CHALLENGES ON THE ADOPTION OF ELECTRONIC COMMERCE BY SUPERMARKET RETAILERS IN LIMPOPO, SOUTH AFRICA

by

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[redacted]

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DECLARATION

I declare that the work about **challenges on the adoption of electronic commerce by supermarket retailers in Limpopo, South Africa** belongs to me, and I referenced all resources that I have quoted or used for acknowledgment. This work was never submitted by anyone in any institution before I do.

Charlene Tempe Mogano

06 September 2024

Signature

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ABSTRACT

The present study aimed to investigate the hurdles hindering the acceptance of electronic commerce (e-commerce) among supermarket retailers in Limpopo, South Africa. Specifically, the objectives were to discern the interrelationships between technological, organisational, and environmental barriers influencing e-commerce adoption, managerial strategies employed to address these challenges and the outcomes of actual implementation of e-commerce. Data collection was executed through online questionnaires distributed to 141 participants via Google Forms. Subsequently, the gathered data underwent analysis using Statistical Package for the Social Sciences (SPSS) version 26, with rigorous tests conducted to ensure reliability and validity. Pearson correlation analysis was employed to examine the associations between variables.

The findings revealed significant associations between the obstacles impeding e-commerce adoption among supermarket retailers and the managerial interventions aimed at overcoming these barriers. Moreover, a positive relationship was observed between managerial strategies to address challenges and the perceived usefulness and ease of use of e-commerce technologies. Notably, these strategies also exhibited a correlation with the actual outcomes of e-commerce adoption.

Based on the results, it is recommended that supermarket retailers in the Limpopo Province consider implementing targeted managerial interventions to address the identified challenges hindering e-commerce adoption. These may include investing in staff training programs, enhancing technological infrastructure, and fostering a supportive organizational culture conducive to e-commerce integration. Additionally, fostering collaborations with industry stakeholders and seeking guidance from e-commerce experts could provide valuable insights and resources for navigating the complexities of e-commerce adoption. By proactively addressing these recommendations, supermarket retailers can position themselves more effectively to capitalize on the opportunities afforded by e-commerce and enhance their competitiveness in the marketplace.

Key words: Electronic commerce, technological challenges, organisational challenges, environmental challenges, technological actions, organisational actions, organisational performance measures, perceive usefulness and ease of use, supermarket retailers.

Table of contents

APPENDIX A: list of abbreviations or acronyms

Abbreviations and/ or acronyms	Referent
B2C	Business to consumer
CDM	Capricorn District Municipality
DOI	Diffusion of Innovation
E-commerce	Electronic commerce
EVA	Economic Value Added
GDP	Gross Domestic Product
ICT	Information and Communication Technology
NII	Net Interest Income
ROA	Return On Assets
ROE	Return On Equity
TAM	Technology Acceptance Model
TOE	Technological, Organisational and Environmental
TREC	Turfloop Research and Ethics Committee
TSR	Total Shareholders Return
TC	Technological Challenges
OC	Organisational Challenges
EC	Environmental Challenges
TA	Technological Actions
OA	Organisational Actions
OP	Organisational Performance
PUEU	Perceived Usefulness and Ease of Use

APPENDIX B: List of Tables

APPENDIX C: List of Figures

CHAPTER ONE
DEFINING THE RESEARCH

1.1. CHAPTER OVERVIEW

This chapter outlined how the study was conducted. The research topic is introduced, and the background is elaborated. Research problem was discussed including the aim of the study, objectives of the study research hypothesis and delimitation of the study. Preliminary literature review, research methodology, significance of the study and ethical consideration were explained. All these contents were explained according to how the entire study was conducted.

1.2. INTRODUCTION AND BACKGROUND

The phenomenon of electronic commerce has grasp researchers' attention as a result of electronic commerce being rapidly adopted. In developed countries, e-commerce is the novel driver of economic growth (Haryanti & Subriadi, 2020). Currently, businesses find the internet an important technology to use. The internet and computers are important tools to change communications, methods of teaching and the way business owners run their businesses (Haryanti & Subriadi, 2020). In developed countries, businesses changed the way they buy or sell products or services by adopting e-commerce, while in developing countries businesses are still trying to adapt to the new way of buying and selling. The adoption of e-commerce requires knowledge and skills of information communication technologies (Mohamed, Jenal & Hanawi, 2018). This study focused on supermarket retailers. Supermarkets are large retail stores that offer self-service to customers. Supermarkets sell their products to end customers, and they are classified as business-to consumer (B2C) model. B2C model is the retailing of a product by a business to an end customer (Kutz, 2016).

E-commerce allows businesses to co-operate more effectively with customers and suppliers. Furthermore, e-commerce improves relationships between businesses and customers (Yaseen, Alhusban, Dingley & Alhosban, 2017). The businesses that adopt e-commerce are influenced by the perceived benefits that they will gain after the adoption (Lima, Limb & Trakulmaykeec, 2018). Additionally, e-commerce offers value for retailers and increase the economic growth rate (Yaseen et al., 2017). Businesses

that adopted e-commerce experienced benefits such as cost reduction, improved customer service, increases in sales, reduction in time to implement new ideas and reduced supply chain problems (Pearson & Grandon, 2014). If e-commerce is properly implemented, then business process will improve, and productivity will increase (Khan, 2016).

Organisations are aware of the challenges that they can encounter when e-commerce is adopted (Mohammed et al., 2018). When e-commerce is adopted, there are challenges that retailers can experience, and those challenges can be managed. There are several challenges experienced by supermarket retailers, which include higher cost of logistics and being unable to reach the target market as well as other technological challenges, organisational challenges, and environmental challenges. There are actions that managers can take to counter those challenges. (Kutz, 2016). Studies have been conducted regarding e-commerce, but there are missing gaps regarding challenges on the adoption of electronic commerce by supermarket retailers. Therefore, this study focused on challenges on the adoption of electronic commerce by supermarket retailers in Limpopo, South Africa.

1.3. RESEARCH PROBLEM

1.3.1. Problem statement

In the context of the Coronavirus pandemic, businesses increasingly recognize electronic commerce (e-commerce) as a pivotal strategy for achieving success. (Al-Tayyar, Abdul, Azmawani & Mass, 2021). The buying and selling of goods electronically started to increase after the covid19 pandemic, whereby even after the pandemic businesses, suppliers and customers and getting used to this method of buying and selling (Galal, 2023). In developing and developed countries e-commerce is expected to grow, and some South African retailers have embraced e-commerce while others are in the process of adopting it (Weber & Badenhorst-Weiss, 2018). Developing countries such as South Africa grow in a slower pace because of challenges that they face limiting their adoption of e-commerce (Weber & Badenhorst-Weiss, 2018). Nevertheless, in South Africa, there are provinces such as Gauteng that develop faster that other provinces such as Limpopo province (ICASA, 2020). According to Stats SA, Gauteng province is the leading province in South Africa in

relation to the adoption e-commerce whereas Limpopo have the lowest growth in adopting e-commerce.

Online grocery retailing is one of the sectors that grow slowly in adopting e-commerce. Both customers, suppliers and retailers in supermarkets are slow to participate in purchasing or selling electronically (Johnson & Iyamu, 2019). South African retailers such as Woolworths and Pick n' pay use e-commerce to their benefits especially in urban areas. Urban areas such as Gauteng are favoured by e-commerce because they have enough resources and capital; and goods can be ordered and delivered easily and in convenient time (Maduku et al., 2016). Rural areas such as Limpopo face challenges that affect their adoption of e-commerce because they lack infrastructures. However, to effectively navigate the e-commerce landscape, retailers must be cognizant of the challenges they may encounter and possess adept management strategies to address them. yet face multifaceted challenges, including security challenges, logistical complexities, and limited computer and internet literacy (Rithari, 2014).

The crux of the issue lies in the lack of comprehensive understanding regarding the challenges on the adoption of electronic commerce by supermarket retailers in Limpopo, South Africa. Existing research falls short in categorising these challenges into distinct domains such as technological, organisational, and environmental, thereby impeding effective management intervention. Moreover, scant attention is devoted to elucidating how management addresses these challenges.

Furthermore, the scholarly landscape lacks inquiries into the intricate relationships between the challenges experienced by supermarket retailers and their impact on the adoption of e-commerce. Notably, no studies have probed into the management's actions to counter these challenges and how such interventions shape the outcomes of e-commerce adoption. Consequently, there exists a notable dearth of knowledge regarding the management strategies employed to mitigate challenges and their consequential effects on e-commerce adoption.

1.3.2. Aim of the study

The aim of the study is to investigate challenges on the adoption of electronic commerce by supermarket retailers in Limpopo, South Africa

1.3.3. Objectives of the study

- To investigate the relationship between challenges influencing the adoption of electronic commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges.
- To examine the relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.
- To explore the relationship between challenges influencing the adoption of electronic commerce by supermarket retailers and the outcomes of the actual adoption of e-commerce.

1.3.4. Research hypothesis.

- H01: There is no relationship between challenges influencing the adoption of electronic commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges.
- Ha1: There is a positive relationship challenges influencing the adoption of electronic commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges.
- H02: There is no relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.
- Ha2: There is a positive relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of actual adoption of e-commerce.
- H03: There is no relationship between challenges influencing the adoption of electronic commerce by supermarket retailers and outcomes of actual adoption of e-commerce.
- Ha3: There is a positive relationship between challenges influencing the adoption of electronic commerce by supermarket retailers and outcomes of actual adoption of e-commerce.

1.3.5. Delimitation of the research

This study was not conducted to specify customer perception towards e-commerce, how e-commerce affects customers' purchasing preferences, or to define benefits and challenges experienced by customers. Neither does it focus on the applications and disadvantages of e-commerce. This research focuses on challenges on the adoption of electronic commerce by supermarket retailers. Technology is slowly being adopted in developing areas (Mohamed, et.al, 2018). This study concentrated on registered supermarkets in Capricorn District Municipality and Mogalakwena Local Municipality because these municipalities are in developing area, Limpopo province where e-commerce is slowly adopted. The study focuses on supermarkets in developing areas where e-commerce is slowly adopted. This study investigated challenges that supermarket retailers in CDM and Mogalakwena Local Municipality encounter in adopting e-commerce and examined how those challenges can be managed and the outcomes of actual adoption of e-commerce.

1.4. DEFINITION OF KEY TERMS

1.4.1. Electronic commerce

Different individuals define electronic commerce (E-commerce) differently (Kurnia, Mahbubur & Alzagooul, 2013). E-commerce is the selling of goods or services conducted electronically. Manzoor (2018) defined e-commerce as the usage of electronic resources and technologies to conduct business, including the purchase, sale, exchange, or transfer of information on products, or services with the aim of expanding business to a worldwide reach (Yaseen et.al., 2017). In this study the definition of e-commerce that was used was Manzoor's definition which state that e-commerce is the usage of electronic resources and technologies to conduct business, including the purchase, sale, and exchange or transfer of information, products, or services.

1.4.2. Electronic Commerce Adoption

E-commerce adoption is the act of deciding to accept, follow, engage in, or use e-commerce. E-commerce adoption is described as a consumer and web vendor's online relationship resulting from the exchange of money for products or services technologically (Rithari, 2014). E-commerce adoption is the conclusion to make use

of the innovations of e-commerce as the route of available action (Khan, 2016). Rithari's definition was used in this research which states that e-commerce adoption is the consumer's and web vendor's online relationship resulting from the exchange of money for products or services technologically.

1.4.3. Supermarket

A supermarket is a large shop retailing foods and goods for households and permit self-service for customers (Bizbolts, 2019). They are retail shops selling products to final consumers. Supermarkets sell different brands that usually comprise of fast moving consumer goods such as dairy products, meat, beverages, canned foods, packaged products, cosmetics, baked foods, kitchen wares, food for pets and medications that do not require doctor's prescriptions (Bizbolts, 2019).

1.4.4. Retailer

A retailer is a business or an individual who sells commodities or services to end customers. A retailer is defined as a business or a person that does not manufacture products but buys products in large quantities from wholesalers or manufacturers and sells those goods in small quantities to final customers (Terblanche, 2016).

1.4.5. Challenges

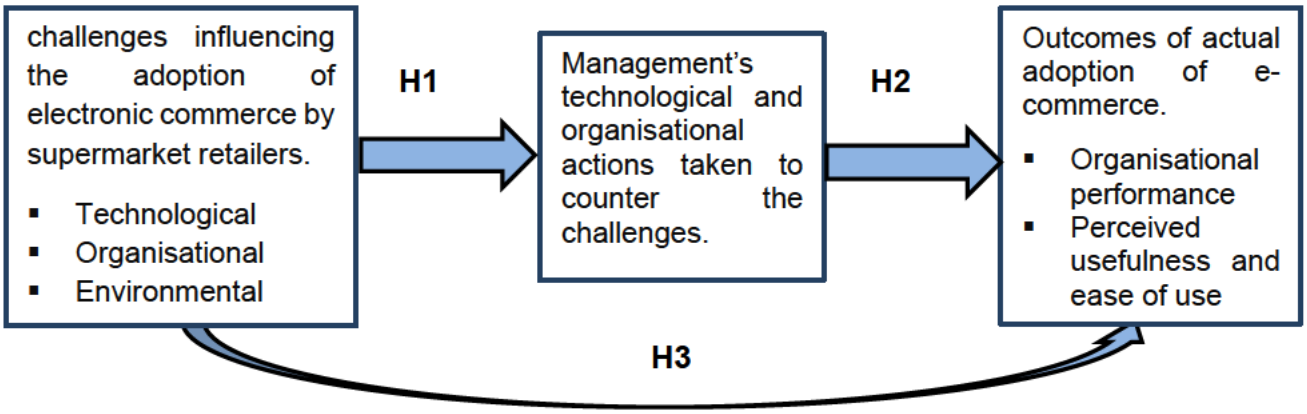
In a business, a challenge is defined as a condition that threatens to delay or disturb a business' quest for success (Álvarez & Gutiérrez, 2019). A challenge is a situation that tests an individual's ability and can result in negative outcomes or unsuccessfulness. Therefore, challenges need excessive effort for a business to be successful (Álvarez & Gutiérrez, 2019).

1.5. PRELIMINARY LITERATURE REVIEW

In the literature review the theoretical base and empirical literature were summarised as per the below figure 1.1. The figure 1.1 below illustrates the conceptual model of the research. The Technology Acceptance Model, Diffusion of Innovation Theory and the Technology, Organisational and Environmental framework were discussed as the theoretical base. The boxes represent the variables; namely: challenges influencing the adoption of electronic commerce by supermarket retailers, and management's technological and organisational actions taken to counter the challenges and outcomes of the actual adoption of e-commerce. The arrows represent the relationship

between variables. Therefore, the main stand-alone chapter of the literature review shall be discussed in detail in this study's chapter 2.

Figure 1.1: Conceptual model of the research.



Source: author's conceptualisation.

1.6. RESEARCH METHODOLOGY

Technology is slowly being adopted in developing areas (Mohamed, et.al, 2018). This study concentrated on selected registered supermarkets in Capricorn District Municipality and Mogalakwena Local Municipality to analyse challenges on the adoption of e-commerce in selected municipalities in Limpopo province, since it is a developing area. A quantitative approach was adopted to explain the relationships among challenges on the adoption of e-commerce, the outcomes of actual adoption of e-commerce, and management's technological and organisational actions taken to counter the challenges.

The targeted population of this study consisted of supermarket owners, CEOs, general managers, marketing managers, and directors of supermarket retailers in Capricorn District Municipality and Mogalakwena Local Municipality. This study used random probability sampling to select registered supermarket retailers and the respondents in each selected supermarket retailer to allow the target population equal probability to be included in the study. The study used a sample size as determined by the Raosoft online sample size calculator to avoid collecting too little data that will cause too many errors and biases in a study. Raosoft calculator ensure accuracy and reliability of population. (Hightower & Scott, 2012).

Primary data was collected through a structured survey questionnaire, whereas secondary data was collected employing books, journal articles, and websites (Surbhi, 2017). The questionnaire was created using Google form in English and Sepedi and it was distributed electronically because it was collected during covid19 pandemic whereby researchers could not travel to risk the chances of contacting corona virus. The researcher received feedback as soon as respondents submitted their answers electronically. Descriptive statistics, ANOVA and regression analysis will be used to analyse the collected data. The Cronbach's Alpha was used to measure reliability. Factor analysis and theory from the literature, was used to develop the questionnaire to ensure that questionnaire is a valid instrument.

1.7. SIGNIFICANCE OF THE STUDY

The significance of the study provides important information about the research (Sandeep, 2015). Therefore, the significance of this study titled: " Challenges on the adoption of electronic commerce by supermarket retailers " lies in its potential to offer valuable insights into the obstacles faced by supermarket retailers in embr;acing electronic commerce (e-commerce) in the Limpopo Province.

Firstly, understanding these challenges is crucial for policymakers, business owners, and stakeholders in the Limpopo Province. By identifying and analysing the barriers to e-commerce adoption, this study can inform the development of targeted strategies and policies aimed at overcoming these obstacles and promoting the growth of e-commerce within the region.

Secondly, the findings of this study can provide practical guidance for supermarket retailers operating in the Limpopo Province. By gaining a deeper understanding of the challenges associated with e-commerce adoption, retailers can develop informed strategies to address these issues and enhance their capacity to effectively integrate e-commerce into their business models.

Furthermore, the study's focus on supermarket retailers specifically adds to its significance. Supermarkets play a vital role in the retail sector and are often at the forefront of technological advancements. Understanding the challenges they face in adopting e-commerce can have broader implications for the retail industry as a whole, both within the Limpopo Province and beyond.

1.8. FORMAT OF THE STUDY.

This research document consists of five chapters including the abstract, appendices, and references. The first **CHAPTER 1** defined the research and outlined the plan of how the study was conducted, the second **CHAPTER 2**, reviewed of other authors' scholarly published literature/s, the third **CHAPTER 3**, discussed the methodological considerations and processes taken thereof, while the fourth **CHAPTER 4** includes data analysis, findings and conclusion and lastly **CHAPTER 5** includes overall conclusions and recommendations.

1.9. ETHICAL CONSIDERATIONS

Ethics are concerned with ensuring that the interest and well-being of people affected by the research are not harmed and their reputations are not ruined because of the research being conducted (Chetty, 2016). Application for ethical clearance from the Turfloop Research and Ethics Committee (TREC) was obtained before the commencement of data collection was done. Participants were given the background and purpose of the study for them to understand what the study is all about; as well as the consent form to decide if they will participate or not. They participated voluntarily; their names were not included in the study, and they were treated with respect. Provided information will remain private and confidential and provided data was used only for academic purposes.

1.10. SUMMARY OF THE CHAPTER

It introduced the significance of understanding the hurdles faced by supermarket retailers in adopting electronic commerce (e-commerce) within the Limpopo Province. Providing background information on e-commerce's evolution and its impact on traditional retail practices, the chapter articulated the specific problem of a lack of comprehension regarding the challenges on the adoption of electronic commerce by supermarket retailers. By outlining the purpose of the study to analyse and identify these challenges, the chapter underscored the importance of the research's potential contributions to academia, industry practices, and policymaking. Additionally, it delineated the scope and limitations of the study, focusing on the Limpopo Province and supermarket retailers, and provided an overview of the organization of subsequent chapters within the thesis or research report. In the next chapter, Literature review from previously scholarly works is presented and discussed.

CHAPTER TWO

LITERATURE REVIEW

2.1. CHAPTER OVERVIEW

There are numerous challenges influencing the adoption of e-commerce (Franco & Bulomine, 2016). The study delved into existing research and scholarly works pertaining to electronic commerce (e-commerce) adoption within the retail sector, with a specific focus on supermarket retailers in the Limpopo Province. The review explored a diverse range of literature encompassing the evolution of e-commerce, its impact on traditional retail practices, and the challenges encountered by retailers in adopting e-commerce technologies. Additionally, the review examined studies that elucidated the factors influencing e-commerce adoption, including technological, organisational, and environmental factors. The theoretical and conceptual framework and the relationships between variables are also reviewed. Through a comprehensive synthesis of the literature, the study aimed to build upon existing knowledge and provide a foundational understanding of the challenges on the adoption of electronic commerce by supermarket retailers.

2.2 DISCUSSION OF RESEARCH AREA

The topic of the research is electronic commerce (e-commerce). E-commerce is defined as the selling or buying of goods or services through a computer network such as the Internet or intranet (Kutz, 2016). E-commerce is embraced by many companies to improve productivity, enhance customer service, decrease costs and to expand markets (Kutz, 2016). E-commerce is a term used to define the connection or communication, the exchange of goods or services, and financial transactions between numerous businesses and their customers (Jabar & Ogunsola, 2022).

E-commerce was introduced over 40 years ago, that is, in the 1960's by John R. Goltz and Jeffrey Wilkins via dial-up connection and in the 1970's electronic shopping was inverted by Michael Aldrich by using computers for transaction processing. It started to grow in innovations and technologies whereby different types of e-commerce models were introduced. (Jabar & Ogunsola, 2022). Business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C) and business-to-government (B2G) are major types of e-commerce models (Manzoor, 2018). The first

business-to-business model was installed in 1981 and 1982 by Thomson Holidays, this model is defined as the selling and buying of goods between businesses. In 1984 the first business-to-consumer model was introduced, and this module is a type of e-commerce where a business sells products directly to end customers with no intermediaries involved (Jabar & Ogunsola, 2022). This study focuses mainly on business-to-consumer e-commerce whereby supermarkets retailers sell directly to end customers.

Advantages of e-commerce can be divided into three categories, that is, advantage for customers, advantage for businesses and advantage for societies (Taher, 2021). Advantage of e-commerce for customers include the fact that the business operates for 24/7, and customers can purchase goods or services any time they want, they can purchase from any store regardless of the distance, and it saves time for them. Businesses benefit from e-commerce because there are no geographic restrictions, saves money for them since they do not have to hire more employees, pay rent or maintain physical building, improve competitive advantage, gain more customers and improve sales (Taher, 2021). Advantages of e-commerce for societies involves the fact that there is no need for customers to move around driving from one place to another for shopping and that will reduce air pollution since few vehicles move from one place to another delivering products to multiple customers. Fixed expenditures result in reduction in price point range of goods; therefore, low earning customers can afford those goods. E-commerce permits the remote zone in rural areas to have assess to goods and services that were not accessible to them before (Taher, 2021).

