.

Table 4:3 Items used on the study instrument

Constructs	Item Code	Items	Question	Source
Socio-Cultural Influence	C1	Masculinity	My gender does influence the way I conduct business.	Zareef A Mohammeda and Gurvirender P. Tejay (2017)
	C2	Collectivism	My culture influences my perception to use e-commerce (doing business on the internet)	
			I need to consider my socio-cultural values before using any internet-based technology.	
C3	Long term orientation	The use of e-commerce (doing business on the internet) in my business, will have long term benefits for my community in general.		

Constructs	Item Code	Items	Question	Source
	C5	Power distance	The decision to use e-commerce (doing business on the internet) depends on higher authorities within my society.	
			Most of the clients of my business are people from my tribal community.	
			My local language is the most effective when I am marketing my products or services.	
			I believe my products or services can equally be consumed by people from different cultures.	
Technology preparedness	TP1	Internet experience	My business clients, already use internet-based technologies to access certain goods and services.	(Acheampong, 2017, Parasuraman et al., 2000); Punit
	TP2	Technology Readiness Index (TRI)	Lack of technological capacity affect the utilization of e-commerce (doing business on the internet) in my business.	Ahluwalia et al., (2020)
	TP3	Maturity and Reach of Internet	There is adequate IT infrastructure within my	

Constructs	Item Code	Items	Question	Source
		Technologies (MRIT)	community to access the internet.	
	TP4	Technology efficacy (TE)	I am prepared to learn new internet-based technologies that might advantage my business.	
	TP5	Access to information	Government gives opportunities for SMMEs staff to learn about new technologies	
Political factors	PF1	Power privileges and domineering	Some business privileges, in my type of business, are accessible through political positioning.	Dubravka Cecez-Kecmanovic, (2004); Finger, et al., (2018);
	PF2	Freedom of business associations	E-commerce will allow everyone to do business across all levels within my sector.	
	PF3	Capacity to contact business at all levels	E-commerce (doing business on the internet) will improve access to information in my business sector.	
	PF4	Availability of training	Government gives opportunities for SMMEs staff, in my sector to learn about new technologies.	
			Currently, there are no regulations that stop me from doing business with anyone throughout the world.	

Constructs	Item Code	Items	Question	Source
			Government policies do affect the way I do my business.	
	PF4		The use of e-commerce (doing business on the internet) in my business, will have long term benefits for my community in general.	
Organizational factors	Org1	Technical expertise in organization	Some staff members in my organization are familiar with e-commerce.	Lin (2005) and Ricardo M. R. Barroso, (2019)
	Org2	Knowledge level	My organization is already using e-commerce for its business activities.	
			Use of e-commerce (doing business on the internet), will see my business penetrate new markets.	
	Org3	Knowledge acquisition	My organization has capacity to train staff on new technology	
	Org4	Knowledge application	Organizational factors influence our capacity to utilize e-commerce for business.	
Org5	Knowledge sharing	Our business environment allows staff to share ideas on utilizing technology.		

Constructs	Item Code	Items	Question	Source
Trust on E-Commerce	TOE1		The use of e-commerce in my business, will have long term benefits	
	TOE2		Use of e-commerce (doing business on the internet), will see my business penetrate new markets.	
	TOE 3		E-commerce will allow everyone to do business across all levels within my sector.	
	TOE 4		E-commerce will eliminate the use of political positioning to gain business privileges by some individuals in my sector.	
	TOE 5		E-commerce (doing business on the internet) will improve access to information in my business sector.	
Socio-Economic Demographics Variables	DM1	Age	What is your gender?	<i>Abdulaziz Albeshar (2015)</i>
	DM2	Gender	Which is your age group in years?	
	DM3	Level of education	What is your highest level of education?	
	DM4	Internet experience	Are you knowledgeable about the Internet?	

Constructs	Item Code	Items	Question	Source
	DM5	Business Sector	What is your business sector? (for example, transportation, beauty therapy, retail, food industry...)	
	DM6	Province	Indicate your province	

A questionnaire was administered to collect data from a sample of SMMEs participants from the various categories. Amongst the enterprise categories are cross border traders, vegetable vendors, home industries, beauty therapy, private transporters, fruit vendors and food sellers. Questionnaire items were established based on the four factors identified in Chapter 3 and the predictor variables identified through the literature review (See Table 4.3).

The study identified 24 predictor variables, and the questionnaire carried 29 items. The questionnaire used demographic questions as a measure to control the identified factors. Section A of the questionnaire captured organization and demographic data. The questionnaires used a multiple-choice question structure in this section. Section B captured data on the four factors identified in the model in Chapter 3 - cultural, political, technological, and organizational. The questions in section B used a five-point Likert scale with a range from *strongly disagree* (1) to *strongly agree* (5). The researcher conducted a pilot test to establish the internal consistency and reliability of the questionnaire.

The interview guide consisted of questions that sought to extract the stakeholders' data on infrastructure, legislation, and policy issues. It also aimed to establish stakeholders' perceptions about e-commerce in SMMEs and sustainable development. The interviews depended on the organization's involvement with the SMMEs. The interview guide was pilot-tested to establish the validity of the instrument.

4.8 Sampling Technique and Sample Frame

The first phase of this research applied quantitative research techniques and involved statistical data analysis. The sample size was one of the most addressed issues in the statistical analysis of data, therefore, several factors were considered to establish the most

appropriate sample size for the survey. Factors that needed to be considered were the population sizes for SMMEs in the three provinces - Mpumalanga, Limpopo, and Northwest. The multiple regression technique would require a minimum of 20 cases per item and this had to be considered (Hair et. al., 2014).

To effectively test the model under study, a survey was conducted in which a self-administered questionnaire was used. All effort was put into ensuring participants could easily understand the survey tool. The survey attempted to cater for diverse participants, like directors of SMMEs from different regions, in each of the three provinces. Considering the issue of generalisability, guidelines from different scholars were consulted to establish the best approach to identifying the required number of cases in multiple regression to ensure generalisability.

The study population for this research included all participants and stakeholders in the SMMEs businesses in South Africa; these SMMEs businesses were considered organizations. Amongst the enterprises' categories for SMMEs were cross-border traders, vegetable vendors, home industries, beauty therapy, private transporters, and others. Purposive sampling was applied to come up with relevant SMMEs.

Purposive sampling, also known as 'judgmental, selective, or subjective sampling', represents a group of sampling techniques that depend on the researcher's judgment in choosing the units (for example, people, cases/organizations, events, pieces of data) that are to be studied (Sharma, 2017).

For South Africa, according to BusinessTech (2018) report, previous research puts the total number of SMMEs in South Africa at 5.6 million. About 3.3 million of these SMMEs were branded 'survivalists' businesses (entrepreneurship motivated by owners' desperation to earn a living), 1.7 million micro-enterprises, and 554,000 small enterprises (Hewitt, 2020). This research mainly focused on micro-enterprises and small enterprises which the researcher branded as 'SMMEs'; that gives an estimated population of 1.8 million business units for South Africa. Based on the normal distribution and considering a confidence level of 95%, and a 5% error margin, a response distribution of 50 %, a sample size of 385 was initially considered for the SMMEs questionnaire distribution in South Africa. Three provinces were randomly sampled for the distribution of questionnaires - Northern Cape, Mpumalanga, and Limpopo.

Based on the similarity in SMMEs' business activities across the country, the influence of province choice was assumed insignificant on the data collected.

Interviewees were conducted with selected stakeholders, and selected policy documents were analysed. Stakeholders included, heads of government departments, telecommunications service providers, and the heads of financial sectors. Participants were selected from those organizations and interviewed until saturation was reached.

4.9 Questionnaire validation

Validation of the tool for data collection is a critical stage in research since it eliminates errors and biases that might result from a poorly constructed data collection tool. Messick (1989, 1995) and Dellinger (2005) appropriately express validity as a unitary concept, with construct validity as its core, used to measure psychological constructs. To validate means to investigate the extent to which a proposed interpretation and use of test scores are justified (Hawkins, 2019). Measurement instruments can be validated through different tests, such as content validity, construct validity, and reliability (Albeshar, 2015).

The questionnaire consisted of two categories; category 1 had multiple choice questions to capture the respondents' age, gender, education level, internet experience, province, and business sector. Category 2 had close-ended questions using a five-point Likert scale (1-5) with endpoints of "*strongly agree*" and "*strongly disagree*" to indicate the respondents' answers to the questions.

4.9.1 Question Wording

A few researchers found no significant differences in performance for positively and negatively worded items in a questionnaire, however, many researchers have confirmed that semantically negative and positive items in educational surveys tend to produce varying results (Roszkowski & Soven, 2010). Some psychometricians recommend that both negative and positive items should be included to guard against respondents indiscriminately agreeing or disagreeing, it has been observed that negatively worded items do function aberrantly, thus lowering the internal consistency of the scale. Kam, & Fan (2020), caution that negatively-worded items have lesser item quality than positively-worded items. They point out that although negatively and positively worded items can measure a similar construct, a correlation

might not always be guaranteed. Based on these observations, the use of positively worded questions was preferred, however, a pilot test was performed to test the use of a few negatively-worded questions and observe the effects on the results.

4.9.2 Pilot Study

The study conducted a pilot test for the survey by administering the questionnaire to a random sample of 40 participants from the Limpopo Province in South Africa. Among the 40 participants, the sample consisted of SMME owners, researchers, and administrators from government departments dealing with SMMEs. The researcher administered the questionnaire, then engaged with the participants to ensure they understood the questions and the researcher received feedback from the participants. Time for completing the questionnaire was measured during this exercise to adjust the questionnaire where necessary. Most of the survey participants confirmed the validity of the questionnaire, although, a few changes were suggested for improvement.

4.9.3 Test-retest reliability

The test-retest reliability test was also applied to some of the respondents from the pilot test sample. The retest was undertaken to measure consistency over time. The test-retest reliability test involves selecting a small group of participants, re-administering the questionnaire to the same respondents over different points, and then comparing the responses to check on consistency (Aithal, 2020). A high level of retest reliability was established as most of the respondents could produce the same responses they had given almost three weeks ago. Of the ten respondents involved, three of them changed their previous set of responses to one or two questions. For these few, their general meaning remained the same but only varied on the degree, for example, where the respondent had previously answered *agree*, they now chose *strongly agree*.

4.9.4 Pilot Study Reliability

The study applied Cronbach's Alpha test to test the reliability of the pilot study. Kennedy (2022) notes reliability as obtaining stable and consistent results from an assessment over a period of time. Internal consistency confirms homogeneity amongst the items used to measure a construct. The Cronbach's Alpha test is a reliability test.

The degree of reliability is assessed by using the correlation coefficient. When the correlation coefficient is 0.0 it means no relationship; a perfectly negative correlation gives a correlation coefficient of - 1.0, and a correlation coefficient of +1 shows a perfect positive relationship; thus, the closer the correlation is to +1.0 (a measure of perfect reliability), the more reliable the results. Table 4.4 shows the correlation coefficients for the constructs used in this study.

Table 4:4: The results for construct internal consistency test

Construct	Items quantity	Cronbach's alpha	Reliability
Socio-Cultural	6	0.907	Excellent reliability
Technological Preparedness	5	0.962	Excellent reliability
Political Factors	3	0.921	Excellent reliability
Organizational Factors	5	0.866	High reliability
Trust in E-Commerce	4	0.894	High reliability

Schrepp (2020) quoting George and Mallery (2003), advice that the following rules of thumb be used to access reliability based on Cronbach's Alpha: a > 0.9 (Excellent), > 0.8 (Good), > 0.7 (Acceptable), > 0.6 (Questionable), > 0.5 (Poor), and < 0.5 (Unacceptable). All the constructs assessed in the questionnaire passed the reliability test.

4.10 Data analysis Procedure

This section discusses the data presentation and analysis procedures. The conceptual model derived from literature (see section 3.7) proposes four significant factors that have a causal effect on trust in e-commerce in SMMEs in South Africa. Confirmatory Factor Analysis was applied to the model to test the proposed relationships amongst the proposed variables.

The study adopted the following steps for quantitative data analysis:

Step 1: Prepare data

- Collect Data
- Eliminate Unusable responses
- Check outliers

Step 2: Prepare Measures

- Check Reliability (Cronbach's Alpha)
- Check Validity (Explanatory Factor Analysis)

Step 3: Prepare constructs (Factors)

- Compute Constructs' variables (by considering the mean of their measures)
- Check Normality
- Check Multicollinearity

Step 4: Conclusion

- Descriptive analysis
- Regression Analysis

The SPSS software was used for quantitative data analysis, while the Demographic-related data was analysed using descriptive statistics. Structural Equation Modelling (SEM) and Regression analysis were used to test the proposed hypotheses and refine the proposed model as illustrated in the conceptual framework. Table 4.5 presents the various tests applied on the collected data.

Table 4:5: Tests on Data

Test	Description	Threshold
Outliers	Outlying responses are those likely to distort statistical tests. These are responses whose magnitude greatly vary from the rest. Contaminators must be eliminated from research data.	Consider $Q_3 + 1,5 (IQR)$ or $Q_3 - 1,5(IQR)$ IQR-Interquartile Range
Reliability Test (Cronbach's alpha)	Essential for validation of the models' components and statistical methods confirm the significance of the dataset (TJ. Dunn, T Baguley, V Brunnsden 2014)	A value of Alpha greater than 0,7 is acceptable.
Validity Test (Exploratory Factor Analysis (EFA))	Insignificant measurement items for each factor on the model are identified and removed for better accuracy.	A loading Factor of above 0,45 is acceptable.
Normality	Ascertain normal distribution for each factor (Mishra, 2019)	Skewness and Kurtosis value of between + 1 and -1
Multicollinearity	Testing for the non-existence of multicollinearity amongst independent variables which can negatively affect statistics and the regression coefficient.	Correlation coefficient should be less than 0,9 (Shrestha, 2020)

4.11 Validity and Reliability

Validity and reliability demonstrate the rigor of the research processes and the trustworthiness of research findings. A researcher must take measures to ensure that the research findings are trustworthy. For these processes, the quantitative component of the research, the

questionnaire was piloted, and various validity tests were applied to establish content, concurrent, and construct validity.

Validity strategies were enforced in the qualitative stage to ensure the accuracy of findings. The strategies included, among others: triangulation of different sources of data to ensure coherent justification of themes, member checking, which involved referring the themes back to interviewees for them to confirm the accuracy, rich description to convey the findings, self-reflection to clarify bias on the part of the research, peer debriefing and use of an external editor. Reliability was checked through cross-checking transcripts for transcription errors, reassessment of codes during the coding process, coordinating communication amongst coders of the research project, and cross-checking codes developed by different researchers. These strategies were applied to ascertain the reliability of the findings.

4.12 Ethics

With the increasing number of research studies being carried out in developing countries across Africa and the world, several ethical dilemmas usually arise. Given this, the researcher tried to consider all possibilities and adhere to ethical issues in respect of them. An Ethical Clearance letter was obtained from the University of Venda to guide this study. The ethical values of the ethnic groups involved were respected in line with the group's dictates and the land's laws.

4.12.1 Voluntary participation

All respondents signed a consent letter agreeing to participate for non-financial gains and the researcher observed their human rights. The questionnaire administrators clarified the purpose of the research to all the participants; participation in the study was voluntary; the confidentiality of personal data was observed; data was used solely for this research; participants were freely engaged and were allowed to share their views voluntarily.

4.12.2 Anonymity and confidentiality

The researcher ensured the confidentiality of the collected data, therefore, the participants shall remain anonymous. Only members of the research team were guaranteed access to the collected data and the rights of the participants were safeguarded by not capturing their personal details.

4.12.3 Avoidance of harm

The researcher ensured no harm to participants through their involvement in the research. Such harm included embarrassing or endangering the home life of respondents, their friendships, and jobs.

4.12.4 Permission to conduct study

The researcher requested permission to conduct the research from the various stakeholders (see Annexure C). These include government ministries directly involved with informal sector SMMEs and the ethics committee issued an ethical clearance certificate for the University of Venda.

5 CHAPTER FIVE QUANTITATIVE DATA ANALYSIS

5.1 Introduction

This chapter will discuss the analysis of the empirical quantitative data. A questionnaire survey was used to collect quantitative data for this study. Four hundred and ninety-seven (497) responses were considered adequate for the relevant data analysis to conclude on the proposed hypotheses. The collected data analysis helped confirm the proposed model for trust in e-commerce for SMMEs in South Africa.

The questionnaire used twenty-nine items to represent the five constructs under research - Socio-Cultural Factor (C), Political Factor (P), Technological Preparedness Factor (TP), Organizational Factor (Org), and Trust in E-commerce for SMMEs (TOE). Four Constructs were independent variables (C, P, TP, and Org), while one construct was a dependent variable, (TOE).

This chapter will begin by describing the profiles of the respondents to the questionnaire, followed by descriptive statistics of the survey findings. The chapter presents reliability test results using Cronbach's alpha test; the dimension analysis for the factors through Exploratory Factor Analysis (EFA) will also be discussed. A multicollinearity test was applied to check the significance of all the involved factors based on the correlations between pairs of factors. Structural Equation Model (SEM) and Regression Analysis were used to test the research model, as illustrated in the chapter. The chapter will conclude by giving a summary of the quantitative data findings.

5.2 Descriptive statistics

This section presents the descriptive statistics from the survey findings and frequency tables will be used to give summaries of the collected data. Further discussion of these descriptive statistics is held in Chapter 7.

5.2.1 Response Rate

The study deployed approximately 620 questionnaires through trained research assistants who administered the questionnaires. The administrators recorded the number of all possible recipients. A total of 513 responses were received, and of these, 497 questionnaires were complete and usable for the quantitative data analysis. The response rate was 82,7 % which is very good for an Information Systems Research (Dillman, 2020).

5.2.2 Respondents' profiles

Profiles of respondents were classified using five categories - gender, age, education level, internet experience, and business Sector. The researchers had not used a predefined list in the question on the business sector to allow any new categories of SMMEs to emerge. In respect of gender, there was a slight difference in the composition of respondents, with males constituting 49.9% and females 50,1% (see Table 5.1).

Table 5.1: Participants' gender

Gender	Frequency	Percent
Female	248	49.9
Male	249	50.1

On age, 28% of the respondents were between 18 and 34 years old, 58,6% were between 35 and 54 years old, and 13,5% were above 55 years old. Based on this result, the majority of the SMMEs owners are middle-aged (see Table 5.2).

Table 5.2: Respondents' age

Age	Frequency	Percent
18 - 34 years	139	28.0
35 - 54 years	291	58.6
55 years and above	67	13.5

The respondents with a level of education below high school were in the majority at 35.4%. Respondents with high school qualifications constituted 28,4%; those with a bachelor's degree were 17,5%, and 18,5% had a post-graduate qualification (see Table 5.3).

Table 5.3: Respondents' level of education

Level of Education	Frequency	Percentage
Below High School	194	39.0
High School	124	24.9
Bachelor's Degree	87	17.5
Postgraduate	92	18.5

On knowledge about the internet, 61,4% of the respondents claimed to be *highly knowledgeable* about the internet, 29,2% *slightly knowledgeable*, and 9,5% were *not knowledgeable at all* about it (see Table 5.4).

Table 5:4: Respondents' level of knowledge on use of the internet

Internet Knowledge	Frequency	Percentage
Not at all	47	9.5
Highly knowledgeable	305	61.4
Slightly knowledgeable	145	29,2

SMMEs from 3 provinces - Limpopo, Mpumalanga, and Northern Cape - in South Africa, were considered for this survey; the distribution of respondents per province was 59,8%, 31,0% and 9,3% respectively (see Table 5.5).

Table 5:5: Respondents' province

Province	Frequency	Percentage
Limpopo	297	59.8
Mpumalanga	154	31.0
Northern C	46	9.3

A variety of business sectors had representation amongst the respondents. Common sectors were the food industry (including fruit and vegetable vending), transport industry, beauty therapy, construction, and education.

Table 5.6 describes the composition of responses by participants to survey questions investigating the main proposed factors influencing trust in e-commerce. The literature review identified five variables, and the responses fall under these factors - Socio-Cultural (C), Technological Preparedness (TP), Political (P), Organizational (Org), and Trust in E-commerce (TOE).

Table 5:6: Survey responses summary

Factor	Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
C1	My gender does influence the way I conduct business.	8,9	17,7	24,1	25,2	24,1
C2	The decision to use e-commerce depends on higher authorities within my society.	14,1	30,2	29,0	22,7	4,0
C3	I need to consider my socio-cultural values before using any internet-based technology.	2,8	5,0	66,4	10,5	15,3
C4	Most of my clients are people from my tribal community.	21,7	29,8	22,7	22,5	3,2
C5	My local language is most effective when I am marketing my products or services.	16,1	20,9	34,8	21,7	6,4
C6	I believe my products or services can equally be consumed by people from different cultures.	8,2	20,1	34,0	16,1	21,5
TP1	The government provides opportunities for me to learn about new technologies.	31,4	21,7	17,7	13,1	16,1
TP2	I am prepared to learn new internet-based technologies that might advantage my business	7,4	9,7	22,5	29,4	31,0

Table 5:7:Survey responses summary (continued....)

TP3	My business clients already use internet-based technologies to access goods and services.	17.7	23.3	36.2	16.3	6.4
TP4	Lack of the right skills to use technological affects my utilization of e-commerce (doing business on the internet) in my business.	7,2	10,5	23,3	30,0	29,0
TP5	There is adequate IT infrastructure within my community to access the internet.	8.0	9.7	28.4	37.8	16.1
P1	Currently, there are no regulations that stop me from doing business with anyone throughout the world.	1.8	4.8	10.7	51.1	31.6
P2	Some business privileges, in my type of business, are accessible through political positioning.	4,8	7,0	11,5	46,7	30,0
P3	Government policies do affect the way I do my business.	4,8	7,0	11,5	46,7	30,0
Org1	My business is already using e-commerce (doing business using the internet) for some of its business activities.	29,4	30,8	17,3	16,9	5,6

Table 5:8:Survey responses summary (continued....)

