CONTEXTUAL ANTECEDENTS OF E-COMMERCE ADOPTION FOR SUPPLY CHAIN MANAGEMENT BY RETAIL AND CONSUMER GOODS TRADERS IN ZAMBIA

BY

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A Dissertation submitted to the University of Zambia in partial fulfilment of the requirements for the award of the Degree of Master of Science in Operations, Projects and Supply Chain Management

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DECLARATION

I, Jonathan Vincent Ngwira, do hereby declare that this work is my original work achieved through personal reading and research. This work has never been submitted to the University of Zambia or any other Universities. All sources of data used and literature on related works previously done by others, used in the production of this Dissertation have been duly acknowledged. If any omission has been made, it is not by choice but by error.

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APPROVAL

This Dissertation, by Jonathan Vincent Ngwira, has been approved as partial fulfilment of the requirements for the award of the Degree of Master of Science in Operations, Projects and Supply Chain Management by the University of Zambia

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ABSTRACT

E-commerce, as a transformative technological innovation, offers unparalleled opportunities for enhancing supply chain management efficiency and effectiveness. This study was conducted to investigate the factors influencing the behavioural intention of retail and consumer goods traders to adopt e-commerce for supply chain management in Zambia. The research employs a quantitative design with the data being collected through the administration of questionnaires to a randomly selected sample size of 329 registered retail and consumer goods traders in Zambia. The sample size was determined using the Yamane formula and the data collected was analysed using statistical methods based on correlation and multiple regression analysis in Statistical Package for Social Sciences (SPSS). The findings indicate that the core constructs of the conceptual model that is based on an adapted Unified Theory of Acceptance and Use of Technology Model (UTAUT) and Theory of Perceived Risk (TPR) model significantly influences the behavioural intention of retail and consumer goods traders in adopting e-commerce for supply chain management. Performance Expectancy ($\beta = 0.261$, $p < 0.05$), Effort Expectancy ($\beta = -0.088$, $p < 0.05$), Social Influence ($\beta = -1.057$, $p < 0.05$), Perceived Risk ($\beta = -0.083$, $p < 0.05$) and Facilitating Conditions ($\beta = 0.201$, $p < 0.05$) have a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce for supply-chain management. The Pearson's product moment correlation (r) indicates that all five antecedents are negatively correlated with the dependent variable. The R-values for the antecedents, which are performance expectancy, effort expectancy and social influence, are -0.488, -0.662, and -0.892 respectively suggesting a strong relationship between the variables. Correlation values for perceived risk are -0.35 suggesting a medium strength and those for facilitating conditions are -0.242 suggesting a weak relationship. The limitation of this study lies in its geographical context as the survey was only targeted at retail and consumer goods traders operating in the catchment area of Lusaka, Zambia. The study also established an unexpected negative regression coefficient between social influence and behavioural intention to adopt e-commerce for supply chain management.

KEY WORDS: E-Commerce, Supply Chain Management, UTAUT, Theory of Perceived Risk (TPR)

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DEDICATION

To my father; Mr Vincent Ngwira for his vision and unforgotten sacrifice to give his children the platform to be the best they can be. May his soul rest in peace. My Mother; Luddy Ngoma Ngwira for her unconditional love and sacrifice, and my family; for giving me a reason to remain diligent and like my father before me, to do my absolute best in creating a platform for them to be the best they can be.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

UTAUT	- Unified Theory of Acceptance and Use of Technology
E-Commerce	- Electronic Commerce
SCM	-Supply Chain Management
PE	- Performance Expectancy
EE	- Effort Expectancy
SI	- Social Influence
FC	- Facilitating Conditions
BI	- Behavioural Intention
UNZA	- University of Zambia
ICT	- Information and Communication Technology
SPSS	- Statistical Package for the Social Sciences
B2B	- Business-to-Business
B2C	-Business-to-Consumer
SME	-Small and Medium Enterprise

CHAPTER 1

INTRODUCTION

1.1 Introduction

Digitalization in the logistics and supply chain management industry is of increasing strategic importance as it impacts established paradigms, business models and industry boundaries (Herold et al., 2021). The emergence of electronic commerce (e-commerce) has been a pivotal force, reshaping traditional supply chain management practices across various industries.

The concept of e-commerce is defined as the buying and selling of goods and services through computer networks (Shemi and Procter, 2018). This transformation is particularly noteworthy in the retail and consumer goods sector, where the integration of e-commerce into supply chain management practices has become increasingly vital for sustaining competitiveness. Supply chain management (SCM) involves the coordination of activities involved in the production and delivery of goods and services, from sourcing raw materials or inventory to delivering finished products to customers. Effective supply chain management is critical for businesses to meet customer demands, minimize costs, and optimize operations (Abtahi and Farhana, 2023). Companies in various industries have shifted to e-commerce to optimize market opportunities, increase efficiency and minimize costs (Toleuuly *et al.*, 2020).

The adoption of e-commerce in the context of supply chain management has emerged as a critical determinant of competitiveness and sustainability in today's globalized business environment (Herold *et al.*, 2021). Utilization of e-commerce for Supply chain management largely involves business-to-business models (B2B) which refers to a situation where one business makes a transaction with another business. Such trade is riskier as it involves larger volumes and the use of payment systems (Yu *et al.*, 2016a). Business-to-customer (B2C) models which refer to the type of commerce where businesses sell products, services, or information directly to individual consumers are a common form of commerce in retail, online shopping, and various service industries. B2C transactions are typically characterized by relatively smaller order sizes and a larger number of customers compared to Business-to-Business (B2B) transactions. The integration of e-commerce and supply chain management practices involves aligning and synchronizing key supply chain processes with e-commerce activities to create a seamless end-to-end flow. A supply chain is a network that consists of suppliers, manufacturers, warehouses, distributors and retailers who coordinate their plans and

activities in order to convert raw materials to finished goods (Marinagi *et al.*, 2014). One aspect of the integration would include centralized data management platforms (SCM software) integrated with e-commerce platforms which would allow for the provision of real-time visibility into inventory levels, order placement and e-payment statuses. E-commerce cannot exist without payment systems for any transaction to take place (Lesa and Tembo, 2016). A second aspect in the absence of SCM-e-commerce integrated software is the placement of orders online and the subsequent use of e-payment methods such as mobile money and e-banking to pay for the service. In both aspects, E-commerce adoption in supply chain management transforms traditional processes, ushering in a new era of efficiency and responsiveness as businesses are enabled to leverage real-time data to optimize inventory, streamline order fulfilment, and enhance customer experiences. This synergy enables end-to-end visibility, from online sales channels to logistics and distribution. Automated order processing, collaborative planning with suppliers, and data-driven decision-making contribute to a more agile and adaptive supply chain. As a result, the adoption of e-commerce in supply chain management not only improves operational effectiveness but also positions businesses to meet the dynamic demands of the modern market.

Developing countries are lagging in e-commerce adoption due to internet challenges, trust, and security issues about online trading and payment facilities (Hendricks and Mwapwele, 2023). E-commerce adoption in SMEs in developing countries is very slow compared to developed countries due to many barriers, such as IT infrastructure, level of economic, cultural, legal, social, IT skills among people, and postal infrastructure factors (Alrousan, 2016).

Zambia, like many other emerging economies, stands at the intersection of tradition and innovation, where conventional retail and consumer goods trading practices coexist with the potential of digital technologies. As the country experiences economic growth and increased connectivity, the adoption of e-commerce becomes a critical consideration for businesses aiming to optimize their supply chain processes and stay competitive in the global market. Supply chain digitalization significantly allows companies to streamline their activities via sustainable supply chain practices (Sarfraz *et al.*, 2023).

In 2021, the total number of active internet subscriptions in the country increased from 10.3 million subscriptions reported at the end of 2020 to 10.4 million recorded at the end of 2021 representing a growth of 1.3 percent (ZICTA, 2021). Despite the growing interest in leveraging digital technologies, the extent to which businesses in the retail sector have embraced e-

commerce within their supply chain operations, and the factors driving or inhibiting this adoption, remains largely uncharted territory in Zambia. Digital transformation of organizations fosters resilience, however, digital transformation of SMEs in sub-Saharan Africa has been slow (Achieng and Malatji, 2022).

The study therefore aims to investigate the factors affecting the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia based on the Unified Theory of Acceptance and Use of Technology (UTAUT) extended constructs. UTAUT and its constructs are a resultant model from cross-examination across models of individual acceptance whose intention was to improve the predictive powers of the behaviour of intentions to use technology (Paul et al., 2015). Comparative analysis of Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) against the UTAUT model lead to the selection of the UTAUT based on its predictive power. The TPR construct of Perceived Risk was further included to further increase the predictive power of the model. Applying the adapted UTAUT model in e-commerce and supply chain management contexts will help stakeholders gain insights into the core factors that contribute to successful technology adoption, design effective interventions, and address barriers to e-commerce adoption in SCM, ultimately enhancing the overall adoption and effectiveness of e-commerce in supply chain management initiatives.

1.2 Background to the Research

1.2.1 E-commerce adoption globally and in emerging markets

E-commerce (EC) has seen exponential growth globally, fuelled by increased internet penetration, smartphone usage, and improved online payment systems. Mobile devices such as smartphones connected to the internet can purposefully support supply chain management (SCM), from placing orders to delivering products, as well as making the associated payment decisions (Corinna *et al.*, 2015). Advances in online payment systems, including Internet banking and mobile money (e-wallets), have facilitated seamless and secure transactions. They provide customers with a variety of services which include; bill payments, balance enquiry, telegraphic transfers etc. (Daka and Phiri, 2019).

The adoption of internet-enabled systems is considered to be an important component of firms' supply chain operational strategy and according to estimations, internet technologies enabled 40% of all electronic business-to-business (B2B) transactions in the United States of America as far back as 2008 (Ismail, 2015).

There are also positive perspective projections for the future of Business to Business (B2B) EC in emerging economies (Mohtaramzadeh *et al.*, 2017). Internet usage in Sub-Saharan Africa (SSA) has increased considerably in recent years. Internet users in SSA countries have recorded a remarkable increase of almost 15922.0% in Ethiopia, 3677.0% in Kenya, 14704.0% in Nigeria, and 712.0% in Botswana between 2002 and 2015 (Ocloo *et al.*, 2020). In 2020, developing countries recorded a growth of 2.5 percent in internet subscribers, from 1.2 billion to 1.3 (ZICTA, 2021). Developing countries have witnessed a surge in e-commerce adoption as access to the internet becomes more widespread, creating new opportunities for businesses to reach untapped markets. The potential benefits of e-commerce to SMEs include cost reduction typically in procurement, communications, inventory holding and search activities; improved quality outputs and customer service, value-added information; and new levels of innovation from network externalities and knowledge sharing (Awa *et al.*, 2015).

E-commerce adoption however has been historically faced by several challenges in developing nations. As e-commerce transactions increase, so do threats. This cybersecurity concern surfaces because the information supplied online travels through many unsecured systems and stands the risk of being intercepted and/or misused (Awa *et al.*, 2015). Other cited challenges are related to logistics and the fulfilment of orders placed. The main obstacles are the complexity of the logistics network (Cichosz *et al.*, 2020). In emerging economies such as Nigeria, poor infrastructural facilities are the major factors hindering e-commerce adoption (Oluyinka *et al.*, 2013). Other findings in the African context identify the technological environment and customer trust as the main challenges affecting e-commerce adoption (Hendricks and Mwapwele, 2023). Fundamentally, these risks relate to information security and fraud in payment methods generally referred to as cyber-security risks (Toleuuly *et al.*, 2020).

1.2.2 Supply Chain Management in Zambia

SCM practices are defined as the set of activities undertaken by an organization to promote effective management of its supply chain. SCM has been defined to explicitly recognize the strategic nature of coordination between trading parties (Chileshe and Phiri, 2022). The adoption of e-payments for trade plays an important role for consumers and merchants in terms of making payments and providing payment information (Kilay *et al.*, 2022). In Zambia, It has been established that some of the challenges faced in SCM were due to unreliable lead times and non-adherence to service level agreements between buyers and suppliers (Milambo and Phiri, 2019a). Financial inclusion has also been cited as a challenge and according to the

Zambia Information and Communication Technologies Authorities (ZICTA) ICT Survey Report of 2015, the proportion of people in the Country cognizant of the availability of technological financial services and products was 45.9% (Daka and Phiri, 2019). As of 2021, the total number of active mobile money subscribers in the country increased from 8.6 million in 2020 to 9.8 million subscribers in 2021 representing a growth rate of 15 percent. The slow adoption rate, in Zambia, raises many questions about what influences the adoption of mobile payment services concerning trade (Lesa and Tembo, 2016).

1.3 Statement of the Problem

The problem identified is the low adoption of e-commerce for trade in developing countries and the study therefore seeks to research this phenomenon by investigating the factors influencing the adoption of e-commerce for supply chain management by retail and consumer goods traders in the Zambian context.