Disadvantages of e-commerce include the trust issues between buyers and sellers, theft of personal information or finances, readiness level which include organisational, industrial and national readiness level. (Zunawanis, Mohd, & Mohamad, 2016). However, there are strategies that can be used to minimise or avoid disadvantages to negatively affect stakeholders. Trust issues as a disadvantage of e-commerce can be avoided by displaying trust badge to customers to see that indeed the business and products are registered, display the information of a business such as contact details, address and refund and return policies on websites and give customers the opportunity to rate and review products. security risk can be avoided by providing a tight security on business website that is implementing encryptions, using a strong

password and two factor authentication, update software regularly to prevent vulnerabilities and conducting security regularly to identify and manage vulnerabilities. Readiness level can be avoided by assessing the readiness of the organisation and identify the area for improvement, developing a strategy for digital transformation, investing in network equipment's, software and hardware as well as providing training for digital skills (Zunawanis, et al., 2016)

2.3. THEORETICAL LITERATURE REVIEW

The research utilises the Technology Acceptance Model (TAM), Diffusion of Innovation theory (DOI) and Technology, Organisational and Environmental (TOE) framework.

2.3.1. Technology Acceptance Model (TAM)

The TAM is a model that explains an individual's decision to adopt technology (Colvin, 2018). The TAM was successfully applied in different contexts of marketing, and online retailing to elucidate and understand the adoption of e-commerce (McKechnie, Winklhofer & Ennew, 2016). The Technology Acceptance Model is used to determine the perceived ease of use and perceived usefulness of technology for users. Perceived ease of use is the extent to which prospective users expects to control the system with ease, and perceived usefulness articulates the possibility of potential users who assume that specific applications might increase performance of users (Fedorko, Bacik & Gavurova, 2015).

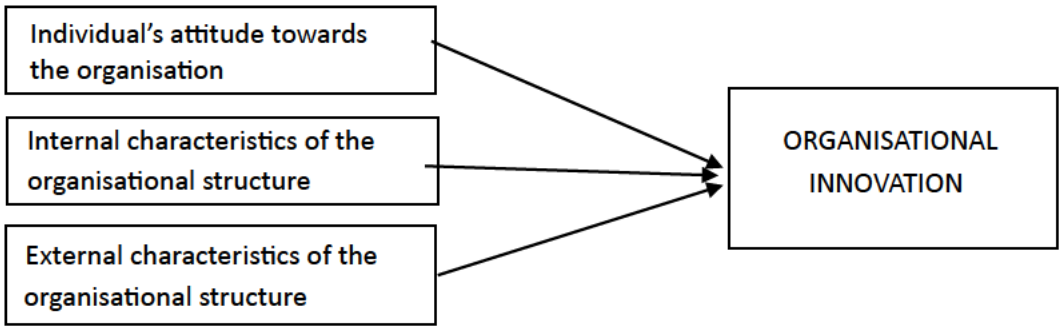
The TAM hypothesises that the behavioural intentions of individuals towards the adoption of technology are determined by the attitude of individuals towards the use of technology (Jistem, 2017). The TAM is used to estimate the attitude of users to use technology. Attitude is influenced by beliefs namely: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which people have confidence that technology will enhance performance, and perceived ease of use is the extent to which people are convinced that technology will be easy to use (Abdullai & Micheni, 2018). The TAM model theorises that perceived ease of use is a forecaster of perceived usefulness. Retailers will perceive e-commerce as useful if it is easy to use. Therefore, retailers will experience more benefits from e-commerce if e-commerce does not require much effort to adopt or use (Tanikan & Nittaya, 2019).

Perceived usefulness and perceived ease of use contribute to system use. Retailers of supermarkets adopt electronic commerce. The TAM identifies the perceived usefulness of technology which leads to its adoption (McKechnie et al., 2016).

2.3.2. Diffusion of innovation (DOI)

Diffusion of innovation is the procedure by which a novelty is communicated through channels amongst social system members (Kurnia, 2013). DOI is a unique form of communication, a way in which novelties are spread (Muthini, 2013). DOI encompasses the adoption and diffusion of organisational and technological novelties and estimates the outcomes for an organisation (Kurnia, 2013). Innovation is associated with independent variables such as individual leader attitude towards the organisation, internal characteristics of the organisational structure and external characteristics of the organisational structure (Rithari, 2014). In this study, Kurnia's definition was used because it includes the adoption of e-commerce as a form of technology used by supermarkets retailers. The figure 2.1 below illustrates the variables affecting diffusion of innovation.

Figure 2.1- Diffusion of innovation (DOI).



Source: Rithari,2014.

There are five main characteristics of novelties that affect the adoption of technology namely: complexity, observability, relative advantage, trial-ability, and compatibility (Kurnia, 2013).

The characteristics are described as follows:

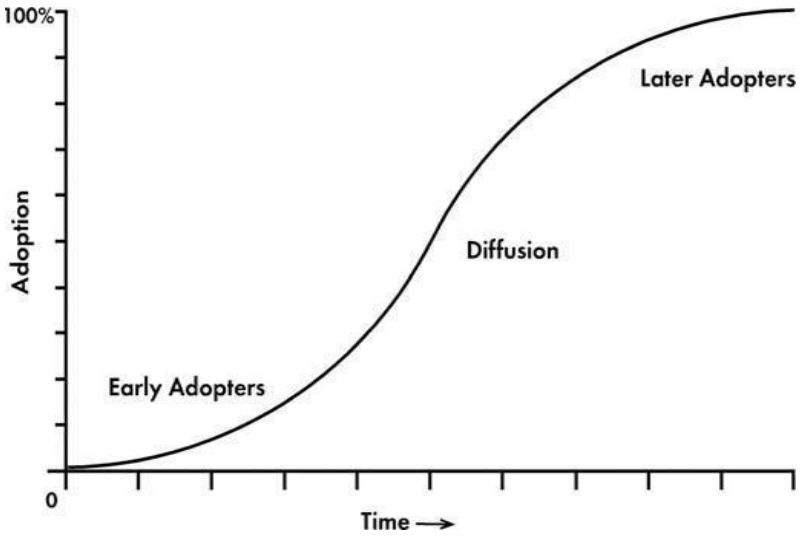
- Relative advantage: is the extent to which novelty is perceived as being greater than products that already exist (Muthini, 2013).

- Complexity: the extent to which novelty is perceived as relatively challenging to understand and to make use of (Muthini, 2013).
- Compatibility: is the degree to which novelty is perceived as being consistent with existing value, beliefs, needs and experienced results (Muthini, 2013).
- Trial-ability is the extent to which novelty can be experienced using a limited basis (Scott et al., 2018).
- Observability: is the extent to which innovation's results are noticeable to adopters (Scott et al., 2018).

Relative advantage and observability are used in this study because the study focus on the outcomes of actual adoption of ecommerce and the perceived usefulness to supermarket retailers. High observability, high relative advantage, high trial-ability, and high compatibility have a positive influence on the adoption of novel innovation (Kurnia, 2013). DOI theory is used to describe factors influencing the spread of new technologies or new ideas. (Tuffour et al., 2018).

DOI theory describes four elements affecting the diffusion of new ideas, namely: time, the communication channels, social systems, and the type of innovation (Tuffour et al., 2018). Time is the time at which the information of a new product is floated in the market as well as the time the new product is purchased. The communication channel is the way in which participants form and share data within themselves to be able to reach a common understanding. A social system is a set of units that are interrelated which are involved in combined problem solving to achieve a shared goal (Sahin, 2016). Innovation is an object, idea or practice that is perceived as new by specific individuals. (Pease & Rowe, 2015). The result of DOI is that individuals adopt new ideas, products, technology, or behaviour.

Figure 2.2- The diffusion of innovation S-curve.



Source: Peixoto, Castro & Nascimento, 2015.

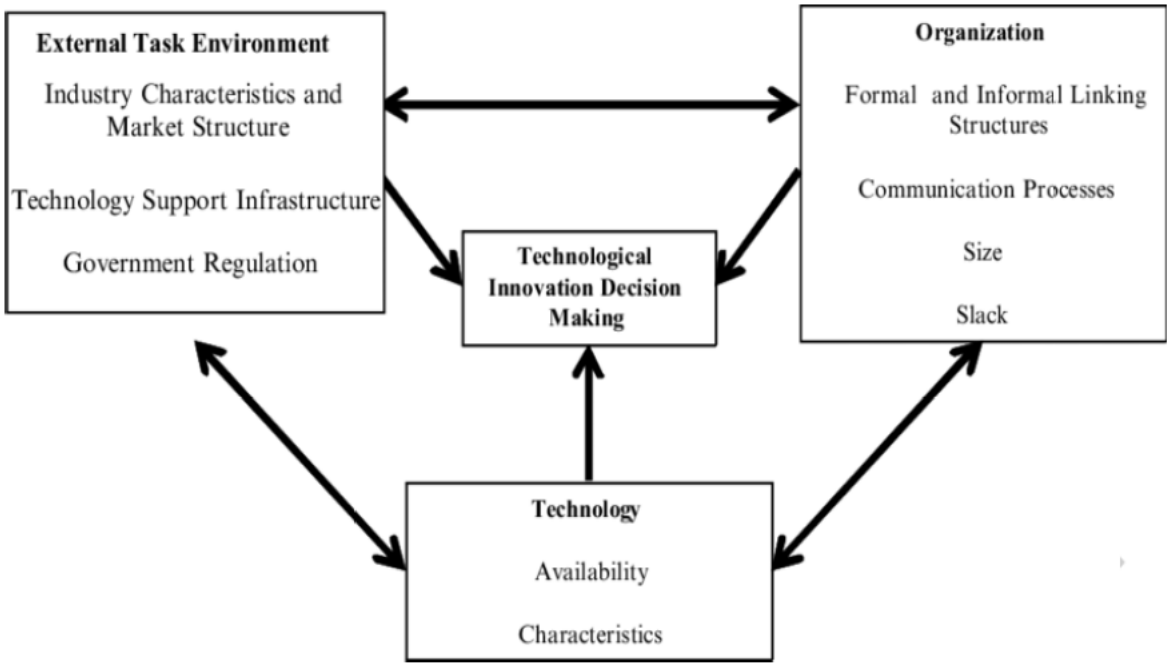
The diffusion starts from early adopters to latest adopters. Early adopters are more restricted with limitations of the social systems, and they are more probable to achieve roles of leadership in the social system. Early adopters include business owners or managers. Other members of the social systems seek information about the novelty from the leadership of the social system which are early adopters. (Peixoto et.al, 2015). Late adopters consist of one-third of all social system members who are mostly afraid of taking risks or those who are afraid of changing the way they operate; they delay until the majority of their peers adopt the novelty. Even though they are incredulous about the novelty and its results, they are pressurized by peers to adopt the novelty *(*Peixoto et.al, 2015).

DOI theory contributes to this study because characteristics of novelties affect the adoption of technology. Complexity is experienced when retailers experience challenges such as a lack of knowledge and skill in e-commerce. A social system is involved when the management of supermarket retailers interrelates and comes up with actions to counter challenges to achieve shared goals. Observability is included when the outcomes of the adoption of e-commerce are noticeable to adopters and when organisational performance is measured. DOI theory will help in the formation of the questionnaire. Using this theory will aid in the management of electronic commerce challenges experienced by supermarket retailers and identifying outcomes of actual adoption of e-commerce.

2.3.3. Technology, Organisational and Environmental Framework

The technology, organisational and environmental (TOE) framework was adapted to expound how the adoption of new technology and its use are influenced by different factors (Bryan & Zuva, 2021). There are three important determinants that impact the adoption of novelty namely, technology context, organisation context and environment context.

Figure 2.3 – The technology, Organisational and environmental framework.



Source: Tornatzky and Fleischer (1990).

Technology focuses on the accessibility of technologies in the marketplace and characteristics of technologies appropriate to the firm, that will influence the decision of the firm, individual or organisation to adopt novelty (Bryan & Zuva, 2021). The organisation focuses on the characteristics of the organisation: the size of the organisation, organisational slack, processes used to communicate, and the formal and informal linking structures and the organisational resources used in the adoption of novelty (Chau & Deng, 2018). Environmental context is the area where an industry targets the government to create a relationship on government regulations. It consists of technology infrastructure, industry characteristics and market structure, including external pressure from suppliers, competitors, and buyers as well as external support influencing the adoption of novelties.

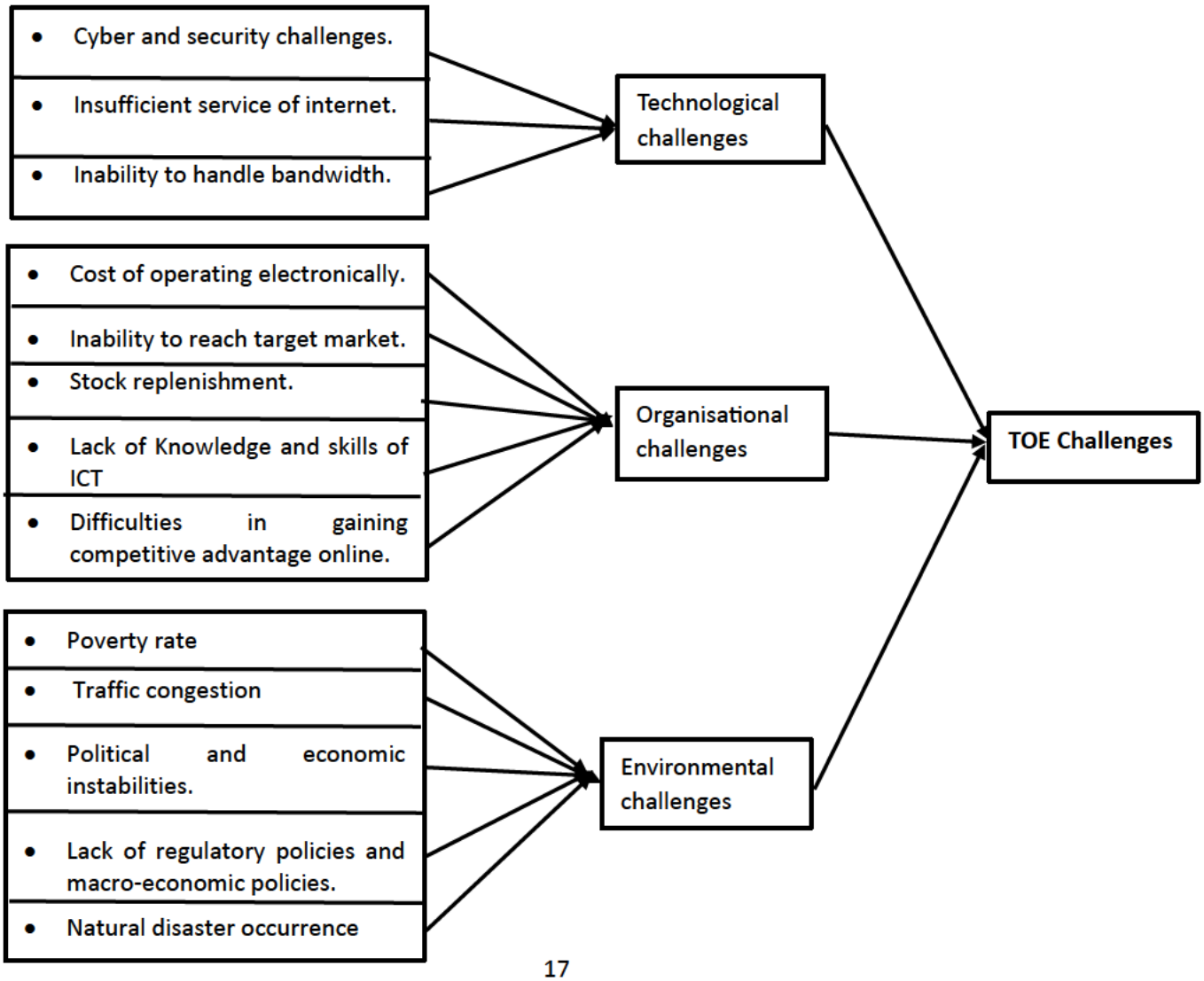
Therefore, all the factors listed in **Figure 2.3** influence the adoption of new technology. TOE challenges derived from the TOE framework where there are specific factors from the TOE framework which can also be considered as TOE challenges such as government regulation, availability of knowledge and skills of e-commerce as well as the cost of operating electronically. Using the TOE framework to analyse the adoption of e-commerce can help supermarket retailers identify and classify challenges on the adoption of e-commerce.

2.4. THE EMPIRICAL LITERATURE REVIEW

2.4.1. Challenges experienced by retailers in the adoption of e-commerce

Technology impacts retail supermarkets through e-commerce (Shozi, 2021). There are different challenges encountered by supermarket retailers, those challenges include technological, organisational, and environmental (TOE) challenges. Figure 2.4. below illustrates TOE challenges adopted in this study.

Figure 2.4: TOE Challenges.



Source: Author's conceptualisation.

2.4.1.1. Technological challenges

Technological challenges are challenges attained from ICT characteristics and systems that supermarket retailers use for the adoption of e-commerce (Shemi & Procter, 2013). Technological challenges are major challenges faced by retailers, especially when moving from a lower technology to a higher technology (Bayo, 2019). These challenges include Cyber and security challenges, insufficient service of internet and inability to handle bandwidth.

- Cyber and security challenges

These challenges focus more on accessing accounts illegally to steal organisational data or finances. Organisations experience financial loss due to cyber and security challenges. Even if organisations may not undergo financial loss, cyber and security challenges can result in bad experiences for customers, and this will affect the organisation whereby they gain few customers and lose more customers and that will ruin the reputation of an organisation (Varghese, 2022). There is a lot of data or information involved in electronic commerce; data or information involved can be part of technical issues that can cause a severe damage on daily operations of supermarkets retailers if there is a loss of data, downtime, data breaches and/or incorrect data (Varghese, 2022).

Cyber and security challenges are major issues in electronic commerce (Batra & Juneja, 2013), if the data of an organisation is protected and kept secret from competitors, then the organisation will be able to perform better. (Niranjanamurthy, Kavyashree, Jagannath & Dharmendra, 2013). Adopters of e-commerce worry about hackers and viruses that can attack their devices. Security of wireless transmission can be breached by hackers to acquire important information of an organisation including financial matters (Batra & Juneja, 2013). In e-commerce, security is regarded as the safeguard of assets of e-commerce from unlawful access, amendment, devastation, or usage.

Electronic commerce is exposed to multiple cyber and security challenges including phishing, spamming, denial of services, malware, spyware, spam mail and man in the middles. Cyber and security challenges are defined as follow:

i) Phishing: An electronic scam technique involved in tricking users into providing confidential information for scammers to gain financially. Malicious websites or emails are used by phishing attackers as legitimate account interfaces to implore personal data such as credit card numbers or login credentials (Belbergui et al., 2020).

ii) Spamming: this is the messaging system method used to lure individuals to become victims of cyber and security challenges through sending spam messages as adverts to receipts (Manivannan & Moorthy, 2020).

Spam email: this type of attack is about sending emails to individuals' accounts without their permission, the email contains inappropriate advertisements or posts which may bait individuals to become victims of cyber-attacks (Manivannan & Moorthy, 2020).

iii) Denial of services (DoS attack): Known as an attempt to make resources of electronic commerce unavailable to its anticipated users by overflowing the network. These challenges will deny legitimate users to have access to information systems (Belbergui et al., 2020).

Malware: is used when viruses are spread through downloading files that are infected or emails that can modify the data of a customer. It includes worms and Trojans; worms are programs that can spread independently on their own from one computer to another. while Trojans spy on confidential information (Belbergui et al., 2020).

iv) Spyware is software installed in the computer of the user without the user's awareness and this software enables the hacker to have access to the user's files of information in the system without any consensus (Manivannan & Moorthy, 2020).

v) Man in the middle: act as a middleman between two parties' transactions to gain access, obtain data and use it against users (Manivannan & Moorthy, 2020).

- Insufficient service of internet

E-commerce is powered by the internet subsequently, if there is insufficient service, then e-commerce will not be a success. (Vyshnova, 2020). In most developing countries, internet service is not reliable because there are poor telephone communications and unreliable supply of electricity. Even if businesses can afford to

operate electronically, it will still be a challenge if their customers lack network infrastructures (Japhet & Usman, 2018). The internet provides techniques for data to be moved from the internet to computers. Insufficient service challenge occurs when a business is unable to access communication tools, websites, and data (Vyshnova, 2020). Communication tools are tools such as social networking, and e-mails, if there is insufficient internet service, retailers won't be able to communicate with other stakeholders such as their customers and suppliers since there is no connection between the internet and the computer. The ability of retailers to access powerful communication tools will influence their decision to adopt electronic commerce (Vyshnova, 2020).

- Inability to handle bandwidth.

Bandwidth challenges occur when the website is unable to handle the amount of traffic space that it uses (West, 2019). Retailers are unable to handle bandwidth when they exceed their traffic space, and their hosting accounts end up being suspended. When people visit retailers' websites and view their images or any other data on their websites, they take up space and when there is insufficient space, bandwidth challenges occur, the website will take longer to load, and performance will be poor (West, 2019). When the website can handle bandwidth, retailers will be influenced positively to adopt e-commerce but if the website cannot handle bandwidth, retailers will be influenced negatively to adopt e-commerce (West, 2019). These challenges transpire when the demand for bandwidth expands (Tandon, Mandal &Saha, 2016).

2.4.1.2. Organisational challenges

Organisational challenges refer to complications that personnel face that thwart them from attaining their goals (Shemi & Procter, 2013). These challenges include the cost of operating electronically, inability to reach target markets, poor stock replenishment, lack of knowledge and skills in ICT, and difficulties in gaining competitive advantage.

- Cost of operating electronically

The majority of businesses benefit from e-commerce, but the initial costs and recurring costs of trading online pose a challenge to supermarkets (Mkansi, 2020). Lack of finance is a challenge to retailers in the adoption of e-commerce (Franco, & Bulomine, 2016). Electronic commerce can be costly to some adopters, while others experience

otherwise. It depends on how retailers find the e-commerce adoption cost, the cost of running the business electronically or upgrading and maintenance costs (Prasad, Ali & Joseph, 2014). Some customers expect retailers to ship their products for free after purchasing and therefore, retailers perceive this as an expense for their supermarkets. If retailers add shipping costs to customers, then customers will switch to suppliers with less shipping cost or to traditional shopping (Prasad et al., 2014).

The cost of operating electronically may result in retailers losing profit or customers due to the cost of transporting goods or products and this will add to challenges that retailers face when operating electronically. The cost of adopting e-commerce can be higher than expected due to unforeseen factors. This becomes a challenge for retailers who have difficulties in obtaining the required start-up cost and installation cost, advanced software and hardware cost, as well as maintenance cost and the cost of other required electronic resources (Belbergui, Elkamoun & Hilal, 2020). Some retailers perceive the cost of shipping as an investment and there are retailers who perceive the cost of shipping as an expense (Prasad et al., 2014). Those who perceive it as an investment are more likely to adopt e-commerce and those who perceive it as an expense are unlikely to adopt e-commerce.