Org2	My business has capacity to train staff on new technology.	20.9	31.4	25.2	16.5	6.0
Org3	Some staff members in my business are familiar with e-commerce.	16.1	27.2	30.4	18.3	8.0
Org4	Staff members in my business share information on new technologies.	16.1	26.4	32.4	18.1	7.0
Org5	There are factors within my business establishment that influence my capacity to utilize e-commerce for business	2.6	2.6	18.3	57.9	18.5
TOE1	The use of e-commerce in my business, will have long-term benefits	7,2	10,1	23,1	35,6	23,9
TOE2	Use of e-commerce (doing business on the internet), will see my business penetrate new markets.	4,0	10,5	25,2	34,2	26,2
TOE3	E-commerce (doing business on the internet) will improve access to information in my business sector.	3.2	12.3	18.5	44.3	21.7
TOE4	E-commerce will allow businesses in my sector, to do business across all levels	4.8	23.3	18.5	29.0	24.3

The standard deviations and means, for the items of the five constructs related to this study are presented in Table 5.7. The captured participants' responses to the questionnaire have descriptive statistics derived from the scores obtained from the questionnaire responses, as shown in the Table 5.6. The study used a Likert scale with 5 points and endpoints of "strongly agree" (5) and "strongly disagree" (1). As presented in Table 5.7, respondents' scores for the socio-cultural factor, show that the mean varies between 2,58 and 3.38, which is reasonably high; for Technology Preparedness, scores ranged from 2.61 to 3.87, which is reasonably high; for Organizational Factors, scores ranged from 2.39 to 3.87; Political Factor scores ranged from 3.90 to 4.06, indicating that the scale is reasonably large. Finally, scores for Trust in E-commerce ranged from 3.45 to 3.69, which is high.

Table 5:9: Items mean and standard deviation.

Factor s	Mean	Standard Deviation	Factors	Mean	Standard Deviation
Socio-Cultural			Technology Preparedness		
C1	3,38	1,268	TP1	2,61	1,448
C2	2,72	1,086	TP2	3,67	1,218
C3	3,30	0,888	TP3	2,70	1,130
C4	2,56	1,152	TP4	3,63	1,208
C5	2,81	1,139	TP5	3,44	1,117
C6	3,23	1,227			
Organizational Factor			Trust on E-commerce		
Org1	2,39	1,226	TOE1	3,59	1,166
Org2	2,55	1,166	TOE2	3,68	1,093
Org3	2,75	1,167	TOE3	3,69	1,044
Org4	2,74	1,142	TOE4	3,45	1,222
Org5	3,87	0,833			
Political Factor					
P1	4,06	0,881			
P2	3,90	1,060			
P3	4,02	1,022			

5.3 Reliability Test

The IBM SPSS Statistics 27 software was used to assess the reliability of the scales used for the study. This section discusses the item analysis done to improve the reliability of the questionnaire's scales. Each scale was analysed to identify and eliminate poor items.

5.3.1 Item analysis of the Socio-cultural Scale

The Socio-Cultural Factor scale was made up of six items and the factors gave a Cronbach alpha of 0.821. This reliability coefficient is acceptable since the Cronbach's alpha was above 0.70 (Pallant, 2020). The corrected item correlations' column shows all item-total correlations values to be above the 0.30 cut-off (see Table 5.8) which are acceptable (Pallant, 2020). No poor items were identified; hence all items were retained.

Table 5:10: Reliability statistics for Socio-cultural Factor

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0,821	0,820	6

Item-Total Statistics						
	Scale Mean if item is deleted	Scale Variance if item is deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item is deleted	
C1	14,92	13,156	0,689	0,524	0,768	
C2	15,45	16,047	0,393	0,271	0,833	
C3	14,80	16,934	0,470	0,309	0,815	
C4	15,63	14,294	0,699	0,537	0,768	
C5	15,36	13,126	0,758	0,634	0,751	
C6	14,72	15,571	0,538	0,341	0,802	

5.3.2 Item analysis of the Technological Preparedness Factor

The Technological Preparedness Factor scale was made up of five items and a Cronbach alpha of 0.846 was obtained on the Technological Preparedness factors. The reliability coefficient is acceptable (Pallant, 2020). The corrected-item total correlation column in Table 5.9 shows that all the item-total correlations are above the cut-off level. No poor items were identified, hence all items were retained.

Table 5:11: Reliability statistics for Technological Preparedness Factor

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0,846	0,855	5

Item-Total Statistics						
	Scale Mean if item is deleted	Scale Variance if item is deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item is deleted	
TP1	13,71	9,517	0,617	0,420	0,832	
TP2	13,08	9,489	0,693	0,485	0,804	
TP3	13,87	11,701	0,603	0,389	0,829	
TP4	13,01	10,601	0,728	0,556	0,797	
TP5	13,09	10,692	0,688	0,543	0,806	

5.3.3 Item analysis of the Political Factor

The Political Factor scale was made up of three items. A Cronbach alpha of 0.203 was obtained on the Political factors. The reliability coefficient was not acceptable, since it was below 0.70. Removing any of the items would not improve the scale. The Corrected-Item total correlation column in Table 5.10 shows all item-total correlations below the cut-off level of 0.30. The items were considered poor; hence all items were dropped (Pallant, 2020), therefore, the proposed Political Factor scale could not be used to test the proposed hypotheses in this study as the collected data did not give conclusive results.

Table 5:12: Reliability statistics for Political Factor

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0,203	0,237	3

Item-Total Statistics						
	Scale Mean if item is deleted	Scale Variance if item is deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item is deleted	
P1	7,71	1,977	-0,014	0,000	0,442	
P2	6,68	1,500	0,160	0,091	-.001a	
P3	6,03	1,985	0,217	0,091	-.040a	

5.3.4 Item analysis of the Organisational Factors Scale

The Organisational Factors scale was made up of five items. A Cronbach alpha of 0.886 was obtained on the Organisational factors. This reliability coefficient is acceptable with a Cronbach's alpha above 0.70 (Pallant, 2020). All the item-total correlations in Table 5.11 indicate that all the values are above the 0.30 cut-off, thus, acceptable, above the cut-off level of 0.30 as recommended (Pallant, 2020). No poor items were identified, hence all items were retained.

Table 5:13: Reliability statistics for Organisational Factor

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0,866	0,881	5

Item-Total Statistics					
	Scale Mean if item is deleted	Scale Variance if item is Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item is deleted
Org1	11,42	12,207	0,685	0,508	0,871
Org2	11,31	11,467	0,810	0,663	0,843
Org3	11,00	10,036	0,858	0,888	0,828
Org4	11,01	10,292	0,839	0,878	0,834
Org5	10,26	14,385	0,455	0,246	0,913

5.4 Dimension Analysis

This study applied EFA to confirm the dimensions of the subscales utilized in the survey. Items with poor loadings were identified, and the scale was divided into the relevant dimensions (Mahembe, 2015).

5.4.1 Exploratory Factor Analysis (EFA)

Factor Analysis was applied to the data set to investigate the distinctions between the factors. Exploratory Factor Analysis explores correlative relations among manifest variables and models the relations with one or more latent variables (Watkins, 2018). Factor analysis achieves data reduction by grouping items under constructs. For this research, Socio-Cultural Factors, Technological Preparedness, Political Factors, Organisational factors, and trust in e-commerce were identified to segregate the survey items. Construct validity was verified using principal component analysis (PCA) with varimax rotation (Goretzko, 2019). The factor loadings for individual items are shown in Table 5.12. All the factors loaded well above 4.

Table 5:14: The Exploratory factor analysis results (EFA)

Rotated Component Matrix^a

Items	Component				
	Socio-Cultural	Technology Preparedness	Organizational Factor	Political Factor	Trust on E-commerce
C1	0,832				
C2	0,793				
C3	0,775				
C4	0,606				
C5	0,527				
C6	0,431				
TP1		0,812			
TP2		0,781			
TP3		0,753			
TP4		0,668			
TP5		0,666			
Org1			0,929		
Org2			0,903		
Org3			0,854		

Table 5:15: The Exploratory factor analysis results (EFA) Continued...

Org4			0,722		
Org5			0,477		
P1				.551	
P2				.546	
P3				.019	
TOE1					.935
TOE2					.918
TOE3					.847
TOE4					.793

On the rotated component matrix, the six items loaded to the same factor for socio-cultural factors. This factor's coefficients varied between (0.686) and (0.964). Secondly, for Technological Preparedness, all five items loaded to the same factor. For this factor, the

coefficient estimates range from (0.753) to (0.969). Thirdly, for Organisational factors, four of the five items are loaded together under the factor. The coefficient estimates of this factor range from (0.913) to (0.954). One of the items under this factor did not show any loading into the factor. Three items are loading together for the Political Factor, and coefficients estimates of this factor vary between (0.914) and (0.963). Lastly, for trust in E-commerce, all four items loaded together, and the coefficient estimates vary between (0,793) and (0,935)

Construct validity for this study was assessed by applying the Principal Component Analysis (PCA) with varimax rotation. Based on the results in Table 5.12, all items loaded with no less than (0.40) to their respective constructs thus adequately validated the instrument used and the items for each construct.

5.4.2 Eigen Values Test

The Socio-Cultural factor subscale attained a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value of 0.809, and Bartlett's Test of Sphericity statistic value was 1121.215 ($df=15$, $p=0.000$), indicating that factor analysis can be applied. The socio-cultural factor scale was found to be uni-dimensional, with 53,7 % of the variance being described by the dominant factor as shown in Table 5:13.

Table 5:16: Dimension analysis of Socio-Cultural Subscale

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,809
Bartlett's Test of Sphericity	Approx. Chi-Square	1121,215
	df	15
	Sig.	0,000

Total Variance Explained						
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,224	53,729	53,729	2,751	45,857	45,857
2	0,991	16,509	70,238			
3	0,598	9,961	80,199			
4	0,545	9,085	89,284			
5	0,388	6,462	95,746			
6	0,255	4,254	100,000			

The Technological Preparedness factor obtained a Kaiser-Meyer-Olkin measure of sampling adequacy value of 0.833, and Bartlett's Test of Sphericity statistic value was 1046.901 ($df=10$, $p=0.000$), indicating that factor analysis can be conducted. The technological preparedness factor scale was found to be uni-dimensional, and the dominant factor accounts for 63,3 % of the variance. (See Table 5:14).

Table 5:17: Dimension analysis of Technological Preparedness Subscale

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.833
Bartlett's Test of Sphericity	Approx. Chi-Square	1046.901
	df	10
	Sig.	0,000

Total Variance Explained						
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,169	63,380	63,380	2,725	54,505	54,505
2	0,635	12,710	76,090			
3	0,477	9,541	85,632			
4	0,425	8,491	94,123			
5	0,294	5,877	100,000			

The Organisational Culture factor obtained a Kaiser-Meyer-Olkin measure of sampling adequacy value of 0.791, and Bartlett's Test of Sphericity statistic value was 1923.613 ($df=10$, $p=0.000$), indicating that factor analysis can be conducted. The Organisational Culture factor scale was found to be uni-dimensional, with 69 % of the variance being accounted for by the dominant factor (See Table 5:15).

Table 5:18: Dimension analysis of Organisational Factor Subscale

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.791
Bartlett's Test of Sphericity	Approx. Chi-Square	1923.613
	df	10
	Sig.	0,000

Total Variance Explained						
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,450	69,006	69,006	3,157	63,133	63,133
2	0,749	14,988	83,994			
3	0,475	9,509	93,502			
4	0,262	5,237	98,740			
5	0,063	1,260	100,000			

The Political factor obtained a Kaiser-Meyer-Olkin measure of sampling adequacy value of 0.500, and Bartlett's Test of Sphericity statistic value is 47.199 ($df=3$, $p=0.000$), indicating that factor analysis can be conducted. The Political factor scale was found to be uni-dimensional, and 43 % of the variance was accounted for by the dominant factor. (See Table 5:16).

Table 5:19: Dimension analysis of Political Factor Subscale

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	47.199
	df	3
	Sig.	0,000

Total Variance Explained						
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,302	43,396	43,396	0,602	20,065	20,065
2	1,000	33,330	76,726			
3	0,698	23,274	100,000			

The Trust in e-commerce factor obtained a Kaiser-Meyer-Olkin measure of sampling adequacy value of 0.791, and Bartlett's Test of Sphericity statistic value was 683,746 ($df=6$, $p=0.000$), indicating that factor analysis can be conducted. The Trust in e-commerce scale was found to be uni-dimensional, and the dominant factor accounts for 62 % of the variance. (See Table 5:17).

Table 5:20: Dimension analysis of Trust in e-commerce Subscale

KMO and Bartlett's Test						
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.					0,708	
Bartlett's Test of Sphericity	Approx. Chi-Square				683,746	
	df				6	
	Sig.				0,000	
Total Variance Explained						
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,482	62,046	62,046	2,079	51,980	51,980
2	0,655	16,378	78,424			
3	0,611	15,273	93,697			
4	0,252	6,303	100,000			

5.5 Multicollinearity (Correlation)

The relationships between the independent variables are called Multicollinearity (Hair et al, 2014). In regression analysis, multicollinearity reduces the predictability of the regression model, hence, it is essential to examine the relationship (Myers, 1990).

Bivariate analysis was applied to test multicollinearity in this study. The test explores relationships between pairs of variables. The only possible values for the Pearson correlation coefficients are between -1 and 1, and the strength of a relationship is guided by the size of the absolute value. Multicollinearity exists on a scale when there is a correlation of 0.9 and above, between two independent variables (Hair et al., 2020).

Cohen (2013) gave guidelines to interpret correlation coefficient values which range between 0 and 1. A correlation of 0 means no relationship exists between the two involved variables. A correlation of 1 or -1 denotes a perfect correlation and indicates that, for the two variables involved, the value of one is determined by the value of the other variable. A correlation of 0.9 and above between any pair of independent variables indicates the existence of multicollinearity. For this study, the correlation coefficients fell between (0.756) and (0.397), as such, the study does not suffer from multicollinearity (see Table 5.18).

Table 5:21: Correlation coefficients for independent variables

		Socio-Cultural Factors	Technological Preparedness	Organisational Factors	Political Factor
Socio-Cultural Factors	Pearson Correlation	1	.791**	.749**	.397**
	Sig. (2-tailed)		0,000	0,000	0,000
	N	497	497	497	497
Technological Preparedness	Pearson Correlation	.791**	1	.756**	.416**
	Sig. (2-tailed)	0,000		0,000	0,000
	N	497	497	497	497
Organisational Factors	Pearson Correlation	.749**	.756**	1	.471**
	Sig. (2-tailed)	0,000	0,000		0,000
	N	497	497	497	497

(Table 5:21: Correlation coefficients for independent variables continued.....)

Political Factor	Pearson Correlation	.397**	.416**	.471**	1
	Sig. (2-tailed)	0,000	0,000	0,000	
	N	497	497	497	497

5.6 Testing the Research Model

The last stage of the quantitative data analysis phase was an evaluation of the validity of the structural model. Two techniques were used to evaluate the proposed conceptual model. The first technique was the structural equation modeling using Amos 27, and the second was regression analysis using SPSS.

5.6.1 The Structural Model (Testing the Path Model)

The study analysed the conceptual model by structural modelling (SEM). The modelling helps to confirm the survey findings' credibility. With SEM, structural relationships are evaluated through a series of equations that will define the interrelationships within the model structure and the nature of the relationships among constructs is specified. Correlations amongst constructs may be introduced without restriction to improve model fit. Indicators can only load onto one construct.

This study used AMOS 27 for the SEM procedures to test the conceptual model. Confirmatory Factor analysis (CFA) was conducted first to check the model fit and establish a measurement model. The scales' convergent and discriminant validity was also determined by CFA by examining the Average variance extracted (AVE), Standardized factor loadings, and Construct reliability. The built structural model was then used to examine the proposed causal paths between constructs and to check if it provides a suitable fit based on the empirical data.

5.6.2 Measurement Model (Confirmatory Factor Analysis (CFA))

The confirmatory factor analysis (CFA) model for this study is shown in Figure 5.1, with factors as proposed in the conceptual model. The CFA model illustrates correlations among the independent variables of the research. All the factor loadings on standardized estimates loaded above 0.6 and items below six were removed from the model. The independent variable, Political Factor, was excluded from the model since it was affecting the model fit.

The descriptive fit indices for the CFA model were then compared to the typical measurement model. A wide discrepancy between the two models will indicate the inadequacy of the proposed model.

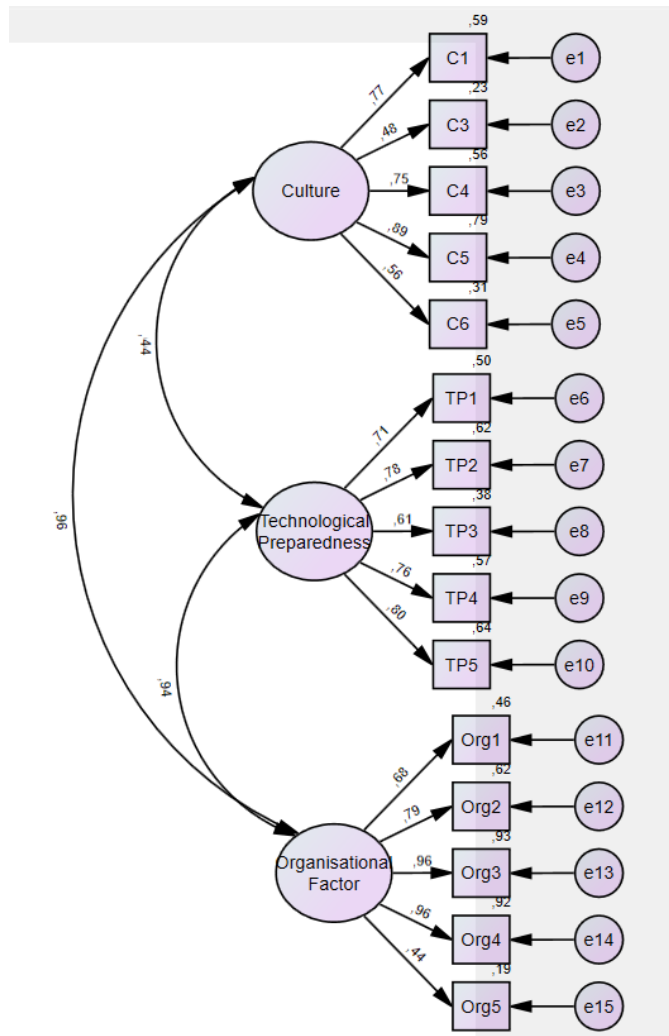


Figure 5:1 The CFA model for the study (using Amos 27)

The structural model fit, and the CFA model fit, were compared. Only those constructs included on the CFA measurement model had to be included in the structural model. The structural theory are considered invalid if the structural model fit is found to be worse than the CFA model fit.

5.6.3 Structural Model fit analysis

The approved factors on CFA (C, TP, and Org) were used to model the proposed conceptual model together with the demographic variables. Hypothesised relationships were tested for significance based on the p-Values from the model analysis summary by AMOS. The

relationships between all the independent variables - C, TP, and Org - with the dependent variable (TOE) were found to be significant. Relationships of all demographic variables (D1, D2, D3, D4 and D6) with the dependent variable (TOE) were found not significant (see Table 5.19).

5.6.4 Model fit analysis by Structural Equation Modelling (SEM)

A structural equation model generated through Amos was used to test the relationships. A good fitting model is accepted if the value of the CMIN/df is less than 5, and the goodness of fit (GFI) indices, (Hair et.al, 2014), the Tucker and Lewis (1973) index TLI, the Confirmatory Fit index (CFI) (Bentler, 1990) are greater than 0.9 (Hair et. al., 2014). In addition, the model fit is acceptable if the computed value of the standardized root mean square residual (RMR) is less than 0.05 and the root mean square error approximation (RMSEA) is between 0.05 and 0.08 (Hair et.al., 2014). The Fit indices for the model in Table 5:23 fall within the acceptable range.

Table 5:22: SEM Model fit indexes

Fit Indices	Acceptable threshold	Study test results	Decision
CMIN/DF	< 3.0	2.96	Accepted
NFI	≥ 0.90	0.911	Accepted
IFI	≥0.90	0.922	Accepted
TLI	≥ 0.90	0.902	Accepted
CFI	≥ 0.90	0.905	Accepted
RFI	≥0.90	0.902	Accepted
GFI	≥0.90	0.913	Accepted
AGFI	≥0.90	0.901	Accepted
RMSEA	< 0.80	0.78	Accepted

Based on the provided guide, all the indicators meet the expected threshold for an acceptable model fit, therefore, an acceptable model fit was obtained from the survey findings. The political factors variable was removed from the final model since it failed the factor analysis stage and further analysis of the scale might be needed to establish its shortfalls.