The adoption of e-commerce in developing countries is still lagging when compared to SMEs in developed countries (Rahayu and Day, 2015). An assessment of the Adoption and Usage of E-commerce by Insurance Firms in Zambia revealed that less than 25% offer online e-commerce options (Nyirenda and Nyirenda, 2023).

The adoption of e-commerce for supply chain management in Zambia presents a critical yet underexplored area of research. Several contextual gaps have been identified from past studies conducted on e-commerce adoption specific to various contexts. The difference between developing countries and developed countries is not only an economic but also political, environmental, social and cultural differences (Shehata and Montash, 2020) and despite the growing global significance of e-commerce in optimizing supply chain processes in developed countries, the factors influencing its adoption in the Zambian context remain insufficiently investigated.

This dissertation aims to address this gap by examining the unique socio-economic, technological, and infrastructural factors that either facilitate or hinder the integration of e-commerce into supply chain operations in Zambia based on an extended UTAUT model. By identifying and analyzing these factors, the study seeks to provide valuable insights for businesses, policymakers, and stakeholders to formulate informed strategies, fostering the successful integration of e-commerce into the Zambian supply chain landscape.

1.4 Research Aims

The study aims to investigate the factors influencing the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia.

1.5 Research Objectives

The research objectives and subsequent research questions provide a framework for investigating the factors influencing the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia.

The following are the research objectives:

1. To investigate the factors that influence the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia based on the modified UTAUT model

2. To provide insights and recommendations for retail and consumer business houses and policy-makers to enhance e-commerce adoption for supply chain management in Zambia based on the findings

1.6 Research Questions

The following are the associated research questions:

1. What are the factors that influence the adoption of e-commerce solutions for supply chain management by retail and consumer goods traders in Zambia?

2. What insights and recommendations can be derived from the study to enhance retail and consumer goods traders' e-commerce adoption in Zambia?

1.7 Significance of the Study

The significance of this dissertation lies in the investigation of the factors influencing the adoption of e-commerce for supply chain management in Zambia. As a developing economy, Zambia faces unique challenges and opportunities in leveraging digital technologies to enhance supply chain efficiency. Understanding the determinants of e-commerce adoption in the Zambian context holds substantial practical implications for businesses, policymakers, and stakeholders. The findings of this study can inform strategic decision-making, enabling businesses to overcome barriers, capitalize on facilitators, and optimize their supply chain

processes through the integration of e-commerce. Additionally, policymakers can utilize these insights to formulate targeted initiatives aimed at fostering a conducive environment for the successful adoption of e-commerce in the Zambian supply chain landscape, contributing to the overall economic development of the country.

1.8 Research Scope

The study focuses on investigating the factors that affect the adoption of e-commerce systems for supply chain management by retail and consumer goods traders within the geographic jurisdiction of Lusaka, Zambia. It relies on empirical evidence to support its findings and it shall utilize quantitative methods by administering questionnaires intended to gather primary data.

The study utilizes a modified Unified Theory of Acceptance and Use of Technology (UTAUT) model as a theoretical framework to understand e-commerce adoption by leveraging the four core constructs of the UTAUT model which include performance expectancy, effort expectancy, social influence, and facilitating conditions as adapted from a study conducted in Taiwan in which empirical data were collected using a cross-sectional survey involving 2,000 students from ten universities (Chao, 2019). An additional core construct (perceived risk) is adapted from the Theory of Perceived Risk.

1.9 Dissertation Layout

The dissertation is divided into six chapters as follows.

Chapter One covers the introduction to the dissertation and provides information on the background of the study. The statement of the problem is given, followed by the aim and objectives. The research questions, scope and significance of the study are also covered in this chapter.

Chapter Two documents the literature review section of the research. Existing literature on e-commerce adoption is reviewed including a more detailed introduction of the UTAUT model and its relevance to commerce adoption. The chapter concludes with gap identification and the rationale for the current study.

Chapter Three highlights the research methodology that was employed to carry out the study, discussing the design, population, data collection methods, techniques, and analysis. The proposed research method, hypothesis and ethical considerations are also covered;

Chapter Four presents the analysis of the collected data;

Chapter Five presents the discussion of research;

Chapter Six provides conclusions and recommendations based on the findings of the study.

1.10 Chapter Summary

The chapter provides a comprehensive examination of the contextual landscape of e-commerce adoption for supply chain management. It begins by outlining the introduction and background of the study and proceeds to highlight the problem statement as the low adoption of e-commerce for trade in developing countries. It further outlined the aim as investigating the factors influencing the adoption of e-commerce for supply chain management by retail and consumer goods traders in the Zambian context. It further highlighted the research objectives, questions, significance and scope of the study, which is to investigate the factors influencing the adoption of e-commerce for supply chain management in Zambia based on the modified UTAUT model.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review chapter critically examines existing research on the factors influencing the adoption of e-commerce for supply chain management. With the increasing global emphasis on digital transformation in supply chains, understanding the factors that facilitate or hinder the adoption of e-commerce is crucial for businesses and policymakers in Zambia.

The preceding chapter briefly introduced the concept of e-commerce and its growing importance in supply chain management and highlighted the focus of the research as the investigation of factors affecting the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia. The chapter further provided a comprehensive background of e-commerce adoption both globally and within developing nations and discussed the benefits, challenges, and trends associated with e-commerce adoption.

This chapter aims to present the literature on contextual antecedents of e-commerce adoption for SCM in Zambia, utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model as a theoretical framework. To date, limited research has been conducted on the contextual antecedents in the Zambian context and therefore, this literature review aims to bridge this gap by synthesizing and analysing existing literature in this area. The literature review shall be based on secondary sources of information which shall largely include journal articles and official published reports by recognizable institutions.

The structure of this literature review is divided into several sections which explore the definitions, frameworks, empirical evidence, literature limitations and suggestions to fill the knowledge gaps identified.

2.2 Literature Review Process and Justification

The literature review process involves systematically reviewing existing research and scholarly works relevant to the research topic. It is an essential step in the research process on e-commerce adoption for SCM as it helps identify the current state of knowledge, identify research gaps, and provide a theoretical foundation for this study.

The literature review process involves searching electronic databases such as Google Scholar and academic databases on the Zambian Library Consortium Library (ZALICO) such as JSTOR, Emerald Insight, Springer Link etc. using relevant key sentences related to the topic such as Supply Chain Management, e-commerce adoption and UTAUT. The search results are then reviewed and evaluated for relevance with information regarding the authors, key concepts, theories, methodologies, findings and gaps being recorded in the Literature Review Table. Over Eighty (80) journal articles were reviewed and referenced in the bibliography over a twelve (12) year period ranging from 2012 to 2024.

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2.3 Supply Chain Management Practices in Developing Countries

This section defines SCM and describes its constituents and applications. The perspective helps to justify the importance of understanding e-commerce adoption given the existing SCM processes.

A supply chain (SC) is a network that consists of suppliers, manufacturers, warehouses, distributors and retailers who coordinate their plans and activities to convert raw materials to finished goods (Marinagi *et al.*, 2014). Digitalization plays an increasing role in the Logistics and Supply Chain industry and numerous scholars have addressed and discussed its transformation potential for societies, economies and organizations (Herold *et al.*, 2021). Technology plays an essential role in improving the efficiency and effectiveness of supply chain management (Yu *et al.*, 2016b) and the main enablers of successful digitalization are flexibility, supply chain visibility, collaboration/coordination among supply chain partners utilizing communicative and cooperative relationships (Colicchia *et al.*, 2019).

In a systematic review conducted on sustainable supply chain management, results indicated that if a sustainable and digital transformation strategy is not developed and implemented, technology can pose a significant challenge for a firm (Sarfraz *et al.*, 2023). Other scholars in the field of SCM have also asserted that digitization is not a choice but an imperative for all businesses across all industries and that change is inevitable for business sustainability (Agrawal and Narain, 2018) (Odusina, 2022). The benefits of digitization have been documented to include improved communication, information sharing, cost reduction, smooth production flows, and shorter cycle times (Pulevska-Ivanovska and Kaleshovska, 2013). In Pakistan, a study on Adoption of Electronic Supply chain Management and E-commerce by

Small and Medium Enterprises and Their Performance established from the quantitative analysis of 210 SMEs that E-commerce and E-SCM adoption has a significant and positive influence on SMEs who have significantly higher average sales, growth rate, on-time order management and delivery processes than non-adopters.

Supply chain management practices in developing countries present themselves with challenges and opportunities, necessitating a nuanced understanding of the unique economic, social, and infrastructural contexts. In Saudi Arabia, a study established that the relationship between Supply Chain Management Practices and Supply Chain Performance in Saudi Arabian Firms is positively correlated. (Alahmad, 2021). Practices including SC Planning, Information Sharing, Customer Relationship Management and Supplier Relationship Management. A casual analysis of the impact of information systems and supply chain management practices on operational performance evidenced from Turkey established that supply chain management practices positively and significantly influence the operational performance of a firm. These findings are also supported by similar studies on the relationship between SC digitization and performance. (Almajali *et al.*, 2016) In a study investigating the impact of Electronic Supply Chain Management Usage on firm performance established that e-SCM usage has a significant positive and direct impact on performance. Other scholars, however, have found some of the practices to be insignificant in their contexts. A study on The Impact of Supply Chain Management Practices on the Performance of Small and Medium Enterprises in Developing Countries upon the analysis of p-values revealed that strategic supplier relationships, level and quality of information sharing influenced performance but Customer relationships were found to be insignificant (Chileshe and Phiri, 2022).

The often-limited infrastructure poses challenges to the seamless movement of goods, with fragmented and informal supply chains complicating standardization efforts. Resource constraints can impede the adoption of advanced technologies and the perceived risk creates an inertia to change diverge from traditional practices. Some developing countries have indicated a strong SC integration. Ethiopian large-scale manufacturing firms were found to be highly integrated internally via information systems and that enabled them to share up-to-date information within firms. A strong level of integration with downstream supply chain members in strategic partnership, and in sharing adequate and quality information was also found (Balda and Singh, 2020).

Supply chain management consists of different business activities, ranging from the purchasing of raw materials to vendor management. The primary focus points of the supply chain management functions are minimizing cost, improving service, increasing interaction among business partners, and providing flexibility in most of the supply chain activities, especially delivery and response systems (Tarofder, 2013).

2.4 Empirical Literature on Factors Influencing E-commerce Adoption in Developing Countries

E-commerce adoption in developing countries represents a transformative force with profound implications for economic growth and societal development. Developing countries, often characterized by vibrant informal economies, stand to benefit from the democratizing nature of e-commerce, providing opportunities for small businesses and entrepreneurs to access broader markets. The rise of mobile technology, coupled with expanding internet penetration, further accelerates the adoption of e-commerce platforms. There is a positive significant effect of ICT-driven relationships on a firm's competitive advantage of adopting e-business (Shehata and Montash, 2020).

Several factors influence the adoption of e-commerce, shaping the decisions of businesses and consumers to engage in online transactions. In a study on E-commerce Adoption in SME Retail Sector, it was established that issues related to e-commerce adoption for SMEs include technological factors (relative advantage, compatibility, complexity, security, ICT Infrastructure), Organizational factors (organizational readiness, owner support, financial capacity) and Environmental factors (competition, buyer pressure, external support) (Mohammad rahul amin, 2014). Other scholars have also collaborated on these findings. (Alrousan, 2016) established that E-commerce adoption factors are affected by technological innovation factors which determine owner/manager attitudes toward e-commerce adoption. These factors can vary across industries, regions, and individual circumstances. This section categorically provides empirical literature on influencing factors and serves to lay a theoretical foundation for the proceeding chapter on theoretical frameworks and conceptual models.

2.5 Technological Infrastructure:

Technological infrastructure plays a pivotal role in influencing the adoption of e-commerce for supply chain management (SCM). A systematic review of the factors influencing e-commerce

adoption in developing countries identified technology, environment, and customer trust as the main challenges affecting e-commerce adoption (Hendricks and Mwapwele, 2023). These assertions have been collaborated by findings from other studies such as a literature review on The State of Empirical Research on the Adoption and Diffusion of Business to Business E-commerce in which it was established that the factors affecting adoption included technological, organisational and inter-organisational (Ismail, 2015). Robust technological foundations, including reliable internet connectivity, advanced communication networks, and scalable IT systems, are essential for the seamless integration of e-commerce into supply chain processes. In the context of SCM, where real-time data exchange, inventory tracking, and order fulfilment are critical, a well-developed technological infrastructure ensures the efficient flow of information across the entire supply chain. Countries or regions with sophisticated infrastructure are better positioned to adopt e-commerce practices for SCM, facilitating quick and accurate decision-making, optimizing inventory levels, and enhancing overall supply chain visibility. Conversely, areas with limitations in technological infrastructure may face challenges in realizing the full potential of e-commerce in SCM, highlighting the importance of strategic investments and innovations in technological capabilities to unlock the transformative benefits of digital supply chain management.