The cost of hiring staff members who are qualified and have knowledge of e-commerce is also a challenge in the adoption of e-commerce since it can be costly for other retailers (Mkansi. 2020). Another cost challenge is the challenge of tightening up the security of a retailer to secure the retailer's data and finances. Legal issues are expenses for retailers because legal representatives need to be paid to do their job. If retailers cannot afford legal representatives; consequently, that becomes a challenge for supermarket retailers because they might commit legal mistakes and end up being unable to legally protect their retailer (Mkansi, 2020).

Table 2.1 below summaries the cost challenges that retailers face in the adoption of e-commerce.

Table 2.1- E-commerce adoption cost challenges.

E-commerce adoption cost challenges
Direct costs Network facilities (that is monthly network connection cost) Technical Cost of ICT equipment or tools Re-organisation and software and for secure payment The cost of connecting internet and having access to telecommunications, Internet Service Providers (ISP) pricing and reasonably priced agreement lines (that is monthly costs of connection internet)
Complementary Cost Upgrades and maintenance costs Legal issues costs The cost of hiring expertise and qualified staff Appropriate distribution and supply of goods Security issues

Source: Adapted from Mkansi (2020).

- Inability to reach target market.

Retailers find it difficult to reach their target market when operating electronically and that becomes a challenge for them (Gangeshwer, 2013). This challenge is caused by higher transparency of setting prices and augmented price rivalry. Retailers are unable to reach their target market because of advertising their product on the wrong marketing platform, a platform that their target market does not visit or entertain regularly or at all. If they don't advertise their products in almost all marketing platforms, it will be difficult for them to reach their target market (Brook, 2015). The worst that retailers do to contribute to this challenge is estimating and assuming instead of conducting research to know more about which platform their target market prefers (Brook, 2015). Not everyone who visits a business website is their target market. Thousands of people visit websites but are not interested in the advertised product. This becomes a challenge for retailers because when people visit their websites without buying, then it means that they are not their target (Tanir, 2019).

- Stock replenishment.

Stock replenishment challenge transpires when retailers are unable to make sure that the correct items of stock are ordered in time to meet the demands of customers (Chapman, 2020). The inability of retailers to take care of stock orders may result in stocking more than or less than what is needed. Replenishment is a very serious

challenge for supermarket retailers due to obsolescence. (Patil & Divekar, 2014). If retailers purchase smaller quantities of stock, then they may run out of stock and if they purchase more than what is needed their products might end up being spoiled and thrown away. To avoid them being spoiled in their hands they might end up selling them at a cheaper price without any profit or with a lower profit (Patil & Divekar, 2014).

- Lack of knowledge and skills

There are numerous challenges delaying improvements in South Africa such as lack of knowledge and skills in computer literacy, incapability to use credit or debit cards for online transactions and poor e-commerce website design (Shozi, 2021). In the Limpopo province, the majority of schools have not adopted online education, Individuals lack ICT skills, and this affects them later in their working environments. Businesses end up having employees who lack knowledge and skills of ICT, and employees who do not know the value of the Internet and computers, and this becomes a challenge for businesses that want to adopt electronic commerce (Japhet & Usman, 2018). Lack of knowledge and skills is the problem that prevents supermarkets in developing countries from adopting e-commerce. Managers are under pressure to understand the challenges and opportunities involved in e-commerce. Staff members lack knowledge and skills in ICT (Shozi, 2021). If the management does not find a solution to overcome the challenge of lack of knowledge and skills, then this will continue to be a challenge in the adoption of e-commerce. If they can manage this challenge supermarkets will be more likely to adopt e-commerce (Looi, 2015). Having staff that lacks knowledge and skills about technology becomes a challenge for retailers to adopt e-commerce and operate electronically.

- Difficulties in gaining competitive advantage online.

Competing electronically can be a challenge for some retailers adopting electronic commerce. Competition can result in environmental ambiguity and increase the need for technology adoption (Looi, 2015). A business needs to be in a competitive environment to gain a competitive advantage. It is challenging for supermarkets in developing regions to gain a competitive advantage because technology is slowly adopted (Looi, 2015). It is challenging for retailers to influence customers to purchase

electronically. Therefore, retailers will find it difficult to gain competitive advantage if they are unable to compete electronically (Looi, 2015).

2.4.1.3. Environmental challenges

Environmental challenge refers to constraints that the environment outside the business enforces on a business (Babu & Kalaiyarasan, 2019). These challenges include poverty rate, traffic congestion, political and economic instabilities, lack of regulatory policies and macroeconomic policies, and natural disasters.

- Poverty rate

The poverty rate in a community can be unfriendly to a business and influence the adoption of e-commerce. A community that has individuals that have low income are unlikely to have access to technology that enables them to purchase online, therefore retailers in that community are negatively influenced to adopt e-commerce since their target market has no access to ICT (Shemi & Procter, 2013). Developing countries adopt e-commerce more slowly than developed countries (Shemi & Procter, 2013). Generally, countries that are still developing are consumers of internet technologies and ICT that offer a backbone for systems of e-commerce. In most cases, internet technologies originate from developed countries (Shemi & Procter, 2013). In developing countries, access to internet technologies has not been simple for most retailers due to lack of electricity, lack of financial resources or required energy that can assist in operating ICT as well as systems of e-commerce.

- Traffic congestion

Traffic congestion is defined as a circumstance of traffic deferral, that is, the flow of traffic is slowed beneath reasonable haste as a result of information that exceeds the road capacity (Parks & Winkenbach, 2023). As volumes and congestion of traffic grow on roadways, carriage and delivery service operators become more challenged to sustain reliable and consistent plans (Parks & Winkenbach, 2023). Customers won't be able to get their orders in time, there will be delays due to traffic congestion and which will affect customer loyalty (Parks & Winkenbach, 2023). Traffic congestion not only wastes time for customers and organisations, but it negatively affects the productivity of a business and costs a lot of money for a business (Parks & Winkenbach, 2023). Productivity will be affected as the cost of operating increases

and the market size reduces and this will reduce the profit margin of electronic orders. Traffic congestion affects the supply chain of an organisation since it involves the traffic from warehouses to customers (Peng, 2019). There are two forms of traffic congestion delay namely, frequent daily traffic delay and non-frequent traffic delay (Parks & Winkenbach, 2023). Frequent daily traffic delay occurs as the velocity of a car is reduced and queues of vehicles increase because of the high volume or capacity ratio on a precise corridor at a specific period. Non-recurring traffic delay occurs when there are incidents such as breakdowns of vehicles, medical emergencies on the road, and collisions (Parks & Winkenbach, 2023). These forms of congestion can cause a delay at off-peak times and therefore, supermarket retailers will be affected by traffic congestion to adopt electronic commerce.

- Political and economic instabilities

The instability of the economy plays a huge part in the adoption of e-commerce (Japhet & Usman, 2018). In some countries, political and economic instabilities prevent supermarkets from trading freely (Shemi & Procter, 2013). The political and economic situation in countries where there are conflict present challenges for supermarkets that want to adopt electronic commerce. Electronic businesses might pay certain taxes without being aware of it (Japhet & Usman, 2018). In most developing countries, the government does not prioritise internet services. Supermarket retailers will be influenced by political and economic instabilities which will impact the adoption of e-commerce (Japhet & Usman, 2018). Since electronic commerce depends on expensive technology infrastructure; it will be challenging for supermarket retailers to adopt electronic commerce (Japhet & Usman, 2018).

- Lack of regulatory policies and macro-economic policies

Lack of regulatory policies and macroeconomic policies can prevent organisations from participating in activities of e-commerce (Shemi & Procter, 2013). Developing countries prioritise policies for education, hunger, poverty, and health, therefore, they end up being unable to keep track of the development of ICT that changes frequently (Shemi & Procter, 2013). Regulatory and economic policies linking to security, protection of data, regulation, marketing, and tax criteria, such as the expense of accessing Internet, classically affect how businesses generate profit and how they

increase their effectiveness, and that will have an influence in the adoption of electronic commerce (Looi, 2015).

- Natural disaster occurrence

Natural disasters can interrupt the supply chain of e-commerce and that can affect the adoption of e-commerce. Interrupted supply chains can affect e-commerce such as increasing costs, delaying deliveries, damaging infrastructure, and reducing customer satisfaction. When customers' satisfaction reduces, they start to lose trust in their sellers and that will affect their reputation (Franco, & Bulomine, 2016). Most customers trust organisations that are more reputable rather than those with no reputation (Marakanon & Panjakajornsak, 2017). It can be a challenge for supermarkets to adopt e-commerce because they do not know when natural disaster will occur and how it will affect their businesses. The occurrence of natural disasters such as storms and floods can ruin technical resources or network connections and businesses end up being unable to sell their products electronically (Marakanon & Panjakajornsak, 2017).

2.4.2. Management's technological and organisational actions taken to counter challenges.

2.4.2.1. Technological actions

Top management needs to adapt technology more than anyone in the organisation to be able to take technological actions to counter challenges. Managers must be observant and always back up the firm's data to protect themselves against cyber and security challenges. There are serval security plugins that can be installed to prevent websites from being hacked (Varghese, 2022). Supermarket retailers can invest in identity or address verification systems to manage challenges that they face while operating electronically or that they might face in the adoption of e-commerce. Supermarket retailers can Install and update HTTPS protocol to secure users' sensitive information (Varghese, 2022). There are altered ways that can be used to integrate online verification such as AI, one-time password, single sign-on, biometrics and two-factor authentication (Prasad et al., 2014). Changing passwords frequently and creating complex passwords can help to manage password theft (Varghese, 2022). Management can install antimalware to detect, remove and prevent malware from infecting IT system and computer. They can also install anti-virus software to

manage viruses (Varghese, 2022). Management can create firewalls to help in creating barriers between trusted and untrusted networks to manage technical issues (Varghese, 2022). The supply chain or logistic entity can adopt the concept of electronic commerce fulfilment needs to be well ahead of its competitors (Shozi, 2021). A short phrase that can be used for electronic commerce fulfilment is e-fulfilment, which includes the procedure of shipping and fulfilling orders to customers (Shozi, 2021). This procedure is part of the retail supply chain which includes receiving and storage of inventory, processing of data, picking and packaging of items, shipment of packages as well as simplifying returns of e-commerce (Shozi, 2021). Supply chain organisation does not include only manufacturers and suppliers, but also comprises retailers, transporters, warehouses, and customers (Shozi, 2021). There are security challenges faced by adopters of e-commerce, but those challenges can be managed by ensuring that features of security are always updated and monitored frequently. Features of security do not ensure a safe system, but they are essential to constructing a safe system (Niranjanamurthy et al., 2013).

According to Niranjanamurthy et al. (2013), there are several classifications of security features namely: Authorization, non-repudiation, availability, authentication, encryption, integrity, and auditing.

- Authorization: Permits only account holders to have access and influence their wealth in particular ways, it determines the level of access for users.
- Non-repudiation: Ensure that parties do not break promises on a contract after the point. It approves the legitimacy and validity of the message. No party can repudiate that it sent or received a message.
- Availability: Preclusion in contradiction of the removal or delay of data. It protects the functionality of the support system and ensures that data is available when users need it.
- Authentication: Confirms users' identity, that is, it verifies that users are who they claim to be. It imposes that users are the only individuals who are permitted to log into their accounts on the Internet. The person must enter accurate data to validate identity.
- Encryption: It has to do with hiding information. It makes sure that spies do not achieve their goals during transactions of Internet banking.
- Integrity: Prevention in contrast to illegal modification of data.

- Auditing: stores a record of all operations. Retailers make use of auditing to verify that all specific products are bought.

The management team can manage the issue of bandwidth by ensuring that they measure their traffic space monthly and decide on increasing the space needed to avoid exceeding bandwidth (West, 2019). They must ensure that their hosting company handle their usage of bandwidth monthly to make sure that their account is not suspended for exceeding bandwidth (West, 2019). Hosting companies can recommend the level of bandwidth for supermarket retailers based on their existing traffic to manage bandwidth challenges. Management can also set the amount of data that can be transferred between their website and the internet before exceeding the bandwidth plan (West, 2019).

To manage the internet service challenge; first, supermarket retailers must select the internet network suitable for their location to avoid network issues. They can also purchase and install network aerial or signal boosters for better network services (Japhet & Usman, 2018). The management must ensure that their business organisation make use of high-speed internet to make sure that the production is not delayed. The management team should always put their eyes on internet traffic to avoid the slowing down of the internet or interruption of the service to ensure that online service is always available 24 hours 7 days (Japhet & Usman, 2018).

2.4.2.2. Organisational actions

Electronic commerce depends on effective logistics infrastructures in the entire world. Management must ensure that the logistics and delivery processes used in their supermarket are effective for them to survive in the e-commerce world. Supermarket retailers need to have in place logistics and delivery channels with the ability to meet the expectations of customers (Japhet & Usman, 2018). Automation as a probable solution to increase productivity might be considered by businesses to decrease challenges related to e-commerce. Procedures such as picking orders are known as labour intensive, contributing to poor health, exhaustion, and absence of staff, although help in reducing challenges of e-commerce. Furthermore, the increase in efficiency, convenience and a flawless experience for consumers put warehouses under pressure to constantly have goods that are available and ready, delivering

quickly, effect on the value chain and apply innovative classy technologies to sustain a competitive advantage in the market (Shozi, 2021). Management needs to select a business strategy that will allow maintenance and formulate a competitive advantage that is sustainable to manage organisational challenges. Businesses that have a competitive advantage can improve their performance and gain more profit (Konstantinidi, 2016).

Management can choose the following competitive advantage to gain more customers and perform better than their competitors:

- Cost leadership: The management of supermarket retailers should offer products at a cost lower than their competitors to gain a competitive advantage over them. Low-cost advantage reduces the possibility of pricing pressure from competitors, customers and other stakeholders such as suppliers.
- Differentiation: Retailers offer products that are unique or different to competitor's products. Different models of e-commerce allow successful differentiation when a business can offer products of higher perceived value to customers.
- Speed: Marketing time must be reduced to enable suppliers to finish delivering products to retailers as they are needed to capture market share, reduce cost of holding inventory and increase turnover of an inventory, where buyers can meet progressively greater time limits and gain benefits prior for early exploitation of supply in their markets. Management should ensure that they provide customers with current products and deliver quickly.
- Time or Timeliness: Management should ensure that the business is always open on the website for 24 hours and 7 days. Retailers must avoid placing orders late from their suppliers or avoid late or slow production to ensure that customers do not have to wait longer before receiving their orders.
- Quality: Management must provide customers with products with greater quality in terms of reliability, performance, conformance to standards, serviceability, and durability; and additional features.
- Efficiency: E-commerce has accepted competence in its supply chain. E-commerce allows effective electronic procurement that can decrease administrative fees, decrease prices to purchase products and reduce cycle time.

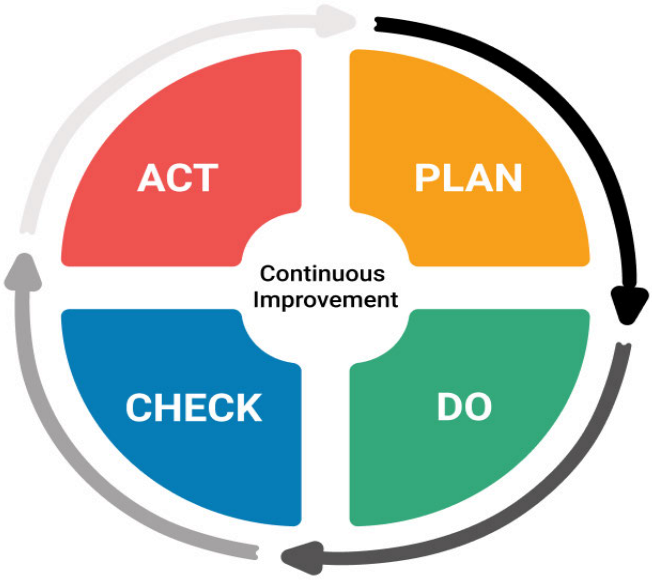
- Customer loyalty: Management can increase their customers' loyalty by creating a brand image since it increases the confidence of customers to buy online. Management must avoid manipulating customers such as delivering something different from what they advertised. They must also avoid being out of stock to satisfy customers for them to stay loyal and not purchase from competitors.
- Customer relations: Management should interact with customers more often and closely, even if they must use intermediaries to interact with customers. This will improve customer relationship with the management.

Retailers must have a system of replenishment that can help in gathering data about products and their history of sales across all their channels and make use of them by recognizing patterns of sales and predicting demands (Kleindl, 2019). Systems such as automating routine tasks are secrets to streamlining replenishment, although it is essential for management to work with the system rather than letting the system work on its own (Kleindl, 2019). Management can make use of different rules in each location to avoid grocery replenishment since there are different factors in each location influencing the demand for specific products such as weather, culture and beliefs (Kleindl, 2019). Managers should know their target market and their demands to avoid purchasing stock that will end up in rubbish bins before customers demand or purchase them or to avoid purchasing less than what is required. They can make use of refrigerated containers to manage stock replenishment (Mkansi et al., 2018).

The challenge of reaching the target market can be tackled by researching more about your target market, knowing which social media platform the majority of your target market makes use of, breaking diverse products to suit altered preferences and ensuring that marketing mails plea straight to the stage that prospective consumers are at (Kleindl, 2019). Retailers can advertise their products on almost all platforms to be able to reach their target, not only on their websites. The challenge of reaching the target market can be managed by developing surveys when researching to know more about the target market (Kleindl, 2019). Policies are essential in e-commerce adoption; no progress is possible if there are no clear policies which will guide the adoption of e-commerce.

Retailers face the challenge of lack of trust and perceived quality. Trust can be measured by claim, commitment, reputation, expectation and performance (Marakanon & Panjakajornsak, 2017). These measures will aid in the management of lack of trust and perceived quality challenges. Supermarket retailers should prioritise their products more than any other things in the organisation because products are what they offer to customers. They should devote their products to improving or maintaining their qualities to strengthen their image to survive for a longer period in the market and operate electronically (Prateek, 2022). The management can adopt a quality assurance plan to assist in building a strong reputation for their supermarket, guaranteeing customer satisfaction as well as smoothening compatibility across platforms and devices. By doing so, customers will no longer lack trust in retailers, and they will receive products of great quality as perceived when placing orders (Prateek, 2020). Quality assurance is the procedure taken to verify that products that retailers offer to customers meet or exceed customers' expectations. This procedure can help in managing the challenge of lack of trust and perceived quality. The management can use the most popular tool of quality assurance which is the Plan, Do, Check and Act (PDCA) cycle to manage some electronic commerce challenges.

Figure 2.5- PDCA cycle.



Source: Patel & Deshpande, 2017.

The PDCA cycle consists of four steps namely: Plan, Do, Check and Act. Patel & Deshpande (2017) define the steps of the PDCA cycle as follows:

i) Plan- This is about problem identification and analysis. The management finds out exactly what the problem is, and what could have caused the problem and gathers available information as possible as they can, to assist in sketching possible solutions.

ii) Do- The management develops potential solutions that can solve the problem, and then they use techniques to select the best solution and implement it. In this step, the solution is not fully implemented, and the management tries or test possible solutions.

iii) Check- In this step the management measure how effective the potential solution was, examine if the potential solution needs to be improved and how it can be improved.

iv) Act- The improved solution gets fully implemented. The cycle can be repeated for continuous improvement.

There is a challenge of traffic congestion, this challenge can be managed by using measures of traffic congestion with an index. The index is known as the proportion of genuine passing time and free flow passing time of cars in a segment of a road. At some point, management can reschedule to reduce traffic congestion by planning deliveries and distribution and avoid making deliveries during pick hours (Peng, 2019). There are specific procedures that can be taken into account to manage challenges relating to the cost of operating electronically, these procedures can reduce costs and increase organisational revenues (Bhavya, 2022). These include, supermarket retailers delivering products to customers with minimal return, whereby retailers absorb packaging costs, shipping expenses and the effort of transporting goods received back to the dispatcher. Suitable packaging boxes can be useful for products ordered to reduce operational costs, such as using compact and lightweight packaging to reduce shipping costs because the shipping cost depends on the weight of a product (Bhavya, 2022). Retailers can also consider drop shipping, whereby retailers purchase products from manufacturers and get them delivered straight to customers to avoid the cost of shipping and holding/storing goods. Management needs to make sure that they deny former employees access to the system to avoid theft of information (Varghese, 2022). The challenge of lack of knowledge and skills can be managed by hiring individuals with knowledge and skills in ICT and, training courses can be provided to all employees. Even when there is a new development as well as trends

of new technologies, employees should be trained to keep up with new technologies to gain more knowledge and skills in ICT (Bhavya, 2022).

2.4.3. Outcomes of actual adoption of e-commerce.

2.4.3.1. Organisational performance

Electronic commerce technology can be adopted by all enterprises, not only large enterprises but also small and medium-sized enterprises including all retailers (Tanikan & Nittaya, 2019). This adoption of electronic commerce contributes to the improvement of organisational performance by creating and maintaining a positive and closer relationship with customers and clients (Fonseka et al., 2021). Performance refers to doing the job, as well as achieving results. Rono (2015) defined performance as the results of work done since it offers the toughest relationship to the organisational strategic goals, economic contribution, and customer satisfaction. Organisational performance includes repeated activities to establish the goals of an organisation, monitor improvement towards established goals as well and make adjustments to accomplish established goals more efficiently and successfully (Kale & Mente, 2018). Measurement of performance is defined as the procedure of quantifying previous actions successfully and efficiently through acquirement, collation, arranging, examination, elucidation, and distribution of relevant data (Kale & Mente, 2018).