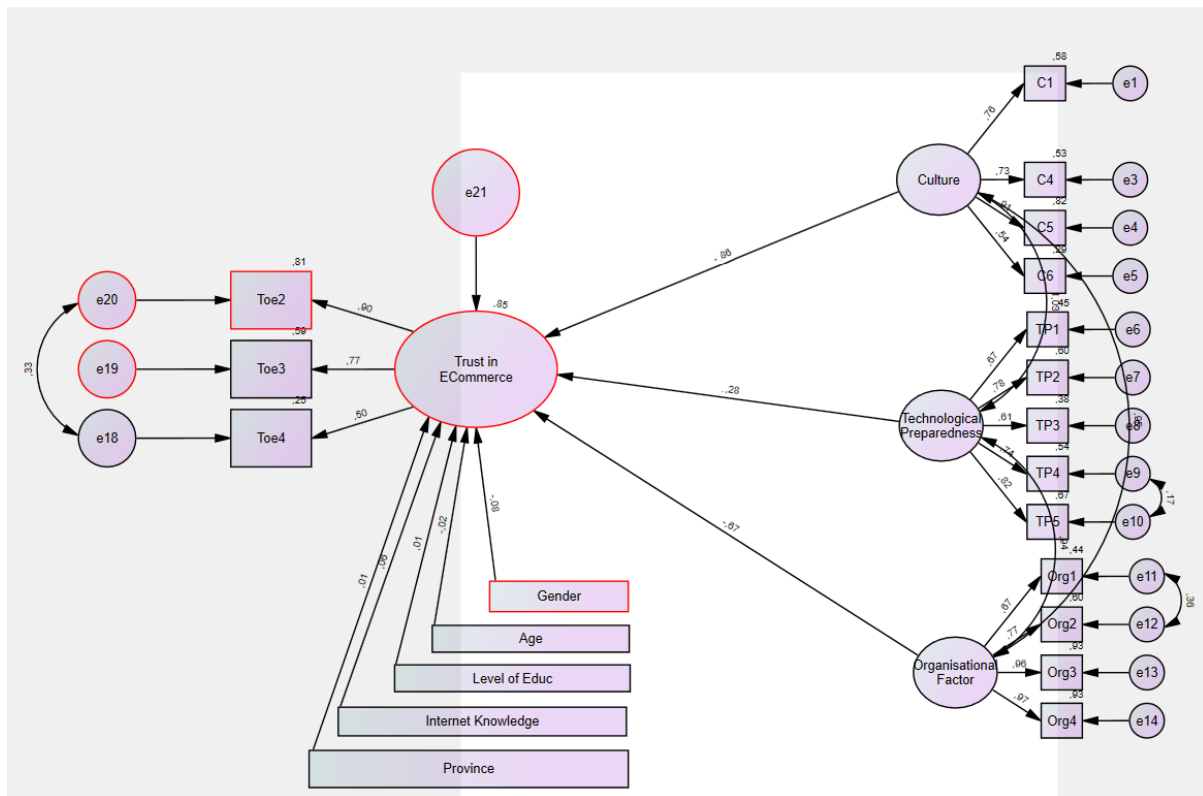


Figure 5.2: The squared multiple correlations and standardized estimates of the study's conceptual model (using AMOS)

5.6.5 Hypothesis testing (t- test analysis)

The study evaluated the structural model to determine how the theoretical relationships specified in the conceptual model are substantiated by the empirical data. The evaluation focused more on the structural linkages between the endogenous and exogenous latent variables. According to Mahembe (2015), four issues are of paramount significance in the assessment of the structural model. Firstly, it is vital to assess the signs of the parameters representing the paths between the latent variables to ascertain the degree of consistency with the nature of the causal effect hypothesised to exist between the latent variables. Secondly, it is important to determine if the parameter estimates are significant ($p < .005$). Thirdly, it is important to assess the magnitudes of the estimated parameters indicating the strength of the hypothesised relationships. Lastly, it is important to evaluate the squared multiple correlations (R^2), which indicate the amount of variance in each endogenous latent variable that is explained by the latent variables linked to it in the hypothesised structural model.

To conclude on the hypotheses, the following indices were obtained from the SEM report by Amos - Standardised regression weight (b- value), Critical value (t- value) and p- value. The t value must be greater than 1.96 and the p value less than 0.05 for the hypothesis to be acceptable. The magnitude of the b- value indicates the amount of influence the independent variable has on the dependent variable (Hair, 2014). The study evaluated the influence of socio-cultural factors on trust in e-commerce; this was negative and significant (b=-0,721, t= 1,666, p<0.05), hence H1 was supported. The influence of technological preparedness on trust in e-commerce was positive and significant (b=0,740 t=4,235 and p<0.05); H2 was, therefore, supported. The influence of organisational factors on trust in e-commerce was negative and significant (b= - 0,506, t= 3,764 and p<0,05), hence the hypothesis H3 was supported. The hypotheses H3, testing the influence of political factors on trust in e-commerce was included from the SEM model.

The study also evaluated the influence of demographic variables on trust in e-commerce. The influence of gender on e-commerce was found to be positive in favour of males and insignificant (b= 0,07, t= 2,724, p= 0.06). The influence of age was found to be negative and insignificant (b= - 0,016, t= 0,724, p= 0.469). The influence of the level of education was found to be positive and insignificant (b= 0,04, t= 0,254, p=0.8). The influence of knowledge of the internet was found to be positive and insignificant (b=0.03, t=2,036, p=0,042). The influence of location was found to be negative and insignificant (b=0,008, t=0,498, p=0,618). For all the demographic variables, the b- value was very small, the t- value less than 1,96 and the p- value greater than 0.05, hence the t-test confirmed the hypothesis that demographic variables have an insignificant influence on trust in e-commerce (Hair et.al, 2014).

Table 5:23: Results of hypotheses testing and path coefficients

	Estimate	S.E.	C.R.	P	Label	Hypothesis	Decision
TOE <--- C	-,733	,184	1,666	***	par_13	Socio-Cultural factors influence trust in e-commerce	Supported
TOE <--- TP	,759	,179	4,235	***	par_16	Technological Preparedness influence trust in e-commerce	Supported
TOE <--- Org	-,508	,135	-3,764	***	par_17	Organisational factors influence trust in e-commerce	Supported

	Estimate	S.E.	C.R.	P	Label	Hypothesis	Decision
TOE <--- D1	-,077	,028	-2,724	,006	par_21	Gender influences trust in e-commerce	Supported
TOE <--- D2	-,016	,022	-,724	,469	par_22	Age does not influence trust in e-commerce	Supported
TOE <--- D3	,004	,017	<u>,254</u>	,800	par_23	Level of Education does not influence trust in e-commerce	Supported
TOE <--- D4	,030	,015	2,036	,042	par_24	Internet Knowledge does not influence trust in e-commerce	Supported
TOE <--- D6	,008	,017	,498	,618	par_25	Location Province does not influence trust in e-commerce	Supported

5.6.6 Regression Analysis

Regression Analysis is another statistical technique to evaluate relationships between independent and dependent variables (Desboulets, 2018). *Multiple Regression* is applied to explore the relationship between a single dependent variable and several independent variables. In Multiple Regression analysis, known values of independent variables are used to predict the single value of a dependent variable (Desboulets, 2018). This study adopted *the Multiple Regression analysis* technique to evaluate the conceptual model (see Figure 5:3)

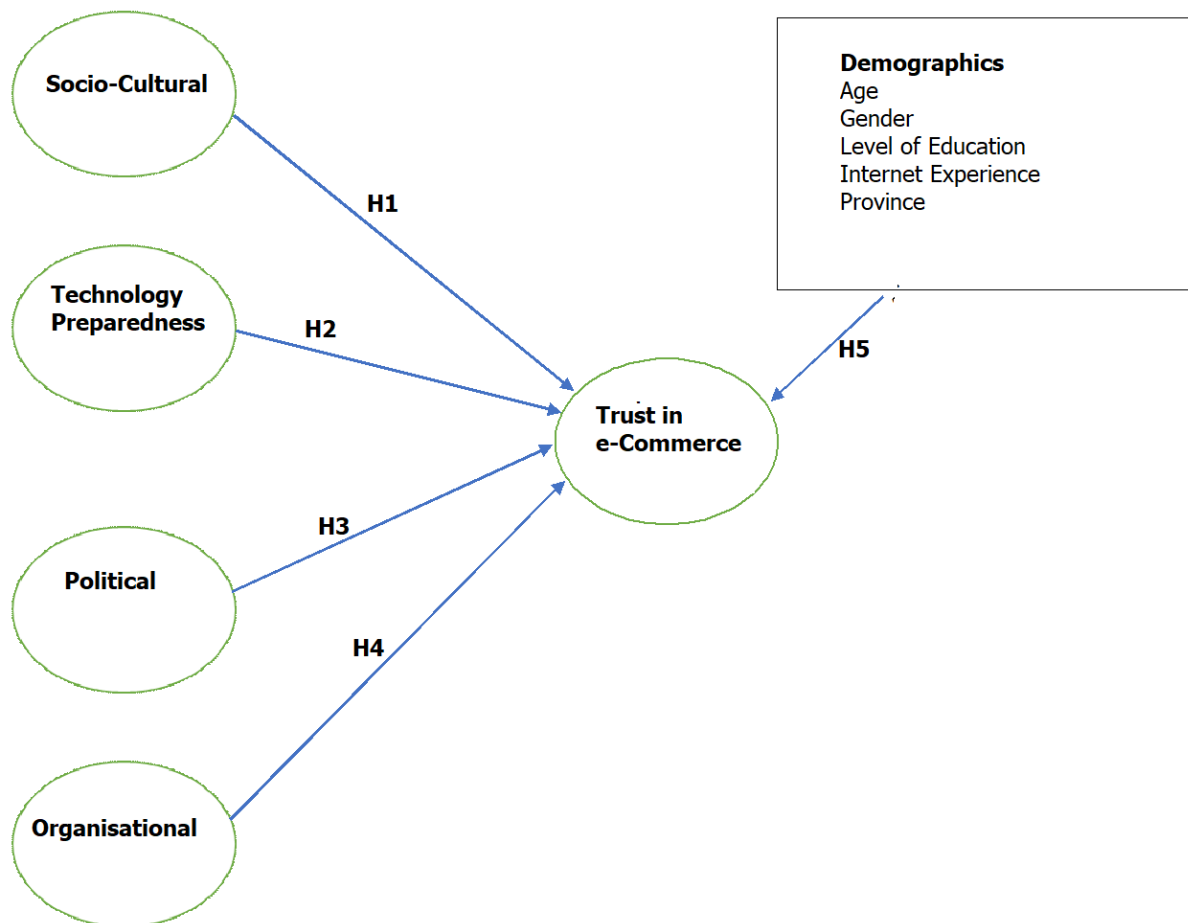


Figure 5:3: Conceptual Model

Multiple Regression Analysis was applied to test model fit. The hypotheses as established in Chapter 3 were tested by the model

5.6.6.1 Multiple Regression Analysis

This study identified a set of control variables (age, gender, internet experience, education level and province). Determining the significance of the relationship between these controller variables and the dependent variable is essential, thus, the first part was an analysis of the regression of the controller variables on the dependent variable. The second part tested the regression of the demographics together with independent variables - socio-cultural, technological preparedness, organisational preparedness, and political factors - on the dependent variable.

In the first stage, trust in e-commerce was added in the dependent variable box in the linear regression procedure using the SPSS software. The controller variables - age, education level, gender, province, and internet experience - were moved into the "Block 1" box as

independent while, socio-cultural, technological preparedness, political and organisational factors were introduced as the independent variables in the "Block 2" box.

Table 5:21 summarises the regression analysis results, showing the two models separately. Model 1 shows the regression analysis results for - age, gender, education level, Internet experience, and province (controller variables) on trust in e-commerce (dependent variable). Model 2 demonstrates the combined model's effect that includes controllers and independent variables - socio-cultural, technological preparedness, organisational preparedness, and political factors - on trust in e-commerce (TOE) when applying the regression analysis.

Table 5:24: Summary for the Regression Analysis Test

Model Summary^c				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.148 ^a	0,022	0,012	0,72626
2	.781 ^b	0,610	0,603	0,46040

ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,821	5	1,164	2,207	.052b
	Residual	258,982	491	0,527		
	Total	264,803	496			
2	Regression	161,573	9	17,953	84,694	.000c
	Residual	103,230	487	0,212		
	Total	264,803	496			

Table 5:25: Summary for the Regression Analysis Test (Continued....)

Coefficients ^a											
Dependent Variable: Trust e-commerce	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics		
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF	
Model 1	(Constant)	3,552	0,159		22,358	0,000					
	Gender	-0,124	0,090	-0,085	-1,374	0,170	-0,015	-0,062	-0,061	0,525	1,906
	Age	-0,101	0,058	-0,087	-1,751	0,081	-0,046	-0,079	-0,078	0,812	1,231
	Education	0,062	0,041	0,069	1,528	0,127	0,080	0,069	0,068	0,977	1,023
	Internet Knowl	0,107	0,051	0,139	2,106	0,036	0,046	0,095	0,094	0,458	2,185
	Province	0,066	0,040	0,073	1,638	0,102	0,065	0,074	0,073	0,996	1,004
Model 2	(Constant)	1,631	0,171		9,513	0,000					
	Gender	-0,003	0,057	-0,002	-0,057	0,954	-0,015	-0,003	-0,002	0,520	1,924
	Age	-0,008	0,037	-0,007	-0,225	0,822	-0,046	-0,010	-0,006	0,805	1,242
	Education	0,051	0,026	0,057	1,985	0,048	0,080	0,090	0,056	0,973	1,028
	Internet Knowl	0,028	0,032	0,037	0,880	0,379	0,046	0,040	0,025	0,453	2,210
	Province	0,017	0,026	0,019	0,678	0,498	0,065	0,031	0,019	0,983	1,018
	CULT	-0,551	0,065	-0,571	-0,852	0,395	0,651	-0,039	-0,241	0,178	2,616
	TECH_P	0,383	0,063	0,415	0,603	0,547	0,667	0,027	0,171	0,170	2,898
	ORG_FAC	0,661	0,053	0,763	12,469	0,000	0,777	0,492	0,353	0,214	2,673
	POLIT_F	0,162	0,041	0,148	1,507	0,133	0,401	0,068	0,143	0,773	1,293

5.6.6.2 Implication of regression test on Hypotheses

The results of the regression analysis show that model 1 is not significant with ($P > 0.001$) while model 2 is significant with ($P < .001$). The R^2 suggests that the independent variables (socio-cultural, technological preparedness, organisational preparedness, and political factors) can explain 61% (R Square multiplied by 100) of the variance determining trust in e-commerce. The effects of - education level, age, internet experience, gender, and the province of the SMME - were controlled. The VIF (Variance Inflation Factor) values vary between (1.293) and (2,898), and this indicates the absence of multicollinearity.

The study found all the predictors (independent variables) in the model to be significant. According to the data sample, the beta weight in organisational factors was ($\beta = 0.661$), signifying that it is the most substantial predictor factor of trust in e-commerce. Cultural Factor is the second influential factor for trust in e-commerce with ($\beta = -0.551$). The negative coefficient means that, as the independent variable, socio-cultural factor, increases, the dependent variable (trust in e-commerce) tends to decrease. Respondents from the sample, who are more into cultural beliefs, do not trust e-commerce to be advantageous to their businesses. Technological factor was the third influential factor for trust in e-commerce ($\beta = 0.383$), and political factors have the least influence on trust in e-commerce (political factors $\beta = .162$).

For the results from the controllers, although model 1 is insignificant with ($p > 0.001$); gender, age, and internet knowledge significantly influence trust in e-commerce. According to the

results, males have more trust in e-commerce. Age has an inverse influence on trust in e-commerce, while the level of education and internet knowledge directly influence trust in e-commerce. The influence of the level of education was minimal in this sample, therefore, the results of the regression analysis support the hypotheses (see Table 5:22).

Table 5:26: Regression test results implication on hypotheses

Relationship	Hypothesis	β	Sig	Outcome
Socio-Cultural Factors influence Trust in e-commerce	H1	-0,551	.000 ^c	Supported and significant
Technological Preparedness influences Trust in e-commerce	H2	0.162	.000 ^c	Supported and significant
Political factors influence Trust in e-commerce	H3	0.383	.000 ^c	Supported and significant
Organisational Factors influence Trust in e-commerce	H4	0.661	.000 ^c	Supported and significant
Gender, Age, Level of education, Internet experience and Province influence trust in e-commerce	H5	<0.1	.052 ^b	Supported and significant

5.7 Summary

The findings of the survey data analysis were presented in this chapter. The focus of the survey was to examine the factors influencing SMMEs' trust in e-commerce in the Limpopo, Mpumalanga, and Northern Cape Provinces of South Africa. Each section of the chapter discusses specific techniques that were used in analysing the quantitative data as guided by literature.

The chapter starts by giving descriptive statistics of the survey. The response rate for the survey and respondent profiles were discussed in sections 5.2.1 and 5.2.2. The reliability test results in section 5.3 show that all five scales used in the survey had a Cronbach alpha above 0.7, which is acceptable (Pallant, 2020).

Section 5.4 discussed the results of the dimension analysis for the survey scales. The exploratory factor analysis (EFA) indicated that all the items used in the survey had loadings above 0.40, and no cross-loadings were found (Pallant, 2020; Straub, 2004). The principal component analysis (PCA) was applied to verify the constructs' validity (Pallant J. , 2020)

Section 5.5 discussed the results of study model's testing using structural equation modelling (SEM) and multiple regression analysis. Both tests suggested that sociocultural factors, technological preparedness, and organisational factors significantly predict SMMEs' trust in e-commerce. The dataset results, however, do not significantly support the inclusion of political factors in the model as demonstrated through SEM.

The qualitative study (interview findings) will be discussed in Chapter 6. As highlighted in Chapter 4, the qualitative study was applied to investigate the relationship between e-commerce in SMMEs and sustainable development. The qualitative study was also used to confirm some of the findings of the quantitative study and establish the challenges of e-commerce in SMMEs.

6 CHAPTER SIX QUALITATIVE DATA ANALYSIS

6.1 Introduction

This chapter aims to test and validate the proposed conceptual model on the impact of adopting e-commerce to promote sustainable development. The qualitative data identified the factors that influence e-commerce adoption by SMMEs. Referring to the proposed research design (Figure 4.5), the qualitative data analysis is the second phase of the sequential mixed-methods approach. The qualitative data analysis responded to the first research question by identifying the challenges of e-commerce in SMMEs. The analysis also responded to the third research question that focused on determining whether e-commerce in SMMEs can contribute to sustainable development.

In the quantitative approach phase, the researcher conducted a survey to confirm the causal factors for e-commerce adoption by SMMEs in South Africa. In the qualitative phase, semi-structured interviews and document analysis were undertaken to gather data. The collected qualitative data contributed much to confirming the challenges for e-commerce in SMMEs, which responded to the first research question.

Qualitative data was collected from directors of SMMEs, administrators in government departments involved with SMMEs, and service providers for e-commerce. Eight interviews were carried out, and ten documents were selected for data analysis. As discussed in Chapter 3, sustainable development has been a topical issue in the modern world. The adoption of e-commerce is viewed as potentially uplifting the previously-disadvantaged in developing countries, however, despite these intentions, no empirical data have been obtained on the contribution of e-commerce in SMMEs to sustainable development in developing countries, such as South Africa.

This chapter begins by detailing the data analysis strategy and the tools used, then gives the interviewees' profiles and the documents selected for analysis. The extraction of themes, from the process is illustrated, and the themes are discussed. The vital findings are also highlighted in these discussions.

6.2 Qualitative Data Analysis Tools

The purpose of data analysis is to interpret and draw conclusions from the mass of collected data. Qualitative collected data were brought together in an orderly manner to be structured and interpreted by the researcher. According to Lofland & Lofland (1995); Marshall & Rossman

(2014), qualitative data analysis is best done by way of discovering patterns in the data. The in-depth structured interviews were recorded using a digital voice recorder and then transcribed using Microsoft word. The transcribed interviews and the secondary data documents gathered were analysed using the Archive of Technology, Lifeworld, and Language for text interpretation (ATLAS.ti) version 8, a qualitative data analysis computer program. The final interview guide used during the data collection phase is attached in the appendix section (see Appendix B).

6.2.1 ATLAS.ti

ATLAS.ti is a data analysis software that may be used for qualitative data analysis (QDA); it is exceptionally adaptable and user-friendly. The software allows researchers to apply codes or labels to text, sounds, photos, or video; search these codes for patterns; and build classifications of codes that represent stable models of the underlying data's conceptual structure (Lewis, 2004). ATLAS.ti 8.4.26 was used to analyse the qualitative data in this study.

Despite numerous other QDAs available for this study, ATLAS.ti was selected mainly for the following reasons: first and foremost, its simple access to training and program support. Compared to other qualitative tools, ATLAS.ti is more cost-effective and fits within the study's budget (Chakuzira, 2019; Lebambo, 2017; Shumba, 2020). The following section describes the various ATLAS.ti phases that were implemented when analysing data.

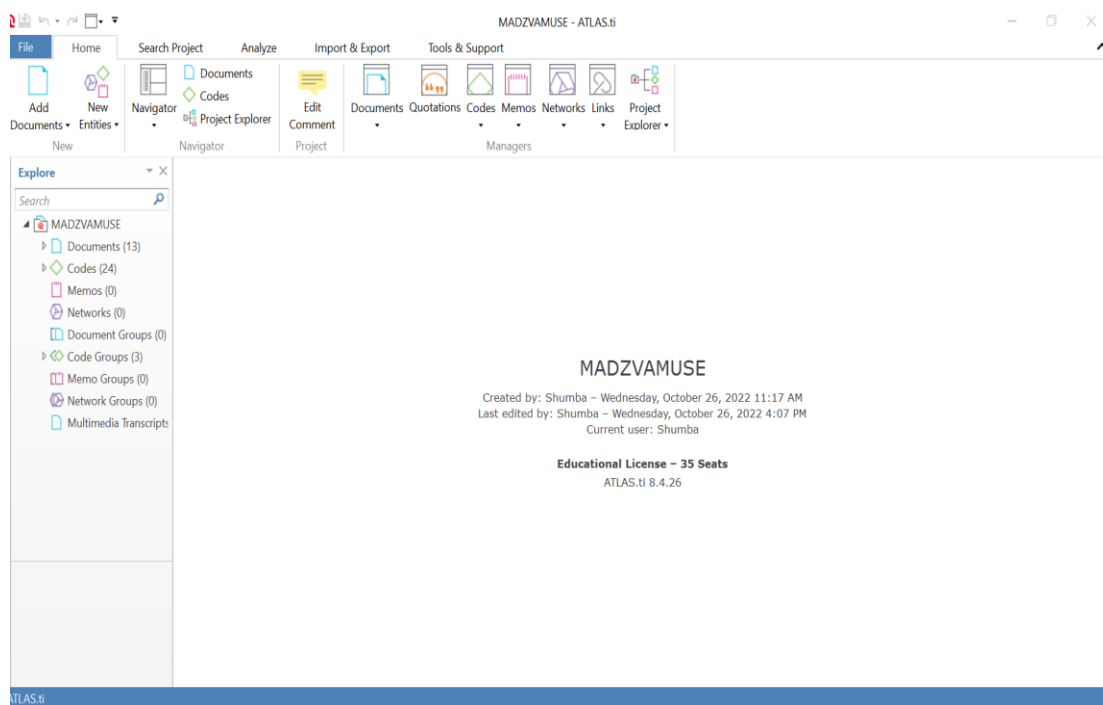


Figure 6.1: ATLAS.ti Primary Document Manager Window

Source: ATLAS.ti 8.4.26

The framework thematic analysis was used to analyse data from the participants. A framework thematic analysis is flexible during an analysis process as it allows the user to either gather all the data and then analyse it or analyse the data as it is being collected (Srivastava & Thomson, 2009). The following sections discuss the various ATLAS.ti phases that were employed to clarify the framework theme analysis.