Several studies have been conducted on the factors influencing e-commerce adoption based on various theories and contexts. (Sakala and Phiri, 2019) In a quantitative study involving 384 respondents on Factors Affecting the Adoption and Use of Mobile Banking Services in Zambia Based on the TAM Model concluded that there was a significant positive relationship between perceived ease of use, perceived usefulness, user attitude, external variables, user intention and system use. In another study based on the UTAUT model on Factors Driving the Adoption of E-banking Services Based on the UTAUT Model, the results from 313 respondents revealed that the UTAUT factors; performance expectancy (PE), effort expectancy (EE), facilitating conditions (FC) and behaviour intention (BI) have a significant impact in the adoption of e-banking services (Daka and Phiri, 2019). (Lesa and Tembo, 2016) A quantitative study on factors Affecting Mobile Payment Systems Diffusion in Zambia based on the TAM model concluded that Perceived Ease of Use (PEOU), Perceived Use (PU) and Social Norm (SN) had a significant and positive influence on the Behavioural Intention to Use e-commerce systems. The study further established that Perceived Cost (PC) and Perceived Risk (PR) were insignificant and negatively correlated.

Other scholars such as (Triandini *et al.*, 2013) established from a study based on the Innovation Diffusion theory that the Factors Influencing E-commerce Adoption by SMEs in Indonesia constituted Perceived usefulness, perceived ease of use, relative advantage, perceived risk, perceived trust and compatibility influence the adoption of e-commerce. Similar studies on Explaining the Adoption of transactional B2C mobile commerce also established from analysis of 202 sets of data that Perceived usefulness was found to be the most important factor for predicting the behaviour intention to adopt e-commerce. The literature on e-commerce adoption for supply chain management consistently underscores the foundational role of technological infrastructure in shaping the landscape of digital supply chains. (Kafile et al., 2023) in a study on Improving Last Mile Distribution Systems through the Internet of Things (IoT) established that IoT affects the cost and quality of last-mile distribution. The IoT integration with existing infrastructure enables seamless communication, proactive decision-making, and reduced delivery delays. Another quantitative study on E-commerce reiterated that technologies like Internet of Things (IoT), Big Data Analytics, and Cloud Computing would be possibly adopted in future to enhance the E-commerce logistics in terms of system level, operational level, and decision-making levels (Yu et al., 2016b).

2.6 Security and Privacy Concerns:

Security and privacy concerns constitute significant dimensions in the literature on e-commerce adoption for supply chain management. Supply chain risk management is a critical facet of modern business operations, recognizing the inherent vulnerabilities and uncertainties within global supply networks (Scannell *et al.*, 2013). Scholars consistently highlight the pivotal role of trust and confidence in fostering the uptake of e-commerce technologies within supply chains. Security considerations, encompassing the protection of sensitive data, financial transactions, and the overall integrity of information systems, emerge as critical determinants influencing the willingness of businesses to engage in digital supply chain practices. Privacy concerns, relating to the collection, storage, and use of personal and business-related information, further contribute to the hesitancy in adopting e-commerce for SCM.

Studies have shown that growth in e-commerce is accompanied by an increase in risk exposure (Toleuuly *et al.*, 2020). In a qualitative study conducted in Botswana on E-commerce and Entrepreneurship in SMEs based on the Theory of Contextualism, it was established that the factors that propelled e-commerce entrepreneurial activities included trust, commitment and innovativeness (Shemi and Procter, 2018). Another study on the Impact of Supply Chain Risks

and Supply Chain Risk Management Strategies on Enterprise Performance in Ghana revealed that enterprises with structures dedicated to risk management perform better (Ganiyu *et al.*, 2020). (Li and Huang, 2009) in a qualitative study involving 637 participants also established a negative relationship between perceived risks and perceived usefulness. A negative relationship between perceived risks and perceived ease of use is established. A similar study on E-Commerce Platforms in Developing Economies based on the Technology Acceptance Model (TAM) revealed that people's trust, enjoyment, and how well e-commerce fits with their habits play a significant role in their decisions.

2.7 Regulatory Environment:

The regulatory environment emerges as a critical theme in the literature on e-commerce adoption for supply chain management (SCM). (Balda and Singh, 2022) established that government regulation and legislation, pressures from competitors, and international standards are the major external driving forces. (Awiagah *et al.*, 2016) in a study on Factors affecting e-commerce adoption among SMEs in Ghana also established that Government and managerial support play a vital role in stimulating SME e-commerce adoption. Scholars emphasize that the regulatory landscape significantly influences the feasibility and pace of digital integration within supply chains. Clear and supportive regulations are identified as key drivers, providing businesses with a conducive framework to navigate legal complexities, enforce contracts, and safeguard against potential risks associated with e-commerce transactions. Conversely, ambiguous or restrictive regulations can act as impediments, hindering the seamless flow of goods and information. The research underscores the importance of a regulatory environment that not only addresses legal frameworks for digital transactions but also accommodates evolving technological trends. Scholars advocate for adaptive regulatory measures that balance the need for consumer protection with the imperative to foster an environment conducive to the innovative adoption of e-commerce practices in supply chain management. Findings from a study conducted in Malaysia on the SME retail sector indicate a significant influence of organizational and national readiness on the adoption of various EC technologies (Kurnia *et al.*, 2015). (Anas and Katsioloudes, 2015), in a study on the factors affecting e-commerce adoption by Jordanian SMEs also established that the effect of the adoption of e-commerce systems by SMEs is affected by both internal and external organizational factors, particularly readiness, strategy, managers' perceptions and external pressure by trading partners. Readiness and external pressure are most important for achieving maximum benefit from e-commerce adoption

2.8 Access to Smartphones and Devices:

Access to smartphones and devices emerges as a pivotal factor influencing e-commerce adoption for supply chain management. With the widespread penetration of mobile technology, particularly smartphones, the literature underscores the transformative impact of handheld devices on facilitating engagement with e-commerce platforms within supply chains. Studies consistently highlight that the ubiquity of smartphones enhances accessibility, enabling businesses and consumers to participate in digital transactions, order tracking, and real-time information exchange throughout the supply chain. Mobile-friendly interfaces and applications are identified as instrumental in overcoming barriers related to device constraints, empowering users to leverage e-commerce tools irrespective of their geographical location. (Ranganathan *et al.*, 2011) established that web-enabled SCM and performance impact were significantly related. In a similar study based on the technology-organizational-environment model, it was established that by diffusing web technologies, organizations could enhance their supply chain activities (Tarofder, 2013). The same author in a different study also established during an empirical Investigation of Internet Adoption in Supply Chain Management that Internet technologies contribute more to operational activities rather than strategic initiatives (Tarofder *et al.*, 2017).

2.9 Cultural and Social Factors:

Cultural and social factors also play a significant role in shaping the e-commerce adoption for supply chain management. Scholars highlight that societal attitudes, cultural preferences, and social dynamics profoundly influence the adoption and success of digital technologies within supply chains. In a quantitative study involving 315 participants and based on the TOE model on the Determinant Factors of Business to Business (B2B) E-Commerce Adoption in Small and Medium Sized Manufacturing Enterprises, it was established that Perceived desirability, organization readiness, and competitive pressure positively and significantly influence the different B2B e-commerce adoption levels (Ocloo *et al.*, 2020). (Mohammad *et al.*, 2016), in an empirical assessment of the antecedents of electronic-business implementation and the resulting organizational performance established that the effects of organizational factors (learning capabilities, knowledge management capabilities, adhocracy culture, and top management support) affect e-business implementation.

2.10 Logistics and Delivery Infrastructure:

The literature on e-commerce adoption for supply chain management also highlights the crucial role of logistics and delivery infrastructure. Scholars emphasize that the efficiency and reliability of transportation and delivery services are pivotal factors influencing the success of e-commerce within supply chains. Effective last-mile delivery, optimized transportation routes, and streamlined warehouse operations are essential components for the seamless integration of e-commerce in SCM. (Cichosz et al., 2020) in conducting a systematic literature review on Digital Transformation at Logistics Service Providers established that the main obstacles are the complexity of the logistics network and lack of resources, while the main success factor is a leader having and executing a Digital transformation vision, and creating a supportive organizational culture. (Islam *et al.*, 2023) in a study on Supply Chain Management and Logistics asserts that the interdependence between logistics and supply chain management serves as an enabler for company success in a complex global landscape with high demands. A study of electronic commerce adoption factors in Nigeria concluded that infrastructural facilities are the major factors hindering e-commerce adoption among Nigerians (Oluyinka *et al.*, 2013).

2.11 Marketplace Competition:

The level of competition among e-commerce platforms can influence adoption. A competitive marketplace often leads to innovations, better service offerings, and improved customer experiences. In a quantitative cross-sectional study conducted in Zambia on the Adoption of Social Media for SME Growth in the COVID-19 era based on the VT4-Framework, it was established from the analysis of 240 participant responses that there was a statistically significant relationship between social media adoption for e-commerce marketing and supply chain management and SME Growth (Kakumbi and Phiri, 2022). Results from a Study conducted in Zambia on Factors Hindering the Adoption of E-marketing among Cable Manufacturers based on the TAM model indicated after a mixed-method analysis of data collected from 51 organisations that age influences the perceived usefulness of technology. Frequency of use also positively influenced the perceived ease of use of technology and level of education did not influence perceived security (Mooya and Phiri, 2021).

2.12 Awareness and Education

The level of awareness and understanding of e-commerce benefits among businesses and consumers affects adoption rates. (Rahayu and Day, 2015) in a study on determining Factors of E-commerce Adoption by SMEs in Developing Countries established that perceived benefits, technology readiness, owners' innovativeness, owners' IT ability and owners' IT experience are the determinant factors that influence Indonesian SMEs in their adopting e-commerce. (Munafumpa and Phiri, 2023) in a study on Hindering the Adoption of the Customs Electronic Licensing System (CELS) by Clearing and Forwarding Agents in Zambia however dispelled the importance of education levels when it was established that age, gender, education level and attitude were not significantly associated with adoption. (Mlitwa and Raqa, 2012) asserts the need for awareness as a study done in the South African context E-commerce offerings are not well known. There is a lack of access to e-payment facilities and there is a fear of cyber crimes.

2.13 Economic Factors:

Economic conditions, including income levels and purchasing power, influence the propensity of consumers to engage in online transactions. (Almousa, 2013) maintains that barriers to E-commerce Adoption include high shipping costs, experience, language and payment systems. Affordability and value for money are critical considerations. A systematic literature review on the Digital transformation of small and medium enterprises in sub-Saharan Africa indicated after the review of 44 journal articles that themes that impeded the digital transformation of SMEs in the Sub-Saharan region included economy-based, market-based and sociotechnical contextual factors (Achieng and Malatji, 2022). These factors encapsulate a spectrum of issues ranging from economic instability and resource limitations to market inefficiencies and technological infrastructure deficiencies. Addressing these multifaceted barriers are pivotal for fostering effective strategies to facilitate the digital transformation of SMEs in Sub-Saharan Africa, thereby unlocking their full potential for growth, innovation, and socio-economic development. (Kilay *et al.*, 2022) propounds that in the Influence of E-payment and E-Commerce Services on Supply Chain Performance, there exists a positive and significant influence of both e-payment and e-commerce service variables on the performance of MSME supply. A study conducted in Zambia also asserts the positive correlation between relative economic advantage and adoption (Iluba and Phiri, 2021)

In an Iranian study on B2B E-Commerce Adoption in Iranian Manufacturing Companies, B2B commerce is affected by cost of adoption, top management support, competitive pressure, and government support (Mohtaramzadeh *et al.*, 2017). Economic factors not only impact the decision-making of businesses but also influence consumer behaviour, as purchasing patterns are often intricately linked to economic stability and disposable income. Results from a study based on the TAM model on how digitalization in Banking improves service Supply Chain Resilience of the E-Commerce Sector showed that the most critical driving factors are performance expectancy, e-cost effectiveness and Trust (Zaman *et al.*, 2023). Other scholars agree with this position and a study conducted in Indonesia affirmed this position as the findings of this study show that cost is the most important criterion with a degree of importance of 33.19%, followed by infrastructure of 29.40%, differentiation of 27.96% and sustainability of 9.45% (Febransyah *et al.*, 2020).

The integration of e-commerce into supply chain management (SCM) is increasingly recognized as a pivotal strategy for businesses seeking a competitive advantage. A study on the Impact of Information Technology on the Development of Supply Chain Competitive Advantage established that price/cost, quality, delivery dependability, product innovation, and time to market as the most decisive sources of competitive advantage (Marinagi *et al.*, 2014). (Abtahi and Farhana, 2023) asserts this finding in a Study on The Impact of E-Commerce Adoption for Enhancing Supply Chain Efficiency in Bangladesh where the findings reveal that increased efficiency, cost savings, and improved customer experience are the primary drivers for e-commerce adoption. However, resistance to change, lack of technical skills, and security concerns pose challenges to adoption. (Sagar, 2024), in a recent study also affirms that the challenges faced largely include technological adoption costs, Resistance to Change and Data Security Concerns.