Organisational performance is viewed as an important indicator of the organisation's efficiency (Hussain et al., 2020). It analyses the performance of a business contrary to its objectives and goals. In other words, it encompasses real outcomes compared to planned outcomes. Measuring organisational performance assists in assessing the growth of business in the economy (Hussain et al., 2020). Specific standards, such as benchmarks are required to measure the performance of the firm by comparing the actual performance alongside the past organisational performance or alongside the performance of its competitors to improve their quality of service and competitive strength (Kale & Mente, 2018). Retailers need to evaluate the performance of supermarkets to gain the component of control in the daily activities of a business and reduce production and delivery costs (Rono, 2015). This assists management in ensuring that achievements are on track. Retailers need to evaluate supermarkets' performance to be able to create customers' level of satisfaction and enhance feedback of customers (Kale & Mente, 2018). Operational performance consists of a

set of indicators namely: financial and non-financial indicators (Rono, 2015). Financial indicators are indicators used to measure revenues generated from the assets of the organisation. Non-financial indicators are indicators used to measure important organisational activities used to achieve the strategic objectives of the organisation. Those measures relate to relationships with customers, employees as well as suppliers; also, it involves cycle time, quality, operations, and the supply chain of the organisation (Rono, 2015). These indicators offer data on the extent of accomplishment of goals and outcomes. Improved performance can be seen by measuring annual sales, profit, and growth rate (Rono, 2015). Organizational performance encompasses the results or actual output as measured in contrast to organisational objectives and goals (Konstantinidi, 2016)

Organisational performance consists of the firm's profitability which is the financial performance, it also consists of the firm's growth which is shareholder value; and consists of market share which is market performance. These are areas of organisational performance, and these areas measure organisational efficiency (Hussain et al., 2020).

i) Market performance: Reveals the expectancy of the prediction of the firm and its aptitude to adjust to prospective changes (Hussaini & Muhammed, 2018). Market performance consists of sales and market shares. It measures how the business or its product/ service performs in the marketplace. Specifically, it measures whether the market share of a product/ service has risen or not and if the upgraded product or service helped to improve sales or not (Pidada et al., 2018).
ii) Shareholder value: It is the shareholder's return which consists of total shareholder return (TSR) and economic value added (EVA). TSR measures the achieved actual shareholders return and it is calculated from the alteration in price of a particular share (Sharma, 2013). The calculation of TSR is on the size of the cash flows that were experienced by shareholders. If the total shareholder return is higher, shareholders will gain more capital, and the stock price will increase for future achievements (Sharma, 2013). EVA measures the financial performance of a company based on deducting the cost of capital from the operating cost of a company, that is, it shows how profitable are projects of a company.
iii) Financial performance: Involves several methods to evaluate how well an organisation generate income using its assets. Moreover, several measures should

be considered to evaluate the performance of a company rather than using a single measure of financial performance on its own (Muteti, 2014). Financial performance consists of return on assets (ROA), return on equity (ROE) and net interest income (NII). ROA measures how competent management of the supermarket is generating profit from total assets, ROA is calculated by dividing net income by total assets. ROE measures the profitability of the supermarket on the equity, it is calculated by dividing net income by shareholder's equity. NII is the difference between generated income and the liability service cost, it is calculated by subtracting interest expenses from interest revenues (Pidada, Yuesti & Kepramaremi, 2018).

Table 2.2 illustrate areas of organisational performance that can measure supermarkets performance after the actual adoption of e-commerce.

Table 2.2- Areas of organisational performance.

Source: Market Business News, 2022.

Recently, organizational performance can be managed by making use of a balanced scorecard method whereby performance is measured in various dimensions such as social responsibility, financial performance, customer service and employee stewardship (Konstantinidi, 2016). Technology is one of the major forces that drives

supermarkets to change. Technology influences organisational performance through opening novel opportunities, possibilities and demands from customers to the business (Konstantinidi, 2016). It is therefore important to evaluate organisational performance to improve organisational performance to advance the element control of a business in the everyday activities of a business. Although, there are numerous reasons for supermarkets to evaluate their performance. Managers should determine what should be achieved by an agency to evaluate performance.

2.4.3.2. Perceived usefulness and ease of use

Perceived ease of use is one of the major variables that explain the adoption of e-commerce and the intentions of individuals on the internet based on electronic commerce services (Mohamed et al. 2018). Perceived usefulness describes how e-commerce is perceived to be useful to organisations (Mohamed et al., 2018). The actual usage of technology also relies on the influence of technology on the performance of a business (Tuffour, Akuffo, kofi, Frimpong & Sasu, 2018). As a result, even if individuals are not willing to welcome new technology systems, the possibility that they will use them is higher when it is perceived that new technological systems will enhance performance. Mostly, when there are two systems with similar features, users will deem the technology systems more useful because they can select a system that they perceive as easier to make use of (Tuffour et al., 2018).

E-commerce is perceived as useful because it can increase opportunities for sales. After all, online stores are open 24 hours/7 days, the market is not restricted geographically, and it offers the opportunity to expand the market and create new business opportunities (Konstantinidi, 2016). Retailers can reach their target market and gain more customers because shoppers can place their orders regardless of where they are located or what time it is (Fonseka et al., 2021). E-commerce can also be perceived as easy to use if retailers can easily create and access websites and easily understand how to operate electronically (Franco & Bulomine,2016). It was discovered that e-commerce is perceived as useful because it increases sales, improves organisational performance, reduces maintenance and operations costs, lessens procurement, transportation and purchasing costs, increases loyalty and retention of customers, improves stakeholder relationships, enhances operating speed, grows the brand and the image of a company as well as enhancing external and internal communication Fonseka, Jaharadak, Raman, & Tham, 2021).

It is expected that perceived usefulness should have a positive influence towards the adoption of technology, that is, the more retailers perceive the benefits of e-commerce, the more likely they are to adopt e-commerce. Additionally, if retailers are convinced that technology is easy to understand then, it will be more likely for them to adopt e-commerce (Tanikan & Nittaya, 2019). Adoption is more related to the choice to agree and make use of innovation, in this study adoption is related to the use of e-commerce (Hussain et al. 2020).

The usage of the internet is no longer restricted to networking media. Nowadays, the internet has anticipated the character of a marketing and sales transaction intermediate for people, attracting new customers, offering faster and better customer services, reducing expenses, and creating business opportunities worldwide (Shozi, 2021). The adoption of e-commerce has made it easier and cheaper for organisations to manage operations, expand markets and manage value chains crossways borders (Shozi, 2021). The majority of retailers view electronic commerce as an innovative technology for their businesses. This shows that retailers perceive e-commerce as a technology that adds advantages to their businesses (Kurnia et al., 2013). Electronic commerce has been admired as an opportunity, particularly in countries that are still developing as it helps in attaining a tough position in the existing current multilateral trade-off system (Kabugumila, Lushakuzi & Mtui, 2016).

2.5. THE RELATIONSHIPS IN THE CONCEPTUAL MODEL

2.5.1. The relationship between challenges influencing the adoption of e-commerce and management's technological and organisational actions taken to counter the challenges.

There is a relationship between the challenges of e-commerce and the management of e-commerce challenges, the relationship can either be positive or negative. If retailers are aware of challenges in the adoption of e-commerce and how those challenges can be managed, then they are more likely to adopt e-commerce (Gupta, Kushwaha, Badhera, Chatterjee & Santibanez, 2023). If the management can be able to take action and manage those challenges then retailers will not encounter negative impacts on their business such as losing income or customers (Kurnia, 2013).

2.5.2. The relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.

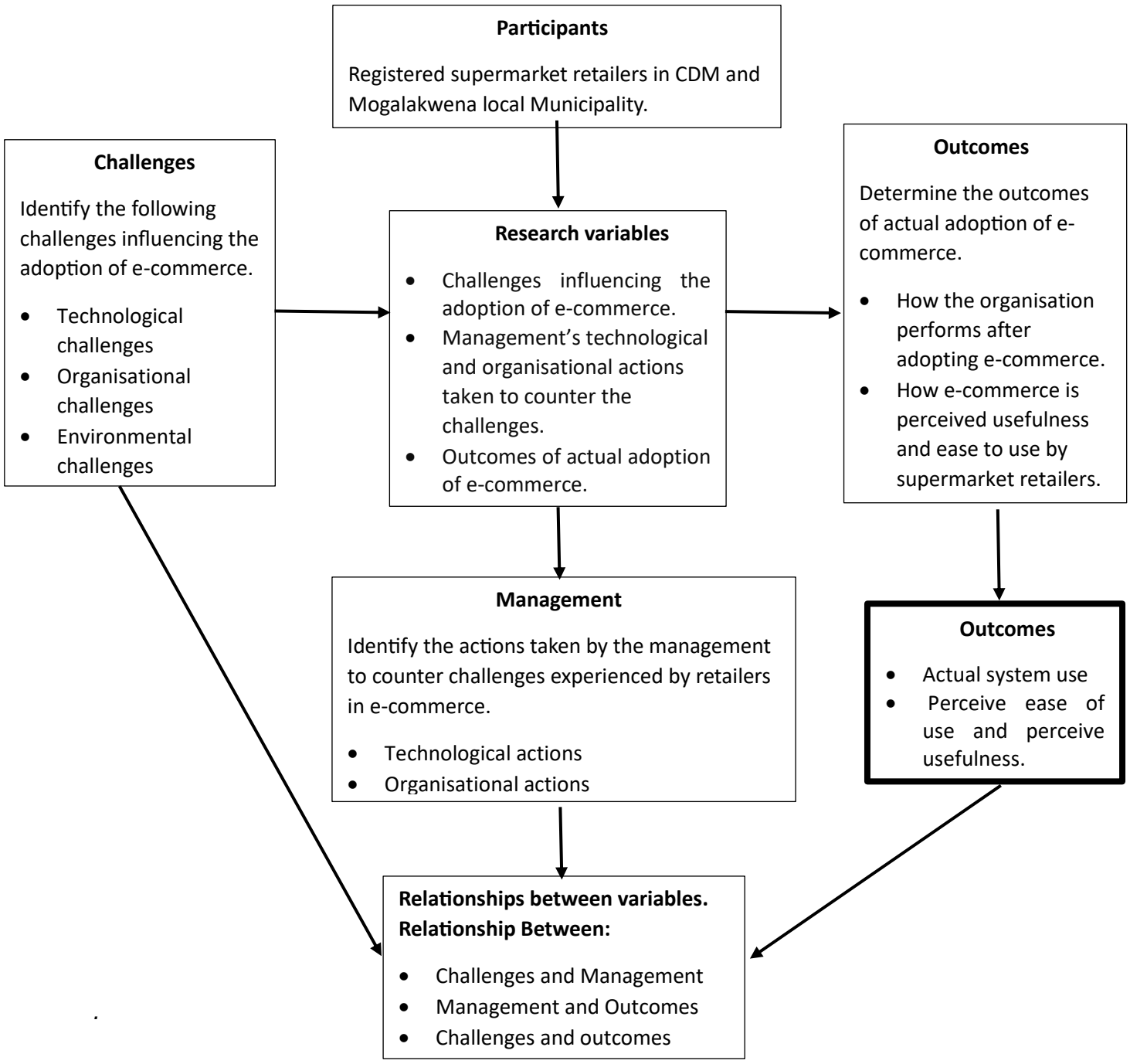
Retailers are more likely to perceive the usefulness of e-commerce if the potential of e-commerce to improve the performance of a business is clear and challenges are manageable (Kurnia, 2013). There is a relationship between management's actions taken to counter the challenge and the outcomes of the actual adoption of e-commerce, the relationship can either be positive or negative. If the management can be able to manage encountered challenges, then retailers will not encounter difficulties in using e-commerce and e-commerce will be useful to them. If e-commerce is useful and easy to use, then the organisational performance will improve (Fonseka et al., 2021).

2.5.3. The relationship between challenges experienced by supermarket retailers in the adoption of e-commerce and the outcomes of actual adoption of e-commerce.

Challenges such as traffic congestion influence the adoption of e-commerce resulting from delays in delivering products from retailers to customers (Parks & Winkenbach, 2023). If retailers experience such challenges, then they will be unlikely to adopt e-commerce because they will not want to be unreliable retailers to their customers (Hendricks, & Mwapwele, 2023). There is a relationship between the challenges of e-commerce and the outcomes of actual adoption of e-commerce; because if retailers experience challenges such as technological, environmental, and organisational challenges then e-commerce will be perceived as difficult to use and useless to retailers, therefore organisational performance will not improve if there are such challenges encountered (Kurnia, 2013).

2.6. FRAMEWORK FOR ANALYSIS

Figure 2.6- Theoretical analysis model.



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Source: Author's Conceptualisation

2.7 SUMMARY OF THE CHAPTER

In this chapter other authors' views are recognised and presented on what electronic commerce is, its challenges and the management of those challenges, as well as the influence of those challenges on the actual adoption of electronic commerce. There are three concepts of theories that are covered by theoretical framework, which are, TAM, DOI and TOE frameworks. The relevant literature review was accordingly demonstrated including relationships between variables.

In the next **Chapter 3**, the methodological considerations and processes taken for data collection are discussed.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. INTRODUCTION

The purpose of this chapter is to discuss the research methodology. A quantitative approach was employed to systematically investigate the challenges faced by supermarket retailers in adopting electronic commerce (e-commerce). This approach involved the use of a structured questionnaire as the primary tool for data collection. By employing a quantitative methodology, the study aimed to gather empirical evidence and numerical data to analyse and identify the specific challenges influencing e-commerce adoption among supermarket retailers in the Limpopo Province.

3.2. THE RESEARCH DESIGN

3.2.1. Research paradigm.

A Paradigm of research is a view about conducting research, it provides researchers with an idea of how to select the methodology and research design (Antwi & Hamza, 2015). This research uses a positivistic paradigm. The research is quantitative research with structured questionnaires. The Positivism paradigm believes that the use of quantitative methodologies and empirical methods is the only way to find out the truth (Antwi & Hamza, 2015).

In line with the study's title " challenges on the adoption of electronic commerce by supermarket retailers," the study adopts a positivist paradigm. This paradigm asserts that the use of quantitative methodologies and empirical methods is essential for uncovering the truth. Positivism emphasises the objective measurement and analysis of observable phenomena, aligning with the study's aim to systematically analyse the challenges influencing e-commerce adoption among supermarket retailers. By employing quantitative methodologies such as surveys and statistical analysis, the study seeks to gather empirical evidence and numerical data to understand the underlying factors impacting e-commerce adoption. This positivist approach allows for a rigorous and systematic investigation of the research problem, providing valuable insights into the challenges faced by supermarket retailers in the Limpopo Province as they navigate the adoption of electronic commerce.

3.2.2. Research methodology.

Quantitative research is a method used for observation and collection of numerical data to make a meaning and provide details of specific variables or concepts (Hancock, Ockleford & Windridge, 2019). In the quantitative approach reliability can be measured, it is less time consuming and more objective as it does not depend on observations that can be biased (Nguegan & Mafini, 2017). A quantitative approach was chosen in this study with the intention of analysing challenges on the adoption of e-commerce in the Limpopo province.

3.2.3. Descriptive research design

Descriptive research is planned and has a designed structure so that collected data can be statistically analysed and utilised to conclude on a population (Frost, 2021). Descriptive research was used to describe challenges influencing the adoption of electronic commerce, and management's technological and organisational actions taken to counter the challenges and outcomes of actual adoption of e-commerce. Descriptive statistics for example central tendency measures and variability measures were used to summarise data by making use of graphs, charts, and tables.

3.2.4. The use of a survey

A cross-sectional survey design was chosen since data was collected from a particular population at a particular point in time (Nguegan & Mafini, 2017). In cross-sectional surveys, collecting data is easy and inexpensive (Thomas, 2020). By conducting a cross-sectional survey, researchers can gather data from a diverse range of participants representing different supermarket retailers across the Limpopo Province. This allows for a comprehensive assessment of the challenges influencing e-commerce adoption within the region. Additionally, the survey enables researchers to analyze the data quantitatively, using statistical methods to identify patterns, trends, and relationships among variables related to e-commerce adoption.

3.3. STUDY AREA

This study focused only on selected registered supermarket retailers in Limpopo province but specifically within Capricorn District Municipality (CDM) and Mogalakwena Local Municipality.

The figure 3.1 below illustrates municipalities in Limpopo province.

Figure 3.1- Municipalities in Limpopo Province

Source: Municipalities.co.za, 2021.

The Capricorn District Municipality is in the central parts of the Limpopo Province. CDM includes Polokwane Local Municipality, Molemole Local Municipality located in Dendron, Blouberg Local Municipality located in Bochum and Lepelle-Nkumpi Local Municipality located in Lebowakgomo. Mogalakwena local municipality is in Mokopane under Waterberg municipality. Mogalakwena municipality is included in this study because it is closer to the Capricorn district than other municipalities, it is developing at the pace that CDM is developing *(Municipalities.co.za, 2021)*. Therefore, CDM and Mogalakwena Local Municipality seem to experience the same challenges of e-commerce which is why the researcher included Mogalakwena Local Municipality in this study.

3.4. POPULATION OF THE STUDY

In research population refers to individuals who are targets to become respondents or those relevant to participate during data collection for the researcher to obtain relevant information (Taherdoost, 2016). The study's target population consist of owners, CEOs, general managers, marketing managers, and directors of supermarket retailers in Capricorn District Municipality and Mogalakwena Local Municipality. A list (sampling frame) of selected registered supermarket retailers' outlets in Limpopo was obtained from the internet and confirmed by the municipality. According to statistics SA, majority of individuals on managerial positions are men, therefore, majority of population of this study are expected to be male. Population size which is the number of selected supermarket retailers in Limpopo is 217.

3.5. SAMPLE AND SAMPLING METHODS

There are two sampling methods namely non-probability sampling and probability sampling method (Taherdoost, 2016). Non-probability sampling is a method whereby not all individuals are given equal chance of being selected in the population (Vehovar et al, 2016). Probability sampling refers to where individuals are given equal chance of being selected in the population (Vehovar et al., 2016).

This study adopted a random probability sampling method to select registered supermarket retailers and the respondents in each selected supermarket retailer to allow the target population equal probability to be included in the study. Hence, the inferences to be made were objective and generalisation of results for the selected Municipalities were accurate and can be extended to related regions in South Africa.
The study used a sample size as determined by the Raosoft online sample size calculator. The calculator takes into consideration, 95% confidence level, population size and 50% response distribution to calculate the minimum recommended sample size. The sample size calculated for selected supermarket retailers' outlets is shown below.

Sample size calculation: Where N =217

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{217}{1 + 217(0.05)^2}$$

$$n = \frac{217}{1 + 217(0.0025)}$$

$$n = 140.68$$

Where N = Population size = number of selected supermarket retailers in Limpopo

E = precision = 0.05

And n = sample size = 141

A simple random sampling method was used in this study, whereby the population consist of 217 selected supermarkets and a sample of 141 supermarkets was calculated using Raosoft formular. Each supermarket was assigned a unique identifier, and the sample was selected using a random number generator. This sampling technique was applied without sampling since registered supermarkets were selected without repetition from the population. Simple random sampling method was also applied using an online questionnaire to select a sample size of 141 from the population size of 217. This was done by defining the population of 217, obtaining contact details of selected registered supermarkets from the municipality and websites then, sample size of 141 was calculated and participants were selected. Therefore, selected participants were contacted electronical, and emails were sent to them to respond the questionnaire. Emails were monitored frequently to make sure that the correct sample size is achieved.

3.6. RESEARCH INSTRUMENT

In this research study, data was collected by making use of both primary data collection and secondary data collection. Primary data was collected using a structured survey questionnaire, whereas secondary data was collected by means of books, journal articles, and websites (Surbhi, 2017). Primary data is a data which is original and collected with a certain goal in mind (Joop & Hennie, 2015).

3.7. REFERENCED QUESTIONNAIRE

The questionnaire was generated from the literature reviewed corresponding with the research hypotheses and research objectives. Tables 3.1 to 3.7 below demonstrate all research variables with reference to contents discussed in literature review, study problem as well as the objectives.

SECTION B: CHALLENGES INFLUENCING THE ADOPTION OF E- COMMERCE BY SUPERMARKETS RETAILERS

Table 3.1: Technological challenges

No.	**The following are Challenges influencing the adoption of e-commerce by supermarkets retailers.**	**References**	**Page numbers in chapter 2**
+1.	Data security issues.	Varghese, 2022	16
2.	Insufficient service of internet.	Konstantinidi, 2016	17
3.	Issues of cybersecurity.	Franco, & Bulomine, 2016	16
4.	Inability to handle bandwidth needed for telecommunication.	Franco, & Bulomine, 2016	18

Source: Author Conceptualisation

What are other technological challenges influencing the adoption of e-commerce in your supermarket? _____

Table 3.2: Organisational challenges

No.	The following are organisational challenges experienced by supermarket retailers in the adoption of e-commerce.	**References**	**Page numbers in chapter 2**
1.	Lack of finance.	Franco, & Bulomine, 2016	19
2.	Inability to reach target market.	Franco, & Bulomine, 2016	20
3.	Stock replenishment.	Kutz, 2016	21
4.	Lack of knowledgeable and Skilled ICT employees.	Shemi & Procter, 2013	21
5.	Inability to gain competitive advantage online.	Kutz, 2016	22

Source: Author Conceptualisation

What are other organisational challenges influencing the adoption of e-commerce in your supermarket? _____

Table 3.3: Environmental challenges

No.	**The following are challenges experienced by supermarket retailers in the adoption of e-commerce.**	**References**	**Page numbers in chapter 2**
1.	Poverty rate.	Franco, & Bulomine, 2016	22
2.	Traffic congestion.	Shemi & Procter, 2013	23
3.	Political and economic Instabilities.	Konstantinidi, 2016	23
4.	Lack of regulatory policies and macro-economic policies.	Shemi & Procter, 2013	24
5.	Natural disasters occurrence.	Franco, & Bulomine, 2016	24

Source: Author Conceptualisation

What are other environmental challenges influencing the adoption of e-commerce in your supermarket? _____

SECTION C: MANAGEMENT'S TECHNOLOGICAL AND ORGANISATIONAL ACTIONS TAKEN TO COUNTER THE CHALLENGES

Table 3.4: Technological actions

No.	**The following are management's technological actions taken to counter challenges experienced by supermarkets retailers.**	**References**	**Page numbers in chapter 2**
1.	Installation of address verification system to avoid fraud.	Prasad et al., 2014	26
2.	Install and update HTTPS protocol to secure users' sensitive information.	Varghese, 2022	25
3.	Installation of anti-malware to detect, remove and prevent malware from infecting IT system and computer.	Varghese, 2022	25
4.	Installation of anti-virus software to manage viruses.	Varghese, 2022	25

5.	Changing of passwords frequently and creating complex passwords to manage passwords theft.	Niranjanamurthy et al., 2013	25
6.	Creating firewalls help to create barriers between trusted and untrusted network.	Varghese, 2022	25

Source: Author Conceptualisation

Please mention any other technological actions that you take. _____

_____

Table 3.5: Organisational actions

No.	**The following are management's organizational actions taken to counter challenges experienced by supermarkets retailers.**	**References**	**Page numbers in chapter 2**
1.	Educating staff reduce challenges of lack of skills and knowledge.	Crandall, 2021	31
2.	Avoiding traffic congestion by delivering before or after rush hours.	Crandall, 2021	31
3.	Deny former employees access to the system to avoid theft of information.	Varghese, 2022	31
4.	Managing the route used to deliver products strategically to limit cost of delivering products.	Varghese, 2022	31
5.	Refrigerated containers to help to manage the issue of stock replenishment.	Mkansi, Eke & Ebikake, 2018	30

Source: Author Conceptualisation

Please mention any other organisational actions that you take. _____

_____

SECTION D: OUTCOMES OF ADOPTION OF E-COMMERCE

Table 3.6: Organisational performance measures

No.	**The following are the outcomes of actual adoption of e-commerce:**	**References**	**Page number/s**

			in chapter 2
1.	The quality of service is improved.	Fonseka et al., 2021	32
2.	The relationships between stakeholders are improved.	Muhammad et al., 2018	32
3.	Profitability is improved.	Muhammad et al., 2018	33
4.	Production and delivery cost is reduced.	Neely, 2007	32
5.	Competitive strength is improved.	Fonseka et al., 2021	32
6.	Strategies and missions become a reality.	Neely, 2007	33

Source: Author Conceptualisation

Table 3.7: Perceived usefulness and ease of use

No.	**The following benefits indicate that e-commerce is useful and easy to use:**	**References**	**Page numbers in chapter 2**
1.	Offers the opportunity to expand market and create new business opportunities.	Konstantinidis, 2016	35
2.	Improves supermarkets retailer's performance.	Rono, 2015	
3.	The business operates for 24 hours 7 days	Fonseka et al., 2021	35
4.	Increase sales.	Konstantinidis, 2016	35
5.	Eliminates geographic restrictions.	Fonseka et al., 2021	35
6.	Offers faster and better customer service.	Rono, 2015	36

Source: Author Conceptualisation

3.8. PILOT STUDY INDICATORS

A pilot study was used because it can provide indicators about where the research could fail (Junyong, 2017). A pilot study provides an initial test of the feasibility of the questionnaire provided individuals are selected who bear a resemblance to the targeted population. (Junyong, 2017). Before the distribution of questionnaire to supermarkets retailers in Capricorn district Municipality and Mogalakwena municipality a pilot study was carried out, with the aim of determining any possible unclear

questions or mistakes. A pilot study was conducted using 10 respondents before the actual collection of data. This study adopted a pilot study to detect any possible errors and check if respondents understand questions without any challenges.