6.2.2 STEP 1: Attitude of openness

The researcher began the data analysis phase with an open attitude, ensuring that the appropriate emerging codes were extracted from the collected data. As depicted in Figure 6.2, all the information collected for data analysis was imported to ATLAS.ti to form the primary document.

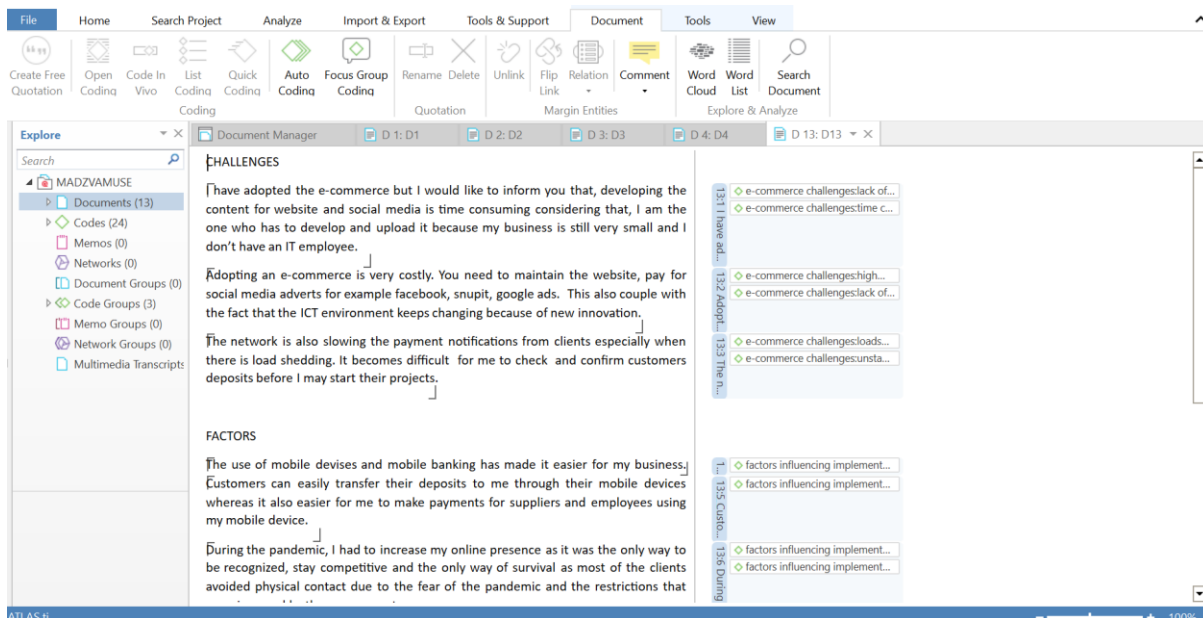


Figure 6.2: Primary Document Manager Window for ATLAS.ti

Source: ATLAS.ti 8.4.26

6.2.3 STEP 2: Constant Comparison and Open Coding

The next step involved the generation of various categories by constant comparison of data through a procedure known as 'open coding' (Age, 2011). This procedure saturated the whole research process since it involved comparing cases and emerging data to create more cases throughout the data collection process (Heath & Cowley, 2004). ATLAS.ti used the Code Manager to execute this process; this function clusters data into related ideas called 'codes' (see Figure 6.3).

The next step was to generate numerous categories by constantly comparing data using a method known as 'open coding' (Age, 2011). Since the process included comparing cases and emerging data with other cases throughout the data-gathering phase, this technique saturated the whole research process (Heath & Cowley, 2004); ATLAS.ti uses the Code Manager for this procedure. This function clustered data into related ideas called 'codes' (see Figure 6.3).

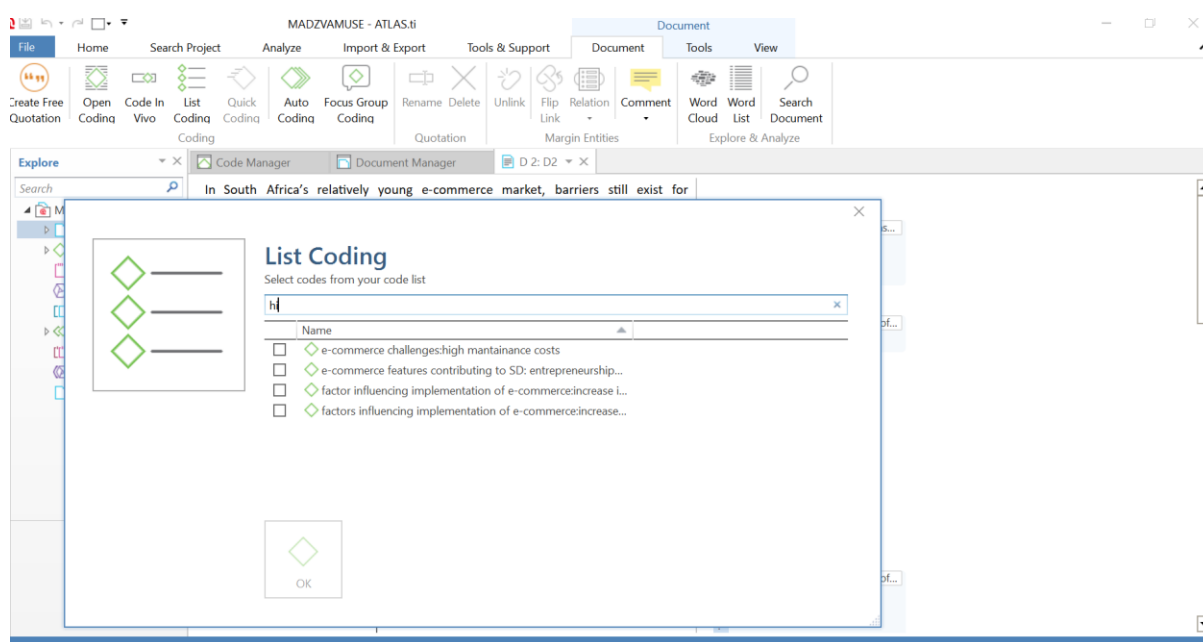


Figure 6.3: ATLAS.ti codes option window

Source: ATLAS.ti 8.4.26

During this step, the researcher obtained meaning from paragraphs, sentences, phrases, and words on the primary document manager text on ATLAS.ti, by highlighting the paragraph, sentence, phrase, or word and right-clicking on the highlighted text to create a code, as shown in Figure 6.3. The researcher constructed several codes by repeatedly performing this method on the primary document management text.

ATLAS.ti supports seven code assignment techniques (Archer, 2008). First, "free codes" may be formed without being connected with any specific content (Friese, 2014). The most prevalent strategy utilized for this study is "open coding," which assigns a code to individual parts of the text. After storing codes in the Codes Manager, codes from an existing list may be assigned to existing - "coding by list" (Archer, Herman, van Vuuren et al., 2017).

6.2.4 STEP 3: Selective coding and Core category

Codes are then combined into families or clusters for further analysis as shown in Figure 6.4.

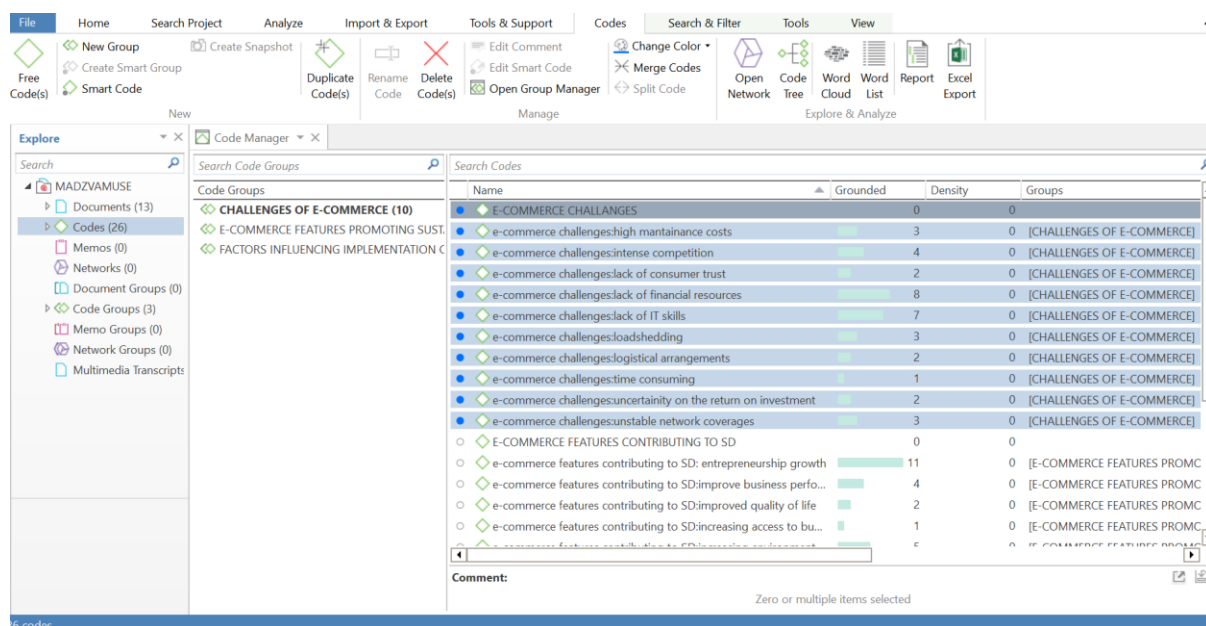


Figure 6.4: Code Group manager window for ATLAS.ti

Source: ATLAS.ti 8.4.26

Using constant comparison, the researcher established core codes based on the information offered by the participants (Braun & Clarke, 2006), which is a category that holds all other categories together (for example, Challenges of E-Commerce, Figure 6.4). When the core code emerged, the researcher undertook the process of selective coding (Heath & Cowley, 2004). Selective coding allowed the researcher to compare incoming data to the core codes more precisely than when the categories were first established. In this process of selective coding, only variables related to the core codes were considered to generate improved categories

6.2.5 STEP 4: Building new theory

The final stage involves comparing the improved categories to concepts thereby developing new theory. A theoretical coding technique is used to analyze how multiple categories are connected and is aided by the creation of theoretical memos (Heath & Cowley, 2004) and the elaboration of theoretical codes. The analysis phase ended with the theoretical writing (Age, 2011) thus, all the details of the practical theory were brought together in an overall conceptual description. A framework was, therefore, developed using the codes and code groups that emerged from the analysis. In this study the framework was developed using a mixed-method data analysis.

6.3 Participants profiles' summary

To understand the challenges of e-commerce and factors influencing the implementation of e-commerce and to determine whether there are goals for sustainable development that can be advanced through the adoption of e-commerce by SMMEs' in South Africa, the study used findings from six interviews with SMMEs entrepreneurs. Data from the interviews were complemented by analysing eight documents selected based on their relevance to the study. Summary of the participants' demographics are given in Table 6.

Table 6:1: Summary of Participants

Participant	Data collection method	Nature of business	Description
Participant 1	Primary	Clothing designer, restaurant, and e-hailing transport	<ul style="list-style-type: none"> The SMME has been operating online from the year 2018. It intensified the online operation during the Covid-19 pandemic. The business is located in Thoyandou and has many customers across South Africa.
Participant 2	Primary	Security	<ul style="list-style-type: none"> Installs cameras in private buildings and maintains them. Uses a lot of social media such as Instagram, Facebook to advertise its business services. Started operating in 2019. The owner has BCom in Business Information Systems.
Participant 3	Secondary	ICT analyst	<ul style="list-style-type: none"> A news article written by the Co-Founder and CEO of a data-driven logistics aggregation platform that promotes efficiency in e-commerce logistics by linking online merchants with logistics providers along the supply chain to allow end-to-end solutions.
Participant 4	Secondary	ICT analyst	<ul style="list-style-type: none"> Analysis e-commerce data.
Participants 5, 6, 7 & 8	Secondary	Business analyst	<ul style="list-style-type: none"> News stories from a Senior Director, IoT for one of the world's leading telecommunications firms, with over 320,000 workers and operations in over 190 countries.
Participants 9, 10, 11 & 14.	Secondary	Business analyst	<ul style="list-style-type: none"> News article from Co-founder and Editor-in-Chief a well-known firm in South Africa which provides opportunities to new digital startups.

Participant 12	Primary	Construction business	<ul style="list-style-type: none"> • The business started operating in 2016. • The owner is a hybrid entrepreneur and holds a Master's in Business Management.
Participant 13	Primary	Construction business	<ul style="list-style-type: none"> • A hybrid entrepreneur who holds a PhD in Economics. The company started operating in 2015 and has been utilizing social media and other online platform to advertise the services offered by the business. • The firm has branches in Limpopo, Gauteng and Kwazulu Natal Provinces.
Participants 16 & 17	Primary	Middle level managers	<ul style="list-style-type: none"> • Works at the Department of Communications and Digital Technologies in the Limpopo Province.

6.4 Challenges for e-commerce in SMMEs in South Africa

This section aimed to establish the challenges for e-commerce adoption by SMMEs in South Africa. The perspectives from the interviews and the analysed documents for this study are discussed. About 35 codes initially emerged from the data during analysis; these were merged based on their similarity using constant comparison of codes. The process resulted in ten codes: high maintenance costs, intense competition, lack of consumer trust, lack of financial resources, lack of IT skills, load-shedding, logistical arrangements, time consumption, uncertainty on returns on investment, and unstable network coverage.

Name	Grounded	Density	Groups
e-commerce challenges:high mantainance costs	3	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:intense competition	4	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:lack of consumer trust	2	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:lack of financial resources	8	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:lack of IT skills	7	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:loadshedding	3	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:logistical arrangements	2	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:time consuming	1	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:uncertainty on the return on investment	2	0	[CHALLENGES OF E-COMMERCE]
e-commerce challenges:unstable network coverages	3	0	[CHALLENGES OF E-COMMERCE]

Figure 6.5: Challenges of e-commerce

Source: Challenges of e-commerce using Atlas.ti

6.4.1 High maintenance costs

The study results show that one of the challenges for e-commerce in SMMEs in South Africa is high maintenance costs. The maintenance costs are website development, connectivity, hardware, software, the cost of e-payment and logistics, maintaining a workforce, and hidden costs such as annual license fees and upgrading fees. The following captured remarks confirm this reason.

For any company that exists today in the digital world, visibility is an integral aspect that can make or break a business. (Participant 1).

Their digital expenditure is significantly higher since they must maintain a unique digital offering while ensuring data security. (Participant 9).

Adopting e-commerce is very costly. You need to maintain the website and pay for social media adverts such as for facebook, snupit and google ads. This is coupled with the fact that the ICT environment keeps changing because of innovation. (Participant 13).

These remarks confirm what has been concluded from reviewing literature. Limited budgets for SMMEs have been identified as a challenge for e-commerce adoption (Kebonye, 2010; Ndayizigamiye, 2019).

6.4.2 Intense competition

The existence of large firms in e-commerce was proffered as one of the challenges SMMEs face in the e-commerce market. The participants commented that it becomes difficult for them to prosper due to the existence of large firms with better resources when competing in the e-commerce market. Large firms, thus, enjoy a competitive advantage in e-commerce due to their better ICT infrastructure, financial and human resources, making SMMEs reluctant to adopt e-commerce (Matsinhe, 2019; Gupta, 2020; Jones, 2013; Kotelnikov, 2007).

Consumers with an abundance of choices, naturally settle for brands that offer immaculate customer experience, resulting in SMEs doing the same to drive business growth. (Participant 1).

The venture into e-commerce is complex due to the competition with established players in the market. Larger organisations give them tough competition, and they easily attract skilled staff in these areas. The existence of a skills gap in the IT field, therefore, causes SMEs who struggle to secure trained staff to operate the new technologies, falling behind the competition. (Participant 2).

Larger retailers have bargaining power and that potentially and significantly lowers input costs than an SME (small medium enterprises) going virtual. (Participant 9).

These remarks confirm the findings of this study as discussed in Section 2.3.

6.4.3 Lack of consumer trust

Lack of consumer trust in e-commerce is one of the significant challenges facing SMMEs when adopting e-commerce for their businesses. A study by Bhatnagar and Ghose (2004) claimed that numerous consumers do not prefer to purchase online because they are concerned about the security of their sensitive and detailed information, therefore, security concerns are one of the factors limiting SMMEs consumers from purchasing online. It has been established that privacy and security issues negatively impact e-commerce for people who do not trust online transactions would probably spend less on them. Reddy (2012), Matea and Vojvodic (2014)

state that customers' concerns about online transactions are usually associated with online stores revealing private information, the possibility of fraud, and the incapability to touch and see the product before making the actual purchase. The following confirms the lack of consumer trust in engaging in e-commerce transactions.

Key challenges to overcome were consumer trust in the fulfilment of sales where physical products had to be delivered, and logistical solutions to meet spiking demand. (Participant 9).

For me the growth of mobile banking is also an important contributor in making the adoption of e-commerce successful because everything can be done on a mobile phone even though majority of the people fear losing their money as they engage in online trading. (Participant 12).

The above remarks confirm the findings on the Culture, Policy, Technology Framework (Section 3.1.1), which identified trust as influencing how consumers and business make decisions regarding e-commerce transactions (Bajaj, 2004; Park, 2014; Ahluwalia, 2020).

6.4.4 Lack of financial resources

The study results show that SMMEs lack the financial resources required to adopt e-commerce for their business operations. SMMEs need financial resources to acquire ICT resources or infrastructures which serve as the backbone of e-commerce initiatives (Ameyaw & Modzi, 2016; Kebonye, 2010; Ndayizigamiye, 2019). The participants in the study indicated the following:

SMEs often have limited resources in terms of capital, manpower, etc, making it challenging for them to manage every activity within the organization. For every business, customer satisfaction needs to be the priority, but SMEs often find this challenging due to a lack of sufficient resources. (Participant 1).

This can come at a significant cost, especially as the global pandemic has forced companies to shift available funds to more pressing areas such as health and safety, and employment protection. Many SMEs face infrastructure challenges, ranging from loadshedding. (Participant 2).

Ranging from lack of digital access to poor town planning which can make delivery difficult. (Participant 4).

Adopting an e-commerce is very costly. You need to maintain the website, pay for social media adverts, for example, on Facebook, snupit, and google ads. This is also coupled with the fact that the ICT environment keeps changing because of innovation. (Participant 13).

These remarks confirm the findings from literature as discussed in Chapter 3.

6.4.5 Lack of IT skills

The study results revealed that the lack of IT skills in SMMEs also challenges their capacity to adopt e-commerce. SMMEs entrepreneurs and their employees lack the IT skills needed to implement e-commerce. This makes it difficult for them to adopt e-commerce and use it as a tool for operation. For SMMEs, the owner is the center of the business, making all or most of the decisions for the business, so the adoption and use of e-commerce depend on the owner's IT skills, personality, and attitude toward technology (Bvuma & Marnewick, 2020; Gupta, 2020; Barroso, 2019; Jones, 2013; Kotelnikov, 2007).

It often requires various skills, including technical savvy, analytical skills, and basic marketing capabilities. They compete with more prominent firms that attract qualified personnel in these areas. As a result of the IT skills gap, SMEs need to catch up since they need skilled personnel to operate and adopt new technology. For example, an SMME wishing to adopt an e-commerce strategy may require site design, coding, marketing, and SEO expertise. (Participant 2).

SMMEs from the townships have many challenges with e-commerce, some of which need more access to better town infrastructure, which results in difficulties in delivering goods and services. (Participant 4).

I also do not have any know how to develop a website and some of the thing that are needed for my business to have an online presence. (Participant 12).

I have adopted the e-commerce, but I would like to inform you that, developing the content for website and social media is time consuming considering that, I am the one who has to develop and upload it because my business is still very small, and I don't have an IT employee. (Participant 13).

6.4.6 Loadshedding

The results showed that load-shedding severely affects e-commerce's adoption by SMMEs. The increase in electricity load-shedding affects the network coverage, affecting the internet connectivity for SMMEs and their clients and slowing down business transactions, hence, some business transactions take a long time to complete. The following remarks were captured during the interviews:

We are faced with infrastructure challenges, ranging from loadshedding. (Participant 2).

I prefer to do business the traditional way because of loadshedding; my customers will have to come on their own to purchase the products from me. (Participant 12).

The network is also slowing the payment notifications from clients especially when there is load shedding. It becomes difficult for me to check and confirm customers deposits before I may start their projects. (Participant 13).