2.14 Related Works and Gaps in the Literature

In the exploration of e-commerce adoption for supply chain management, the literature reveals a comprehensive body of related works, addressing various facets of this dynamic intersection. Researchers have extensively investigated technological infrastructures, security and privacy concerns, regulatory environments, cultural and social factors, logistics and delivery infrastructure, awareness and education, economic considerations, and competitive advantages associated with e-commerce adoption in SCM. These studies collectively contribute to a foundational understanding of the complexities and opportunities within this evolving landscape.

However, while significant strides have been made, there are notable gaps in the existing literature and addressing these gaps is critical for advancing the field, guiding policymakers, and providing practical insights for businesses operating in diverse and evolving economic landscapes.

Table 1: Literature Review and Gaps

No	Authors	Topic	Analysed sample	Findings	Theory used	Gap Identified
1	(Herold *et al.*, 2021)	The emergence and adoption of digitalization in the logistics and supply chain industry: an institutional perspective	10, qualitative	The findings of the study provide insights into the evolution of a digitalization logic and thus advance the institutional view on digitalization in the L&SC industry	Institutional Theory	The conceptual model depicts a few antecedents which may not represent all the enabling factors of the logistics and supply chain industry. A small sample size was established using non-probabilistic methods which affects

						the reliability of the study.
2	(Shemi and Procter, 2018)	E-commerce and entrepreneurship in SMEs	1, Qualitative	Factors that propelled e-commerce entrepreneurial activities included trust, commitment and innovativeness	Theory of Contextualism	A small sample size affects the reliability of the study. The study had a methodological limitation in that only one informant responded to the questionnaire.
3	(Achieng and Malatji, 2022)	Digital transformation of small and medium enterprises in sub-Saharan Africa: A scoping review	44 journal articles	The results indicate economy-based, market-based and sociotechnical contextual factors emerging as themes that impede the Digital Transformation of SMEs in the Sub-Saharan region.	systematic literature review	The systematic literature review explored only 12 articles with the context being generalized to the sub-Saharan region
4	(Kakumbi and Phiri, 2022)	Adoption of Social Media for SME Growth in the Covid-19 Era: A Case of SMEs in the Clothing Industry in	240, Quantitative	The study established that there was a statistically significant relationship between social media adoption for e-commerce,	VT4 Framework	The research is limited to SMEs in the clothing industry in the Zambian context and thus the results cannot be

		Lusaka, Zambia		marketing, SCM and SME growth		generalized to other contexts
5	(Cichosz *et al.*, 2020)	Digital transformation at logistics service providers: barriers, success factors and leading practices	9, Qualitative	The main obstacles are the complexity of the logistics network and lack of resources, while the main success factor is a leader having and executing a Digital transformation vision, and creating a supportive organizational culture	Literature Review	The research was conducted in the context of logistic service support
6	(Hendricks and Mwapwele, 2023)	A systematic literature review on the factors influencing e-commerce adoption in developing countries	Qualitative	findings identified technology, environment, and customer trust as the main challenges affecting e-commerce adoption.	Literature review	The inclusion criteria of literature limits the extent to which the results can be generalized to the Zambian context
7	(Sarfraz *et al.*, 2023)	Sustainable supply chain, digital transformation, and blockchain technology adoption in the tourism sector	23 peer-reviewed articles, qualitative	Results indicate that if a sustainable and digital transformation strategy is not developed and implemented, technology can pose a	Systematic literature review	The study focused on the tourism sector

				significant challenge for a firm		
8	(Mooya and Phiri, 2021)	Factors Hindering the Adoption of E-Marketing among Cable Manufacturers in Zambia, Based on Technology Acceptance Model (TAM)	51, mixed methods	The results indicated that age influences the perceived usefulness of technology. Frequency of use also positively influenced the perceived ease of use of technology. Level of education did not influence perceived security	TAM	The study was specific to traders of cables and only three cable manufacturers were considered resulting in a limited sample size.
9	(Sakala and Phiri, 2019)	Factors Affecting Adoption and Use of Mobile Banking Services in Zambia Based on TAM Model	384, quantitative	There is a significant positive relationship between perceived ease of use, perceived usefulness, user attitude, external variables, user intention and system use	TAM	The conceptual model had limited constructs which may result in some antecedents not being captured
10	(Milambo and Phiri, 2019b)	Aircraft Spares Supply Chain Management for the Aviation Industry in Zambia Based on the Supply Chain	100, qualitative	it was concluded that the Supply Chain Operations Reference (SCOR) Model can be	Supply Chain Operations Reference (SCOR) Model	The context is specific to the aviation industry and therefore cannot be generalized to represent

		Operations Reference (SCOR) Model		adopted to eliminate delays in the procurement and delivery of spare parts		other retail and consumer goods sectors
11	(Daka and Phiri, 2019)	Factors Driving the Adoption of E-banking Services Based on the UTAUT Model	313, qualitative	The results of the study revealed that the UTAUT factors; performance expectancy (PE), effort expectancy (EE), facilitating conditions (FC) and behaviour intention (BI) have a significant impact on the adoption of e-banking services	UTAUT	The method of sampling used non-probability sampling (purposive sampling) and the research was purely descriptive.
12	(Agrawal and Narain, 2018)	Digital Supply Chain Management: An Overview	Exploratory, undisclosed	Digitization is not a choice but an imperative for all businesses across all industries	Digital Supply Chain Framework	The study does not rely on empirical evidence
13	(Munafumpa and Phiri, 2023)	Hindering the Adoption of the Customs Electronic Licensing System (CELS) by Clearing and Forwarding Agents in Zambia	178 respondents	Age, gender, education level and attitude were not significantly associated with adoption. Perceived effectiveness, ICT skills, access to the	UTAUT	Low sample size

				internet, possession of electronic devices, and ease of use significantly affected adoption.		
14	(Campbell *et al.*, 2018)	Breaking the Ice in B2C Relationships: Understanding Pre-Adoption E-commerce Attraction	345 and 240 respondents from two empirical studies	Website design influences e-commerce attraction and adoption	e-commerce attraction model	The study adopted a survey approach and had a small sample size
15	(Son, 2018)	Supply Chain Risk Management: A Review of Thirteen Years of Research	Literature Review, 133	quantitative methods of simulation/ modelling are the most used by researchers to mitigate supply chain risks (SCR)	Risk Management Framework	Only articles published in English were considered which limits the scope and generalization
16	(Mlitwa and Raqa, 2012)	The Socio-Technical Dynamics of e-Commerce Adoption in the Mainstream Grocery Supermarkets in South Africa	.qualitative	E-commerce offerings are not well known. There is a lack of access to e-payment facilities and there is a fear of cyber crimes.	Activity Theory (AT)	Use of purposive sampling
17	(Balda and Singh, 2022)	Driving Forces towards the Adoption of Sustainable Supply Chain Management Practices: Empirical	420, Mixed Methods	major internal driving forces are social responsibility, interest to manage reputation and environmental	Sustainable Supply Chain Management	The scope of the study was limited to respondents from 4 major large-scale industry groups.

		Evidence from Manufacturing Industries in Ethiopia		-related risk, and desire to cut down costs, whereas; pressure from customers, government regulation and legislation, pressures from competitors, and international standards are the major external driving forces		
18	(Hasan, 2013)	Sustainable Supply Chain Management Practices and Operational Performance	Qualitative	SSCM practices have considerable effects on the environmental and operational performance of companies	Sustainable Supply Chain Management	Use of convenience sampling with the scope being limited to 5 companies
19	(Khan *et al.*, 2014)	Adoption of Electronic Supply Chain Management and E-commerce by Small and Medium Enterprises and Their Performance: A Survey of SMEs in Pakistan	210, Quantitative	E-commerce and E-SCM adoption have a significant and positive influence on SMEs who have significantly higher average sales, growth rate, on-time order management and delivery processes than non-adopters.	Innovation Diffusion Theory	The study was limited geographically to 3 cities in Pakistan

20	(Lesa and Tembo, 2016)	Study on Factors Affecting Mobile Payment Systems Diffusion in Zambia	152, Quantitative	Perceived Ease of Use (PEOU), Perceived Use (PU) and Social Norm (SN) had a significant and positive influence on the Behavioural Intention to Use (BIU). Perceived Cost (PC) and Perceived Risk (PR) were insignificant and negatively correlated.	Technology Acceptance Model (TAM)	The sample size was small and focused on an urban area of Lusaka affecting the generalization of results.
21	(Nyirenda and Nyirenda, 2023)	An assessment of the Adoption and Usage of E-commerce by Insurance Firms in Zambia	28 companies, qualitative	Actual levels of use are lower than adoption levels. Less than 25% offer online e-commerce options	UN-ASPA e-adoption framework	The scope of adoption is limited to insurance companies
22	(Ganiyu *et al.*, 2020)	The Impact of Supply Chain Risks and Supply Chain Risk Management Strategies on Enterprise Performance in Ghana.	210, Quantitative	Enterprises with structures dedicated to risk management perform better. Negative correlation between supply chain risk and performance.	Structural Equation Modelling (SEM)	Scope limited to the Ghanaian context

23	(Awiagah *et al.*, 2016)	Factors affecting e-commerce adoption among SMEs in Ghana	20, Quantitative	Government and managerial support play a vital role in stimulating SME e-commerce adoption. SMEs tend to adopt successful first-movers.	Theory of Perceived Behavioural Control (TPB)	This study examined e-commerce adoption through cross-sectional survey data, which does not permit the interpretation of causal inferences between constructs. The study also focused on the adoption decision and not its implementation. The study was further limited to 4 cities from Ghana's 10 regions and utilized purposive sampling which is non-probabilistic.
24	(Triandini *et al.*, 2013)	Factors Influencing E-commerce Adoption by SMEs Indonesia: A Conceptual Model	10, Literature review	Perceived usefulness, perceived ease of use, relative advantage, perceived risk, perceived trust and compatibility influence the adoption of e-commerce	Innovation Diffusion Theory	Few sources of secondary information were reviewed and the study did not base its results on quantitative empirical evidence.

25	(Alahmad, 2021)	The relationship between Supply Chain Management Practices and Supply Chain Performance in Saudi Arabian Firms	196 firms, Quantitative	SCMPs including SC Planning, Information Sharing, Customer Relationship Management and Supplier Relationship Management positively relate to SC performance.	SCOR	The study looked at SCM practices across various sectors. The study also geographically focused on 3 main regions of Saudi Arabia
26	(Kilay *et al.*, 2022)	The Influence of E-payment and E-commerce Services on Supply Chain Performance: Implications of Open Innovation and Solutions for the Digitalization of Micro, Small and Medium Enterprises (MSMEs) in Indonesia.	164, Quantitative	There exists a positive and significant influence of both e-payment and e-commerce service variables on the performance of MSME supply chains in Indonesia	Open Innovation	The population sample was obtained from regions of Indonesia
27	(Awa *et al.*, 2015)	Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs.	Conceptual study	The introduced constructs in the integrated framework (e.g. company mission, individual difference factors, perceived trust and perceived service quality) introduce	Conceptual Study based on the Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Technology - Organizatio n-	The proposed framework has not been empirically tested.

				socio-technical systems and improve the theoretical base of adoption	Environment (TOE)	
28	(Balda and Singh, 2020)	Level of Integration among Supply Chain Members in Moving Towards the Adoption of Sustainable Supply Chain Management in Ethiopian Manufacturing Industries	420, Quantitative	Large-scale manufacturing firms in Ethiopia were found highly integrated internally via information systems and that enabled them to share up-to-date information within firms. A strong level of integration with downstream supply chain members on strategic partnership, and in sharing adequate and quality information was also found. Integration of both supplier's and customers' involvement in environmental and social-related issues of SSCM was found weak.	Sustainable Supply Chain Integration	Data purposively collected from middle-level managers

29	(Khalifa and Ning Shen, 2008)	Explaining the Adoption of transactional B2C mobile commerce	202, Qualitative	Perceived usefulness was found to be the most important factor for predicting behaviour intention.	TAM, TPB	Future research needs to investigate the findings in different contexts and needs to review the relationship between intention and actual use.
30	(Anas and Katsioloudes, 2015)	The factors affecting e-commerce adoption by Jordanian SMEs	Mixed Methods, 500	The effect of adoption of e-commerce systems by SMEs is affected by both internal and external organizational factors, particularly readiness, strategy, managers' perceptions and external pressure from trading partners. Readiness and external pressure are most important for achieving maximum benefit from e-commerce adoption	TAM	The study is specific to the Jordanian Context

31	(Mohammad et al., 2016)	An empirical assessment of the antecedents of electronic-business implementation and the resulting organizational performance	Quantitative, 258	effects of organizational factors (learning capabilities, knowledge management capabilities, adhocracy culture, and top management support) affect e-business implementation	Unspecified	The study is specific to the Saudi Arabian Context Furthermore, this study did not test environmental factors and technological factors nor it did test all organizational factors and focused particularly on learning capabilities, knowledge management capabilities, adhocracy culture, and top management support
32	(Schramm-Klein and Wagner, 2014)	Broadening the Perspective on E-commerce: A Comparative Analysis of Mobile Shopping and Traditional Online Shopping.	402, Quantitative	Experience with the device had a significant effect on all tested variables. There was no significant impact of age. There is a significant difference between females and males concerning PE	TAM	An experimental design was utilised resulting in the overlooking of situational and contextual factors of actual shopping behaviour