The following questions were adjusted after conducting the pilot study:

Technological actions

From : Installation of AVS to avoid credit card fraud.
To : Installation of address verification system to avoid fraud.

From : HTTPS protocol to secure users' sensitive information.
To : Install and update HTTPS protocol to secure users' sensitive information

From : Anti-malware to detect, remove and prevent malware from infecting IT system and computer.
To : Installation of anti-malware to detect, remove and prevent malware from infecting IT system and computer.

Organisational actions

From : Removing information of former employees to forbid the access to the system to manage theft of information.
To : Deny former employees access to the system to avoid theft of information.

From : The quality of service or products is improved
To : The quality of service is improved

Improves the relationship between stakeholders was removed from perceived usefulness and ease of use, since it is appearing in organisational performance measures.

3.9. DATA COLLECTION PROCEDURE

In the questionnaire, there were four different sections. **Section A** contained demographic information questions, **Section B** contained questions on challenges

influencing the adoption of e-commerce by supermarket retailers, including questions on technological, organizational, and environmental challenges. **Section C** contained questions on management's technological and organisational actions taken to counter the challenges, including questions on technological and organizational actions. **Section D** contained questions on the outcomes of actual adoption of e-commerce, including questions on organisational performance measures and perceived usefulness and ease of use. Importantly, all the respondents were given an opportunity to mention challenges not stated in the questionnaire and actions taken to manage those challenges.

3.10. RELIABILITY AND VALIDITY

Research instruments need to be reliable and valid (Nguegan & Mafini, 2017). Reliability is the degree to which data is accurate (Salkind, 2012). Reliability was measured using Cronbach's Alpha and a value of a minimum of 0.7 was used as the cut-off point. A reliable factor analysis was performed based on adequate sample size of 141. In this study, a Cronbach's alpha coefficient of 0.70 or higher is considered as reliable (Douglas & Thomas, 2014). To ensure that the study is reliable, pilot study was conducted to measure the reliability of the research hypotheses.

Validity is the extent to which theory and evidence support the interpretation of the results. (Root, Fellows & Hancock, 2013). Four categories of validity were considered namely, face validity, convergent validity, predictive validity, and content validity. Content validity was guaranteed as all the variables of the research were gained from the literature review (Lobiondo-Wood & Haber, 2013). Face validity was guaranteed by including variables discussed in the literature (Nguegan & Mafini, 2017). Theories from the literature were used to develop the questionnaire questions in ensuring the validity of the instrument. A Pilot study was conducted to ensure face validity by asking relevant research experts to review measurement techniques and items. Convergent validity was guaranteed by testing relationships between variables. The Kolmogorov-Smirnov and kurtosis tests are used to test the normality of data and the descriptive statistics on both the skewedness and Kurtosis was also used to test the normality distribution of data for variables.

3.11. DATA ANALYSIS

The Statistical Package of Social Science (SPSS) was used to analyse data. In chapter 4 tables, graphs and figures are used to present data. Analysis of Variance (ANOVA), descriptive statistics, and regression analysis are used for data analysis. Descriptive statistical methods are used to analyse data. Descriptive analytical methods are adopted because they use frequency distribution and tables to present data (Nguegan & Mafini, 2017). ANOVA and regression analysis were used to evaluate the connection between variables. Factors analysis was used to classify the variables that offer the greatest clarification for the proportion of the entire variance of the dependent variables (Nguegan & Mafini, 2017).

3.12. PRESENTATION OF DATA

The findings of this study were discussed in detail in chapter 4, conclusions were drawn, and recommendations were made. Research results were presented by means of tables, figures, and graphs. Presentation of the results was done in the next chapter, chapter 4.

3.13. ETHICAL CONSIDERATIONS

Ethics are concerned with ensuring that the interest and wellbeing of people affected by the research are not harmed and their reputations are not ruined because of the research being conducted (Chetty, 2016). Application for ethical clearance from the Turfloop Research and Ethics Committee (TREC) was obtained before beginning of data collection.

- **Informed consent**

When the data collection started, participant received written information about the purpose of the research and the background. They also received a consent form.

- **Voluntary participation**

Participation in the research study was voluntary and was specified as such in the introductory letter.

- **Anonymity**

The researcher ensured that participant's names are not mentioned in any part of the study.

- **Confidentiality and privacy**

Information provided by participants is confidential and private and the information collected was used for academic purposes only. Respondent's privacy, their confidentiality and their cultural sensitivities were respected by the researcher.

3.14. SUMMARY OF THE CHAPTER

In this methodology chapter, a quantitative approach was adopted to investigate the challenges influencing the adoption of electronic commerce (e-commerce) by supermarket retailers in the Limpopo Province. A structured questionnaire was utilized as the primary tool for data collection. The questionnaire comprised four sections: Section A contained demographic information questions, Section B included questions on challenges influencing e-commerce adoption, such as technological, organizational, and environmental challenges. Section C consisted of questions on management's technological and organisational actions taken to counter the challenges, while Section D contained questions on the outcomes of actual e-commerce adoption, including organizational performance measures and perceived usefulness and ease of use. Additionally, respondents were given the opportunity to mention any challenges not covered in the questionnaire and actions taken to manage those challenges. The methodology chapter outlined the process of questionnaire development, including formulation, pilot testing, and finalization. It also detailed the sampling strategy, sample size determination, and data collection procedures. Overall, the methodology chapter provided a systematic framework for investigating the challenges influencing e-commerce adoption among supermarket retailers in the Limpopo province.

The next **Chapter 4** deals with the analyses of data, findings, and conclusions

CHAPTER FOUR
ANALYSIS OF DATA, FINDINGS AND CONCLUSIONS

4.1. INTRODUCTION

In this chapter, the analysis of the data, data findings, and conclusions are presented. Tables and graphs are used to analyse the empirical findings of the research study. Response rate was analysed by evaluating the number of questionnaires that were filled. The biographical data was analysed based on the number of respondents. The chapter allude the normality test or analysis on the data, this was followed by accessing the descriptive statistics of the contracts. The chapter continue by investigating the reliability measures on each contract in the conceptual framework. Then the independent sample T-Tests and ANOVA was evaluated followed by the correlation analysis and the regression analysis to test the hypothesis. Conclusions are based on the findings of research after data is analysed.

4.2. Response rate

Data collection was done online, that is questionnaires were distributed electronically. The average online questionnaire response rate is 100%. The “require a response” button was set on. That is, respondents could not continue to the next question without answering the question that came first. The Google form was constantly monitored and as soon as 141 respondents filled in the questionnaire, data was analysed.

4.3. Biographical data

Respondent’s gender, age groups, occupation and employment period were analysed below. Tables, figures, or diagrams were used to outline the demographic data collected.

Analysis of respondent’s gender

Table 4.1 below outlines the frequency and percentage of different genders responded to questionnaires and was used to develop figure 4.1.

Table 4.1: Respondent’s gender by percentage

Gender

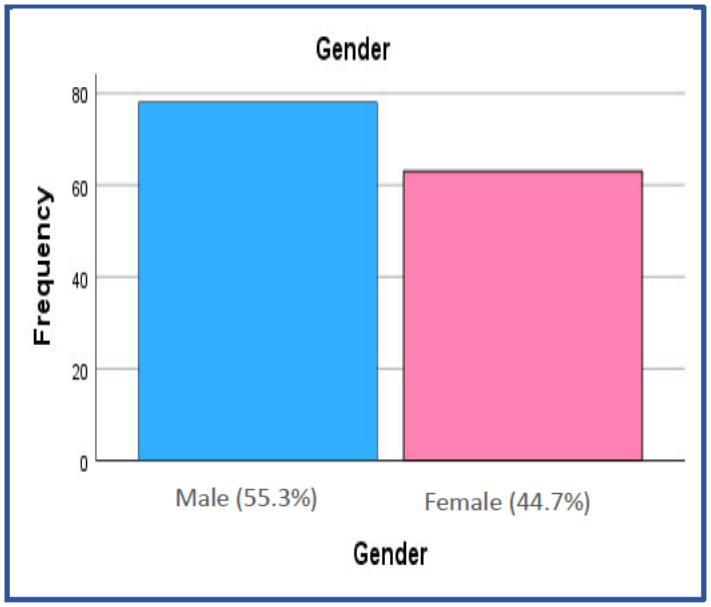
	Frequency	Percent	Valid Percent
Male	78	55.3	55.3
Female	63	44.7	44.7
Total	141	100.0	100.0

Finding/s and conclusion

The outcome revealed that the majority of individuals who filled Google form questionnaire are male, and the minority are females because out of 141 respondents, 63 (44.7%) of them are females and 78 (55.3%) are males.

Therefore, this confirms Statistics SA's findings about the population. That is to say, the majority of gender in managerial positions are men. Since the target population consists of individuals in managerial positions, it can be concluded that the majority of the population of this study are male.

Figure 4.1: Respondent's gender



Analysis of respondent's age group

The results from table 4.2 below indicate that 5.7% of respondents fall between the age group of 18-29 years old, 14.2% of respondents fall in the age category of 30-39

years old, and 31.9% are between the age of 40-49 years old, 41.1% of respondents fall in the age group 50-59 years old and 7.1% of respondents are 60 years and above.

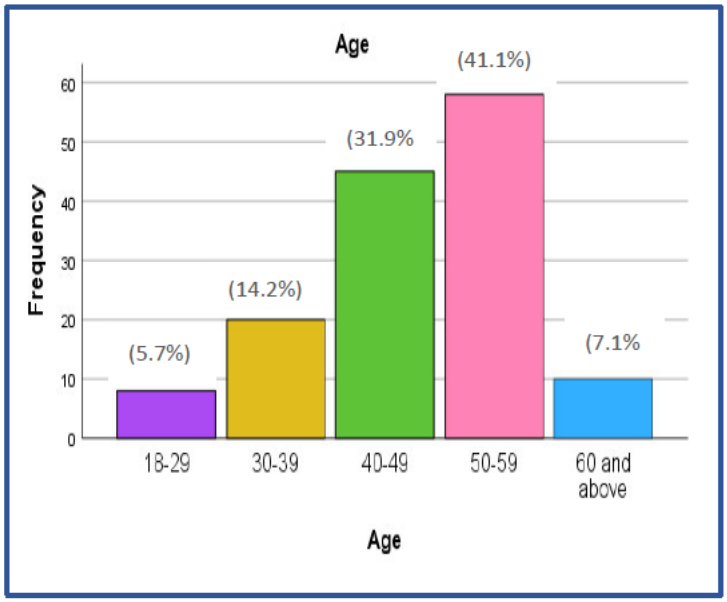
Table 4.2 Age group by percentage

Respondent's age group			
	Frequency	**Percent**	**Valid Percent**
18-29	8	5.7	5.7
30-39	20	14.2	14.2
40-49	45	31.9	31.9
50-59	58	41.1	41.1
60 and above	10	7.1	7.1
Total	**141**	**100.0**	**100.0**

Findings and conclusion

The results show that the majority of respondents are between the age of 50 and 59 years old followed by 40-49 years old. This confirms expectations in **Chapter 3** about respondents being between the age of 40-59 years old, therefore, it can be concluded that the majority of respondents are between the age of 50-59 years old followed by 40-49 years old.

Figure 4.2: Respondent's age category



Analysis of respondent's occupation

The below table 4.3 represent respondent's occupation in supermarkets and was used to develop figure 4.3. This shows that already 74.5% of respondents are people relevant to this study, they are the targeted population. The table below shows the remaining 25.5% of employees who contributed to this study by answering the questionnaire.

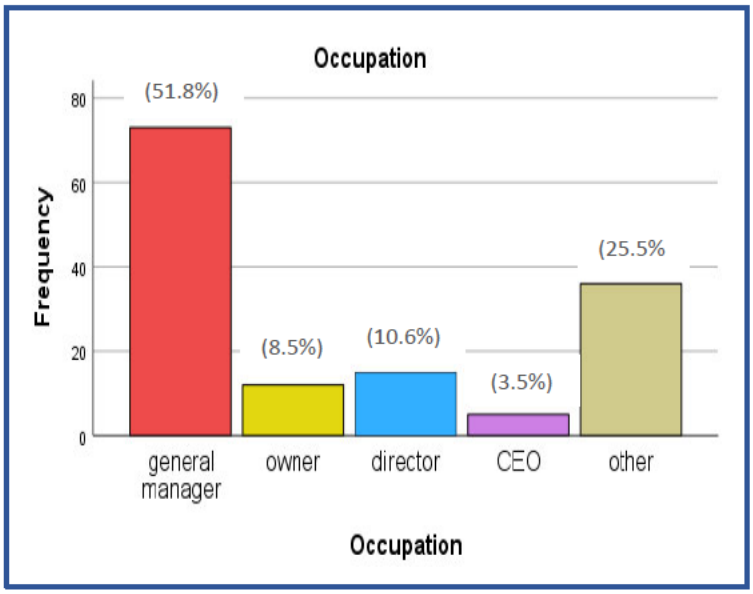
Table 4.3: Respondent's occupation

Respondent's occupation			
Frequency		Percent	Valid Percent
General manager	73	51.8	51.8
Owner	12	8.5	8.5
Director	15	10.6	10.6
CEO	5	3.5	3.5
Other	36	25.5	25.5
Total	**141**	**100.0**	**100.0**

Finding/s and conclusion

The majority of respondents occupy positions in supermarket retailers as expected by the researcher. Therefore, it can be concluded that the respondents who contributed to this study are a relevant population.

Figure 4.3: Respondent's occupation



Analysis of other respondent's occupation

Table 4.4 below shows other occupations for employees who did not select the provided occupations on the questionnaire, this is important to see if employees who answered questionnaires are relevant to this study. There were 74.5% of respondents who selected the occupation provided on the questionnaire and there were 25.5% who did not. From that 25.5%, 7.1% are assistant managers, 4.2% are digital managers, 10.6% are marketing managers, 2.1% are SEO (Search Engine Optimization) specialists and 1.4% are SMM (Social Media Marketing) specialists.

Finding/s and conclusion

Findings in Table 4.4 shows that some respondents do not occupy positions as expected by the researcher, they occupy other positions related to those positions expected by the researcher. Therefore, it can be concluded that the above-mentioned occupations are found relevant to contribute to this study because they work with supermarket's online stores.

Table 4.4: Other respondent's occupation

Other occupation		
	Frequency	**Percent**
	105	74.5
Assistant Manager	10	7.1
Digital Specialist	6	4.2
Marketing Manager	15	10.6
SEO Specialist	3	2.1
SMM specialist	2	1.4
Total	**141**	**100.0**

Analysis of respondent's employment period

Table 4.5 below indicate respondent's employment period, and it was utilised to develop Figure 4.4.

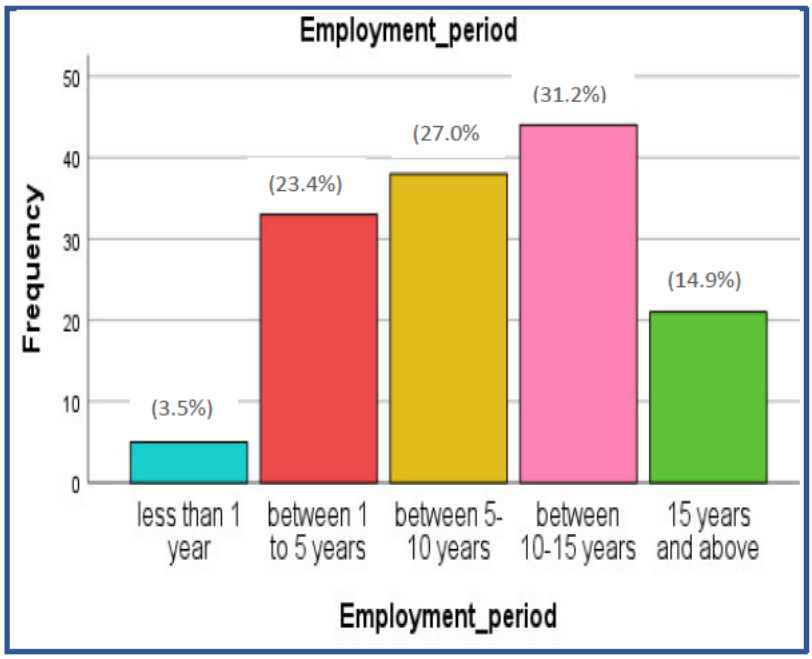
Table 4.5: Respondent's Employment Period by Percentage

Employment period			
	Frequency	**Percent**	**Valid Percent**
Less than 1 year	5	3.5	3.5
Between 1 to 5 years	33	23.4	23.4
Between 5-10 years	38	27.0	27.0
Between 10-15 years	44	31.2	31.2
15 years and above	21	14.9	14.9
Total	141	100.0	100.0

Source: Author's conceptualisation

Figure 4.4 below illustrates the distribution of respondents based on their employment duration. Specifically, 3.5% of respondents reported having less than a year of employment, while 23.4% indicated an employment period of 1 to 5 years. Additionally, 27.0% of respondents reported being employed for 5 to 10 years, while a significant proportion, accounting for 31.2%, reported a tenure of 10 to 15 years. Furthermore, 14.9% of respondents stated having been employed for more than 15 years.

Figure 4.4: employment period



Finding/s and conclusion

The study findings indicated that a significant portion of respondents, constituting 31.2%, had been employed for a duration ranging from 10 to 15 years. Consequently, it can be inferred that these respondents possess considerable knowledge about supermarket operations, given their extensive tenure in the industry. As a result, their responses to the questionnaire can be deemed reliable, aligning with the researcher's anticipation regarding the respondents' employment tenure falling within the 10 to 15-year period.

4.4. NORMALITY TEST

4.4.1 Normality test for TOE challenges

Table 4.6 below presents the Kolmogorov-Smirnov and Shapiro-Wink Tests on TOE challenges with a degree of freedom of 141. To meet the normality assumptions for the Shapiro-Wilk test, the P-value must be greater than 0.05 (Shapiro & Wilk, 1965). The results from Table 4.6 below shows that all Kolmogorov-Smirnov and Shapiro-Wink variables are greater than 0.05 sig. @ 0.100. Therefore, we can conclude that data is normally distributed because the distribution of the sample is not significantly different from a normal distribution if p values are greater than 0.05. Furthermore, TOE challenges can be used for statistical examination with linear regression model to analyse the correlation between TOE challenges and management's actions as well as the correlation between TOE challenges and outcomes of actual adoption of e-commerce.

Table 4.6: Kolmogorov-Smirnov and Shapiro-Wink Test on TOE challenges

Tests of Normality on technological challenges						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Data security challenges	0.361	141	0.100	0.700	141	0.100
Insufficient service of internet	0.407	141	0.100	0.632	141	0.100
Issues of cybersecurity	0.435	141	0.100	0.627	141	0.100
Inability to handle bandwidth	0.341	141	0.100	0.776	141	0.100
Tests of Normality on organisational challenges						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Lack of finance	0.286	141	0.100	0.768	141	0.100
Inability to reach target market	0.279	141	0.100	0.777	141	0.100
Stock replenishment	0.324	141	0.100	0.778	141	0.100
Lack of knowledge and skills	0.237	141	0.100	0.814	141	0.100
Inability to gain Competitive advantage	0.316	141	0.100	0.731	141	0.100
Tests of Normality on environmental challenges						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Poverty rate	0.256	141	0.100	0.854	141	0.100
Traffic congestion	0.221	141	0.100	0.837	141	0.100
Political and economic instabilities	0.266	141	0.100	0.782	141	0.100

Lack of policies	0.288	141	0.100	0.755	141	0.100
Natural disaster occurrence	0.234	141	0.100	0.833	141	0.100
a. Lilliefors Significance Correction						

4.4.4 Normality test for managements' technological and organisational actions

Table 4.7 below presents Kolmogorov-Smirnov and Shapiro-Wink Tests on managements' technological and organisational actions with degree of freedom of 141. To meet the normality assumptions for the Shapiro-Wilk test the P-value must be greater than 0.05 (Shapiro & Wilk, 1965). The results from Table 4.9 below shows that all Kolmogorov-Smirnov and Shapiro-Wink variables are greater than 0.05 sig. @ 0.100. Therefore, we can conclude that data is normally distributed because the distribution of the sample is not significantly different from a normal distribution if p values are greater than 0.05. Furthermore, managements' technological and organisational actions can be used for statistical examination with linear regression model to analyse the correlation between TOE challenges and managements' technological and organisational actions as well as the correlation between managements' technological and organisational actions and outcomes of actual adoption of e-commerce.

Table 4.7: Kolmogorov-Smirnov and Shapiro-Wink Test on managements' technological and organisational actions

Tests of Normality on technological actions						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Installation of AVS	0.342	141	0.100	0.636	141	0.100
Installation and update HTTPS	0.390	141	0.100	0.623	141	0.100
Installation of antimalware	0.455	141	0.100	0.559	141	0.100
Installation of antivirus	0.507	141	0.100	0.444	141	0.100
Changing passwords	0.263	141	0.100	0.837	141	0.100
Creating firewall	0.294	141	0.100	0.769	141	0.100
a. Lilliefors Significance Correction						

Tests of Normality on organisational actions						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Educating staff	0.303	141	0.100	0.756	141	0.100
Avoid traffic congestion	0.338	141	0.100	0.725	141	0.100

Deny employees access	0.199	141	0.100	0.886	141	0.100
Manage route strategically	0.238	141	0.100	0.823	141	0.100
Refrigerated containers	0.269	141	0.100	0.865	141	0.100
a. Lilliefors Significance Correction						

4.4.6 Normality test on outcomes of actual adoption of e-commerce

Table 4.8 below presents Kolmogorov-Smirnov and Shapiro-Wink Tests on outcomes of actual adoption of e-commerce with the degree of freedom of 141. The results from Table 4.11 below shows that all Kolmogorov-Smirnov and Shapiro-Wink variables are greater than 0.05 sig. @ 0.100. Therefore, we can conclude that data is normally distributed because the distribution of the sample is not significantly different from a normal distribution if p values are greater than 0.05. Furthermore, organisational performance can be used for statistical examination with linear regression model to analyse the correlation between TOE challenges and outcomes of actual adoption of e-commerce as well as the correlation between management actions and outcomes of actual adoption of e-commerce.