Loadshedding is generally attributed to inadequate infrastructure which is common in most of the developing countries (Bajaj, 2004; Park, 2014; Ahluwalia, 2020).

6.4.7 Logistical arrangements

An increase in third-party logistics firms also contributed to the implementation of e-commerce for SMMEs. Businesses now use third-party logistics providers to outsource logistics functions that are not core activities. These third-party logistics firms' services frequently include transportation and warehousing services at a lesser cost and with better results than enterprises that employ in-house operations. When a firm can acquire high logistical services from its suppliers, it may boost consumer satisfaction with its products while depending on satisfactory order fulfillment by third parties, making it more straightforward to adopt and benefit from e-commerce, effectively.

There are now logistics organisations and fulfillment platforms using modern technology to guarantee efficient, cost-effective, easy delivery and order fulfillment. Additionally, there are now networks of delivery partners that businesses can use. (Participant 1).

Bajaj, 2004; Park, 2014 and Ahluwalia, 2020 identified logistical issues as playing an important role in the decision by both businesses and consumers regarding e-commerce. Unreliable logistics will negatively impact e-commerce.

6.4.8 Time consuming

The study's findings also show that adopting e-commerce by SMMEs is time-consuming. Adopting e-commerce is not easy for all SMMEs as it requires a lot of effort and commitment to ensure that all the platforms that enable the business to stay online are efficient and effective. This was explained as follows:

I have adopted the e-commerce, but I would like to inform you that, developing the content for website and social media is time consuming considering that, I am the one who has to develop and upload it because my business is still very small and I don't have an IT employee. (Participant 13).

6.4.9 Uncertainty on the return on investment

The uncertainty of the return on investment is one of the significant challenges that prevent some SMMEs investing heavily in e-commerce for their businesses (Bajaj, 2004; Park, 2014; Ahluwalia, 2020). The following remarks were captured:

My business is not using e-commerce because, I am not fully aware of the benefits of adopting e-commerce. I am not sure if the money, I will invest in e-commerce will generate profit for me. I am of the view that you need to invest a lot of resources to be able to have an online business. (Participant 12).

6.4.10 Unstable network coverage

Unstable network coverage affects e-commerce as it slows down access to the internet. The internet is essential for every business that has adopted e-commerce as it facilitates access to powerful tools of communication, available on e-commerce websites, for information search. Should SMMEs be disconnected from the internet, this could cause a severe loss of business, thus, SMMEs' productivity and other operations are stalled when disconnected or when the network is unstable (Bvuma & Marnewick, 2020; Gupta, 2020; Barroso, 2019; Jones, 2013; Kotelnikov, 2007).

Poor connectivity and network access due to expensive or inadequate infrastructure also significantly affect ordering, payments, marketing, and many other business areas. This digital gap affects how businesses contact customers in local areas,

making it grow harder in the long run, especially for SMMEs operating in remote areas. (Participant 2).

The network is also slowing the payment notifications from clients especially when there is load shedding. It becomes difficult for me to check and confirm customers deposits before I may start their projects. (Participant 13).

Figure 6.6 summarises the challenges of e-commerce for SMMEs

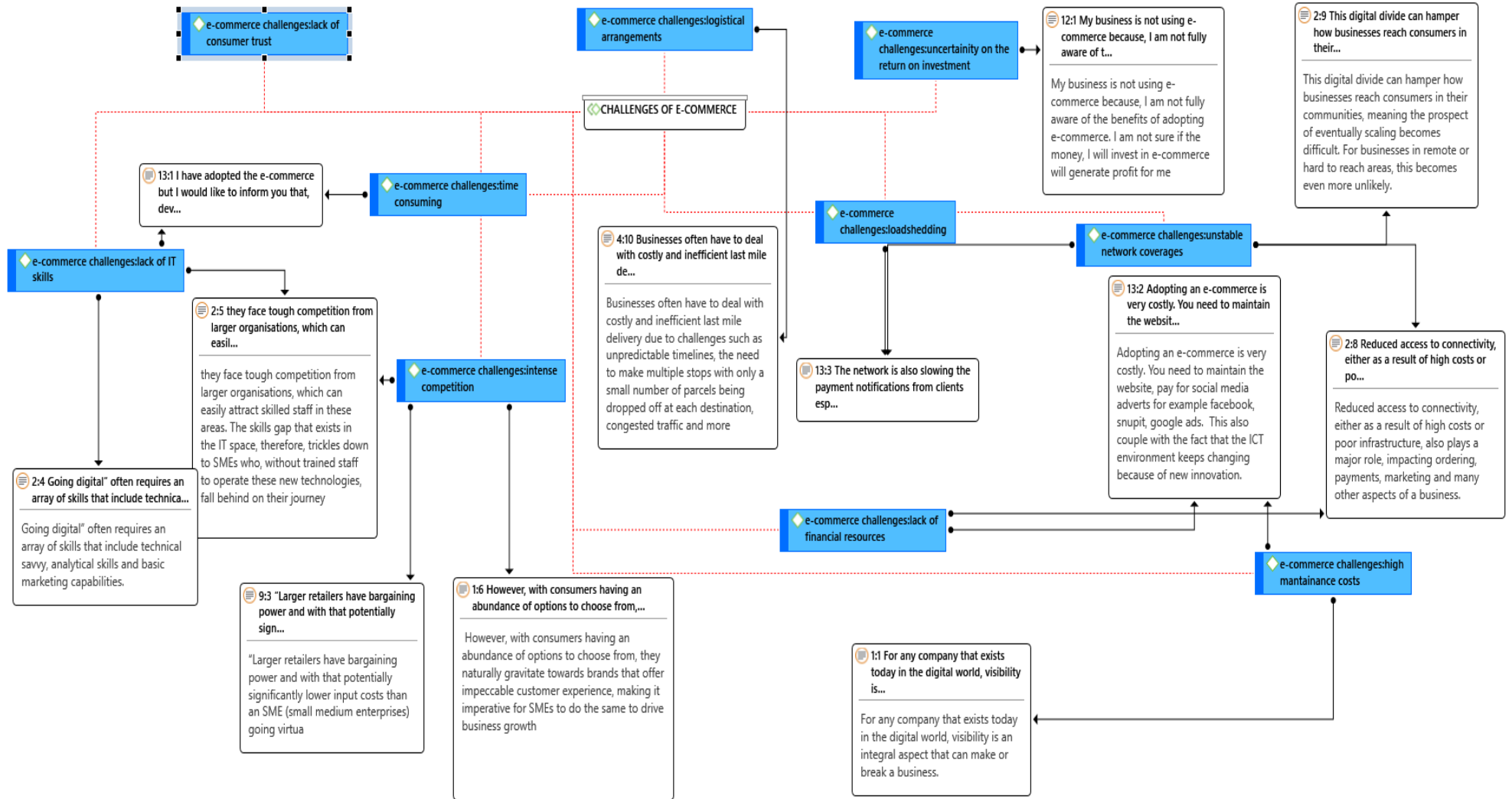


Figure 6.6: Challenges of e-commerce for SMMEs

Source: Challenges of e-commerce for SMMEs using ATLAS.ti

6.5 Factors influencing the implementation of e-commerce

This section presents the Factors influencing the implementation of e-commerce. Data analysis initially identified 19 codes from the data and based on their similarity, they were merged using the constant comparison of codes technique. This resulted in five codes emerging after a constant comparison; the Covid-19 pandemic, growth of mobile money transfer services, increase in third-party logistics, increasing customer demand, and technological improvements.

Search Codes

Show codes in group **FACTORS INFLUENCING IMPLEMENTATION OF E-COMMERCE**

Name	Groun...	Den...	Groups
◊ factors influencing implementation of e-commerce: Covid-19 pandemic	3	0	[FACTORS INFLUENCING IMPLEMENTATION OF E-COMMERCE]
◊ factors influencing implementation of e-commerce: growth of mobile money transfer services	3	0	[FACTORS INFLUENCING IMPLEMENTATION OF E-COMMERCE]
◊ factors influencing implementation of e-commerce: increase in third party logistics	2	0	[FACTORS INFLUENCING IMPLEMENTATION OF E-COMMERCE]
◊ factors influencing implementation of e-commerce: increasing demand from customers	7	0	[FACTORS INFLUENCING IMPLEMENTATION OF E-COMMERCE]
◊ factors influencing implementation of e-commerce: technological improvements	4	0	[FACTORS INFLUENCING IMPLEMENTATION OF E-COMMERCE]

Figure 6.7: Factors influencing the implementation of e-commerce

Source: Factors influencing the implementation of e-commerce codes using ATLAS.ti

6.5.1 Covid-19 pandemic

The study's findings show that the Covid-19 pandemic lockdown resulted in some SMMEs adopting innovative ICT solutions leading to their survival, hence, the adoption of e-commerce. During the lockdown, South African entrepreneurs that operate conventionally were affected hard during this pandemic (Nhamo, Dube & Chikodzi, 2020). As the covid regulations forced them to close and reduce their activities, some businesses quickly turned to online platforms. Kendall Shaw of Maybach Media, as cited by Rios (2020), explains, "If you cannot go to your store or your location to do business, you have to find another outlet to stay afloat." Consequently, going online implied finding a new way of meeting customer demands for some businesses and usage of social media platforms went up. There was talk of social media explosion during the Covid19 outbreak, with engagement shooting up. Everyone spent more time on social media than before (Chan, Nickson, Rudolph, Lee & Joynt, 2020).

E-commerce is fast changing the retail landscape, allowing businesses to reach customers who may not be in physical proximity to them. Spurred by the pandemic, e-commerce has seen massive growth in South Africa over the past two years. (Participant 4).

When you rewind, during the covid lockdown businesses had to have an online presence for them to be seen by customers and also as a mean of survival as they were a lot of restriction such as on travelling, hence, some of the SMMEs had to adopt online trading. For example, a lot of restaurants adopted e-commerce and the meals were being delivered or the customers would come a pick up their meals in the store or through kerb-side pickup. (Participant 12).

During the pandemic, I had to increase my online presence as it was the only way to be recognized, stay competitive and the only way of survival as most of the clients avoided physical contact due to the fear of the pandemic and the restrictions that were imposed by the government. (Participant 13).

6.5.2 Growth of mobile money transfer services

The growth of mobile money transfer services was proffered as a contributing factor influencing the implementation of e-commerce. Mobile money has become very popular and people living in the remotest areas now use mobile money to pay for goods and services and send money to friends and relatives.

Not even that long ago, checking out on an e-commerce platform could last days as you waited for EFTs to clear. But the rise of new fintechs means that payments have become instantaneous. These developments have the potential to revolutionise the informal business sector where most users are online, making it easier and safer to transact. (Participant 4).

For me the growth of mobile banking is also an important contributor in making the adoption of e-commerce to be successful because everything can be done on a mobile phone even though majority of the people fear losing their money as they engage in online trading. (Participant 12).

Customers can easily transfer their deposits to me through their mobile devices whereas it also easier for me to make payments tor suppliers and employees using my mobile device. (Participant 13).

As discussed in Chapter 3, technology and infrastructure influence the adoption of e-commerce (Marnewick, 2020; Gupta,2020; Barroso, 2019; Jones, 2013; Kotelnikov, 2007).

6.5.3 Increase in third party logistics

An increase in third-party logistics firms has also contributed to the implementation of e-commerce for SMMEs. Businesses could now use third-party logistics to outsource functions that are not their primary business. These third-party logistics firms specialize in services, which frequently includes transportation and warehousing services at a lesser cost and with better results than enterprises that employ in-house operations. When firms can acquire high levels of logistical service from their suppliers, it may boost consumer satisfaction with their products, since they will be depending on satisfactory order fulfillment by third parties, facilitating the effective adoption of e-commerce.

Today, there are third-party logistics and fulfillment platforms leveraging cutting-edge technology to ensure efficient, cost-optimised, hassle-free last-mile delivery and order fulfillment. Logistics and fulfillment platforms also have a wide network of expert delivery partners. (Participant 1).

Ahluwalia (2020) in a further analysis of the Culture-Policy-Technology (CPT) framework, discussed the significance of improved logistics in promoting e-commerce adoption (see Section 3.1.1).

6.5.4 Increasing demand from customers

The study results show that increasing customer demand for online shopping is also possible from the implementation of e-commerce among SMMEs; because of the Covid-19 pandemic, online shopping has gained popularity, worldwide. Online shopping is convenient and offers competitive prices. and businesses using this strategy also try their best to make online shopping experiences compete with conventional practices.

Having a presence is a must in a world where travelers search for, book, and pay for accommodations online. (Participant 4).

Large-ticket items such as household electronics and décor (televisions, dining room sets, kitchen equipment, living room sets) would likely still see consumers wanting the touch/feel/witness experience before committing to an expensive purchase. This highlights the urgent need for retail companies to focus on their omni-channel retail strategy. Millennials and Gen-Z are evermore digitally entrenched and have little or no fear for online experiences, whether social or commercial. Window-shopping is now migrating to browser-shopping which now dictates how future retails are developed. (Participant 9).

When I personally look at it, these days, everyone has a mobile phone, hence, it become easier for entrepreneurs to sell their products online even though most of the small businesses do not have the capacity and resources to sell their products online. When you rewind back, during the covid lock down, businesses had to have an online presence for them to be seen by customers and also as a mean of survival as they were a lot of restriction such as travelling, hence, some of the SMMEs had to adopt online trading. For example, a lot of restaurants adopted e-commerce and the meals were being delivered or the customers would come and pick up their meals in the store or through kerb-side pickup. (Participant 12).

During the pandemic, I had to increase my online presence as it was the only way to be recognized, stay competitive and the only way of survival as most of the clients avoided physical contact due to the fear of the pandemic and the restrictions that were imposed by the government. (Participant 13).

6.5.5 Technological improvements

Based on the collected data, it is evident that technological improvements are some of the factors that contribute to the implementation of e-commerce among SMMEs. Technology innovations have changed the way retailers transact with consumers, and with the changes new opportunities for handling business-to-consumer transactions have emerged. Various tools now exist that can assist consumers in comparing prices, seeking alternatives, locating stores, and handling coupons. SMMEs owners realize that technology can offer many benefits, such as connecting them with their customers and developing their brands, thus, technology is changing the way of handling business-to-consumer transactions.

Besides, it is beneficial to upgrade customer experience by investing in advanced technologies such as, AI, ML, blockchain, and data analytics to improve customer services and attract customer retention, acquisition, satisfaction, and loyalty. (Participant 1).

Digital technologies such as Artificial Intelligence and data science can improve last-mile delivery by finding the best routes to take to avoid traffic, the most efficient use of fuel, and predict demand and labour requirements. These technologies play a crucial role in enabling dynamic predictive models which permit our customers to circumvent these challenges at the speed needed for successful delivery. (Participant 4).

For me the growth of mobile banking is also an important contributor in making the adoption of e-commerce to be successful, because everything can be done on a mobile phone even though majority of the people fear losing their money as they engage in online trading. (Participant 12).

The use of mobile devices and mobile banking has made it easier for my business. (Participant 13).

Figure 6.8 Gives a summary of the factors influencing the implementation of e-commerce

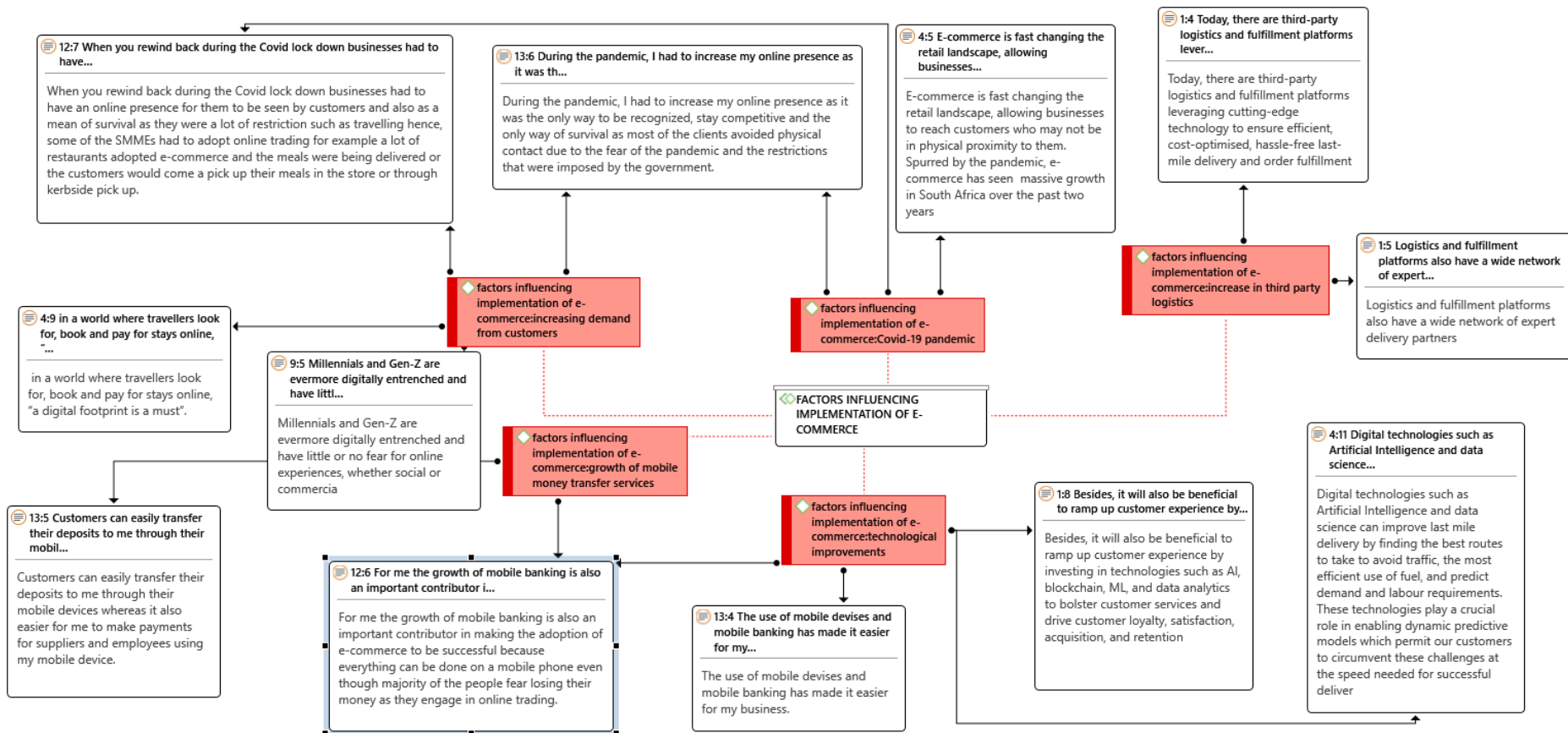


Figure 6.8. Summary of the factors influencing the implementation of e-commerce

Source: Factors influencing the implementation of e-commerce using ATLAS.ti

6.6 Sustainable Development Goals and E-Commerce in SMMEs

This section presents e-commerce features promoting sustainable development. During data analysis, 32 codes were initially identified from the data. As a result of constant comparison of these codes, eight codes emerged - entrepreneurship growth, food security, business performance through IoT, improved quality of life, increasing environmental awareness through IoT, healthy lifestyle, reduced inequalities, and social development – as promoting sustainable development.

Search Codes

Show codes in group **E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT**

Name	Grounded	Density	Groups
e-commerce features contributing to SD: entrepreneurship growth	11	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:ensuring food security	5	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:improve business perfo...	4	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:improved quality of life	2	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:increasing environment...	5	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:promoting healthy life...	3	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:reduced inequalities	1	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]
e-commerce features contributing to SD:social development	1	0	[E-COMMERCE FEATURES PROMOTING SUSTAINABLE DEVELOPMENT]

Comment

Figure 6.9: Goals of sustainable development promoted by e-commerce

Source: E-Commerce Features Promoting Sustainable Development using ATLAS.ti

6.6.1 Entrepreneurship growth

The results from the data collected revealed that entrepreneurship growth is one of the sustainable development goals that are achievable through e-commerce. E-commerce enables SMMEs to improve their sales revenue and marketing efforts immediately, thereby enhancing their chances of survival. By being online, SMMEs expand their businesses nationally and internationally, increasing their customer base. It enables them to compete with large businesses for the same markets globally. When a business is online, it can compete with any other business that trades online, regardless of its size.

IoT technology may help organizations increase their environmental impact, adapt to a new reality, and increase production and efficiency simultaneously. (Participant 6).

Besides its efficiency, 5G can also provide much wider coverage, which can enable a lot of SMME development in the township economies. Airbnb meanwhile is working to bridge the digital divide in the township tourism sector. Over the next two years, Airbnb will work with Ikeja to provide at least 100 Airbnb Academy Hosts and their communities with free Wi-Fi. Each of these hosts will become a WIFI hotspot within their community, giving 100s of others access, resulting in a powerful network effect. Growing access to markets for township travel has been one of the bigger stumbling blocks for many in the business, but technology now gives them a fighting chance. (Participant 4).

Business owners can access tech reviews and recommendations to help them make smarter buying decisions. They can also get quotations, as well as compare prices and features. (Participant 6).

Personally, I think e-commerce unlocks new business opportunities beyond the traditional trade. It attracts and retain talent more easily. E-commerce makes it easier for people to start and run their own businesses through the use of technology which makes it easier for businesses to connect with their customers and partners. (Participant 13).

6.6.2 Food security

From the data collected, it became apparent that e-commerce promotes sustainable development through providing food security. Identifying plant diseases has been a mainstay in any farming and agricultural activity for a long time. The most prevalent way has been for professionals to physically check the plants to identify diseases and then prescribe chemicals to cure these diseases. There have been breakthrough in this industry, with technologies such as mobile applications now taking over. There are now a variety of mobile apps aiding farmers in addressing the issue.