33	(Daka and Phiri, 2019)	Factors Driving the Adoption of E-Banking Services Based on the UTAUT model	267, quantitative	PE, EE, and FC influenced the adoption whereas Social influence largely did not.	UTAUT	The use of non-probabilistic sampling (purposive) limits the generalizability of findings as the sample might not be a representation of the population. The research was purely descriptive
34	(Oluyinka *et al.*, 2013)	A study of electronic commerce adoption factors in Nigeria	150, quantitative	Poor infrastructural facilities are the major factors hindering e-commerce adoption among Nigerians. Other factors include lack of government support, poor socio-economic conditions	Innovation Diffusion Theory	Samples were derived from postgraduate students who may not be commerce-oriented.
35	(Chileshe and Phiri, 2022)	The Impact of Supply Chain Management Practices on the Performance of Small and Medium Enterprises in Developing Countries	151, quantitative	Analysis of p-values revealed that strategic supplier relationships, level and quality of information sharing influenced performance. Customer	Supply Chain Management Practices.	The study was focused on the performance of registered agro-dealers

				relationships were found to be insignificant.		
36	(Bayraktar *et al.*, 2009)	A casual analysis of the impact of information systems and supply chain management practices on operational performance: Evidence from manufacturing SMEs in Turkey	203 SMEs	both SCM and IS practices positively and significantly influence the operational performance of the sample firm	SCM and IS practices	Data was collected from single respondents in the organization
37	(Ranganathan *et al.*, 2011)	Web-enabled supply chain management: key antecedents and performance impacts	500 employees, Quantitative	All the hypothesized paths, from antecedents to the web-enablement of SCM activities, and the path between web-enabled SCM and performance impact were found to be significant ($p < 0.01$).	SEM	perceptual measures were used for assessing the performance. Single respondents were interviewed per company
38	(Iluba and Phiri, 2021)	The FinTech Evolution and its Effect on Traditional Banking in Africa – A Case of Zambia	267, Quantitative	Results indicated a strong positive correlation of 0.450 between relative advantage and adoption. Further, the	diffusion of innovation theory	Use of convenience sampling

				study shows that there is a strong positive correlation of 0.621 between Compatibility and Adoption		
39	(Almajali *et al.*, 2016)	The Impact of Electronic Supply Chain Management Usage on Firm's Performance	250, Qualitative	e-SCM usage has a significant positive and direct impact on performance. trust has a significant positive on e-SCM Usage (P = 0.003). communicatio n has a significant impact on e-SCM usage (P = 0.004). trust has a positive significant impact on performance (P = 0.002). Communicatio n has an insignificant impact on performance.	Conceptual, SEM	The study was limited to the Jordanian context
40	(Li and Huang, 2009)	Applying the Theory of Perceived Risk and Technology Acceptance Model in the Online Shopping Channel	637, Qualitative	a negative relationship between perceived risks and perceived usefulness is. A negative relationship between perceived risks and perceived	TAM, TPR	Most of the users were well-versed in the use of information technologies

				ease of use is established. A significantly positive relationship between perceived usefulness and behavioural intention. a positive relationship between perceived ease of use and behavioural intention is confirmed. A positive relationship between perceived ease of use and perceived usefulness is established. a significantly positive relationship between behavioural intention and actual purchase behavior is accepted		
41	(Mohammad rahul amin, 2014)	E-commerce Adoption in SME Retail Sector: A Conceptual Model	Descriptive	Issues related to e-commerce adoption for SMEs include technological factors (relative advantage, compatibility, complexity, security, ICT	Technology - Organization- Environment	The study proposed a model and did not empirically establish the validity of the model.

				Infrastructure), Organizational factors (organizational readiness, owner support, financial capacity) and Environmental factors (competition, buyer pressure, external support)		
42	(Wu *et al.*, 2023)	Research on E-commerce Inventory Demand Forecasting Based on NAR Neural Network	Quantitative, 43 inventory products	The NAR neural network prediction method has better prediction accuracy and precision compared with the traditional AR model	NAR Network	The model cannot make an accurate description of the complex environment with multiple influencing factors and needs to consider the uncertainty and dynamic factors in the actual operation of enterprises for more comprehensive and accurate inventory demand forecasting
43	(Islam *et al.*, 2023)	Supply Chain Management and Logistics: How Important Interconnection is for Business Success	Literature Review, 75 articles, 12 industry reports, 5 policy documents and 20	this report asserts that the interdependence between logistics and supply chain management serves as an	Supply Chain Operations Reference Model	The study is descriptive and relies on existing data that may not comprehensively address the

			other relevant publications	enabler for company success in a complex global landscape with high demands		challenges faced by organizations
44	(Odusina, 2022)	Supply Chain Management: Empirical Case Study of a Small-Scale Manufacturing Company in Nigeria	Quantitative, 75 companies, 188 responses	change is inevitable for the business sustainability	Supply Chain Operations Reference Model	This research work is limited to the small-scale manufacturing sector in developing countries in Africa
45	(Pulevska-Ivanovska and Kaleshovska, 2013)	Implementation of e-Supply Chain Management	Descriptive	Benefits of E-SCM include improved communication, information sharing, cost reduction, smooth production flows, shorter cycle times	Supply Chain Operations Reference Model	The paper does not review advancements in mobile technology and payments and the associated risks. The paper's conclusions are also not empirically supported.
46	(Almousa, 2013)	Barriers to E-commerce Adoption: Consumers Perspectives from a Developing Country	Exploratory, 273	Barriers identified include high shipping costs, experience, language and payment systems.	Grounded theory??	The paper's conclusions rely on descriptive statistics

47	(Yu *et al.*, 2016a)	E-commerce Logistics in Supply Chain Management: Practice Perspective	Qualitative, 5	IT Technology plays an essential role in improving the efficiency and effectiveness of supply chain management	Grounded theory??	The paper focuses on e-commerce logistics for developed companies in developed countries
48	(Mohtaramzadeh *et al.*, 2017)	B2B E-Commerce Adoption in Iranian Manufacturing Companies: Analysing the Moderating Role of Organizational Culture	Quantitative, 320	B2B commerce is affected by the cost of adoption, top management support, competitive pressure, and government support. Organizational culture is negatively related to management support and B2B E-commerce adoption.	Technology Organization Environment (TOE)	The context of the study was Iran which affects the generalization of results.
49	(Ocloo *et al.*, 2020)	The Determinant Factors of Business-to-Business (B2B) E-Commerce Adoption in Small and Medium-Sized Manufacturing Enterprises	Quantitative, 315	Perceived desirability, organization's readiness, and competitive pressure positively and significantly influence the different B2B e-commerce adoption levels. Likewise, top	Technology Organization Environment (TOE)	The context of the study was Ghana which affects the generalization of results.

				management support and government support partially had a significant impact on the various levels of B2B e-commerce adoption, whereas the business partner's pressure has no significant influence on B2B e-commerce adoption levels.		
50	(Ismail, 2015)	The State of Empirical Research on the Adoption and Diffusion of Business to business-to-business e-commerce	Literature Review, 197	Factors affecting adoption include technological, organisational, inter-organisational, and technological factors	Various Innovation Diffusion Theory, TOE Framework, Institutional theory, transaction cost theory	Studies lacked the use of empirical evidence and they could also examine factors that inhibit adoption and diffusion since most studies focus on factors that facilitate them
51	(Scannell *et al.*, 2013)	Integration of ISO 31000: 2009 and Supply Chain Risk Management	Survey, 58 firms	Factors influencing SCM performance satisfaction include logistics and delivery reliability, meeting customer	ISO 31000: 2009	The research relied on purposive sampling methods

				service levels, supplier reliability and continuous supply, defect-free delivery, after-sales performance, inventory management, reduced SC disruptions, reduced materials price volatility and lower commodity prices		
52	(Tarofder, 2013)	Web Technology in Supply Chain: An Empirical Investigation	Qualitative, 251	The results show also that by diffusing web technologies, organizations can enhance their supply chain activities	technology-organizational-environment model	The survey was conducted in a Malaysian context, using a limited set of variables, thus limiting the generalizability of the finding
53	(Corinna *et al.*, 2015)	Analysing the Diffusion of a mobile service supporting the e-grocery supply chain	Survey, 20 producers, 20 retailers, 20 consumers	The efficiency and reliability of the service drive its diffusion among producers and consumers, who in turn persuade retailers to adopt	innovation diffusion and an inventory management framework	The sample size was relatively small and the focus was on a purposively selected population which deals in fresh food.

54	(Corinna *et al.*, 2017)	E-Grocery Supply Chain Management Enabled by Mobile Tools	Experimental/ Simulation	The three services drive the diffusion of the application. A high level of real-time information brings decreased inventory levels and more frequent order placing, leading to an increased number of logistics transactions managed by the mobile application and growth in the associated revenue for the service provider company	System Dynamics model	The proposed study fosters research on overcoming the barriers that prevent integration, collaboration, and better visibility in e-grocery SCs
55	(Shehata and Montash, 2020)	Driving the Internet and E-business Technologies to Generate A Competitive Advantage in Emerging Markets: Evidence from Egypt	Quantitative, 302	There is a positive significant effect of ICT-driven relationships and env on a firm's competitive advantage of adopting e-business	B2C	The study was conducted in the Egyptian context which affects the generalization of the results
56	(Zaman *et al.*, 2023)	How Digitalization in Banking Improve Service Supply Chain Resilience of E-	Qualitative, 5 experts	The results show that the most critical driving factors are performance expectancy, e-	TAM, Technology Readiness Index (TRI)	The survey relied on purposive sampling from a pool of industry experts

		Commerce Sector. A technological Adoption Model Approach		cost effectiveness and "Trust		
57	(Febransyah *et al.*, 2020)	Measuring the Supply Chain Competitiveness of the E-Commerce Industry in Indonesia	Qualitative, 7 experts	The findings of this study show that cost is the most important criterion with a degree of importance of 33.19%, followed by infrastructure at 29.40%, differentiation at 27.96% and sustainability at 9.45%.	The Analytic Hierarchy Process	the authors limited their study to the business-to-business (B2B) and business-to-consumer (B2C) players
58	(Alrousan, 2016)	A Conceptual Model of Factors Affecting E-Commerce Adoption by SME Owners/Managers in Jordan	Quantitative, 200	E-commerce adoption factors are affected by technological innovation factors which determine owner/manager attitudes toward e-commerce adoption, organisational factors, environmental factors, and owner/manage	technology acceptance model, theory of reasoned action, technology-organisation environment, diffusion of innovation and Hofstede's cultural dimensions	The study is specific to the Jordanian context which affects the generalizatio n of results

				r characteristics .		
59	(Sagar, 2024)	The Impact of Digital Transformation on Retail Management and Consumer Behaviour	Qualitative, 4	Challenges faced include technological adoption costs, Resistance to Change and Data Security Concerns	Omni-Channel Retailing, Data-Driven Decision Making, IoT	The case studies of Amazon, Starbucks, Walmart, and Zara offer a Limited view of the diverse strategies employed by retailers to navigate the digital transformation landscape. Relatively small sample size
60	(Kafile *et al.*, 2023)	Improving Last Mile Distribution Systems Through the Internet of Things: A South African Case	Quantitative, 179	IoT affects the cost and quality of last-mile distribution. The IoT integration with existing infrastructure enables seamless communication, proactive decision-making, and reduced delivery delays	IoT	The study relies on samples collected purposively from distribution companies in South Africa. The results also relied on descriptive statistics.