Table 4.8: Kolmogorov-Smirnov and Shapiro-Wink Test on outcomes of actual adoption of e-commerce

Tests of Normality on organisational performance measures.						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Qualities of service is improved	0.482	141	0.100	0.510	141	0.100
Relationship between stakeholders	0.285	141	0.100	0.771	141	0.100
Profitability is improved	0.273	141	0.100	0.841	141	0.100
Production and delivery cost is improved	0.277	141	0.100	0.761	141	0.100
Competitive strength is improved	0.293	141	0.100	0.775	141	0.100
Strategies and mission become reality	0.306	141	0.100	0.763	141	0.100
Tests of Normality on perceived usefulness and ease of use						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Opportunities to expand market	0.350	141	0.100	0.636	141	0.100
Performance is improved	0.313	141	0.100	0.734	141	0.100
Operating hours increases	0.231	141	0.100	0.869	141	0.100
Sales increase	0.296	141	0.100	0.745	141	0.100
Eliminate geographic restrictions	0.302	141	0.100	0.744	141	0.100
Offer better and faster customer service	0.280	141	0.100	0.738	141	0.100
a. Lilliefors Significance Correction						

4.5 DESCRIPTIVE STATISTICS

4.5.1. Descriptive statistics on Normality Test for technological challenges

Table 4.9 below outlines the descriptive Statistics on the normality test for technological challenges. The mean results for technological challenges are as follows: data security challenges (4.5248), insufficient service of the internet (4.6312), issues of cybersecurity (4.177) and inability to handle bandwidth (3.9929). The standard deviations for technological challenges are as follow: data security challenges (0.58041), insufficient service of the internet (0.55306), issues of cybersecurity (1.467272) and inability to handle bandwidth (0.74159). The overall mean is 4.3324 which is approximately 4 (indicated as agree on the questionnaire scale) and this shows that majority of respondents agree with technological challenges questions. The median is 4.35105, which is approximately 4. According to Zambrano et al., (2019), in normal distribution the mean and the median are equal. Therefore, it can be concluded that data for technological challenges is normally distributed since the mean=median=4. The scale of standard deviation followed in this study is as follow: 1.00-1.50 is low reliability, 0.50-0.99 is reliable and 0.00-0.49 is high reliability. (Zambrano et al., 2019). The table below outline the overall standard deviation of 0.856 and that shows reliability.

Table 4.9: Descriptive Statistics on Normality Test for technological challenges

Descriptive Statistics							
Technological challenges	N	Range	Min.	Max.	Mean		Standard deviation
	statistic	statistic	statistic	statistic	statistic	Standard Error	Statistic
Data security challenges	141	2.00	3.00	5.00	4.5248	0.04888	0.58041
Insufficient service of internet	141	3.00	2.00	5.00	4.6312	0.04658	0.55306
Issues of cybersecurity	141	2.00	3.00	5.00	4.1773	0.033935	1.46727
Inability to handle bandwidth	141	3.00	2.00	5.00	3.9929	0.06245	0.74159
Valid Number	4						

Scale Mean	4.33155
Median	4.35105
Standard deviation	0.98445

4.5.1. Descriptive statistics on Normality Test for organisational challenges

Table 4.10 below outlines the descriptive Statistics on the normality test for organisational challenges. The mean results for organisational challenges are as follows: Lack of finance (4.3237), inability to reach target market (4.0780), stock replenishment (3.9787), for lack of bits of knowledge and skills (4.1702) and inability to gain competitive advantage online (4.4326). The standard deviation results for organisational challenges are as follow: lack of finance (0.83944), inability to reach target market (1.06282), stock replenishment (1.01748), lack of knowledge and skills (0.78338 and inability to gain competitive advantage online (0.65797). The overall mean is 4.1966 which is approximately 4 (indicated as agree on the questionnaire scale) and this shows that majority of respondents agree with organisational challenges questions. The median is 4.1702, which is approximately 4. According to Zambrano et al., (2019), in normal distribution the mean and the median are equal. Therefore, it can be concluded that data for technological challenges is normally distributed since the mean=median=4. The scale of standard deviation followed in this study is as follow: 1.00-1.50 is low reliability, 0.50-0.99 is reliable and 0.00-0.49 is high reliability. (Zambrano et al., 2019). The table below outline the overall standard deviation of 0.9916 and that shows reliability.

Table 4.10: Descriptive Statistics on Normality Test for Organisational Challenges

Descriptive Statistics							
Organisational challenges	N	Range	Min.	Max.	Mean		Standard deviation
	statistic	Statistic	statistic	Statistic	statistic	Std. Error	Statistic
Lack of finance	141	3.00	2.00	5.00	4.3237	0.07069	0.83944
Inability to reach target market	141	4.00	1.00	5.00	4.0780	0.08951	1.06282
Stock replenishment	141	4.00	1.00	5.00	3.9787	0.08569	1.01748

Lack of knowledges and skills	141	3.00	2.00	5.00	4.1702	0.06597	0.78338
Inability to gain competitive advantage online	141	3.00	2.00	5.00	4.4326	0.05541	0.65797
Valid Number	5						
Scale Mean	4.1966						
Median	4,1702						
Standard deviation	0.9916						

4.5.2. Descriptive statistics on Normality Test for environmental challenges

Table 4.11 below outlines the descriptive Statistics on normality test for environmental challenges. The mean results for environmental challenges are as follow: The mean poverty rate (3.7589), traffic congestion (3.9858), political and economic instabilities (4.2199), lack of policies (4.3262) and natural disaster occurrence (3.8369). The standard deviation results are as follow: poverty rate (1.15820), traffic congestion (0.97090), political and economic instabilities (0.87906), lack of policies (0.80619) and natural disaster occurrence (1.21081). The overall mean is 4.0255 which is approximately 4 (indicated as agree on the questionnaire scale) and this shows that majority of respondents agree with environmental challenges questions. The median is 3.9858, which is approximately 4. Therefore, it can be concluded that data for environmental challenges is normally distributed since the mean=median=4. The table below outline the overall standard deviation of 0.2144 and that shows reliability.

Table 4.11: Descriptive Statistics on Normality Test for environmental challenges

Descriptive Statistics							
Environmental challenges	N	Range	Min.	Max.	Mean		Standard deviation
	Statistic	statistic	Statistic	statistic	Statistic	Std. error	Statistic
Poverty rate	141	4.00	1.00	5.00	3.7589	0.09754	1.15820
Traffic congestion	141	3.00	2.00	5.00	3.9858	0.08176	0.97090
Political and economic instabilities	141	3.00	2.00	5.00	4.2199	0.07403	0.87906

Lack of policies	141	4.00	1.00	5.00	4.3262	0.06789	0.80619
Natural disaster occurrence	141	4.00	1.00	5.00	3.8369	0.10197	1.21081
Valid Number	5						
Scale Mean	4.0255						
Median	3.9858						
Standard deviation	0.2144						

4.5.3. Descriptive statistics on Normality Test for technological actions

Table 4.12 below outlines the descriptive Statistics on the normality test for technological actions. The mean results for technological actions are as follows: installation of AVS (4.4965), installation and update HTTPS (4.5957), installation of antimalware (4.7234), installation of antivirus (4.8369), changing passwords (4.0213) and creating firewall (4.1418). The standard deviation results are as follow: installation of AVS (0.50177), installation and update HTTPS (0.49250), installation of antimalware, (0.44891), installation of antivirus (0.37079), changing passwords (0.86576) and creating firewall (0.87490). The overall mean is 4.4693 which is approximately 4.5 and this shows that majority of respondents strongly agree with technological actions questions. The median is 4.5461, which is approximately 4.5. Therefore, it can be concluded that data for technological challenges is normally distributed since the mean=median=4.5. The table below outline the overall standard deviation of 0.6252 and that shows reliability.

Table 4.12: Descriptive Statistics on Normality Test for technological actions

Descriptive Statistics							
Technological Actions	N	Range	Min.	Max.	Mean		Standard Deviation
	Statistic	Statistic	Statistic	Statistic	statistic	Std. Error	Statistic
Installation of AVS	141	1.00	4.00	5.00	4.4965	0.04226	0.50177
Installation and update HTTPS	141	1.00	4.00	5.00	4.5957	0.04148	0.49250

Installation of antimalware	141	1.00	4.00	5.00	4.7234	0.03781	0.44891
Installation of antivirus	141	1.00	4.00	5.00	4.8369	0.03123	0.37079
Changing passwords	141	4.00	1.00	5.00	4.0213	0.07291	0.86576
Creating firewall	141	4.00	1.00	5.00	4.1418	0.07368	0.87490
Valid Number	6						
Scale Mean	4.4693						
Median	4.5461						
Standard deviation	0.6252						

4.5.4. Descriptive statistics on Normality Test for organisational actions

Table 4.13 below outlines the descriptive Statistics on the normality test for organisational actions. The mean results for organisational actions are as follows: educating staff (4.3830), avoiding traffic congestion (4.4681), denying former employees access to the system (3.3404), managing route strategically (4.0000) and refrigerated containers (3.5816). The standard deviation results are as follow: educating staff (0.69343), avoiding traffic congestion (0.61590), denying former employees access to the system (1.34073), managing routes strategically (1.06234) and for refrigerated containers (1.19017). The overall mean is 3.9506 which is approximately 4 (indicated as agree on the questionnaire scale) and this shows that majority of respondents agree with organisational actions questions. The median is 4.0000, which is approximately 4. Therefore, it can be concluded that data for technological challenges is normally distributed since the mean=median=4. The table below outline the overall standard deviation of 0.4902 and that shows reliability.

Table 4.13: Descriptive Statistics on Normality Test for organisational actions.

Descriptive Statistics							
Organisational actions	N	Range	Min.	Max.	Mean		Standard deviation
	Statistic	Statistic	Statistic	statistic	Statistic	Std. error	Statistic

Educating staff	141	3.00	2.00	5.00	4.3830	0.05840	0.69343
Avoid traffic congestion	141	2.00	3.00	5.00	4.4681	0.05187	0.61590
Deny employees access	141	4.00	1.00	5.00	3.3404	0.11291	1.34073
Manage route strategically	141	4.00	1.00	5.00	4.0000	0.08947	1.06234
Refrigerated containers	141	4.00	1.00	5.00	3.5816	0.10023	1.19017
Valid Number	5						
Scale Mean	3.9506						
Median	4.0000						
Standard deviation	0.4902						

4.5.5. Descriptive statistics on Normality Test for organisational performance measures

Table 4.14 below outlines the descriptive Statistics on the normality test for organisational performance measures. The mean results for organisational performance measures are as follows: qualities of service are improved (4.7801), relationship between stakeholders (4.3262), profitability improved (3.7730), production and delivery cost are improved (4.3475), competitive strength improved (4.1277) and strategies and mission become reality (3.8936). The standard deviation results are as follow: qualities of service are improved (0.41563), the relationship between stakeholders (0.68135), profitability is improved (1.16109), production and delivery costs is improved (0.64349), competitive strength is improved (0.87710) and strategies and mission become reality (1.29671). The overall mean is 4.2081 which is approximately 4 (indicated as agree on the questionnaire scale) and this shows that majority of respondents agree with organisational performance measures questions. The median is 4.2270, which is approximately 4. Therefore, it can be concluded that data for technological challenges is normally distributed since the mean=median=4. The table below outline the overall standard deviation of 0.9163 and that shows reliability.

Table 4.14: Descriptive Statistics on Normality Test for organisational performance measures.

Descriptive Statistics							
Organisational performance measure	N	Range	Min.	Max.	Mean		Standard deviation
	Statistic	statistic	Statistic	statistic	statistic	Standard error	Statistic
Qualities of service is improved	141	1.00	4.00	5.00	4.7801	0.03500	0.41563
Relationship between stakeholders	141	2.00	3.00	5.00	4.3262	0.05738	0.68135
Profitability is improved	141	4.00	1.00	5.00	3.7730	0.09778	1.16109
Production and delivery cost is improved	141	3.00	2.00	5.00	4.3475	0.05419	0.64349
Competitive strength is improved	141	4.00	1.00	5.00	4.1277	0.07386	0.87710
Strategies and mission become reality	141	4.00	1.00	5.00	3.8936	0.10920	1.29671
Valid Number	6						
Scale Mean	4.2081						
Median	4.2270						
Standard deviation	0.9163						

4.5.5. Descriptive statistics on Normality Test for perceived usefulness and ease of use

Table 4.15 below outlines the descriptive Statistics on the normality test for perceived usefulness and ease of use. The mean results for perceived usefulness and ease of use are as follows: opportunities to expand the market (4.5177), improved performance (4.4255), operating hours increases (3.2908), sale increase (4.3901), eliminating geographic restriction (4.1631), and offering better and faster customer service (4.3333). The standard deviation results are as follow: opportunities to expand the market (0.50147), improved performance (0.60041), operating hours increases (1.41188), sale increase (0.66303), eliminating geographic restriction (0.92292), and offering better and faster customer service (0.79881). The overall mean is 4.1869

which is approximately 4 (indicated as agree on the questionnaire scale) and this shows that majority of respondents agree with perceived usefulness and ease of use questions. The median is 4.2766, which is approximately 4. According to Zambrano et al., (2019), in normal distribution the mean and the mode are equal. Therefore, it can be concluded that for perceived usefulness and ease of use data is normally distributed since the mean=median=4. The scale of standard deviation followed in this study is as follow: 1.00-1.50 is low reliability, 0.50-0.99 is reliable and 0.00-0.49 is high reliability. (Zambrano et al., 2019). The table below outline the overall standard deviation of 0.8164 and that shows reliability.

Table 4.15: Descriptive Statistics on Normality Test for perceived usefulness and ease of use

Descriptive Statistics							
Perceived usefulness and ease of use	N	Range	Min.	Max.	Mean		Standard deviation
	Statistic	Statistic	Statistic	statistic	Statistic	Std. error	Statistic
Opportunities to expand market	141	1.00	4.00	5.00	4.5177	0.04223	0.50147
Performance is improved	141	2.00	3.00	5.00	4.4255	0.05056	0.60041
Operating hours increases	141	4.00	1.00	5.00	3.2908	0.11890	1.41188
Sales increase	141	3.00	2.00	5.00	4.3901	0.05584	0.66303
Eliminate geographic restrictions	141	4.00	1.00	5.00	4.1631	0.07772	0.92292
Offer better and faster customer service	141	4.00	1.00	5.00	4.3333	0.06727	0.79881
Valid Number	6						
Scale Mean	4.1869						
mean	4.2766						
Standard deviation	0.8164						

4.6 RELIABILITY ANALYSIS OF THE CONSTRUCTS

4.6.1 Reliability for TOE challenges

In this study, a Cronbach's alpha coefficient of 0.70 or higher is considered as reliable (Douglas & Thomas, 2014). Table 4.16 below illustrates the Cronbach's alpha test for TOE challenges. The Cronbach's alpha for 4 items for technological challenges is 0.800, for organisational challenges for 5 items is 0.805 and for environmental challenges for 5 items is 0.80. The Cronbach's alphas for all challenges are above 0.700 and this shows a good level of reliability. According to Table 4.16, if another item in all challenges get deleted the Cronbach alpha would still be above 0.700 and it would still be accepted. Therefore, this shows that there is a great consistency among values included in the study and data is reliable.

Table 4.16: Cronbach's alpha test for TOE challenges

Technological challenges' reliability Statistics				
Cronbach's Alpha	Number of Items			
0. 800	4			
Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Data security issues	12.8014	0.889	0.035	0.793
Insufficient service of internet	12.6950	1.071	0.098	0.779
Cybersecurity	13.1489	1.185	0.137	0.805
Inability to handle bandwidth	13.333	0.795	0.061	0.753
Organisational challenges' reliability Statistics				
Cronbach's Alpha	N of Items			
0.805	**5**			
Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Lack of finance.	16.6596	2.883	0.168	0.795
Inability to reach target market.	16.8652	2.632	0.289	0.802

stock replenishment.	16.9645	3.206	0.470	0.798
Lack of knowledge and skills.	16.7730	3.320	0.470	0.808
Inability to gain competitive advantage online	16.5106	4.080	0.167	0.778

Environmental challenges' reliability Statistics

Cronbach's Alpha	N of Items
0.805	**5**

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Poverty rate	16.3688	2.992	0.249	0.806
Traffic congestion	16.1418	4.365	0.497	0.798
Political and economic instabilities	15.9078	4.184	0.294	0.808
Lack of regulatory policies and macro-economic policies	15.8014	3.675	0.362	0.802
Natural disaster occurrence	16.2908	2.336	0.284	0.807

4.6.4 Reliability for technological and organisational actions

Table 4.17 below illustrate the Cronbach's alpha test for technological and organisational actions. The Cronbach's alpha for 6 items of technological action is 0.815 and for 5 items on organisational actions is 0.827 which is a good level of reliability because it is above 0.700. According to table 4.23 if another item is deleted the Cronbach alpha would still be above 0.700 and it would still be acceptable. Therefore, this shows that there is a great consistency amongst values included in the study and data is reliable.

Table 4.17: Cronbach's alpha test for technological and organisational actions

Technological actions' reliability Statistics	
Cronbach's Alpha	N of Items

0.815	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Installation of AVS to avoid fraud	22.3191	1.705	0.224	0.818
HTTPS protocol to secure users' sensitive information	22.2199	1.830	0.414	0.807
Antimalware to prevent infection on IT system	22.0922	1.956	0.158	0.815
Installation of antivirus to manage viruses	21.9787	1.892	0.041	0.819
Change password frequently to manage theft	22.7943	1.736	0.582	0.798
Firewall to create barrier between trusted and untrusted network	22.6738	1.264	0.495	0.802

Organisational actions' Reliability Statistics

Cronbach's Alpha	N of Items
0.827	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Educating staff to gain knowledge and skills	15.3901	2.840	0.179	0.827
Avoid traffic congestion by delivering before or after rush hours	15.3050	2.742	0.134	0.828
Deny former employees access to the system to avoid theft of information	16.4326	2.590	0.258	0.824
Managing the route used to deliver products strategically to limit the cost of delivering products	15.7730	4.562	0.488	0.815
Refrigerated containers to help to manage the issue of stock replenishment	16.1915	1.656	0.226	0.826

4.6.6 Reliability for the outcomes of actual adoption of e-commerce

Table 4.18 below illustrates the Cronbach's alpha test for outcomes of actual adoption of e-commerce. The Cronbach's alpha for 6 items of organisational performance measures is 0.835 and for 6 items of perceived usefulness and ease of use is 0.858. All these Cronbach alphas are above 0.700 which is a good level of reliability. According to Table 4.25 if another item is deleted the Cronbach alpha would still be above 0.700 and it would still be accepted. Therefore, this shows that there is a great consistency among values included in the study and data is reliable.

Table 4.18: Cronbach's alpha test for the outcomes of actual adoption of e-commerce

organisational performance measure's reliability Statistics				
Cronbach's Alpha	N of Items			
0.835	6			
Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Qualities of service are improved.	20.4681	2.936	0.218	0.833
Relationships between stakeholders are improved	20.9220	2.672	0.525	0.820
Profitability is improved	21.4752	2.408	0.137	0.835
Production and delivery cost is reduced	20.9007	3.376	0.277	0.831
Competitive strength is improved	21.1206	3.564	0.300	0.830
Strategies and mission become reality	21.3546	2.130	0.280	0.831

perceived usefulness and ease of uses' reliability Statistics				
Cronbach's Alpha	N of Items			
0.858	6			
Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Offers opportunities to expand market	20.6028	3.941	0.195	0.863
Improve supermarkets retailer's performance	20.6950	3.613	0.484	0.851
Operating hours increases	21.8298	2.528	0.625	0.841
Sales increases	20.7305	3.827	0.524	0.848
Eliminate geographic restrictions	20.9574	3.855	0.293	0.860
Offer better and faster customer service	20.7872	3.997	0.611	0.842

4.7 INDEPENDENT SAMPLE T-TEST AND ANOVA

A T-test is used to conclude if there is a significant difference between variables and ANOVA is used to determine the connection between variables (Nguegan & Mafini, 2017). In this study, an independent-sample t test was further conducted by the researcher to compare challenges influencing the adoption of e-commerce (technological, organisational and environmental), actions taken to encounter the challenges and outcomes of actual adoption of E-commerce (organisational performance and perceived usefulness and ease of use) between males and females. The ANOVA was conducted to compare outcomes of actual adoption of E-commerce (organisational performance and perceived usefulness and ease of use) and actions taken to encounter the challenges on more independent samples or groups (gender, age of respondents, occupation of respondents and employment period).

4.7.1. Independent sample t-test for gender on variables

Table 4.19 outline the independent sample t-test for gender on challenges influencing the adoption of e-commerce, outcomes of actual adoption of E-commerce (organisational performance and perceived usefulness and ease of use) and actions taken to encounter the challenges. The table depict that there is no statistically

significant difference in Technological factors (0.098), Organisational factors (0.347), Environmental factors (0.065), Technological actions (0.672), Organisational actions (0.075) organisational performance (0.154), management's actions taken to encounter the challenges (0.098) and perceived usefulness and ease of use (0.258) perceptions between male and female. Hence it is concluded that there is no significant difference since the significant value is more than 0.05.

Table 4.19: Independent sample t-test for gender on variables

Variables	T-test	p-values
Technological factors	0.578	0.098
Organisational factors	0.364	0.347
Environmental factors	1.478	0.065
Technological actions	0.571	0.672
Organisational actions	1.354	0.075
organisational performance	0.123	0.154
perceived usefulness and ease of use	0.897	0.258

4.7.2. ANOVA for age group on research variables

ANOVA for age group on challenges influencing the adoption, outcomes of actual adoption of E-commerce (organisational performance and perceived usefulness and ease of use) and actions taken to encounter the challenges. Table 4.20 shows that there is no statistically significant difference in Technological factors (0.068), Organisational factors (0.907), Environmental factors (0.075), organisational performance (0.189), perceived usefulness and ease of use (0.378) and organisational action (0.057) perceptions between age group. Hence it is concluded that there is no significant difference since the significant value is more than 0.05. While there is a statistical difference between age group and technological actions since the P-value is 0.038 which is below 0.5.