Farmers have constantly been challenged by plant disease outbreaks which push their resources to the margins, reducing their profits. Embracing technology has seen more farmers succeeding in fighting plant diseases, therefore, do more with limited resources. This has kept them competitive in their farming business. With technology, farmers can monitor their crops and identify the diseases affecting them. (Participant 16).

Precision farming powered by Artificial intelligence, Big Data, robotics, the Internet of Things, Imagery, and advanced irrigation systems that are efficient in maximizing water use has resulted in the optimization of production (reducing costs) and increased production, guaranteeing food security. (Participant 17).

6.6.3 Business performance through IoT

Enhanced business performance through IoT is one of the sustainable development goals identified that can be promoted by e-commerce. New business opportunities have arisen from technologies like the Internet of things, and companies have benefited from the new revenue models. Vital innovations based on IoT have strengthened business by reducing marketing time and boosting return on investment. IoT can alter the way consumers and businesses view the world. The following remarks were captured in support of this code.

It will also be beneficial to improve customer experience by investing in technologies that boost customer services and develop customer loyalty, satisfaction, and retention. (Participant 1).

Fourth Industrial Revolution (4IR) technologies, such as the Internet of Things (IoT), can help SMEs reduce waste, optimize operations, and monitor processes more effectively. As IoT technologies become accessible, SMEs are in better positions to embrace simple yet proven IoT technology applications that will make their businesses more profitable and sustainable. Participant 3.

6.6.4 Improved quality of life

Improved quality of life is one of the critical goals for sustainable development that is achievable through e-commerce usage by SMMEs. The comprehensive variety of options available due to e-commerce enables consumers to compare prices and quality also to provide easy access to products and services. The following remarks were captured to support this sub-theme.

Consumers benefit as they may compare prices from one firm to another, and they buy whatever they need from the comfort of their houses, workplace, or preferred locations. It reduces the need to drive around, and people do not need to stress about going shopping. (Participant 13).

6.6.5 Increasing environmental awareness through IoT

Another critical goal for sustainable development achievable through e-commerce, is increasing environmental awareness through IoT. Internet of Things technology efficiently mitigates environment-related problems as it involves better use of resources, sensor-based functionalities, and strategies to uplift businesses, therefore, businesses may use their online platforms to run environmental awareness campaigns.

IoT technology may help organizations reduce their environmental impact, adapt to a new reality, and increase production and efficiency simultaneously. IoT solutions may assist SMEs in better complying with green standards and certification, allowing them to capitalize on new market prospects and financial resources through grants and government assistance programs. (Participant 3).

For me, e-commerce promotes the use of electric vehicles, particularly in delivering e-commerce orders which reduces air pollution. (Participant 13).

6.6.6 Promoting healthy lifestyle

Promoting a healthy lifestyle is one essential goal for sustainable development achievable through e-commerce. The following remarks were captured in support of the above.

Since many entrepreneurs are investing in health and wellness startups, it is becoming demanding to provide choices to consumers. Today's consumer has become innovative, and his buying decision depends on online reviews of the products. Consumers are becoming more innovative with the increase in awareness levels. They are giving immense importance to their health by monitoring their calorie intake and sleep patterns. (Participant 15).

I mean that consumers expect to buy nutritious food that meets nutritional standards for their families. The food must be safe as well. (Participant 16).

6.6.7 Reduced inequalities

From the data collected, it became apparent that one goal for sustainable development achievable through e-commerce is reduced inequalities. Online practices are transforming the playing field for SMMEs by enabling them to take advantage of the internet's global reach. Entrepreneurs can freely connect to the internet, and access global markets, then use online payment services and affordable delivery solutions to service remote consumers.

Meanwhile, Airbnb attempts to overcome the digital divide in the township tourist sector. Over the next two years, Airbnb will collaborate with Ikeja to deliver free Wi-Fi to at least 100 Airbnb Academy Hosts and their communities. Each of these hosts will become a WIFI hotspot in their neighborhood, providing access to hundreds of others, resulting in a significant network effect. (Participant 4).

6.6.8 Social development

The results of the study show that e-commerce contributes to sustainable development. As indicated in 6.6.1, e-commerce promotes entrepreneurship growth, which is an essential or a central ingredient in poverty reduction. E-commerce and integration with value chains can be effective in enabling SMMEs to compete and grow, leading to improved income and employment.

E-commerce can drive upskilling and reskilling of the SMME workforce and improve employee productivity. (Participant 13).

Figure 6.10 summarizes the sustainable development goals achievable through the features of e-commerce for SMMEs in South Africa.

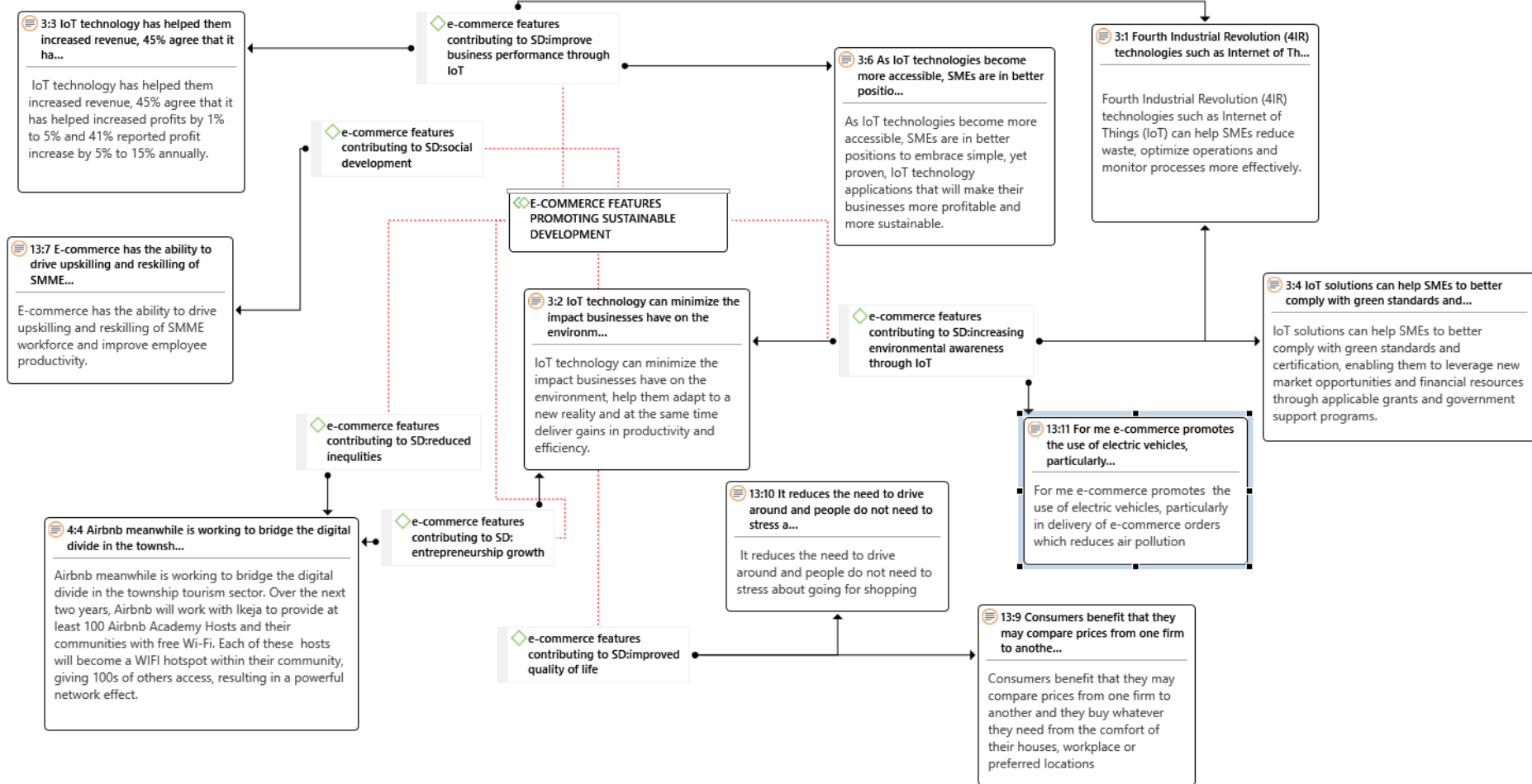


Figure 6.10. Summary of the goals of sustainable development achievable through the features of e-commerce for SMMEs in South Africa

Source: The goals of sustainable development facilitated by the features of e-commerce using ATLAS.ti

6.7 Summary

This chapter has analysed the perspectives of different stakeholders in the SMMEs sector in South Africa about challenges around e-commerce in SMMEs, factors influencing adoption of e-commerce and the features of e-commerce that promote sustainable development. Discussion of the qualitative empirical findings where the specific focus for this chapter. The quantitative study in Chapter 5 confirmed the factors influencing trust in e-commerce and the qualitative study was used to validate and confirm those findings (Creswell, 2018). The qualitative aspect gave an overview of the interviewees perspectives which helped in understanding the context of SMMEs in South Africa. The collected data identified the challenges for e-commerce in SMMEs, the factors influencing adoption of e-commerce and established the relationship between e-commerce and sustainable development. Chapter 7 will consolidate and fully discuss the findings in Chapter 5 (quantitative data analysis) and Chapter 6 (qualitative data analysis).

For this study, the empirical qualitative data was extracted from six interviews. Analysis of eight documents was also used to complement the findings from the interviews. Some directors of SMMEs who participated in the quantitative study were chosen to participate again in the qualitative study. The proposed conceptual model was confirmed by the collected empirical data, thereby achieving the aim of this study which looked at sustainable development through the adoption of e-commerce by SMMEs. The qualitative findings further confirmed the factors that influence SMMEs' trust and adoption of e-commerce as proposed in the conceptual model. Chapter 7 consolidates the findings from chapters 5 and 6 and moderates the conceptual model proposed in chapter 3.

7 CHAPTER SEVEN: DISCUSSION OF KEY FINDINGS AND CONSTRUCTION AND EVALUATION OF FRAMEWORK

7.1 Introduction

In this chapter is discussed the findings reported in Chapters 5 and 6. The literature review in Chapter 2 revealed the need for adequate research on models supported by empirical evidence addressing trust in e-commerce adoption for SMMEs in South Africa. The empirical findings in Chapters 5 and 6 consolidate the literature review in Chapters 2 and 3 and informed a model on e-commerce framework for SMMEs that would promote sustainable development. The code name - Ecom4SD - is derived from e-commerce for sustainable development, and was given to the framework. The developed framework responds to research question 4: *What e-commerce framework can be considered for SMMEs in SA to foster sustainable development?*

Government efforts since 1994 have tried to grow SMMEs to contribute to poverty alleviation and address inequality (Rogerson, 2003). The impact of the covid19 lockdown revealed the lack of adequate appreciation for technology by SMMEs in South Africa (Akpan, 2020). A contemporary theoretical approach is required to support further attempts to grow SMMEs, by incorporating technologies, therefore, the issues investigated in this study, contribute to improving the rate of adoption and use of e-commerce by SMMEs in the South African context. The study developed an e-commerce framework for SMMEs in South Africa that could contribute to sustainable development.

This investigation adopted a sequential mixed methods as the appropriate research methodology to achieve the aim of the study. The quantitative empirical data presented in Chapter 5 and qualitative empirical data presented in Chapter 6 were used to assess the proposed conceptual model in Chapter 3. This chapter consolidates the study's empirical findings with literature in revising the conceptual model. The chapter concludes by proposing a revised conceptual model, demonstrating the impact of socio-Cultural, technological preparedness, political, and organisational factors on trust in e-commerce. The proposed model would contribute to the e-commerce adoption framework that will assist in formulating government policies that aim to enhance the adoption of e-commerce and promote sustainable development.

7.2 Survey Response Rate

The survey questionnaire for this study scored a response rate of 87 %, as reported in Chapter 5. This is considered a good and acceptable response rate that eliminates non-response bias issues. A three months response period was also found reasonable and eliminated chances of bias from prolonged response time (Hendra, 2019).

7.3 Survey instrument validation

Ensuring the validity of findings is essential for every research process, hence, this study carried out instrument validation processes, such as a pilot study, Eigen values test, construct reliability, and exploratory factor analysis. Pre-data and post-data collection validity tests are essential for instrument validation and increasing a survey findings' reliability (Straub, 2004). The pilot study was done before data collection; it ensured that the questionnaire was correctly worded and that all mistakes were rectified before the tool was administered. Reliability tests and construct validity, recommended by standards in Information Systems Research, were applied after data collection. The Cronbach's coefficient alpha value was used to evaluate the internal consistency of the research constructs. Construct reliability was evaluated using the following scale: (0.50 and below) = low, (0.50-0.70) = high moderate, (0.70-0.90) = high and (0.90 and above) = excellent (Taber, 2018), (Hinton, Brownlow, and McMurray, 2004). Construct reliability values for this study ranged high, between 0,82 and 0,88 for socio-cultural, technological preparedness, and organisational factor scales. The value for the political factors construct was below 0.5, therefore, the construct was dropped for further analysis.

7.4 Response Hypotheses

This section will discuss the contributions of the results of the quantitative data analysis in Chapter 5 and the qualitative data analysis in Chapter 6 to the conceptual model proposed in Chapter 3. The study developed hypotheses in Chapter 3 to evaluate the impact of relationships between identified factors and the adoption of e-commerce in the context of South African SMMEs. This chapter discusses the impact of each factor based on the survey findings and the associated implications.

The influence of the demographic variables on trust in e-commerce will also be discussed. This chapter will report on the results of quantitative and qualitative data analysis, whether

significant or non-significant and the main elements of the proposed framework will be deduced from the confirmed hypotheses.

The survey results supported all the proposed hypotheses on factors influencing trust in e-commerce. One hypothesis - political factors influence on trust in e-commerce - could not significantly fit into the model according to SEM, however, the Regression Analysis technique supported the hypothesis.

Overall, the demographic variables used to control the dependent variable had insignificant influence. Some of the demographic variables had a slight significant influence, and these were gender, level of education, and internet knowledge, which calls for further investigation. The following sub-sections will give detailed discussions of these hypotheses.

7.4.1 Socio-Cultural Factors and Trust in e-commerce

H1. Socio-Cultural Factors have significant influence on Trust in e-commerce

According to Cheng (2020) and Hofstede (1988), culture is a collective state of mind that distinguishes the members of one community of people from the other and consists of values that shape an individual's behaviour and perception of the world. Tejay (2017) and Huang (2019) explained the significance of culture in Trust of new technologies, with cultural considerations for privacy being the main issue. Hofstede's theory of cultural differences has also been influential in outlining the cultural effects of information privacy on different societies. Research by Cheng (2021), concludes that countries with high individualistic scores tend to trust e-commerce, while countries with low scores do not embrace e-commerce because of their strong ties to their Culture. This indicates an inverse relationship between trust in e-commerce and cultural orientation. In an individualistic culture, members of society do not always put cultural values first when making decisions; members can easily follow global trends such as the adoption of technologies. The uncertainty avoidance index connects society's tolerance for uncertainty and ambiguity, with society minimizing uncertainty (Cheng, 2020), (Hofstede, 2010). High uncertainty avoidance index would act against trust in new technologies.

Rabayah (2021) applied a modified version of the TAM approach to finding out the cultural dimensions that may have an impact on the adoption of e-commerce in Palestine. They

concluded that the cultural dimensions of uncertainty avoidance, power distance, and long-term orientation influence the intention to transact online.

This study's findings reveal a relationship between culture and trust in e-commerce, which supports the findings of Rabayah (2021), Ediriweera (2020), Cheng (2020), Huang (2019) and Tejay (2017). Many studies have also been found to highlight the relationship between culture and the adoption of technology in general; the results of this survey confirm that relationship.

The researcher, therefore, recommends that all government departments dealing with SMMEs consider the different cultures in their attempts to promote e-commerce in SMMEs. One way of doing this would be to influence community institutions anchored on these communities' cultural values. These may include schools, churches, stokvels, burial societies, and others.

7.4.2 Technological Preparedness and Trust in e-commerce

H2: Technological Preparedness has significant influence on Trust in e-commerce

Rashid (2019) identified a country's ICT infrastructure as an essential national factor contributing to the growth of e-commerce. Poor overall infrastructure, in general, and particularly ICT infrastructure, has been identified by researchers as a significant factor that contributes to the lower diffusion of e-commerce, in developing countries (Onditi, 2017, Rashid, 2019). Previous research guided this study in establishing the technological factor for the research population. Various factors determine the technological preparedness of a society and these factors range from accessibility of technology to establishing technological skills within the community. Acheampong (2017) and Parasuraman (2000) identified Technology Readiness Index (TRI) theory as a multiple-item scale theory used to gauge individuals' readiness for new technology. The TRI assesses an individual's willingness to embrace and use new technologies to accomplish goals at home and work.

Ahluwalia (2020) identified the technology drivers as captured in the composite index - Maturity and Reach of Internet Technologies (MRIT) - which includes accessibility, adequate bandwidth, diffusion of mobile networks, and implementation of security protocols. Technology efficacy (TE) is one of the factors for the technological factor. TE includes dimensions such as education level, internet literacy, technical skills of the workforce, and degree of innovation. Guided by these factors, this study established a suitable scale for technological factors.

Previous research has found technological preparedness of an organization influences trust in e-commerce. The empirical quantitative data analysis of this study confirmed that technological preparedness significantly influenced trust in e-commerce. The SMMEs that confirmed high technological preparedness in their organizations and working environments had high trust in e-commerce as compared to those with low preparedness. Although they were considered under the control variables, knowledge about the internet and level of education, which are determinants for technological preparedness, were also found to have significant implications on trust in e-commerce. Their influence on the survey data confirms the findings of previous research.

SMMEs in environments with poor technological preparedness are expected to be sceptical about adopting e-commerce. Government policy should address technological preparedness issues within the affected communities. Resources should be channelled towards improving network infrastructure, IT support, and sponsorship of training for affected SMMEs. College bursaries could also improve the level of education in these communities.

7.4.3 Political Factors and Trust in e-commerce

H3: Political Factors have significant influence on Trust in e-commerce

Finger (2018) identified government policies, tax rates, and political instability in the country as some of the impediments to international business. With one of the most significant features of e-commerce being global reach, such impediments would work against the gains of e-commerce. Aziz (2021) reiterates that the development of SMMEs depends on their political environments, similarly, the adoption of e-commerce by SMMEs in South Africa depends on the political environment.

Guided by Kecmanovic (2004), this study adopted a set of determinants for political factors, which included: unequal access to information and illegitimate privileges of other enterprises, inequitable and unjust power positions, oppressive and intimidating practices, exploitative relations, domination and control of one group (dealers) over the choices of the other, control over important life decisions and the making of informed choices, free and equal individuals, dealers' and customers' capacity to achieve their goals through mutual understanding, negotiation, and cooperatively-reached agreements. E-commerce will introduce structural

changes in trade conditions and increase competition, resulting in dealers concentrating more on business and customer satisfaction rather than worrying about political positioning (Kecmanovic, 2004).

Previous studies suggest that political factors influence trust in e-commerce, however, based on the dataset from the survey, the findings did not significantly support the hypothesis. The political factor scale did not pass the Cronbach alpha test for reliability, therefore, the factor was dropped from further analysis, however, the results although insignificant, supported the hypothesis. Further investigations are recommended to make relevant improvements to the scale.

7.4.4 Organisational factors and Trust in e-commerce

H4: Organisational factors have significant influence on Trust in e-commerce

Previous studies have identified organizational capabilities as facilitators of information technology (IT) diffusion and innovation performance (Lin, 2005). The technology-organization-environment framework (TOE) model identifies variables that explain adopting specific technologies, including organizational factors related to firms' capability to adopt technologies (Barroso, 2019). For them to be able to adopt complex technologies, businesses are expected to adjust.

Lin (2005) identified organisational learning and knowledge management as the factors influencing an organization's capability to adopt new technologies. Organizational learning includes training availability, as well as technical and knowledge level. Knowledge management involves knowledge acquisition, knowledge application, and knowledge sharing. Constrained by the various economic challenges, SMMEs in developing countries lack the necessary resources to facilitate proper knowledge acquisition and management. Previous research findings proclaim the influence of organizational factors on the adoption of new technologies, particularly e-commerce. Research in Information Systems is anchored in understanding how various the systems may be adopted in various organizational contexts. Descriptive features about the organization, including managerial structure, scope, organizational resources, and organization size, form part of an organization's context (Chandra, 2018). SMMEs in South Africa present unique organizational contexts whose influence on e-commerce has never been well analysed. This survey confirms the influence

of organizational factors on trust in e-commerce by SMMEs in Limpopo, Mpumalanga, and the Northern Cape Provinces of South Africa. New technologies can be overwhelming, if the firm is not technologically prepared to handle them (Chandra, 2018)

Government initiatives must develop policies that level the playing field for SMMEs. Policies must be implemented to ensure that SMMEs operate at par with big businesses in terms of organizational contexts. This is achievable through forming associations for SMMEs in the same sector, starting at the sector level and upgrading to the national level. These associations can put in place the same standards across the country, therefore, in addition to this improving trust in technology, the standard of service will also improve.

To access financial support, financial institutions can set up standards for SMMEs which will ensure that SMMEs employ qualified people to handle specific duties. SMMEs should also seek relevant training where necessary. Policy-makers should, therefore, craft policies that set uniform standards for all SMMEs, to allow equal opportunities for adopting new technologies, such as e-commerce.

7.4.5 Demographic Variables and Trust in e-commerce

H5: Age, gender, level of education, internet knowledge and province for SMME have no significant influence on Trust in e-commerce

Information Systems, like other disciplines, recognises the use of statistical control of extraneous variables as an analytic tool for researchers (Bernerth, 2017). This study used demographic variables - age, gender, level of education, internet knowledge and province for SMME - as statistical control. The survey findings concluded that, the demographic variables as a group had insignificant influence on the model, however individual variables from demographics had some influence that needed to be reported. The regression analysis model indicated that demographics only explained 2,2 % of the variances which can be considered not significant.