61	(Caldwell *et al.*, 2014)	Impact of E-Business on Perceived Supply Chain Risks	Qualitative, 29 organizations	This research finds that small firms (SMEs) adopted a "watching brief" rather than implemented e-business	Risk Management Framework	The cases were based on UK supply chains which limits generalization
62	(Colicchia *et al.*, 2019)	Managing Cyber and Information Risks in Supply Chains: Insights from an Exploratory Analysis	Qualitative, 5 multinational companies	Cyber and Information Risks are mitigated by organizational initiatives, training, compliance, data management, event management, IT Operational resilience	Risk Management Framework	The study focused on Multinational companies with headquarters or a branch in the UK and the results therefore are controlled for factors such as culture, language, legal system and economic environment
63	(Lu and Liu, 2015)	Effects of e-commerce channel entry in a two-echelon supply chain: A comparative analysis of single- and dual-channel distribution systems	Exploratory, 2 distribution channels	Several factors, including the efficiency improvement of third-party logistics companies and rapid developments in e-commerce platforms, have prompted several manufacturers to consider adopting the e-	simple deterministic linear demand model for	Researchers only considered a Stackelberg game on prices. Thus, extending the analysis to a Nash game or Bertrand game is another interesting avenue for this study

				commerce channel		
64	(Marinagi *et al.*, 2014)	The Impact of Information Technology on the Development of Supply Chain Competitive Advantage	Quantitative, 76 manufacturing firms (300 respondents)	price/cost, quality, delivery dependability, product innovation, and time to market as the most decisive sources of competitive advantage	ERP	The cases were based on Greek supply chains which limits generalization
65	(Ji *et al.*, 2020)	Enhancing Consumer Trust in Short Food Supply Chains	Quantitative, 3 agri-businesses (15 respondents)	It is revealed that the companies innovatively adopted social commerce, both online and offline, to overcome the trust problems usually faced by e-commerce companies. It is also shown that offline contact with potential consumers is an important first step	Short food supply chain and trust	Since the findings are from Chinese agribusiness e-commerce companies, the generalization to other sectors must be done with caution

66	(Abtahi and Farhana, 2023)	A Study on The Impact of E-Commerce Adoption for Enhancing Supply Chain Efficiency in Bangladesh SMEs	Qualitative, 15	The findings reveal that increased efficiency, cost savings, and improved customer experience are the primary drivers for e-commerce adoption. However, resistance to change, lack of technical skills, and security concerns pose challenges to the adoption	Exploratory	The findings on the factors affecting adoption are based on the context of Bangladesh. Secondly, the study focused on entities that had already adopted e-commerce in supply chain management.
67	(Kurnia *et al.*, 2015)	E-Commerce Technology Adoption: A Malaysian Grocery SME Retail Sector Study	Quantitative,180	Findings indicate a significant influence of environmental pressure on the adoption of various EC technologies. Organizational and national readiness have different influences across diverse EC technologies, while the influence of industry readiness is shown to be insignificant	Diffusion of Innovation Theory, National Institutional Perspective Theory,	Selection of SMEs is based on personal contacts or association with the local Malaysian university where one of the academic team members was based

68	(Yu *et al.*, 2016c)	E-Commerce Logistics in Supply Chain Management: Implementations and Future Perspectives in Furniture Industry	Quantitative, 6 multinational furniture distributors	technologies like the Internet of Things (IoT), Big Data Analytics, and Cloud Computing would be possibly adopted to enhance E-commerce logistics in terms of system level, operational level, and decision-making level that	Logistics Model	The paper relies on the use of descriptive statistics
69	(Zhang *et al.*, 1848)	Examining the Supply Chain Management Models for Agricultural Products Under the Context of E-Commerce	Quantitative	If the supply chain of agricultural products can be more flexible and efficient, the turnover of products will be higher	Support Vector Machine (SVM)	The paper relies on indexes from the Coordination Decision Centre specific to China which affects the generalization of the model in other contexts
70	(Tarofder *et al.*, 2017)	Operational or Strategic Benefits: Empirical Investigation of Internet Adoption in Supply Chain Management	Quantitative, 236	Internet technologies contribute more to operational activities rather than strategic initiatives	Diffusion of Innovation Theory	The study is specific to the Malaysian Context

71	(Rahayu and Day, 2015)	Determinant Factors of E-commerce Adoption by SMEs in Developing Country: Evidence from Indonesia	Quantitative, 292	perceived benefits, technology readiness, owners' innovativeness, owners' IT ability and owners' IT experience are the determinant factors that influence Indonesian SMEs in their adopting e-commerce	TOE Framework	The study is specific to the Indonesian Context
72	(Hossain *et al.*, 2023)	E-Commerce Platforms in Developing Economies: Unveiling Behavioral Intentions through Technology Acceptance Model (TAM)	Quantitative, 260	people's trust, enjoyment, and how well e-commerce fits with their habits play a significant role in their decisions	TAM	The study is specific to the Indian Context and convenient sampling was used which is probabilistic

The chapter has reviewed and included a comprehensive range of theories to address the contextual antecedents of e-commerce adoption for supply chain management. The UTAUT and its constructs are a resultant model from cross-examination across models of individual acceptance whose intention was to improve the predictive powers of the behaviour of intentions to use technology (Paul et al., 2015). Comparative analysis of Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) against the UTAUT model lead to the selection of the UTAUT based on its predictive power. The TPR construct of Perceived Risk was further included to further increase the predictive power of the model.

Methodological variations in reviewed studies on e-commerce adoption included differences in research design, data collection methods, sample size, geographical scope, and analytical techniques. Our chosen methodology is designed to address these variations by leveraging on

a quantitative approach and utilising a diverse representative sample and use of advanced analytical techniques.

2.15 Theoretical Framework

The theoretical framework provides the overarching theoretical perspective and context for the study. Technology adoption theories serve as cornerstones in understanding the dynamics and patterns associated with the uptake of technological innovations. The chapter delves into well-established models such as the Technology Acceptance Model (TAM) (Davis, 1989), the Theory of Perceived Risk (TPR), the Theory of Planned Behaviour (TPB) (Ajzen, 1991)and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, n.d.). These theories provide a lens through which the research shall analyse and interpret the factors influencing the adoption of specific technologies within the context of the study.

2.15.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a widely used theoretical framework that explains and predicts users' acceptance and adoption of information technology. TAM is a theoretical framework for studying how perceived usefulness (PU) and perceived ease of use (PEU) of new technology affect its acceptance (Alami and El Idrissi, 2022).

The TAM posits that users' intentions to adopt and use technology are determined by two main factors which are perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness refers to the user's belief that the technology will enhance their performance or productivity, while perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort (Kanwal and Rehman, 2017). These two factors are influenced by external variables such as social influence, facilitating conditions, and individual characteristics.

TAM has been widely applied in different research contexts, including e-commerce, to understand and predict users' acceptance of technology. Researchers have used TAM to examine factors influencing e-commerce adoption, such as trader's perceptions of the usefulness and ease of use of e-commerce platforms, the influence of social norms and peer influence, and the impact of technological infrastructure on adoption. Some scholars have also found perceived ease of use to be of significance and have also found that facilitating conditions such as appropriate hardware and software are equally significant (Himoonga and Phiri, 2020). Other scholars such as (Sannegadu *et al.*, 2018) have also supported the argument that

Perceived Usefulness (PU) and Perceived Ease of Use (PEoU) are the predominant antecedents of technology adoption and that they determine the intention to use through attitude.

The acceptance of technology however not only depends on the factors such as PU and PEoU but also various internal and external factors. For example, personal factors such as perception of interaction, cognitive absorption, escape mechanism, cognitive age, etc. play vital roles in determining the use of technology. In addition to this, the environment of an individual such as culture, surrounding conditions, the social network, etc. is pivotal in determining the use of technology (Panigrahi *et al.*, 2018).

2.15.2 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is a social psychological theory that explains and predicts human behaviour, particularly in the context of decision-making and goal-directed actions. The theory is supported by empirical evidence that purports that Intentions to perform behaviours of different kinds can be predicted with high accuracy from attitudes toward the behaviour, subjective norms, and perceived behavioural control; and these intentions, together with perceptions of behavioural control, account for considerable variance in actual behaviour (Ajzen, 1991).

Attitude refers to the individual's positive or negative evaluation of the behaviour. It reflects their beliefs about the outcomes or consequences associated with the behaviour. Subjective norm refers to the influence of others in determining an individual’s adoption and use of technology (Hamiza et al., 2020)

Perceived behavioural control represents the individual's perception of the ease or difficulty in performing the behaviour. It incorporates factors such as self-efficacy, perceived resources, and situational constraints that can influence one's ability to engage in the behaviour (Ajzen, 1991).

Research conducted based on this perspective has revealed that attitude and usefulness of a system are essential for adoption while the experience and satisfaction in the environment lead to continuation intention to use the system. The three constructs of attitude, subjective norms and perceived behavioural control contribute to the formation of behavioural intentions, which in turn guide actual behaviour.

2.15.3 Theory of Perceived Risk (TPR)

The Theory of Perceived Risk, rooted in consumer behaviour literature, addresses the uncertainties and concerns individuals associate with adopting new technologies. Perceived risk is defined as the consumer's subjective expectation of suffering a loss in pursuit of a desired outcome (Lesa and Tembo, 2016). Perceived risks encompass various dimensions, including financial risk, performance risk, and privacy risk. These risk perceptions can act as barriers to technology adoption. While consumers perceive risk in most purchasing decisions, non-store purchasing decisions tend to have a higher level of perceived risk associated with them. Supply chain risks are generally associated with the probability of loss damage or undesired outcomes (Ganiyu *et al.*, 2020). Several types of perceived risk have been widely used in previous research for instance financial risk which is the potential monetary loss that a customer may encounter and convenience risk which stands for the additive problematic inconveniences that the customer may encounter during purchase (Li and Huang, 2009). Performance risk which is the likelihood that the product performs as expected and social risks which are considered to be the perceptions of significant others are catered for under the UTAUT model. Studies have indicated that perceived risk would negatively influence perceived usefulness (Li and Huang, 2009).

2.15.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a theoretical framework that explains and predicts users' acceptance and adoption of information technology. UTAUT and its constructs are a resultant model from cross-examination of technology acceptance models whose intention was to improve the predictive powers of the behaviour of intentions to use technology (Kasse John Paul *et al.*, 2015). UTAUT integrates and extends several existing technology acceptance models, including the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Social Cognitive Theory (SCT). Based on a systematic analysis and comparison of the aforementioned models, (Venkatesh *et al.*, n.d.) proposed an integrated model, namely the UTAUT model, which can explain 70% of the variance in user intention. The results of that empirical study demonstrated that the UTAUT model is the most effective model for analyzing technology acceptance.

UTAUT identifies four key factors that influence technology acceptance and use.

Performance Expectancy is defined as the degree to which individuals believe that using a particular technology will improve their performance or productivity. Effort Expectancy is the degree of ease associated with the use of the system (Chao, 2019).

Social Influence is the impact of social factors such as subjective norms, social norms, and influence from significant others on an individual's intention to use the technology. Facilitating Conditions are the degree to which individuals perceive that the necessary technological infrastructure, support, and resources are available to facilitate the use of the technology (Venkatesh *et al.*, n.d.). UTAUT has been widely applied in various research contexts to understand technology acceptance and adoption as it provides a comprehensive framework that considers not only individual beliefs and perceptions but also social and contextual factors that can influence technology adoption. It is this predictive power that justifies the choice of model for this study.

2.15.5 Supply Chain Operation Reference Model

The Process reference model integrates the well-known concepts of business process re-engineering, benchmarking and process measurement into a cross-functional framework as shown (Milambo and Phiri, 2019b). The Model Contains a standard description of management processes, a framework of relationships among the standard processes, standard metrics to measure process performance and management practices that produce best-in-class performance. The relevance of the SCOR model in this study is to provide a standardised framework for assessing supply chain processes and aligning them with business objectives and identifying areas of improvement in e-commerce adoption. Incorporating SCOR's risk management practices enables businesses to identify e-commerce-related risks such as cybersecurity threats, logistics complexities, and supply chain disruptions.

2.16 Proposed Conceptual Framework

Comparative analysis of Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) against the UTAUT model lead to the selection of the UTAUT based on its predictive power. The TPR construct of Perceived Risk was further included to further increase the predictive power of the model.

The Unified Theory of Acceptance and Use of Technology model (UTAUT) and Theory of Perceived Risk (TPR) were adapted into the proposed model based on the reviewed theories and prior literature. UTAUT integrates various existing theories to provide an extensive understanding of the factors influencing the individual's acceptance and use of technology whereas TPR explores how individuals assess and perceive risks associated with decision-making, particularly in the context of purchasing or adopting a product or service. The current research model proposes an extension of the UTAUT model to account for perceived risk. In the conceptual model, Behavioural Intention to Adopt E-commerce (BI) is influenced by Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC) and Perceived Risk (PR).