Table 20: ANOVA for age group on research variables

Variables	F-test	p-values
Technological factors	0.357	0.068
Organisational factors	0.369	0.907

Environmental factors	1.025	0.075
Technological actions	1.820	0.038
Organisational actions	0.364	0.057
organisational performance	0.578	0.189
perceived usefulness and ease of use	0.875	0.378

4.7.3. ANOVA for respondent's occupation on variables

Table 21 shows ANOVA for respondent's occupation on challenges influencing the adoption, outcomes of actual adoption of E-commerce (organisational performance and perceived usefulness and ease of use) and actions taken to encounter the challenges. The table below shows that there is no statistically significant difference in Technological factors (0.158), Organisational factors (0.198), Environmental factors (0.247), technological actions (0.147), organisational actions (0.067), organisational performance (0.547) and perceived usefulness and ease of use (0.570) between respondents' occupation. Hence it is concluded that there is no significant difference since the significant value is more than 0.05.

Table 21: ANOVA for respondent's occupation on variables

Variables	**F-test**	**p-values**
Technological factors	0.568	0.158
Organisational factors	0.174	0.198
Environmental factors	3.687	0.247
Technological actions	1.820	0.147
Organisational actions	0.247	0.067
organisational performance	0.697	0.547
perceived usefulness and ease of use	0.578	0.570

4.7.4. ANOVA for employment period on variables

Table 4.22 ANOVA for age of employment on challenges influencing the adoption, outcomes of actual adoption of E-commerce (organisational performance and perceived usefulness and ease of use) and actions taken to encounter the challenges

shows that there is statistically significant difference between Technological factors (0.024), Environmental factors (0.037) and perceived usefulness and ease of use (0.014) and age of employment since the P-values are less than 0.50. On the other hand, there is no statistically significant difference in between Organisational factors (0.657), technological actions (0.075), organisational actions (0.472) and organisational performance (0.258) and age of employment. This is because the P-values are above the threshold of 0.50.

Table 4.22: ANOVA for employment period on variables

Variables	F-test	p-values
Technological factors	0.124	0.024
Organisational factors	0.347	0.657
Environmental factors	0.175	0.037
Technological actions	1.217	0.075
Organisational actions	0.145	0.472
organisational performance	0.247	0.258
perceived usefulness and ease of use	0.247	0.014

4.8. CORRELATION ANALYSIS

In **CHAPTER 3,** it was stated that a correlation is used to test the validity of data by assessing the relationship between variables. Relationships between variables were assessed to test hypotheses. Therefore, this section focused on testing the validity of data and analysing the research hypotheses using the correlation analysis.

4.8.1. Correlation between toe challenges and management's actions

Table 23 points out a positive correlation between challenges (TOE challenges) and management's actions (organisational and technological actions) taken to counter the challenges, which is highlighted with technological challenges (r=0.699, p=0.033), organisational challenges (r=0.552, p=0.011) and environmental challenges (r=0.798, p=0.022) and this is in comparison with technological action. On the other hand, organisational action was analysed and the following transpired: technological challenges (r=0.536, p=0.010), environmental challenges (r=0.508, p=0.026) and environmental challenges (r=0.851, p=0.016). The results of Pearson correlation

between TOE challenges and management's action are very strong since Pearson's R-values are closer to 1. The results conclude that changes in challenges strongly correlates with changes in the management's actions. This is supported by the significant value of less than 0.05, confirming a positive correlation between TOE challenges influencing the adoption of e-commerce and management's actions taken to counter the challenges. Therefore, the results depicted in table 4.23 aligns with the findings by Kurnia (2013) and Gupta et al. (2023). That is, there is a relationship between challenges influencing the adoption of e-commerce and management's actions taken to counter the challenges.

Table 4.23: Correlation between TOE challenges and management's actions (technological actions and organisational actions)

		Technological actions	Organisational actions
Technological challenges	**Pearson Correlation**	0.699	0.536
	Sig. (2-tailed)	0.033	0.010
Organisational challenges	**Pearson Correlation**	0.552	0.508
	Sig. (2-tailed)	0.011	0.026
Environmental challenges	**Pearson Correlation**	0.798	0.851
	Sig. (2-tailed)	0.022	0.016
	N	141	141

4.8.2. Correlation between managements actions and outcomes of actual adoption

Table 24 points out a positive correlation between management's actions (technological and organisational actions) and outcomes of actual adoption of e-commerce (organisational performance and perceived usefulness and ease of use), which is highlighted with technological actions (r=0.712, p=0.031), organisational action (r=0.903, p=0.010) and this is in comparison with organisational performance. On the other hand, perceived usefulness and ease of use was analysed and the following transpired: technological actions (r=0.710, p=0.032), organisational action

(r=0.756, p=0.026). The results of Pearson correlation between management's actions and outcomes are very strong since Pearson's r values are closer to 1. The results conclude that changes in management's actions is strongly correlates with changes in the outcomes of actual adoption of e-commerce. This is supported by the significant values of less than 0.05 indicating statistically significant correlation and Pearson correlation of more than 0.70. Therefore, these confirms a positive correlation between management's actions taken to counter the challenges and outcomes of actual adoption of e-commerce. Therefore, the results depicted in table 4.24 aligns with the findings by Kurnia (2013) and Fonseka et al. (2021). That is, there is a relationship between management's actions taken to counter the challenges and outcomes of actual adoption of e-commerce.

Table 4.24: Correlation between managements' actions and outcomes of actual adoption of e-commerce

		Organisational performance	Perceived usefulness and ease of use
Technological actions	**Pearson Correlation**	0.712	0.710
	Sig. (2-tailed)	0.031	0.032
Organisational actions	**Pearson Correlation**	0.903	0.756
	Sig. (2-tailed)	0.010	0.026
	N	141	141

4.8.3. Correlation between toe challenges and outcomes of actual adoption

Table 4.25 points out a positive correlation between challenges (technological, organisational and environmental challenges) and outcomes (organisational performance and ease of use), which is highlighted with technological challenges (r=0.552, p=0.041), organisational challenges (r=0.798, p=0.022) and environmental challenges (r=0.900, p=0.011) and this is in comparison with organisational performance. On the other hand, ease of use was analysed and the following transpired: technological challenges (r=0.508, p=0.026), organisational challenges (r=0.851, p=0.016) and environmental challenges (r=0.573, p=0.048). The results of

Pearson correlation between challenges and outcomes are very strong since Pearson's r values are closer to 1. The results conclude that challenges influencing the adoption of e-commerce is strongly correlates with the outcomes of actual adoption of e-commerce. This is supported by the sig. value of less than 0.05, confirming a positive correlation between TOE challenges and outcomes of actual adoption of e-commerce. Therefore, the results depicted in table 4.25 aligns with the findings by Kurnia (2013), Hendricks & Mwapwele (2023) and Parks & Winkenbach (2023). That is, there is a relationship between challenges influencing the adoption of e-commerce and outcomes of actual adoption of e-commerce.

Table 4.25: Correlation between TOE challenges and outcomes

		Organisational performance	Perceived usefulness and ease of use
Technological challenges	**Pearson Correlation**	0.552	0.508
	Sig. (2-tailed)	0.041	0.026
Organisational challenges	**Pearson Correlation**	0.798	0.851
	Sig. (2-tailed)	0.022	0.016
Environmental challenges	**Pearson Correlation**	0.900	0.573
	Sig. (2-tailed)	0.011	0.048
	N	141	141

4.9 REGRESSION ANALYSIS

4.9.1. Regression analysis between TOE challenges and management's action (Technological actions)

Regression analysis is a method used to identify variables that have impact in a study (Nguegan & Mafini, 2017). The table below depicts the results for linear regression on the relationship between TOE challenges and technological actions. The analysis reveals that there is a significant positive relationship between technological challenges and technological actions (B=0.219 and P-value=0.001). Secondly, the researcher analysed the relationship between organisational challenges and

technological actions. The findings showed the following B=0.415 and P-value=0.000 and this is significantly positive. Lastly, the researcher analysed the relationship between environmental challenges and technological action. However, after the analysis transpired the following B=0.214 and P-value=0.012 and this is statistically significant. Nevertheless, the next discussion will be on TOE challenges and organisational actions.

Table 4.26: Regression analysis between challenges (TOE challenges) and management's actions (TA)

Relationship	Unstandardised beta	Standard error	Beta	T-value	P-value
TC→TA	0.870	0.314	0.219	2.770	0.001
OC→TA	1.638	0.282	0.415	5.770	0.000
EC→TA	0.544	0.200	0.214	2.172	0.012

4.9.2. Regression analysis between TOE challenges and management's action (Organisational actions)

Table 4.27 below shows the results for linear regression on the relationship between challenges and organisational actions. The analysis reveals that there is a significant positive relationship between technological challenges and organisational actions (B=0.758 and P-value=0.00). Secondly, the researcher analysed the relationship between organisational challenges and organisational actions. The findings showed the following B=0.657 and P-value=0.000 and this is significantly positive. Lastly, the researcher analysed the relationship between environmental challenges and organisational actions. However, after the analysis transpired the following B=0.425 and P-value=0.047 and this is statistically significant. Nevertheless, the next discussion will be on management's action and organisational performance.

Table 4.27: Regression analysis between TOE challenges and management's actions (OA)

Relationship	Unstandardised beta	Standard error	Beta	T-value	P-value
TC→OA	0.472	0.485	0.758	1.425	0.000

OC→OA	0.657	0.365	0.657	3.014	0.000
EC→OA	0.471	0.457	0.425	5.110	0.047

4.9.3. Regression analysis between management's action and outcomes of actual adoption of e-commerce (OP)

Table 4.28 below shows the results for linear regression on the relationship between management's action (Technological and Organisational actions) and outcomes of actual adoption (organisational performance). The analysis reveals that there is a significant positive relationship between technological actions and organisational performance (B=0.471 and P-value=0.002). Lastly, the researcher analysed the relationship between organisational actions and organisational performance. However, after the analysis transpired the following B=0.364 and P-value=0.000 and this is statistically significant. Nevertheless, the next discussion will be on management's action and outcomes (perceived usefulness and ease of use).

Table 4.28: Regression analysis between management's actions and outcomes of actual adoption (OP)

Relationship	Unstandardised beta	Standard error	Beta	T-value	P-value
TA→OP	0.574	0.243	0.471	0.547	0.002
OA→OP	0.481	0.475	0.364	1.241	0.000

4.9.4. Regression analysis between management's actions and outcomes of actual adoption (PUEU).

The table 4.29 below shows the results for linear regression on the relationship between management's action (technological and Organisational actions) and outcomes of actual adoption of e-commerce (perceived usefulness and ease of use). The analysis reveals that there is a significant positive relationship between technological actions and perceived usefulness and ease of use (B=0.147 and P-value=0.003). Moreover, the researcher analysed the relationship between organisational actions and perceived usefulness and ease of use and the following transpired B=0.781 and P-value=0.003 and this is statistically significant.

Nevertheless, the next discussion will be on management's action and outcomes of actual adoption (organisational performance).

Table 4.29: Regression analysis between management's actions (technological and organisational actions) and outcomes of actual adoption (PUEU)

Relationship	Unstandardised beta	Standard error	Beta	T-value	P-value
TA→PUEU	0.254	0.257	0.574	0.597	0.020
OA→PUEU	0.471	0.364	0.147	0.781	0.003

4.9.7. Regression analysis between TOE challenges and outcomes of actual adoption (Organisational performance)

The below table 4.30 shows the results for linear regression on the relationship between TOE challenges and outcomes of actual adoption of e-commerce (organisational performance). The analysis reveals that there is a significant positive relationship between technological challenges and organisational performance (B=0.547 and P-value=0.002). Secondly, the researcher analysed the relationship between organisational challenges and organisational performance. The findings showed the following B=0.364 and P-value=0.005 and this is significantly positive. Lastly, the researcher analysed the relationship between environmental challenges and organisational performance. However, after the analysis the following transpired B=0.254 and P-value=0.000 and this is statistically significant. Nevertheless, the next discussion will be on management's action and outcomes (perceived usefulness and ease of use).

Table 4.30 Regression analysis between TOE challenges and outcomes of actual adoption (organisational performance)

Relationship	Unstandardised beta	Standard error	Beta	T-value	P-value
TC→OP	0.574	0.475	0.547	0.578	0.002
OC→OP	0.847	0.571	0.364	0.471	0.005
EC→OP	0.265	0.356	0.254	0.364	0.000

4.9.8. Regression analysis between TOE challenges and outcomes of actual adoption (perceived usefulness and ease of use)

The table 4.31 below shows the results for linear regression on the relationship between TOE challenges and perceived usefulness and ease of use. The analysis reveals that there is a significant positive relationship between technological challenges and perceived usefulness and ease of use (B=0.587 and P-value=0.000). Secondly, the researcher analysed the relationship between organisational challenges and perceived usefulness and ease of use. The findings depict the following B=0.471 and P-value=0.009 and this is significantly positive. Lastly, the researcher analysed the relationship between environmental challenges and perceived usefulness and ease of use. However, after the analysis the following transpired B=0.587 and P-value=0.000 and this is statistically significant.

Table 4.31: Regression analysis between TOE challenges and outcomes (PUEU)

Relationship	Unstandardised beta	Standard error	Beta	T-value	P-value
TC→PUEU	0.687	0.587	0.587	0.587	0.000
OC→PUEU	0.425	0.657	0.364	0.471	0.009
EC→PUEU	0.258	0.741	0.874	0.587	0.000

4.10. SUMMARY OF THE CHAPTER

This chapter elucidates that supermarket retailers encounter various challenges—technological, organisational, and environmental—in the adoption of e-commerce. Additionally, it reveals that specific actions can be taken at both technological and organizational levels to address these challenges effectively. Furthermore, the chapter unveils the outcomes experienced by supermarket retailers upon the actual adoption of e-commerce, demonstrating that they derive benefits from this adoption.

To ensure the robustness of the findings, descriptive normality tests, including skewness and kurtosis, as well as the Kolmogorov-Smirnov diagnostic test, were conducted to assess the normal distribution of the data. The results indicated that the data was indeed normally distributed. Moreover, the reliability of the data was evaluated through Cronbach's alpha, which confirmed that the data is reliable.

Furthermore, the Pearson correlation analysis was conducted to test the hypotheses of the study. The results indicated that the null hypotheses were rejected, while the alternative hypotheses were accepted, demonstrating significant relationships between the variables under investigation. Additionally, correlation analysis was utilized to validate the data, which confirmed the validity of the findings.

In the subsequent chapter, a more comprehensive discussion will be provided, encompassing summaries, conclusions, and recommendations, thereby offering clearer insights and guidance based on the study's outcomes. The next chapter deals with the summary of findings, conclusions and recommendations.

CHAPTER FIVE
SUMMARY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. INTRODUCTION

This chapter concludes the research study on the analysis of challenges on the adoption of electronic commerce by supermarket retailers in Limpopo, South Africa. It presents a summary of the findings, conclusions, and recommendations based on the analysed data. The research has yielded several important insights, and this chapter also outlines potential areas for further investigation.

5.2. RESTATEMENT OF THE STUDY'S PROBLEM STATEMENT, OBJECTIVES AND AIM

5.2.1. Problem statement

In the context of the Coronavirus pandemic, businesses increasingly recognize electronic commerce (e-commerce) as a pivotal strategy for achieving success (Al-Tayyar, Abdul, Azmawani & Mass, 2021). In developing and developed countries e-commerce is expected to grow, and some South African retailers have embraced e-commerce while others are in the process of adopting it. (Weber & Badenhorst-Weiss, 2018). Developing countries such as South Africa grow in a slower pace because of challenges that they face limiting their adoption of e-commerce (Weber & Badenhorst-Weiss, 2018). Nevertheless, in South Africa, there are provinces such as Gauteng that develop faster that other provinces such as Limpopo province (ICASA, 2020). According to Stats SA, Gauteng province is the leading province in South Africa in relation to the adoption e-commerce whereas Limpopo have the lowest growth in adopting e-commerce.

Online grocery retailing is one of the sectors that grow slowly in adopting e-commerce. Both customers, suppliers and retailers in supermarkets are slow to participate in purchasing or selling electronically (Johnson & Iyamu, 2019). South African retailers such as Woolworths and Pick n' pay use e-commerce to their benefits especially in urban areas. Urban areas such as Gauteng are favoured by e-commerce because they have enough resources and capital; and goods can be ordered and delivered easily and in convenient time (Maduku et al., 2016). Rural areas such as Limpopo face

challenges that affect their adoption of e-commerce because they lack infrastructures. However, to effectively navigate the e-commerce landscape, retailers must be cognizant of the challenges they may encounter and possess adept management strategies to address them. yet face multifaceted challenges, including security challenges, logistical complexities, and limited computer and internet literacy (Rithari, 2014).

The crux of the issue lies in the lack of comprehensive understanding regarding the challenges on the adoption of electronic commerce by supermarket retailers in Limpopo, South Africa. Existing research falls short in categorising these challenges into distinct domains such as technological, organisational, and environmental, thereby impeding effective management intervention. Moreover, scant attention is devoted to elucidating how management addresses these challenges.

Furthermore, the scholarly landscape lacks inquiries into the intricate relationships between the challenges experienced by supermarket retailers and their impact on the adoption of e-commerce. Notably, no studies have probed into the management's actions to counter these challenges and how such interventions shape the outcomes of e-commerce adoption. Consequently, there exists a notable dearth of knowledge regarding the management strategies employed to mitigate challenges and their consequential effects on e-commerce adoption.

5.2.2. Aim

The study aims to investigate challenges on the adoption of electronic commerce by supermarket retailers in Limpopo province, South Africa

5.2.3. Objectives

The study's objectives were:

- To investigate the relationship between challenges influencing the adoption of e-commerce by supermarket retailers and management’s technological and organisational actions taken to counter the challenges.
- To examine the relationship between management’s technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.

- To explore the relationship between challenges influencing the adoption of e-commerce and the outcomes of the actual adoption of e-commerce.

In this section of the study, restating the research problem statement, aim and objectives serves multiple crucial purposes. Firstly, it recapitulates the initial goals and aims of our study, offering closure by revisiting what the researcher intended to achieve. Secondly, it reinforces the focus and direction of the study, emphasising the key areas of investigation the researcher pursued throughout the research process. Thirdly, restating the objectives also ensures alignment between the conclusions and recommendations provided in the final chapter and the researcher's original research goals, demonstrating how the study has addressed these objectives and whether the objectives have been met. Moreover, restating the objectives helps to contextualise the findings and insights presented in the final chapter, providing a framework for understanding how our research outcomes relate to the broader research goals.

5.3. SUMMARY OF FINDINGS

5.3.1. Summary of demographic information of response

The results on the demographic characteristics of the respondents show that the managerial position in supermarket retailers is 55.3% dominated by males. In this study, the majority of individuals on managerial positions in supermarket retailers are between 50 and 59 years old and majority of them on 51.8% are general managers and majority of them have been employed for about 10 to 15 years.

5.3.2. Summary of findings for TOE challenges influencing the adoption of e-commerce by supermarket retailers

In this study, technological, organisational, and environmental challenges influencing the adoption of e-commerce by supermarket retailers were identified and researched, and findings are presented in **Chapter 4**. Based on the findings in **Chapter 4**, a significant majority of respondents agree that data security challenges, insufficient service of internet, issues of cybersecurity and inability to handle the bandwidth needed for telecommunication are one of the technological challenges influencing the adoption of e-commerce. The majority of respondents are also in support of the literature review stating that lack of finance, inability to reach target market, stock

replenishment, lack of knowledge and skilled ICT employees and inability to gain competitive advantage online are organisational challenges influencing the adoption of e-commerce. Furthermore, the majority of respondents agree that poverty rates, traffic congestion, political and economic instabilities, lack of regulatory policies and macro-economic policies and natural disasters occurrence influence the adoption of e-commerce.

There were other challenges that were not included in the questionnaire, but respondents listed them as they were answering the questionnaire. According to findings on collected data in **chapter 4**, respondents specified that inventory and supply chain management, payment systems and website development form part of other technological challenges playing the significant role in hindering the adoption of e-commerce within the supermarket sector. Other respondents stated that lack of benefit awareness, operational organisational structure and resistance to change are organisational challenges having the potential to adversely impact the adoption of e-commerce among supermarket retailers. Moreover, other respondents outlined that carbon emission and packaging waste are other environmental challenges posing an adverse impact towards the adoption of e-commerce by supermarket retailers.

5.3.3. Summary of findings on management's actions taken to counter challenges in the adoption of e-commerce

In this study, management's technological and organisational actions taken to counter challenges in the adoption of e-commerce were identified and researched, and findings are presented in **Chapter 4**. Based on the findings in Chapter 4, the majority of respondents agree that the following are technological actions that can be taken to counter the challenges in the adoption of e-commerce, that is, installation of an address verification system to avoid fraud, installation and update of Https protocol to secure users sensitive information, installation of anti-malware to detect, remove and prevent malware from infecting IT system and computer, Installation of anti-virus software to manage viruses, changing of passwords and creating complex password to manage passwords theft and creating firewalls helps to create barriers between trusted and untrusted network. Furthermore, the majority of respondents are in support of the literature review stating that the following are organisational actions that management can take to manage challenges in the adoption of e-commerce, that is, educating staff to reduce challenges of lack of skills and knowledge, avoiding traffic

congestion by delivering before or after rush hours, deny former employees access to system to avoid theft of information, managing route used to deliver products strategically to limit cost of delivering products and use of refrigerated containers to help to manage the issue of stock replenishment.

There were other management's actions that were not included in the questionnaire, but respondents listed them as they were answering the questionnaire. According to findings on collected data in **chapter 4**, respondents specified that adopting eco-friendly packaging, managing time and stock level, providing an accurate and reliable payment gateway for transactions, and sustainable delivery practice can manage other technological challenges influencing the adoption of e-commerce. Furthermore, respondents mentioned that retaining and hiring expertise, modifying the existing workforce, restructuring roles and creating new roles, training and workshopping can also manage other organisational challenges influencing the adoption of e-commerce.

5.3.4. Summary of findings for the outcomes of the actual adoption of e-commerce

In this study in **chapter 2** (literature review), it was determined that adopting e-commerce has specific outcomes that are, e-commerce improves the quality of services, improves the relationships between stakeholders, improves profitability, reduce production and delivery cost, improves competitive strength, makes strategies and mission real, offer opportunity to expand market and create new business opportunities, improves supermarkets retailers performance, increase operating hours, increase sales, eliminate geographic restrictions and offer faster and better customer service. These outcomes were researched, and findings were presented in chapter 4 of this study. Based on the findings in **Chapter 4**, the majority of respondents are in support of the above-mentioned outcomes of actual adoption of e-commerce.