7.4.5.1 Influence of Gender on Trust in e-commerce

Empirical data from the survey showed that gender has insignificant influence on SMMEs trust in e-commerce (sig less than 0.05). The result, hence, does not significantly support the

findings of Rodgers, (2003), however, later research findings by Szymkowiak, (2018) was confirmed by this study. The result of the dataset indicates trust in e-commerce is directly proportional to the male gender (positive B value), however, the influence is very insignificant.

7.4.5.2 Influence of Age on Trust in e-commerce

The survey findings did not identify any significant influence of age on trust in e-commerce (sig value greater than 0,05). A negative Beta value indicates that trust in e-commerce decreases with age, which confirms the findings of previous research on age versus utilization of e-commerce by Lanvin, (2018), however, a minimal variance of trust in e-commerce is explained by the age variable.

7.4.5.3 Influence of the Level of education on Trust in e-commerce

For this survey, the level of education was the only demographic variable that registered a significant relationship with trust in e-commerce (sig less than 0,05). Trust in e-commerce increased with an increase in the level of education. It is logical to expect more educated directors of SMMEs to trust e-commerce since they would better appreciate technology. These findings confirm previous research, which confirmed the level of education as one of the factors influencing the adoption of e-commerce (Lawrence, 2010).

7.4.5.4 Influence of Province of SMME on Trust in e-commerce

The findings established no significant influence of the province of origin on trust in e-commerce. The three provinces were selected randomly based on the similarity of the contextual factors for SMMEs across the country, hence, it is justifiable to generalize the findings to the whole of South Africa.

7.4.5.5 Influence of Knowledge of Internet on Trust in e-commerce

The knowledge of the internet was found to have an insignificant influence on trust in e-commerce (sig value less than 0,05). There is evidence of direct proportionality between internet knowledge and trust in e-commerce (positive Beta value), but the influence was not relevant enough to make any meaningful conclusion.

Table 7.1: Summary Research Hypotheses Results

Hypotheses Code	Hypotheses Proposed	Results
H1	Socio-Cultural Factors have significant influence on Trust in e-commerce.	Supported
H2	Technological Preparedness has significant influence on Trust in e-commerce.	Supported
H3	Political Factors have significant influence on Trust in e-commerce.	Not significantly Supported by SEM
H4	Organisational factors have significant influence on Trust in e-commerce.	Supported
H5	Age, gender, level of education, internet knowledge and province for SMME have no significant influence on Trust in e-commerce.	Supported

7.5 Research Model for Trust in e-Commerce and Adoption

In Chapter 3, a conceptual model was presented, and the findings of the investigations analysed in Chapters 5 and 6 were used to revise the model. The revised conceptual model considered only the significant factors for SMMEs' trust in e-commerce. Empirical quantitative data was collected from the South African provinces of Limpopo, Mpumalanga, and Northern Cape. Different quantitative analysis techniques were used to examine only the significant factors from those proposed in Chapter 3. Figure 7.2 illustrates the model factors using Amos software.

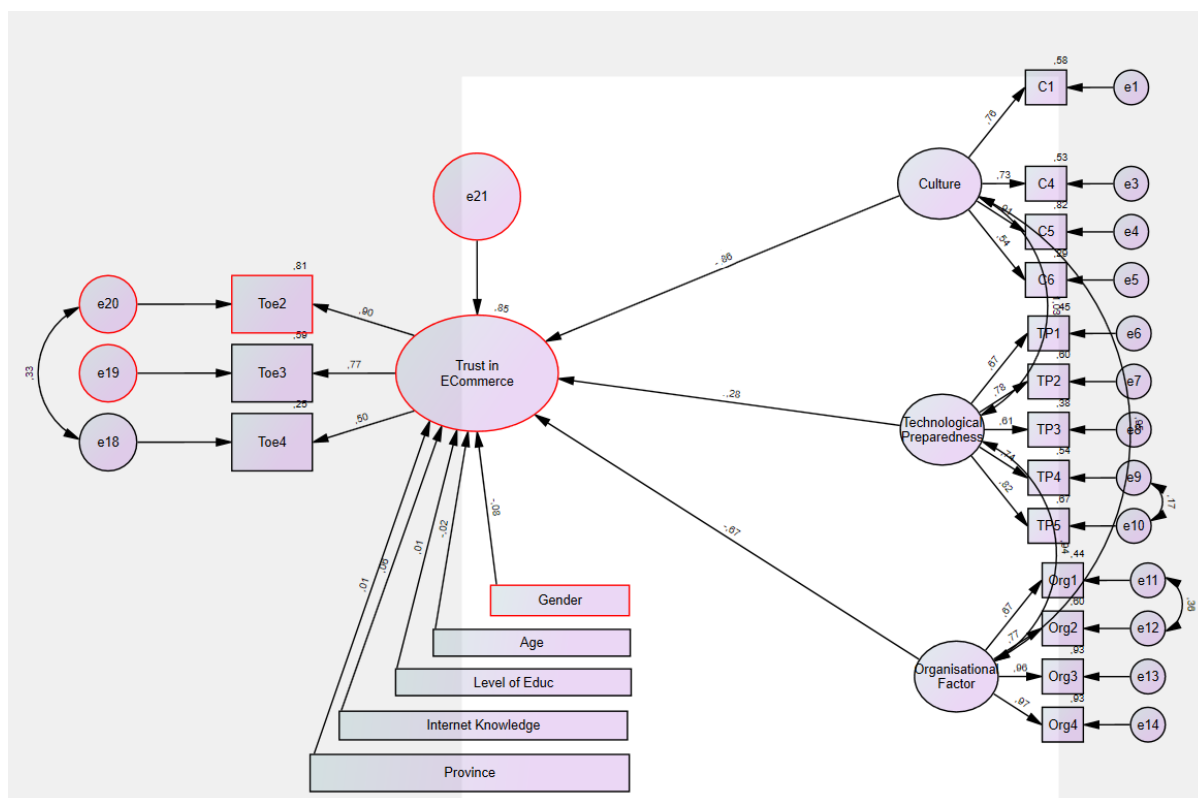


Figure 7.1 Revised Conceptual Model for Factors Influencing Trust in E-commerce.

The next step involved confirmation of some of the quantitative analysis findings and a qualitative validation of the second phase of the proposed model. Semi-structured interviews and document analysis were used to collect qualitative data to confirm the relationship between e-commerce adoption and sustainable development. The data analysis was discussed in Chapter 6. Figure 7.2 illustrates the significant relationships in the revised conceptual model on the relationships between trust in e-commerce and the proposed factors.

The research findings indicate that socio-cultural factors, technological preparedness, and organisational factors are essential to understanding SMMEs' trust in e-commerce, and leading to adoption. Furthermore, the adoption of e-commerce supports the goals of sustainable development.

7.6 Qualitative study findings

The qualitative study established the challenges of e-commerce, confirmed the factors influencing trust in e-commerce and established the relationship between e-commerce and

sustainable development. Chapter 6 gives a detailed discussion of the findings of the qualitative data analysis stage.

Section 6.4 discussed the challenges of e-commerce adoption by SMMEs in South Africa. The qualitative findings confirmed the challenges identified through the literature review in Chapter 2. These include - limited financial resources, logistical issues, issues of infrastructure, lack of competitive advantage, lack of skills, and trust issues (Bajaj, 2004; Park, 2014; Ahluwalia, 2020; Matsinhe, 2019; Gupta, 2020; Jones, 2013; Kotelnikov, 2007; Marnewick, 2020; Barroso, 2019).

Section 6.5 outlined the perspectives from SMMEs directors on factors influencing e-commerce. An analysis of the perspectives confirmed the four factors initially established by the literature review in Chapter 3 and tested by the quantitative data analysis in Chapter 5. These factors are - sociocultural, technological preparedness, political, and organizational (Aziz, 2021; Rabayah, 2021; Ahluwalia, 2020; Cheng, 2020; Rashid, 2019; Barroso, 2019; Hallikainen, 2018; Onditi, 2017; Lin, 2005; Kecmanovic, 2004). Remarks from the interviewees and the analysed documents indicated the following: restrictive business environment resulting from covid19 lockdown, growth of mobile money transfer services, logistics, customers' demands, technological improvements, infrastructure, and skills. These fit into the categories included in the proposed conceptual model (see section 6.5).

Section 6.6 discussed the perspectives extracted from the qualitative data that highlight the promotion of sustainable development goals through features of e-commerce as adopted by SMMEs in South Africa. The literature review in Chapter 3 discussed the potential of e-commerce in SMMEs in promoting sustainable development in South Africa. After identifying the goals of sustainable development, the study reviews how previous research has associated these goals with the features of e-commerce (AlArjani, 2021; Stefano, 2021; Sherfudeen, 2020; Munu, 2019; Cancino, 2018). The captured remarks identified the following goals as achievable through the adoption of e-commerce by SMMEs: entrepreneurship growth, food security, improved business performance, improved quality of life, increased environmental awareness, promotion of healthy lifestyles, reduced inequality, social development, and poverty reduction (see Section 6.6).

7.7 Construction of the SMMEs E-commerce for Sustainable Development Framework

The conceptual model established in Chapter 3 facilitated the planning for the overall research design that guided the direction of the research, thus, in this chapter is proposed a South African SMMEs' e-commerce adoption framework depicted in Figure 7.3. The framework is a practical implication tool for policymakers in government departments and other institutions that provide services to SMMEs. Supporting literature has been integrated with the study findings to develop the framework, thus considering the unique characteristics of the South African SMMEs environment that has influence on the adoption of e-commerce.

7.8 Composition of the Framework

A framework analytically identifies possible constructs and their associations to deliver an abstract tool for integrating the essentials of an intervention; the context affecting the intervention; the entities involved in the intervention; and the structures, procedures, and possible results. Guided by the literature review, the study identified factors that influence the adoption of e-commerce in SMMEs as the major components to incorporate into the framework. These factors were also aligned to the various challenges that SMMEs face. Various participants in e-commerce and the features of e-commerce also form part of the Ecom4SD framework. The last component consisted of the goals for sustainable development as facilitated by the features of e-commerce. The following section discusses the various components and their inclusion in the framework.

7.8.1 The Ecom4SD Framework and Factors influencing E-Commerce in SMMEs

The literature review in Chapter 3 established a conceptual framework consisting of four factors that influence e-commerce adoption by SMMEs in South Africa. The empirical quantitative and qualitative data analysis in Chapters 5 and 6 confirmed three factors: sociocultural factors, technological preparedness, and organisational factors. These factors become an essential component of the Ecom4SD framework since they are essential in formulating strategies and policies that promote the adoption of e-commerce (Al-Tit, 2020; Acheampong, 2017; Mohammed, 2017).

7.8.2 Stakeholders for SMMEs e-commerce as a component for the Ecom4SD Framework

The e-commerce strategies developed by policy-makers target consolidating activities by government departments, related service providers, SMMEs' personnel, and consumers of SMMEs goods and services who constitute the Electronic Trading Environment components (see Section 2.1.2) (McGann, 2002; Gupta, 2014). Among the service providers are financial organizations, network providers, web developers, logistics companies, and others. The literature review established the possible participants in e-commerce activities involving SMMEs (Punit Ahluwalia, 2020; Bajaj, 2004; McGann, 2002). The Ecom4SD framework, thus, consisted of these participants and their role in formulating policy or as subjects of policy.

7.8.3 E-commerce features as a component of the Ecom4SD framework

The literature review in Chapter 2 discussed the features of e-commerce that are beneficial to businesses. These features are - Ubiquity, Global reach, Universal standards, Richness of information, Interactivity, Information density, and Personalization (Naseri, 2021), (Mishra, 2020) (Junglas, 2017; Meeds, 2016; Guercini, 2015; Laudon, 2014; Laisuzzaman, 2010; Walcott, 2007). Through these features, e-commerce for SMMEs will contribute to achieving specific goals for sustainable development, as discussed in section 3.5. The policy, therefore, should leverage these features in using e-commerce to promote sustainable development.

7.8.4 Goals for sustainable development as a component for Ecom4SD

Strategies and policies that promote the adoption of e-commerce by SMMEs should aim to improve relationships, improve trust in government involvement, eliminate deceitfulness and mistrust, improve proper communication between developed and developing countries, reduce cultural disparities, align policies, align laws for tax and intellectual property, improve information sharing within and across borders, improve funding for developing infrastructure, improve access to information, reduce challenges for money transfers and products shipment across international borders, improved consumer support, and consolidated arbitration mechanisms (Ahluwalia, 2020; Bajaj, 2004).

SMMEs should leverage the features of e-commerce to promote sustainable development. The General Assembly of the United Nations (UN) in September 2015 set out the goals for sustainable development. The empirical qualitative studies confirmed the capacity of e-

commerce in SMMEs to achieve some of these goals for sustainable development. These goals are - poverty alleviation, healthy lifestyles, food security, inclusive education, secure water and sanitation, access to resources, an all-inclusive economy /society, sustainable industrialization, reduced inequality, addressing climate change and promoting conservation (Stefano, 2021; Sherfudeen, 2020; Munu,2019; Cancino,2018; AlArjani, 2021). Figure 7.3 gives a diagrammatical illustration of the framework discussed in this section.

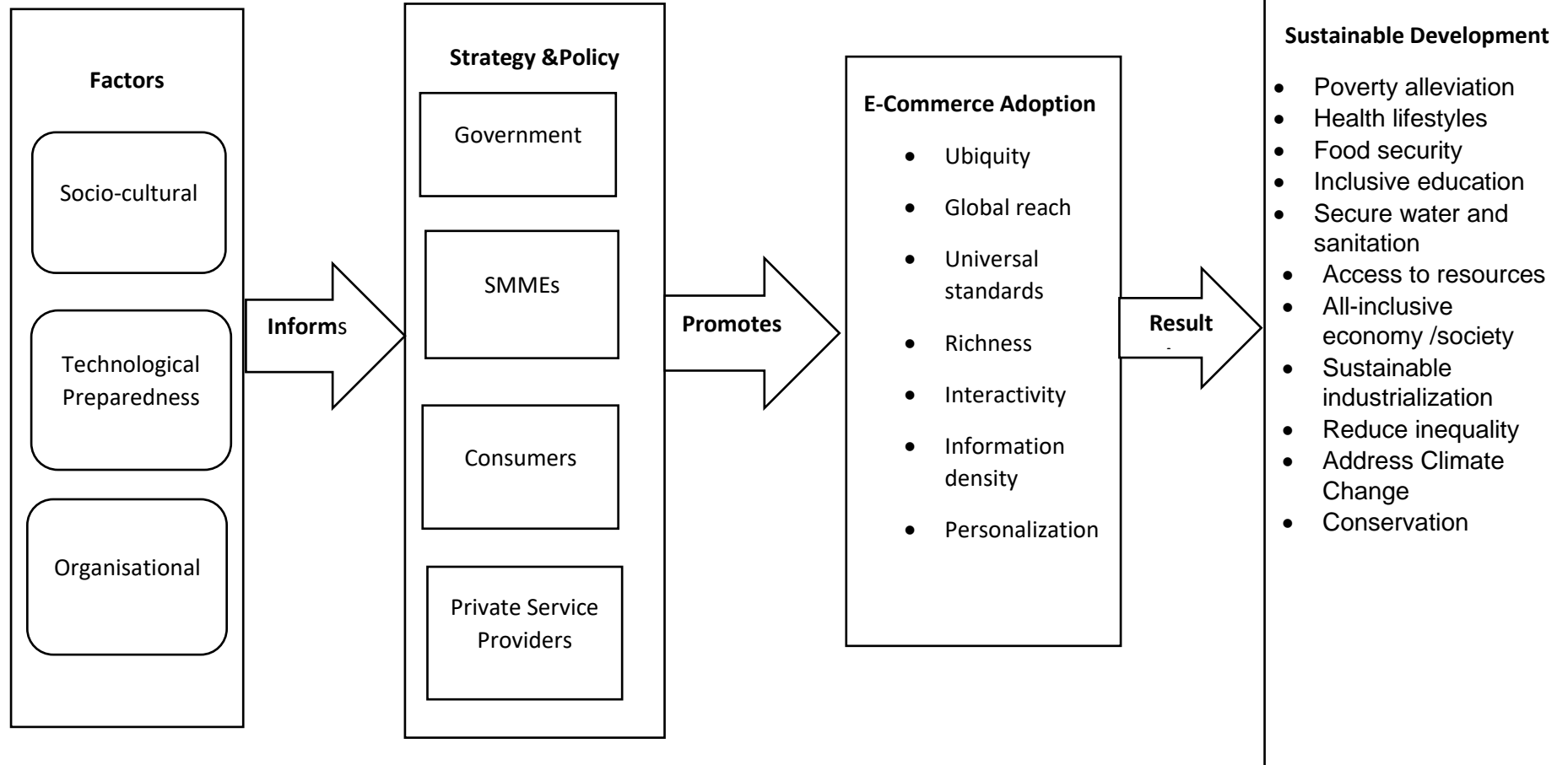


Figure 7.2. The SMMEs E-commerce for Sustainable development Framework for South Africa (Ecom4SD)

7.8.5 Evaluation of the Ecom4SD framework

The findings from the quantitative data analyses in Chapter 5 and the qualitative data analysis in Chapter 6 were used in evaluating the Ecom4SD Framework. In addition, interviews involving focus groups were conducted to ascertain the framework's effectiveness. The focus groups constituted administrators in government departments, specialists in service provider organisations and SMMEs directors.

7.8.5.1 Focus-group profile

The knowledge and expertise of the participants in each focus group were used to evaluate the framework. The participants included two administrators from government departments working with SMMEs, three experts from service providers and three directors of established SMMEs. Participant selection in the focus groups were based on their knowledge and experience with the area under investigation. The focus-group interviews process involved an introduction to the study, its significance, its objectives and the proposed Ecom4SD framework. Open-ended questions were asked according to the focus-group guide in appendix B, part B. The researcher provided clarification to participants where necessary, and participants' responses were digitally recorded.

Table 7.2: Summary of Participants

	Description	Key issues from remarks
Participant 1		
G 1	Administrator in a government department	Policy should <ul style="list-style-type: none"> • reduce negative influence of culture on technology adaption. • improve organisational uniformity and technology preparedness amongst SMMEs • illustrate benefits of e-commerce

Table 7:3: Summary of Participants (Continued...)

G 2	Administrator in a government department	<ul style="list-style-type: none"> • Government should address technological needs and guarantee support for SMMEs. • Government should guarantee trustworthy association amongst stakeholders in SMMEs business environment. • The framework should play a major role in raising awareness for sustainable development among all stakeholders.
SP 1	Specialist in e-commerce service-provider company	<ul style="list-style-type: none"> • Organisational uniformity amongst SMMEs would simplify development of e-commerce solutions by service providers. • Educate SMMEs on benefits of technology.
SP 2	Specialist in e-commerce service-provider company	<ul style="list-style-type: none"> • Government should support service providers in the development of efficient solutions for new technologies, through policy • The framework is a good reminder of the sustainable development goals even as we develop solutions.
SP 3	Specialist in e-commerce service-provider company	<ul style="list-style-type: none"> • Government should promote SMMEs awareness of the benefits of e-commerce.
SMME 1	Director of an SMME	<ul style="list-style-type: none"> • Having coordinated activities amongst SMMEs will be beneficial • We learn about sustainable development through the framework

Table 7:4: Summary of Participants (Continued...)

SMME 2	Director of an SMME	<ul style="list-style-type: none"> • Government support will improve technological preparedness amongst SMMEs. • SMMEs should be well coordinated to enjoy the same standards.
SMME 3	Director of an SMME	<ul style="list-style-type: none"> • Framework encourages engagement amongst stakeholders in the SMMEs sector and well defines the benefits of e-commerce.

7.8.5.2 The Factors component of the Ecom4SD Framework

Policymakers in government appreciated the framework's identification of factors influencing trust in e-commerce. The need to reduce socio-cultural values' negative influence in promoting technology adoption was emphasised. The following remarks were obtained from the interviewees:

G1: It's good that the framework identifies the factors that should be considered to influence SMMEs to adopt e-commerce. As the government, we should implement policies that neutralise the negative influence of cultural values on the use of e-commerce by our SMMEs.

SMMD1: As SMMEs, we need country-wide associations for every business sector, which prescribe a common business culture across the sector. This will discourage certain cultural values that discourage the use of e-commerce in our businesses.

SP1: As service providers, it is much easier to deal with one organisational culture throughout the country. Designing solution products tailor-made for a particular small cultural group is not viable for our business.

All the interviewees suggested that the framework could further identify typical cultural traits that negatively impact trust in using e-commerce by SMMEs. The general opinion was that, by identifying these cultural traits, specific solutions could then be developed to address these,

however, the researcher felt that this could be done in further research. The formation of associations will go a long way in ensuring that SMMEs adopt a similar culture in business.

Administrators in Government also appraised the framework in its identification of technological factors influencing trust in the use of e-commerce by SMMEs. The government should implement policies that encourage all SMMEs to be prepared to use e-commerce. Uniformity in the development of network infrastructure countrywide is encouraged so that all communities should have equal access to network devices. Government should promote technology awareness campaigns and IT training support and training programs should be available to all communities. The following remarks were captured in this regard:

G2: Some communities are not well prepared to embrace e-commerce since they lack the knowledge to utilise technology and do not have access to certain technologies. Government training programs do not directly benefit the communities, and there is a need to align government policies on training with the current technology training needs for SMMEs.

SMMD2: Government should ensure equal access to technology, training and support across the country, which will promote the same standards countrywide. SMMEs' associations will negotiate with the Government and private sector on the needs of the business sector.

SP1: "As service providers, it is important to understand the technology needs of the group of SMMEs and then develop solutions that suit all. It is easier to train organised groups of SMMEs on specific technological solutions rather than dealing with individuals. The framework, therefore, highlights the important factors that need attention during policy formulation."