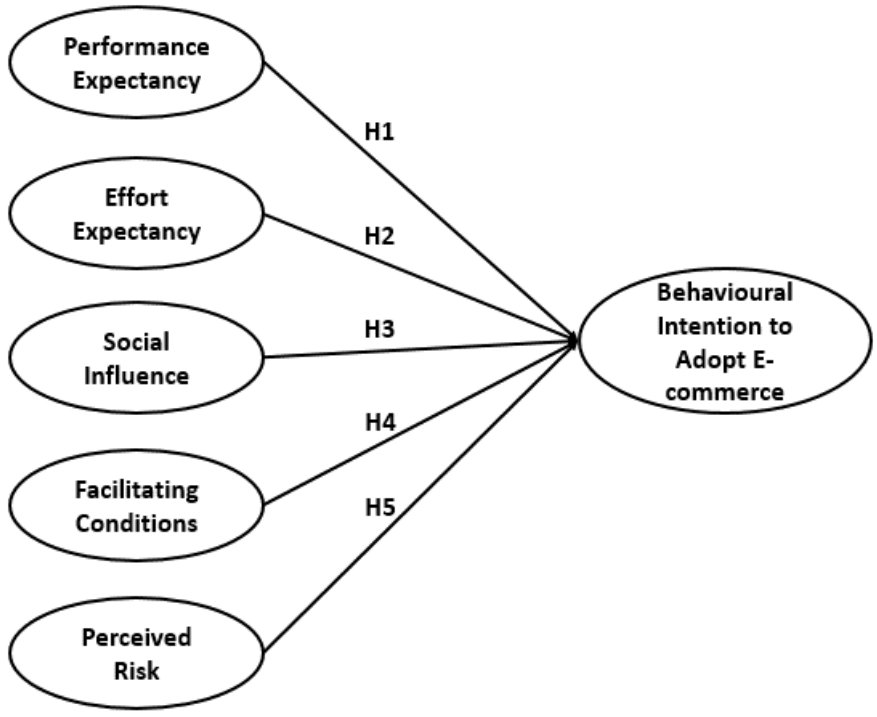


Figure 1: Adapted Conceptual Framework Source:(Chao, 2019)

2.17 Research Hypotheses

The following hypotheses are based on the established and expected associations between the variables of the conceptual framework:

H1: Performance Expectancy has a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

Ho: There is no significant relationship between Performance Expectancy and Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

H2: Effort Expectancy has a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

Ho: There is no significant relationship between Effort Expectancy and Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

H3: Social Influence has a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

Ho: There is no significant relationship between Social Influence and Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

H4: Facilitating conditions have a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

Ho: There is no significant relationship between Facilitating Conditions and the Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

H5: Perceived Risk has a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

Ho: There is no significant relationship between Perceived Risk and Behavioural Intention of retail and consumer goods traders to adopt e-commerce systems.

2.18 Operationalisation of the variables

Operationalization involves assigning specific definitions to a concept to allow it to be quantified. The details of the variables in the model and how they relate to the study are as follows:

Performance expectancy (PE) – independent, continuous;

Performance expectancy ("PE" hereafter) is the degree of ease associated with the use of the system. Behavioural Intention ("BI" hereafter) is the degree to which a person has formulated conscious plans regarding whether to perform a specified future behaviour (Chao, 2019). PE influences BI and if the user has a high PE then it will have a positive impact on the user and create a positive BI to use the technology.

Empirically, prior studies have indicated that PE is a significant antecedent of positive BI to use an e-system. A study conducted in the United States based on the UTAUT 2 model looking at factors affecting the adoption of e-systems in Qatar a developing nation and the USA a developed country, revealed that performance expectancy, hedonic motivation, habit and trust are significant predictors of behavioural intention (BI) (Fathema *et al.*, 2015).

Effort expectancy (EE) – independent, continuous

Effort Expectancy ("EE" hereafter) is the degree of ease associated with the use of the system (Tarhini *et al.*, 2017). EE influences BI and if the user has a low EE then it will have a positive impact on the user and create a positive BI to use the technology. Empirically, prior studies have indicated that EE is a significant antecedent of positive BI to use e-systems. In the United Kingdom (UK), a study on Factors influencing students' adoption of e-systems based on the UTAUT 2 model analysed responses from 366 participants and the findings revealed that behavioural intention (BI) was significantly influenced by effort expectancy. (Tarhini *et al.*, 2017).

Social Influence (SI) – independent, continuous

Social Influence ("SI" hereafter) is described as societal pressure that forces an individual to perform or not perform an action (Akbar, 2021). SI influences BI and if the user has a high SI then it will have a positive impact on the user and create a positive BI to use the technology. Empirically, prior studies have indicated that SI is a significant antecedent of positive BI to use an e-system.

(Tarhini *et al.*, 2017), in a study on Factors influencing students' adoption of e-systems based on the UTAUT 2 model and using a structural equation modelling approach investigated responses from 366 participants and the findings revealed that behavioural intention (BI) was significantly influenced by social influence.

Facilitating Conditions (FC) – independent, continuous

Facilitating Conditions ("FC" hereafter) are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Zaman *et al.*, 2013). FC influences BI and if the user has favourable FC then it will have a positive impact on the user and create a positive BI to use the technology. Empirically, prior studies have indicated that FC are significant antecedent of positive BI to use an e-commerce system. Research conducted in Sri Lanka investigating factors that influenced

students' intention to adopt systems based on the UTAUT model indicated that performance expectancy, effect expectancy and facilitation conditions were the important factors that influenced students' intention to adopt e-systems (Zaman *et al.*, 2013).

Perceived Risk (PR) – independent, continuous

The Theory of Perceived Risk, rooted in consumer behaviour literature, addresses the uncertainties and concerns individuals associate with adopting new technologies. Perceived risk is defined as the consumer's subjective expectation of suffering a loss in pursuit of a desired outcome (Lesa and Tembo, 2016).

In the context of e-commerce adoption, perceived risk encompasses various dimensions such as financial risk, security risk, performance risk, and social risk. These perceived risks can significantly influence decision-making processes among businesses, especially in emerging markets like Zambia. Financial risk relates to concerns about the cost implications of adopting e-commerce technologies and the potential return on investment. Businesses may hesitate to invest in e-commerce if they perceive a high financial risk associated with implementation and maintenance costs. Security risk refers to fears regarding the security of online transactions, data privacy, and cybersecurity threats. Businesses may be reluctant to adopt e-commerce for supply chain management if they perceive a heightened risk of data breaches, fraud, or unauthorized access to sensitive information. Performance risk involves uncertainties about the reliability, scalability, and compatibility of e-commerce platforms with existing supply chain systems. Businesses may fear disruptions to supply chain operations, delays in order fulfillment, or technical issues that could impact customer satisfaction and loyalty

Perceived risk (PR) therefore influences behavioural intention (BI) to adopt and if the user has favourable PR then it will have a positive impact on the user and create a positive BI to use the technology. Empirically, prior studies have indicated that FC are significant antecedents of positive BI to use an e-commerce system.

Behavioural Intention to adopt e-commerce – dependent, continuous

Behavioural intention to adopt e-commerce refers to an individual's expressed likelihood or inclination to engage in electronic commerce activities based on their attitudes, beliefs, and perceptions.

To ensure measurability, questionnaire items will be 5-point Likert scale type with controlled answer options (Buttle, 1996) with a rating scale from the lowest point of 1 to the highest point of 5 indicating the levels of agreement or disagreement with the statements.

Reliability and Validity

A measurement model refers to the set of constructs and their corresponding measures or indicators used to assess or quantify abstract concepts in a research study. Internal validity of a study refers to the extent to which the observed effects or relationships within the study can be attributed to the manipulation of the independent variable(s) and not to other extraneous factors or confounding variables. Justifications for internal validity involve ensuring that the measurement model used in the study is reliable, valid, and appropriate for assessing the constructs of interest. The reliability of a scale indicates how free it is from random error (Pallant, n.d.) and it is determined by examining internal consistency. This research uses techniques such as Cronbach's alpha, which measures the extent to which items within a measure correlate with each other to determine the reliability of the scales. A high level of internal consistency indicates that the items are measuring the same underlying construct reliably.

The validity of the scale which refers to the degree to which the scale measures what it is supposed to measure was verified through content validity (collection of empirical evidence through literature review) which is the adequacy with which a measure or scale has sampled from the intended universe of content.

Table 2 is a tabulation of the constructs and items that constitute the measurement model for this study

Table 2 measurement model for this study.

Construct	**Items**	**Cronbach's Alpha (α)**
Experience	• I have previous experience using online e-commerce systems • My past experiences with e-commerce systems have been positive	0.712

	• The quality of my previous experiences with e-commerce systems affects my intention to use them in the future	
Voluntariness	• I feel a sense of autonomy and choice in deciding to adopt e-commerce systems • My intention to adopt e-commerce systems is driven by my interest and desire to learn • I am voluntarily choosing to adopt e-commerce systems because I believe in their benefits • I am enthusiastic about adopting e-commerce systems and actively choosing to do so	0.712
Performance Expectancy	• I believe that using e-commerce systems will improve my overall SCM experience • I expect that using e-commerce systems will positively impact my business outcomes. • Using e-commerce in supply chain management would lead to improved efficiency in my operations • E-commerce systems are likely to increase my productivity and effectiveness in managing my supply chain. • Using e-commerce in supply chain management would enhance the performance of my retail/consumer goods business	0.712
Effort Expectancy	• I believe that using e-commerce systems for supply chain management will be easy and convenient for me • I anticipate that integrating e-commerce into my current supply chain management processes would be relatively easy • I believe that the benefits of using e-commerce systems outweigh the effort required to learn how to use them • I anticipate that using e-commerce systems will save me time and effort compared to traditional SCM methods	0.712

	• I expect that using e-commerce systems will be user-friendly and intuitive and without challenges	
Social Influence	• The opinions of my peers and colleagues influence my intention to adopt e-commerce systems • recommendations from industry peers influence my decision to consider adopting e-commerce systems • I feel pressured to adopt e-commerce systems for SCM because my peers are using them • The positive experiences and success stories shared by others regarding managing SC using e-commerce systems affect my intention to use them • The support and encouragement from my social network will influence my decision to adopt e-commerce systems for SCM	0.712
Facilitating Conditions	• I have access to the necessary technology and resources to effectively use e-commerce systems for SCM. • The infrastructure and technical support are available for me to use e-commerce systems seamlessly • I feel confident in my ability to overcome any barriers or challenges related to using e-commerce systems for SCM • The policies and procedures in place make it easy for me to adopt and integrate e-commerce systems into my work routine • I believe that the institutions responsible for managing the e-commerce sites provide adequate training and support for using e-commerce systems	0.712
Perceived Risk	• I am concerned about potential financial risks associated with adopting e-commerce in my supply chain management • Implementing e-commerce in SCM poses significant security risks (e.g cyberattacks, data breaches) • There is a perceived risk of disruption to existing SC processes and workflows if e-commerce is integrated	0.712

Behavioural Intention	• I am highly motivated to adopt and use e-commerce systems. • I am committed to actively engaging with e-commerce systems to achieve my SCM goals • I intend to use e-commerce systems regularly as part of my work routine. • I am likely to recommend e-commerce systems to others based on my positive intention to use them. • I am confident that I will follow through on my intention to adopt and utilize e-commerce systems	0.712

Table 1 portrays the questionnaire items used to determine Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Perceived Risk (PR), Facilitating Conditions (FC) and Behavioural Intention (BI). (George and Mallery, 2018) indicate that the measurement criteria for Cronbach's Alpha considers values of $\alpha > 0.90$ as excellent and those between 0.70 and 0.80 as acceptable whereas values between the ranges of 0.50 and 0.70 are poor. Values of $\alpha<5$ are considered unacceptable. All Cronbach's Alpha results are within the acceptable range interpreting a high degree of internal consistency.

2.19 Chapter Summary

The chapter through logical sequence and critique has provided the convergence and divergence points of the various literature and guided on the possible relationships between constructs that will play a role in influencing e-commerce adoption for supply chain management.

From the discussions, most studies have focused on e-commerce adoption for supply chain management in contexts specific to different geographical jurisdictions. It has also considered different perspectives, theories and empirical studies to provide a comprehensive understanding of the adapted model. The limitations of the studies across the various contexts justify the contextual and methodological gaps the research intends to fill.

The section on the development of conceptual frameworks and hypotheses provided the theoretical foundation for the study and outlined the expected relationships between the variables. The theoretical framework that guided the chapter was an adaptation of the UTAUT

model. The main variables of this model included performance expectancy, effort expectancy, social influence, facilitating conditions, perceived risk and behavioural intention. Based on the conceptualization of the main variables and their interrelationships, a set of hypotheses that represent the expected associations was developed and justified through the process of drawing upon existing empirical literature. The chapter on theoretical and conceptual framework lays the foundation for understanding the research problem, identifying key variables, and establishing theoretical connections between concepts. It provides a theoretical lens through which the research aims to explore and analyse phenomena. Following the Literature Review chapter, the research methodology chapter outlines the research design, data collection methods, sampling strategy, and analytical techniques employed to address the research questions or test hypotheses

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This section outlines the research design, data collection methods, and data analysis techniques employed to achieve the study's objectives. It aims to provide a transparent and systematic account of the methodology employed, offering a clear roadmap for conducting the study and answering the research questions.

The following sections of this chapter will provide a detailed explanation of the research design which includes the selection of participants, data collection methods, data analysis procedures, and ethical considerations.

3.2 Research Design

Based on the nature of the research problem, which requires the need to explain the relationship between variables, predict outcomes and apply the results to the population, the study will adopt a quantitative correlational research design. According to (Creswell, 2012), Correlational designs explore the relationship between two or more variables without manipulating them. This design helps identify associations and patterns of co-occurrence between variables.

3.3 Population of the Study

The target population was determined from a publicly available list of 1854 registered retail dealers operating within the catchment area and registered with ZICTA. Secondary data was also obtained from relevant literature and publications on the adoption of e-commerce for supply chain management. The data which included journal articles, official reports and books was collected from academic databases such as Google Scholar and academic databases on the Zambian Library Consortium (ZALICO) such as JSTOR, Emerald Insight and Cochrane Library etc. The ethical consideration measures taken to protect the rights and welfare of participants include ensuring privacy, confidentiality and informed consent (Creswell, 2012).