5.3.5. Summary of findings for relationship between TOE challenges of the adoption of e-commerce and management's actions taken to counter the challenges

Based on the findings, the majority of respondents corroborate that for supermarket retailers to survive in the adoption of e-commerce they need to manage occurring or possible challenges. That is, management of challenges cannot happen if there are no challenges. If the management of challenges happens, it means that supermarket retailers will operate effectively and efficiently without a negative impact on the survival of their business. Therefore, it was proven that there is a positive correlation between challenges influencing the adoption of e-commerce and management's technological and organisational actions taken to counter the challenges.

5.3.6. Summary of findings on the relationship between management's action taken to counter the challenges and the outcomes of the actual adoption of e-commerce

Based on the findings in **Chapter 4**, it was proven that the outcomes of the actual adoption of e-commerce depend on actions taken to counter challenges. In this study, only positive beneficial outcomes are researched, which means that for supermarket retailers to benefit from e-commerce they need to manage the challenges influencing the adoption of e-commerce. That is, they need to know the precise action to take to manage those challenges. It is also proven that there is a positive correlation between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.

5.3.7. Summary of findings on the relationship between challenges on the adoption of e-commerce by supermarkets retailers and the outcomes of actual adoption of e-commerce

The results in **Chapter 4** outline that there is a positive relationship between challenges influencing the adoption of e-commerce and outcomes of actual adoption of e-commerce. The outcome of the actual adoption of e-commerce depends on the challenges that might occur. It is also proven that there is a positive correlation

between challenges influencing the adoption of ecommerce and outcomes of actual adoption of e-commerce.

5.4. CONCLUSIONS

5.4.1. Conclusion on TOE challenges influencing the adoption of e-commerce by supermarket retailers

The study was able to identify technological, organisational, and environmental challenges influencing the adoption of e-commerce by supermarket retailers. It was found that supermarket retailers in the study area are influenced by technological, organisational, and environmental challenges listed in **Section 5.3.1** to adopt e-commerce. Therefore, it can be concluded that the above-mentioned challenges in **Section 5.3.1** have the potential to adversely impact the adoption of e-commerce among supermarket retailers. The widespread awareness and strong agreement among retailers regarding the challenges posed by technological, organisational and environmental challenges underscore the significant role these concerns play in hindering the adoption of e-commerce within the supermarket sectors

5.4.2. Conclusion on management's actions taken to counter challenges in the adoption of e-commerce

The study was able to identify technological and organisational actions taken to counter the challenges in the adoption of e-commerce. In the study area, it was found that supermarket retailers make use of the above-mentioned technological and organisational actions in **Section** 5.4.1 to manage the challenges in the adoption of e-commerce. Therefore, it can be concluded that the above-mentioned technological and organisational actions in **Section** 5.4.1 are taken to manage the challenges in the adoption of e-commerce by supermarket retailers.

5.4.3. Conclusion on the outcomes of the actual adoption of e-commerce

The study was able to determine the outcomes of the actual adoption of e-commerce. In the study area, it was found that supermarket retailers experience the above-mentioned outcomes of the actual adoption of e-commerce. Therefore, it can be concluded that adopting e-commerce results in positive outcomes, it brings improvement to supermarket retailers in terms of performance and profitability.

5.4.4. Conclusion on the relationship between challenges influencing the adoption of e-commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges

According to findings in **Chapter 4**, it was found that there is a positive correlation between challenges influencing the adoption of e-commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges. These findings were determined to achieve the objectives of the study and conclude the research hypotheses. In **Chapter 1** the following hypotheses were listed:

- H01: There is no relationship between challenges influencing the adoption of e-commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges.
- Ha1: There is a positive relationship between challenges influencing the adoption of e-commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges.

In conclusion, the null hypothesis will be rejected because there is enough evidence to accept the alternative hypothesis. There is a positive relationship between challenges influencing the actual adoption of e-commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges.

5.4.5. Conclusion on the relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.

According to findings in Chapter 4, it was found that there is a positive correlation between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce. These findings were determined to achieve the objectives of the study and conclude the research hypotheses. In Chapter 1 the following hypotheses were listed:

- H02: There is no relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.
- Ha2: There is a positive relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.

In conclusion, the null hypothesis will be rejected because there is enough evidence to accept the alternative hypothesis. That is, there is a positive relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce.

5.4.6. Conclusion on the relationship between challenges influencing the adoption of e-commerce by supermarket retailers and outcomes of actual adoption of e-commerce.

According to findings in **Chapter 4**, it was found that there is a correlation between challenges influencing the adoption of e-commerce by supermarket retailers and outcomes of actual adoption of e-commerce. These findings were determined to achieve the objectives of the study and conclude the research hypotheses. In chapter 1 the following hypotheses were listed:

- H03: There is no relationship between challenges influencing the adoption of e-commerce by supermarket retailers and outcomes of actual adoption of e-commerce.
- Ha3: There is a positive relationship between challenges influencing the adoption of e-commerce by supermarket retailers and outcomes of actual adoption of e-commerce.

In conclusion null hypothesis will be rejected because there is enough evidence to accept alternative hypothesis. That is, there is a positive relationship between challenges influencing the adoption of e-commerce by supermarket retailers and outcomes of actual adoption of e-commerce.

5.5. RECOMMENDATIONS

5.5.1. Recommendations for TOE challenges influencing the adoption of e-commerce by supermarkets retailers

Supermarket retailers need to be aware of the technological, environmental, and organisational challenges listed in **section 5.3.1** that influence the adoption of e-commerce for supermarkets to operate effectively and efficiently electronically. Based on the findings in **Chapter 4**, respondents mentioned that inventory and supply chain management, payment system, website development, lack of benefits awareness, operational process, organisational structure, resistance to change, carbon emissions and package waste can also be classified as challenges influencing the adoption of e-commerce. Therefore, supermarket retailers need to consider putting an eye on the above-mentioned challenges to see if indeed they influence the adoption of e-commerce. Furthermore, more research needs to be done on these challenges.

5.5.2. Recommendations for management's actions taken to counter challenges in the adoption of e-commerce

Supermarket retailers need to be aware of how to manage challenges influencing the adoption of e-commerce. They can adapt technological and organisational actions listed in **Section** 5.4.1 to manage challenges influencing the adoption of e-commerce. They must not be scared to adopt e-commerce because there are ways to manage challenges that may occur in the adoption of e-commerce. Based on the findings in **Chapter 4**, respondents mentioned that supermarket retailers can also manage challenges in the adoption of e-commerce by adopting eco-friendly packages, managing real-time inventory, ensuring accurate stock levels, providing secure and reliable payment gateway for transactions, retaining, and hiring expertise, ensuring sustainable delivery practice, modifying existing workforce, restructure and create roles, introducing workshops and train staff. Therefore, supermarket retailers need to consider the above-mentioned actions to see if indeed they can manage the challenges in the adoption of e-commerce. In addition, more research needs to be done on these technological and organisational actions.

5.5.3. Recommendations for the outcomes of the actual adoption of e-commerce

Supermarket retailers need to be aware of the outcomes of the actual adoption of e-commerce. Supermarkets need to adopt e-commerce to improve the quality of their services, improve the relationships between stakeholders, improve profitability, reduce production and delivery costs, improve competitive strength, make supermarkets' strategies and missions real, expand the market and create new business opportunities, to improve their performance, to increase operating hours, to increase sales, to eliminate geographic restrictions and to offer faster and better customer services.

5.5.4. Recommendations for the relationship between TOE challenges and management's actions

It is concluded that there is a positive relationship between challenges influencing the actual adoption of e-commerce by supermarket retailers and management's technological and organisational actions taken to counter the challenges. Therefore, it is essential for supermarket retailers to understand the challenges that may influence the actual adoption of e-commerce to be able to take suitable and effective actions in managing those challenges.

5.5.5. Recommendations for the relationship between management's actions and the outcomes of actual adoption of e-commerce

It is concluded that there is a positive relationship between management's technological and organisational actions taken to counter the challenges and the outcomes of the actual adoption of e-commerce. For supermarkets to experience positive outcomes of actual adoption of ecommerce, they need to manage all the challenges so that they are not negatively affected. Therefore, it is recommended that supermarkets retailers need to manage challenges influencing the adoption of e-commerce for them to benefits from adopting e-commerce. That is, if the supermarket can manage the challenges, then the organisational performance will improve.

5.5.6. Recommendations for the relationship between TOE challenges and the outcomes of actual adoption of e-commerce

Supermarkets need to take into consideration the challenges influencing the adoption of e-commerce because if not, the outcomes of actual adoption of e-commerce might

be negative towards their organisational performance. Therefore, knowing the challenges will help supermarkets to know what they are dealing with so that their organisational performance is positively affected.

5.6. INTEGRATED CONCLUSION AND RECOMMENDATION ON CHALLENGES ON THE ADOPTION OF E-COMMERCE BY SUPERMARKET RETAILERS IN LIMPOPO, SOUTH AFRICA

In conclusion, the research underscores the imperative for supermarket retailers to enhance their organisational performance concerning the adoption of e-commerce. This necessitates a comprehensive understanding of the challenges impeding e-commerce adoption, as well as the requisite actions to address these challenges and an awareness of the outcomes resulting from actual e-commerce implementation. Essentially, supermarket retailers must effectively manage the challenges associated with e-commerce to capitalise on the benefits derived from its adoption. Chapter 2 of the study meticulously delineates the challenges influencing e-commerce adoption, the managerial technological and organisational strategies employed to mitigate these challenges, and the outcomes observed following e-commerce implementation. These findings were subsequently validated in **Chapter 4** of the study, which elucidated various organisational, technological, and environmental challenges hindering e-commerce adoption. Moreover, it underscored the importance of implementing appropriate measures to manage these challenges, ultimately yielding favourable outcomes for supermarket retailers' performance.

Supermarket retailers should familiarise themselves with the diverse challenges and corresponding management strategies to pre-emptively mitigate their adverse impact on performance. A comprehensive understanding of these challenges and the proactive implementation of effective management strategies can mitigate potential negative repercussions, ensuring that supermarket retailers realize the benefits associated with e-commerce adoption and consequently enhance their overall performance.

5.7. AREAS FOR FURTHER STUDY

This study can be extended for research to study the effect of the actual adoption of e-commerce in the economy. Another study can examine the influence of customers'

preference towards the adoption of e-commerce by supermarket retailers. Another study can be to further analyse challenges that can influence the adoption of e-commerce, specifically focussing on other challenges that were listed by respondents, when answering the questionnaire to see if other supermarket retailers agree that those challenges indeed influence the adoption of e-commerce. This study can be further applied in other parts of the country or the world, to see if other supermarket retailers outside the study area of this research are also in support of the findings.

5.8. CONCLUSION

The primary objective of this study was to analyse the challenges influencing the adoption of electronic commerce by supermarket retailers. This entailed identifying the specific challenges that hindered the adoption of e-commerce, assessing the actions taken by management to address these challenges, and evaluating the outcomes resulting from the actual implementation of e-commerce. Additionally, the study sought to determine the relationships between the challenges faced by supermarket retailers in adopting e-commerce and the corresponding technological and organisational actions taken by management to mitigate these challenges. Furthermore, it aimed to investigate the associations between management's interventions and the outcomes observed following the adoption of e-commerce. Through rigorous testing of hypotheses, all objectives of the study were successfully achieved. The findings of this study provide valuable insights and recommendations for supermarkets, addressing pertinent issues and suggesting areas for further research in this domain.

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APPENDIX D: QUESTIONNAIRE

My name is Charlene Tempe Mogano, a Master of Commerce (Business Management) student from the University of Limpopo. I am conducting research on **Analysis of challenges influencing the adoption of electronic commerce by supermarket retailers**; with the purpose of investigating challenges influencing supermarket retailers in the adoption of electronic commerce. I humbly request you to participate in my research by completing this questionnaire. This questionnaire is for academic purpose and will take you 10 minutes to complete.

CONSENT FORM

By answering this questionnaire, I understand that:

1. My responses will be treated with confidentiality and only be used for the purpose of the academic research.
2. No harm will be posed to me and the research project aim has been explained to me.
3. Access to records relating to my participation in the study will be restricted to persons directly involved in the research.
4. Any questions that I may have regarding the research, or related matters, will be answered by the researcher.
5. Participation in this research is voluntary and I can withdraw my participation at any stage.
6. I understood the information regarding my participation in the study and I agree to participate.

SECTION A: DEMOGRAPHY INFORMATION

In this section, the researcher would like to determine if the respondent fit the target population for this study. Please select the appropriate answer.

1. Please state your gender * Mark only one oval.

- ◯ Male
- ◯ Female

2. Please indicate your age * Mark only one oval.

- ◯ 18-29 years
- ◯ 30-39 years
- ◯ 40-49 years
- ◯ 50-59 years
- ◯ 60 and above

3. Please indicate your occupation * Mark only one oval.

- ◯ General manager
- ◯ Owner
- ◯ Director
- ◯ CEO
- ◯ Marketing Manager
- ◯ Other

If other, please state your occupation._____

4. Please indicate your employment period * Mark only one oval.

- ◯ Less than 1 year
- ◯ Between 1 to 5 years
- ◯ Between 5 to10 years
- ◯ Between 10 to 15 years
- ◯ 15 years and above

SECTION B: CHALLENGES INFLUENCING THE ADOPTION OF E- COMMERCE BY SUPERMARKET RETAILERS

The following statements are challenges influencing the adoption of e-commerce. Please indicate within the following statements by choosing either strongly disagree, disagree, neutral, agree or strongly agree.

1. Technological challenges * Tick all that apply.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Data security issues	☐	☐	☐	☐	☐
Insufficient service of internet	☐	☐	☐	☐	☐
Issues of cybersecurity	☐	☐	☐	☐	☐
Inability to handle bandwidth. needed for telecommunication	☐	☐	☐	☐	☐

What are other technological challenges influencing the adoption of e-commerce in your supermarket?

_____

2. Organisational challenges * Tick all that apply.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Lack of finance	☐	☐	☐	☐	☐
Inability to reach target market	☐	☐	☐	☐	☐
Stock replenishment	☐	☐	☐	☐	☐
Lack of knowledgeable and skilled ICT employees	☐	☐	☐	☐	☐
Inability to gain competitive advantage online	☐	☐	☐	☐	☐

What are other organisational challenges influencing the adoption of e-commerce in your supermarket? _____

_____

3. Environmental challenges * Tick all that apply

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Unfriendly business environment	☐	☐	☐	☐	☐
Traffic congestion	☐	☐	☐	☐	☐
Political and economic instabilities	☐	☐	☐	☐	☐
Lack of regulatory policies and macro-economic policies	☐	☐	☐	☐	☐
Natural disasters occurrence	☐	☐	☐	☐	☐

What are other environmental challenges influencing the adoption of e-commerce in your supermarket?

SECTION C: MANAGEMENT'S TECHNOLOGICAL AND ORGANISATIONAL ACTIONS TAKEN TO COUNTER THE CHALLENGES

Please indicate which actions are taken in your business to counter challenges experienced by choosing either strongly disagree, disagree, neutral, agree or strongly agree.

1. Technological action * Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Installation of address verification system to avoid	⬭	⬭	⬭	⬭	⬭
Install and update HTTPS to users' sensitive information.	⬭	⬭	⬭	⬭	⬭
Installation of anti-malware to remove and prevent malware from infecting IT system and computer.	⬭	⬭	⬭	⬭	⬭
Installation of anti-virus software to manage viruses.	⬭	⬭	⬭	⬭	⬭
Changing passwords frequently and creating complex passwords to manage passwords theft.	⬭	⬭	⬭	⬭	⬭
Creating firewalls help to create barriers between trusted and untrusted network.	⬭	⬭	⬭	⬭	⬭

Please mention any other technological actions that you take. _____

_____

_____

2. Organisational action * Tick all that apply.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Educating staff reduce challenge of lack of skills and knowledge.	☐	☐	☐	☐	☐
Avoiding traffic congestion by delivering before or after rush hours.	☐	☐	☐	☐	☐
Deny former employees access to the system to avoid theft of information.	☐	☐	☐	☐	☐
Managing the route used to deliver products strategically to limit cost of delivering products.	☐	☐	☐	☐	☐
Refrigerated containers help to manage the issue of stock replenishment.	☐	☐	☐	☐	☐

Please mention any other organisational actions that you take. _____

_____

_____

SECTION D: OUTCOMES OF ACTUAL ADOPTION OF E-COMMERCE

Please indicate how your organisation performs after adopting e-commerce by choosing either strongly disagree, disagree, neutral, agree or strongly agree.

1. Organisational performance measures * Mark only one oval per row

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The quality of service is improved.	◯	◯	◯	◯	◯
The relationships between stakeholders are improved.	◯	◯	◯	◯	◯
Profitability is improved.	◯	◯	◯	◯	◯
Production and delivery cost is reduced.	◯	◯	◯	◯	◯
Competitive strength is improved.	◯	◯	◯	◯	◯
Strategies and missions become a reality.	◯	◯	◯	◯	◯

2. Perceived usefulness and ease of use * Tick all that apply.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Offers the opportunity to expand market and create new business opportunities.	☐	☐	☐	☐	☐
Improves supermarket retailer's performance.	☐	☐	☐	☐	☐
Improve the relationship between stakeholders.	☐	☐	☐	☐	☐
The business operates for 24 hours 7 days	☐	☐	☐	☐	☐
Increase sales.	☐	☐	☐	☐	☐
Eliminates geographic restrictions.	☐	☐	☐	☐	☐
Offer faster and better customer service.	☐	☐	☐	☐	☐

I APPRECIATE

YOUR TIME AND COOPERATION,

THANK YOU.

APPENDIX E: TREC CLEARANCE CERTIFICATE

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 4713, Fax: (015) 268 2306, Email: moore.hutamo@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING: **28 FEBRUARY 2023**

PROJECT NUMBER: **TREC/59/2023: PG**

PROJECT:

Title:	Analysis of challenges influencing the adoption of electronic commerce by supermarket retailers in the Limpopo Province.
Researcher:	CT Mogano
Supervisor:	Prof GPJ Pelser
Co-Supervisor/s:	Mr NF Ledwaba
School:	Economics and Management
Degree:	Master of Commerce (Business Management)

PROF D MAPOSA
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:

i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**

ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**

iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

Finding solutions for Africa

APPENDIX F: EDITORIAL LETTER

Mogano C.T
University of Limpopo
Sovenga 0727

420 Unit C Mankweng 0727
064 263 5912
rightmovemultimedia@gmail.com
Researcheditors882@gmail.com karabokonyani@gmail.com

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TO WHOM IT MAY CONCERN

This editing certificate serves to certify that this Academic research (Dissertation) was professionally edited for Ms. Mogano C.T Student no 201710558 Thus, this document is meant to acknowledge that I, Mrs. K.L Malatji and Dr. E.J Malatji professional Editors under a registered company RightMove Multimedia, have meticulously edited the academic work of Ms. Mogano C.T from the University of Limpopo.

The evidence of the editorial work done on the document can be forwarded to you should you wish to see it.

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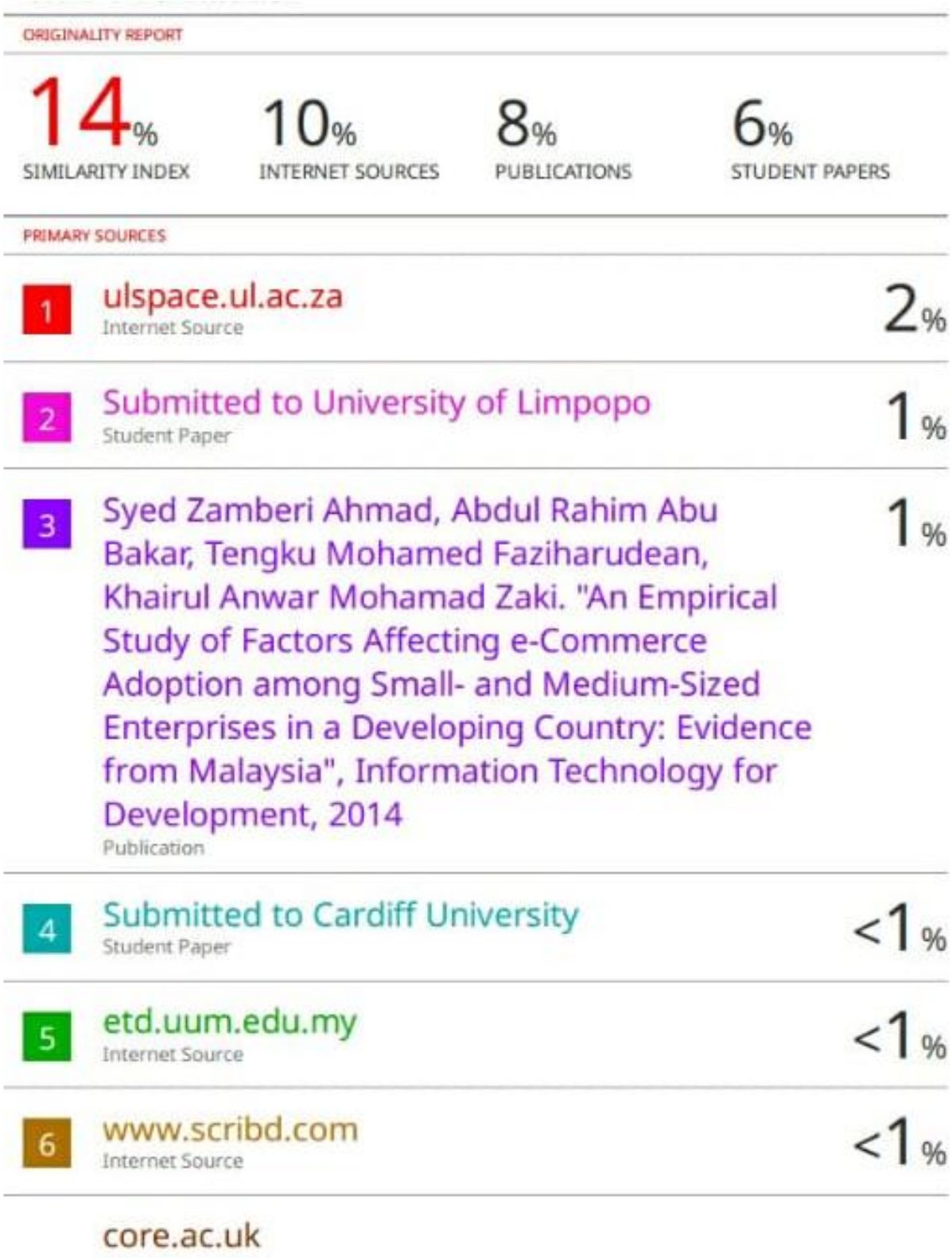
I trust you will find the editing quality in order.

Sincerely,

Mrs. K. L Malatji & Dr. E.J Malatji

APPENDIX G: TURNIT IN REPORT



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