Regarding technological preparedness, the findings suggest that policy should mandate the ministry involved with infrastructure development to address e-commerce-related infrastructure issues. Policies should align the roles of infrastructure service providers and the

government with the needs of the SMMEs. In turn, SMMEs could form associations that would deliberate on infrastructural issues as a combined unity.

In a critique of the framework, interviewees felt it should discuss more than just technology preparedness in general, but should go further and specify the technology and the training needs required. This was, however, beyond the objective of this research since SMMEs considered were from diverse business sectors. Further research could investigate the technological needs by sector and further expand the framework, hence, the current one is a good starting point.

All the interviewed focus groups members appraised the organisational factors focused upon in the Ecom4SD. The interviewees highlighted the need to have similar standards for all SMMEs. The standards highlighted included access to finances, technology, training and support, quality management and others (Lin, 2005). The following remarks supported this:

G1: The disparities amongst SMMEs make it difficult for the government to provide support across the SMMEs. Their challenges, opportunities and expectations are different at times. It would be easier for government to deal with common issues within the SMMEs. It is therefore essential for associations for SMMEs to enforce similar standards across all SMMEs.

SP1: "As service providers, we expect to develop solutions for similar problems within SMMEs. Outliers might not meet the minimum requirements for our technologies. It is, therefore, necessary for SMMEs to adhere to similar standards."

SMMD2: "At times, as SMMEs, we have different expectations from government and service providers based on the uniqueness of our organisations. It would be good to promote similar standards so that it becomes easy to coordinate our activities."

Given the findings, it is essential to have a set of standards expected for all SMMEs. The standards will make it easier to formulate effective policies by the government. Service providers will also find it easy to deploy standard solutions. Empirical evidence indicates that

organisational factors influence trust in e-commerce by SMMEs. There should be efforts to reduce the negative impact of these factors. One way would be to have SMMEs adhere to the same standards, as similar organisational standards are easier to address.

7.8.5.3 The Policy and Strategy component for the Ecom4SD Framework

The study identified four entities that policies and strategies should target. These are the government departments, SMMEs, e-commerce service providers and the consumers of e-commerce products and services. The policies and strategies should consider the South African context for SMMEs. The following remarks supported the inclusion of these entities into the framework:

G2: Government strategies should aim to encourage SMMEs to utilise e-commerce for business. Policies should also reign on service providers making sure they deliver quality services. Policies should also protect consumers of SMMEs goods and services.

SP2: "Government should have strategies that prepare the communities for the ever-advancing technological solutions. Government policies should encourage service providers to deploy more solutions to the SMMEs in a win-for-all type of engagement."

SMME 3: "Service providers, SMMEs, government and consumers must engage and share their expectations to improve trust in the working environment."

As highlighted in the findings, strategies and policies should consider all stakeholders to improve trust, a crucial element for an e-commerce business environment. Trust amongst all entities in the SMMEs business environment will promote e-commerce (Katarzyna Cheba, 2021; Al-Tit, 2020; Park, 2014, Bajaj, 2004).

7.8.5.4 E-commerce features component of the Ecom4SD

The literature review in chapter 3 confirms that the features of e-commerce should support sustainable development (Naseri, 2021; Meeds, 2016; Guercini, 2015; Chaudhuri, 2015), as

such policy could leverage these features to achieve sustainable development goals. At the core of the Ecom4SD framework, the e-commerce component summarises the essential features of e-commerce expected to deliver sustainable development.

The conceptual model proposed in Chapter 3 illustrates the relationships between the various factors influencing e-commerce in SMMEs and the features of e-commerce. The model also illustrates the relationship between e-commerce and sustainable development. Empirical findings in Chapters 5 and 6 confirm the relationships among these entities. In evaluating the framework, all interviewed participants acknowledged the inclusion of the e-commerce features as the core of the Ecom4SD framework. The following remarks support the inclusion of this component:

G1: The framework does well in illustrating what is offered by e-commerce to promote sustainable development. It makes it easier for all stakeholders to appreciate these features and take advantage of them, wherever appropriate. These can guide the government in policy formulation, however, the framework could elaborate on these features and how they fit into the policies.

SP 3: As service providers, the features are at the core of our business solutions to the SMMEs. The framework should, however, illustrate the support to SMMEs and their consumers to appreciate these features since they remain complex to these stakeholders.

SMME 1: “The framework gives an idea of the benefits of e-commerce, however, further support can educate SMMEs and their customers on specific benefits per sector since some features are more beneficial to certain business sectors than others.”

7.8.5.5 The sustainable development component of the framework

The literature reviewed in Chapter 3 discussed the goals of sustainable development and the role of e-commerce in achieving some of these goals. The empirical findings in Chapter 6 confirmed the role of e-commerce in facilitating sustainable development, thereby justifying

the component's inclusion in the framework. The following remarks from interviewees showed approval for the inclusion of this component in the framework:

G 1: The inclusion of sustainable goals onto the framework helps to remind policies to align to the goals of sustainable development. It also motivates the government to include sustainable development awareness campaigns to support SMMEs and the community in general.

SP 3: As solution developers, we must remain aware of sustainable development goals and factor these into our solutions. Solutions must not only be capable of solving today's problems but must also guarantee the wellbeing of future generations.

SMME 3: "The framework raises essential awareness issues to which many of our SMME sector members and customers are ignorant. The government could take advantage and create awareness programs for the communities. The framework could also elaborate on the negatives of not adhering to sustainable development goals for communities to appreciate more."

Based on the remarks from the interviewees, besides just focusing on e-commerce as a way of doing business, sustainable development awareness should also be part of policies that target SMMEs. Policies should regard e-commerce in SMMEs as promoting sustainable development (Ingaldi, 2019).

7.9 Summary

This chapter discussed the factors influencing the adoption of e-commerce and the influence of e-commerce on sustainable development. The quantitative empirical studies in Chapter 5 were used to revise the first phase of the proposed conceptual model in Chapter 3. The qualitative findings were used to confirm the second phase of the model. This chapter examined the data collection instruments used for the survey and gave descriptive statistics. The applied quantitative techniques were discussed with the findings and how they were used to refine the model. The survey findings significantly confirmed three of the four proposed factors for trust in e-commerce. The study also applied qualitative techniques to confirm the

relationship between e-commerce adoption and sustainable development. The qualitative strategy findings are also discussed in this chapter. The findings, confirm a significant relationship between e-commerce in SMMEs and sustainable development.

A framework illustrating the factors influencing the adoption of e-commerce and the relationship between e-commerce and sustainable development was given at the end of the previous chapter. The research findings revised and validated the proposed conceptual model in Chapter 3 which formed the basis of the Framework (*E-com4SD*) as illustrated in Figure 7.3. The socio-cultural, technological preparedness, and organisational factors were confirmed to influence trust in e-commerce adoption. The influence of demographic variables, gender, age, level of education, internet knowledge, and the province of origin was also discussed. Internet experience was the only demographic variable that was confirmed to have a significant influence on trust in e-commerce.

A revised model illustrating the factors influencing the adoption of e-commerce and the relationship between e-commerce and sustainable development was given at the end of Chapter 6. The research findings validated the revised model derived from the previously-proposed model. The socio-cultural, technological preparedness, and organisational factors were confirmed to influence trust in e-commerce, hence, its adoption. The influence of demographic variables, gender, age, level of education, internet knowledge, and the province of origin was also discussed. Internet experience was the only demographic variable that was confirmed to have a significant influence on trust in e-commerce.

This chapter concludes by discussing the evaluation done on the Ecom4SD framework. The interviewed stakeholders examined the inclusion of all the components in the framework. The study considered most of the recommendations this exercise gave to improve the framework.

8 CHAPTER EIGHT CONCLUSION

8.1 Introduction

This chapter concludes the study and provides a summary of the lessons learned. An overview of the motivation for the study is given, together with the structure of the thesis. Objectives of the study are highlighted, and each chapter's contributions in fulfilling these objectives are reviewed. A summary of the significant findings of the study is presented and the researcher then discusses the theoretical, methodological, and practical contributions together with the limitations of the study. The chapter concludes by reflecting on the recommendations for further research.

8.2 Research Overview

There are success stories of e-commerce in larger firms internationally, however, the adoption of e-commerce by SMMEs in developing countries remains challenged. Some contextual factors have been identified as impediments to the trust and adoption of e-commerce by SMMEs in developing countries (Matsinhe, 2019; Hassen, 2019; Damuri, 2021; Ndayizigamiye, 2019; Rawash, 2021). Previous studies have identified socio-cultural, technological preparedness, political and organisational factors as influencing the adoption of e-commerce in SMMEs (Gupta, 2020; Jones, 2013; Kotelnikov, 2007).

To understand the adoption of e-commerce by SMMEs and the role SMMEs play in developing countries' economies makes it essential to document the increasing relevant research (Barroso, 2019; Berkowsky, 2018; Menaka, 2018; Cancino, 2018; Gupta, 2014; Bajaj, 2004; Lim, 2004; Ronald, Lee, 2001). These studies investigate the relationship between SMMEs' trust in e-commerce and the various contextual factors in developing countries, however, more empirical evidence still needs to be analysed to understand the various contexts in which these SMMEs operate. This study focused on understanding the factors considered as influencing e-commerce adoption in the South African context where SMMEs are a solution to previous imbalances where marginalized groups were side-lined from the main economic activities (Ilias, 2020; Farid, 2018; Hallikainen, 2018; Menaka, 2018; Fourie, 2018; Ozel, 2017; Mohammed, 2017; Brown, 2016; Park, 2014; Chidoko, 2011; Bajaj, 2004; Rogerson, 2003).

While previous studies have mainly focused on the broad adoption models such as UTAUT, DOI, and TAM, this study explored the influence of contextual issues for the SMMEs on trust

in e-commerce adoption (Azleen, 2020; Scherera, 2019; Makovhololo, 2017). A few studies have explored the relationship between e-commerce adoption and sustainable development. Some literature analysed the essential features of e-commerce and the current state of SMMEs in developing countries. This study proposed a framework fostering sustainable development through e-commerce in SMMEs in South Africa. Empirical evidence from the qualitative data analysis in Chapter 6 supported the relationship. An overview of the chapters in this study is as follows:

Chapter 1 introduces the study, the research scope, and the study area. It proceeds by discussing the research problem, giving the study's motivation and research aim. The chapter also outlines the research objectives and questions and concludes by providing a general overview of the thesis structure.

Chapter 2 gives a comprehensive review of e-commerce literature. It starts by defining e-commerce and identifying its crucial features. It also explored the categories of e-commerce and their various revenue models. The chapter also discussed the merits of e-commerce and its general challenges. The chapter concludes by exploring e-commerce issues in SMMEs, based on findings from previous research.

Chapter 3 further explores the main elements identified in Chapter 2 and confirms the conceptual model established for this research. The chapter also discussed the hypotheses established from the proposed model revised in chapters 5,6 and 7. Also discussed are the significance of the theory of the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) as a guiding framework to explore the conceptual model. Four constructs; sociocultural, technological preparedness, and political and organizational Factors, were identified as influencing SMMEs' trust in e-commerce. The study used demographic variables as control variables; these were age, gender, education level, province of origin, and Internet experience.

The research methodology for the study is discussed in Chapter 4. An overview of research methods and paradigms is given, and the selected methodology was justified. A comprehensive discussion of the preferred research design was given. The chapter outlined the plan to investigate the significance of the identified contextual factors in influencing trust

in e-commerce and the impact of e-commerce adoption by SMMEs on sustainable development in South Africa.

The study identified the Explanatory sequential mixed-methods approach as the most suitable technique to accomplish the objectives of this research, thus, the chapter described the first phases of this design, which started with the quantitative study as the first phase. The data collection technique for the quantitative study is discussed with the validation and the planned data analysis. This chapter also discussed the study's second phase, focussing on the qualitative aspect. This phase aimed to confirm the factors influencing trust in e-commerce, identify challenges in e-commerce in SMMEs, and establish the relationship between e-commerce adoption in SMMEs and sustainable development.

The findings of the quantitative empirical data are presented in Chapter 5. The empirical data from SMMEs in Mpumalanga, Limpopo, and Northern Cape was used to examine the factors discussed in the literature review in Chapter 3. A survey questionnaire was used to collect data to examine the impact of the independent variables on South African SMMEs' trust in e-commerce.

The data analysis started by reporting on the respondents' profiles, followed by descriptive statistics of the survey. The exploratory factor analysis (EFA) confirmed the validity of all factors with factor loadings above 0.40 (Pallant, 2020; Straub, Boudreau, and Gefen, 2004). No cross-loading was identified between any pair of items, as was confirmed by the principal component analysis (PCA) (Pallant, 2020).

Internal consistency of constructs was tested by applying Cronbach's alpha test, and all constructs passed the test, obtaining a Cronbach's alpha value above 0.7. Structural Equation Modeling and Regression analysis were applied to assess the model fit for the study. The two procedures confirmed that sociocultural factors, technological preparedness, and organizational factors significantly influence trust in e-commerce, however, political factors were not significantly confirmed to influence trust in e-commerce by the SEM procedure. The influence of demographic variables on trust in e-commerce was also found to be insignificant.

The qualitative empirical findings were discussed in Chapter 6. The qualitative study aimed to establish the challenges for e-commerce in SMMEs, confirm the factors that influence trust in e-commerce within SMMEs in South Africa and establish the relationship between e-commerce in SMMEs and sustainable development in South Africa. Chapter 6 gives a detailed discussion of the qualitative study findings. The challenges to e-commerce in SMMEs are listed, and the contribution of e-commerce in SMMEs to sustainable development was confirmed. The qualitative data also confirmed the factors influencing trust in e-commerce within SMMEs in South Africa.

Chapter 7 reflects on the key findings consolidating the theoretical perspectives in the literature review (Chapters 2 and 3) and the findings from the empirical studies (quantitative and qualitative) in Chapters 5 and 6, respectively. The proposed framework in Chapter 3 was also validated based on the empirical findings from the data set, thus leading to the main contribution of this study - a framework for e-commerce adoption by SMMEs in South Africa that promotes sustainable development.

8.3 Accomplishing Research Aim, Objectives, and Research Questions

This research aimed to develop an e-commerce framework for SMMEs in South Africa that promotes sustainable development. Five research objectives were established and each of these was accomplished through one or more of the various stages of the study. The following section states the research questions and discusses how the objectives were accomplished.

Research Question 1: What are the current challenges for e-commerce in SMMEs in South Africa?

A literature review was conducted in Chapter 2 to establish the various challenges for e-commerce in SMMEs. Empirical qualitative data was also collected and analysed in Chapter 6, resulting in the listing of challenges to e-commerce in South African SMMEs (see Section 6.4). These challenges contributed to the construction of the Ecom4SD framework in section 7.5.

Research Question 2: What factors influence the implementation of e-commerce in SMMEs in South Africa?

The literature review in Chapter 2 identified possible factors influencing e-commerce in SMMEs; more review in Chapter 3 gave an in-depth analysis of the identified factors. A strategy to assess these factors in the South African context was initialised in Chapter 3 and further explored in Chapter 4 resulting in the establishment of a suitable methodology. Analysis of empirical quantitative data confirmed socio-cultural, technological preparedness and organisational factors as having influence on e-commerce in SMMEs in South Africa. The political factor could not be significantly confirmed, similarly, the various demographical factors were found to have an insignificant influence on e-commerce in SMMEs.

Research Question 3: How can the features of e-commerce promote SMMEs in SA to contribute to sustainable development?

The literature review in Chapter 4 explicated the 17 goals for sustainable development as established by the UN agenda for Sustainable Development (2015). Through the literature, certain SDGs were found to be achievable through the implementation of e-commerce. The qualitative stage of the sequential mixed method was found suitable to collect and analyse qualitative data for assessing this proposition. The empirical qualitative data analysed confirmed that 13 of the SDGs were achievable through e-commerce in SMMEs in SA. This confirmation supported the inclusion of the relationship into the Ecom4SD framework.

Research Question 4: What e-commerce framework can be considered for SMMEs in SA to foster Sustainable Development?

Based on the confirmed challenges, and factors influencing e-commerce the first entity for the Ecom4SD was introduced in Chapter 7. The literature review in Chapters 2 and 3 had identified the second component of the framework as constituting stakeholders influenced by policies. The literature review in Chapter 2 outlined the features of e-commerce and these constituted the third component of the Ecom4SD framework. The fourth and last component of the framework originated from the discussions in Chapter 3 and the empirical findings in Chapter 6. The four components and their relationships constituted the Ecom4SD Framework.

Research Question 5: How can the e-commerce framework be refined to confirm efficiency?

A qualitative investigation was carried out to evaluate the framework. This, combined with the data analysis in Chapters 5 and 6 was used to evaluate the Ecom4SD framework. The results

for the evaluation are as discussed in section 7.8.5 and these confirmed the efficiency of the framework.

8.4 Contributions of the study

This study made contributions to theory, methodology and to practice. The following section discusses these contributions:

8.4.1 Contributions to theory

Several researchers have explored the adoption of e-commerce by SMMEs however, this study takes advantage of the recently experienced covid19 lockdown to explore perspectives of SMMEs in the South African context about e-commerce adoption and sustainable development. The study conducted a thorough literature review, enabling the designing of a conceptual model for e-commerce in SMMEs and sustainable development. The culture, policy, and technology (Ahluwalia, 2020; Park, 2014; Bajaj, 2004) and adoption barriers to frameworks were reviewed, and the findings were factored into the proposed conceptual model (Zaied, 2014). The significance of the TAM and the DOI theories in analysing the SMMEs' e-commerce context in South Africa was established (Schera, 2019; Acheampong, 2017; Makovholo, 2017; Albeshir 2, 2015). The literature review made significant contributions to the theory by confirming the factors influencing the adoption of e-commerce, as identified by previous researchers. The research further contributed to the theory, by analysing empirical data from the South African context to assess the influence of sociocultural factors, technology preparedness, and political and organizational factors on trust in e-commerce. Literature was also reviewed to establish the relationship between e-commerce and sustainable development (See section 3.5). The study contributes to the theory by identifying SDGs that are achievable through e-commerce in SMMEs. The SDGs were further confirmed through the analysis of empirical qualitative data in Chapter 6.

8.4.2 Contributions to Methodology

This study thoroughly interrogated research methodologies before settling for the mixed methods approach. The study has demonstrated the suitability of the mixed-method approach in investigating such a phenomenon. Through the mixed-methods approach, the researcher holistically understood the topic and delivered solutions to the relevant research questions (Odhiambo, 2019). Similar studies may also benefit by adapting some of the methodological

strategies reviewed in this study. Besides choosing to use sequential mixed methods, the study broadly discussed the advantages of the methodology and its suitability for similar studies. The study also used recommended data analysis techniques for quantitative and qualitative data. Future researchers may easily be guided by the well-laid-out procedures in considering data analysis for their studies (Creswell, 2020).

8.4.3 Contributions to Practice

Based on the empirical findings, the study proposes a framework that can guide policymakers in formulating policies that advance sustainable development goals through e-commerce in SMMEs. The framework focuses on factors influencing e-commerce and challenges to adopting e-commerce by SMMEs in the South African context; it also reveals the relevant stakeholders to the SMMEs' business environment and how they influence policies. In the framework is identified the various features of e-commerce that SMMEs must leverage in contributing to sustainable development. The SDGs that are achievable through e-commerce were also stated by the framework. Policy-makers can, therefore, be guided by the Ecom4SD framework in crafting policies that take advantage of e-commerce in SMMEs to promote sustainable development.

8.5 Limitations of the Study

This section discusses the limitations of the study. Firstly, the sample of SMMEs was selected from three provinces in South Africa. This was done due to the similarity in the common types of SMMEs nationwide, however, the survey registered some unique business sectors, indicating chances of new emerging sectors that are rare in some provinces. The generalisability of the results could have been affected by including such types.

Demographics skewness could have been another challenge. The research assistants randomly sampled the SMME directors to whom they deployed the questionnaires, which could have resulted in bias since the assistants could have approached only the familiar SMMEs. Some SMME business sectors also have very few members, and the distribution of respondents could not have been objective. The same applied to other demographics, such as education level, internet knowledge, and age; coincidentally, gender was well balanced.

Regarding the instrument, self-reporting instruments have the risk of respondents trying to create an impression in their responses, therefore, Factors under investigation might have been affected by this kind of bias (Mahembe, 2014). Furthermore, some respondents might have found some of the constructs on the instrument sensitive and, as such, would give answers that favour their affiliation towards certain bodies, such as the government.

Lastly, the political scale did not pass the reliability test based on the collected data, which could have resulted from the sensitivity of political affiliations. Some respondents would give answers that favour their political preferences rather than the reality on the ground. As a result, the study dropped the political factor from the SEM model.

8.6 Recommendations for future research

Further research should establish conclusive results on the influence of political factors on trust in e-commerce by reconsidering the items used on the scale for this study. The findings from the literature review about political factors remain relevant (Finger, 2018) and although the regression analysis indicated the significance of the political factor, its inclusion in the SEM resulted in a poor model fit.

The empirical qualitative study findings established the relationship between e-commerce and sustainable development. Further studies may confirm these findings using empirical quantitative data, which may further improve sustainable development strategies by utilizing the appropriate technologies. New technologies have also created many entrepreneurial opportunities for young people to pursue. Most of the survey respondents belonged to the conventional South African SMME business sectors, such as transportation, vending, and beauty therapy. Digital technologies have opened new business opportunities for young people to explore; these come with associated lucrative revenue models. Further research could also investigate the suitability of these new business sectors and revenue models for SMMEs in developing countries.

This research only considered SMMEs in three provinces of South Africa. Further research may consider validating the framework by conducting a comparative study involving other developing countries in the SADC region with similar contextual factors to confirm the generalisability of the framework to developing countries.

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