3.4 Sample Size and Sampling Technique

The target population is that of retail and consumer goods traders obtained from a public list of 1854 registered dealers and operating in Lusaka province

Simple Random sampling was used to draw the sample for the study using the RAND() function in Excel to give each participant an equal chance. Simple random sampling was used to draw the sample for the study with the sample size being determined by using the Yamane formula at a Confidence Level of 95%. The Yamane sampling formula is as follows:

$n = N / (1 + N (e^2))$.

Where:

- n is the desired sample size
- N is the size of the target population = 1,854
- e is the margin of error = 0.05

$$n = \frac{1854}{1+ 1854\ (0.05)2} = 329$$

The formula assumes simple random sampling, where each member of the population has an equal chance of being selected. Random retail and consumer traders were allowed to answer the questionnaires and once the cut-off point of the sample size was achieved, the exercise was halted. The response rate was 100% and the data was processed and analysed using the Statistical Package for Social Scientists (SPSS). SPSS which is a software package provides a comprehensive set of tools allowing it to generate descriptive and inferential statistics which form the basis of this quantitative research. The choice of using SPSS (Statistical Package for the Social Sciences) over other statistical packages was influenced by several factors, including the specific research needs, familiarity with the software and for its user-friendly interface.

3.5 Data Collection Methods

Before the mass distribution of the questionnaire to the intended respondents, a pre-test was conducted to assess the clarity, relevance, and effectiveness of the survey instrument. A small sample of 50 individuals, representative of the target population, participated in the pre-test phase. This exercise aimed to identify any ambiguities or potential sources of confusion in the questionnaire, ensuring that respondents can interpret the questions as intended. Feedback from the pre-test participants was carefully analyzed, and necessary adjustments were made to enhance the overall quality and comprehensibility of the survey instrument. The insights gained from the pre-test phase contribute to the robustness of the research design, ultimately improving the validity and reliability of the data collected during the main study.

Primary data was collected from a targeted population of retail and consumer goods traders operating in Lusaka Province using a 5-point Likert scale-type questionnaire with controlled answer options (Buttle, 1996). This study made use of data obtained from both primary and secondary sources.

3.6 Ethical Considerations

The ethical consideration measures taken to protect the rights and welfare of participants include ensuring privacy, confidentiality and informed consent (Creswell, 2012). To avoid the harm that might occur because of a lack of ethical consideration, the information was obtained from respondents who gave their informed consent and a strict level of confidentiality was maintained. The respondents answered the questionnaires anonymously.

3.7 Instruments for Data Collection

The data collection instrument used in this study as a basis for collecting, recording and measuring data which is required to provide answers to our research questions was a questionnaire.

3.8 Questionnaire

The questionnaire was designed in three parts with part one capturing demographic information of business owners. Part two captures their experience and voluntariness factors and Part three captures the E-commerce adoption factors. The questionnaire is documented in Appendix 1. Justification included:

Based on the nature of the research problem, which requires the need to explain the relationship between variables, predict outcomes and apply the results to the population, the study will adopt a quantitative correlational research design. According to (Creswell, 2012), Correlational designs explore the relationship between two or more variables without manipulating them. This design helps identify associations and patterns of co-occurrence between variables.

3.8.1 Reliability of Data

The reliability of a scale indicates how free it is from random error (Pallant, n.d.) and it is determined by examining internal consistency. This research used techniques such as Cronbach's alpha, which measures the extent to which items within a measure correlate with each other to determine the reliability of the scales. (George and Mallery, 2018) indicate that

the measurement criteria for Cronbach's Alpha considers values of $\alpha > 0.90$ as excellent and those between 0.70 and 0.80 as acceptable whereas values between the ranges of 0.50 and 0.70 are poor. Values of $\alpha<5$ are considered unacceptable.

All Cronbach's Alpha results are within the acceptable 0.70 and 0.80 range interpreting a high degree of internal consistency.

Table 3 provides a summary of Cronbach Alpha reliability statistics.

Table 3. Reliability Statistics. Source: (SPSS Reliability Statistics output)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of items
0.712	0.759	35

3.9 Data Analysis

After the data collection, the data was analysed using the Statistical Package for Social Scientists (SPSS) based on correlation and multiple regression analysis. Running multiple regression and correlation analysis in SPSS will provide valuable insights into the relationships between variables and help us understand the factors that influence an outcome of interest.

SPSS which is a software package provides a comprehensive set of tools allowing it to generate descriptive and inferential statistics which form the basis of this quantitative research

3.10 Limitations

The limitation of this study lies in its geographical context as the survey was only targeted at retail and consumer goods traders operating in the catchment area of Lusaka, Zambia. The study also established an unexpected negative regression coefficient between social influence and behavioural intention to adopt e-commerce for supply chain management. Future research must consider including respondents from other major cities to improve the probability of generalization of results and must consider the use of mixed methods in order to obtain a qualitative understanding for the negative relationship.

3.11 Chapter Summary

The chapter outlined the overall approach, methods, and procedures used to conduct the research and it provided a detailed description of the research design, data collection methods, and data analysis techniques employed in the study The chapter further explored the sampling frame and specific sampling techniques used to select the participants and specified the specific statistical tests and software employed to address the research questions and hypotheses. The limitations discussed in a study are crucial as they inform the overall understanding of the research and its findings by highlighting areas of caution, potential biases, and constraints that may impact the interpretation and generalization of results

The next chapter is a crucial section of a research study where the results obtained from data analysis are presented and interpreted through the use of inferential statistics. It involves reporting and discussing the findings concerning the research questions and hypotheses.

CHAPTER 4

PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter describes and analyses the information generated from the data that was obtained from the administration of the questionnaires. The results will be presented using determined and suitable data analysis instruments and in this regard, the study has made use of descriptive statistics which is presented in frequency distribution tables showing absolute and relative values.

The purpose of this chapter is to provide an overview and summary of the key findings obtained from the analysis of the research data. It serves as a bridge between the previous chapters (methodology) and the detailed analysis and interpretation of the findings.

The research objective is to investigate the factors that influence the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia based on the modified UTAUT model and to provide insights and recommendations for retail and consumer business houses and policy-makers to enhance e-commerce adoption for supply chain management in Zambia based on the findings

The results are based on survey data from 329 retail and consumer goods traders. Following the 329 questionnaires administered to participants, all were returned to the researcher representing a 100% success rate. Results are presented using tables, charts, and graphs.

4.2 Descriptive Statistics

The objective of descriptive statistics is to summarize and describe essential features of a dataset, providing a clear and concise overview of its main characteristics. Descriptive statistics serve as a fundamental tool offering insights into the distribution, central tendency, and variability of the data. The findings of the chapter supported the use of parametric statistical methods.

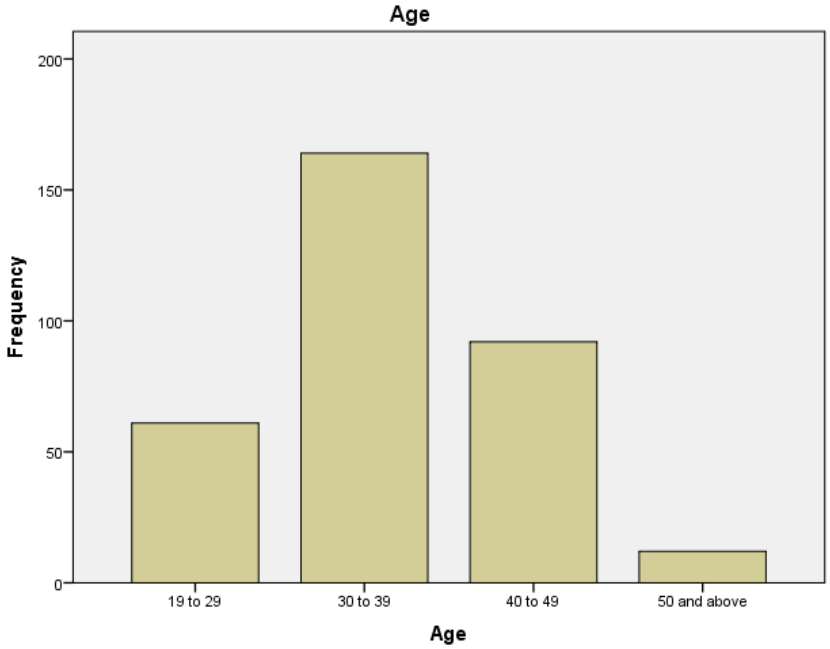
4.3 Demographic Data

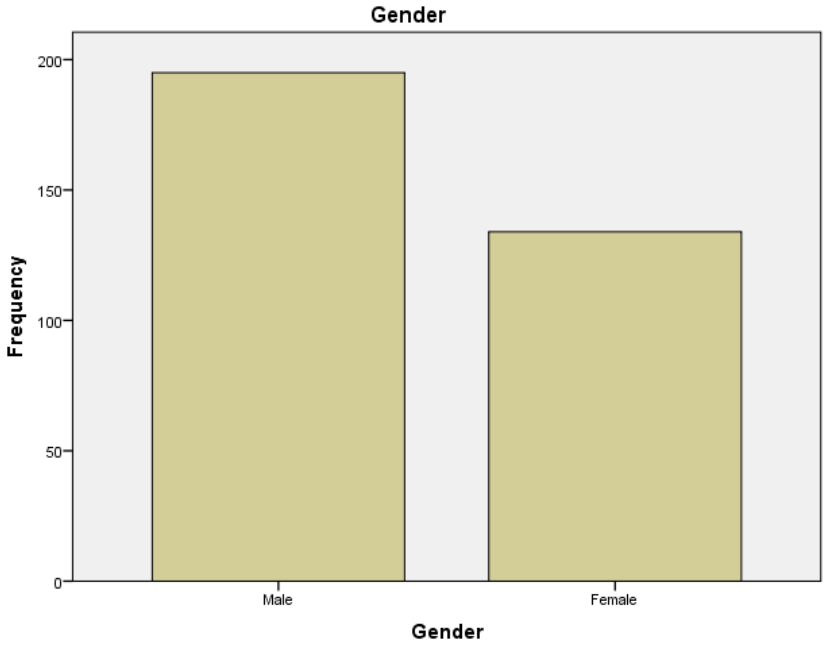
The sample profile indicates that about 59% and 41% of the respondents were male and female respectively. The table also reveals that the 30 to 39 age range was the majority of the population accounting for about 50% of the sample.

Table 4 provides a summary of the demographic profile of the respondents.

Table 4. Demographic Profile Source: (SPSS Descriptive Analysis Output)

Variable	Freq	Percentage	Mean	Std Dev	Min	Max
Gender						
Male	195	59.3				
Female	134	40.7				
Total	329	100.0	1.4073	0.49208	1.00	2.00
Age Group (years)						
19 – 29	61	18.5				
30 – 39	164	49.8				
40 – 49	92	28.0				
50 and above	12	3.6				
Total	329	100.0	3.1672	0.76470	2.00	5
PE	329		19.9757	0.15426	19.00	20.00
EE	329		19.9696	0.17193	19.00	20.00
SI	329		19.9696	0.17193	19.00	20.00
PR	329		14.9970	0.5513	14.00	15.00
FC	329		19.9939	0.07785	19.00	20.00
BI	329		20.0243	0.15426	20.00	21.00





4.4 Normality Tests

Table 4 provides a summary of the Kolmogorov-Smirnov statistic. This assesses the normality of the distribution of scores. A non-significant result (Sig. value of more than .05) indicates normality. In this case, the Sig. value is .000, suggesting a violation of the assumption of normality. This is quite common in larger samples of n > 300 (Pallant, n.d.).

To further assert normality, we performed a graphical analysis to visually assess the distribution. The histograms of the variables projected a normal distribution.

Table 5 provides Kolmogorov-Smirnov normality tests

Table 4. Normality tests Source: (SPSS Descriptive Analysis Output)

	Kolmogorov - Smirnov		
	Statistic	**df**	**Sig.**
Performance Expectancy	.538	329	.000
Effort Expectancy	.540	329	.000
Social Influence	.540	329	.000
Perceived Risk	.519	329	.000
Facilitating Conditions	.525	329	.000
Behavioural Intention	.538	329	.000

4.5 Hypothesis Testing (Inference Statistics) / Thematic Analysis

4.5.1 Correlation

Correlation was used to describe the strength and direction of the relationship between two variables. The statistic obtained from the SPSS output is Pearson's product-moment correlation (r) and the statistical significance of r. Pearson correlation coefficients (r) can range from –1 to +1. The sign in front indicates whether there is a positive correlation (as one variable increases, so too does the other) or a negative correlation (as one variable increases, the other decreases) (Pallant, n.d.). The size of the absolute value provides information on the strength of the relationship. Cohen (1988, pp. 79–81) suggests the following interpretation guidelines: Small r=.10 to .29; Medium r=.30 to .49 and large r=.50 to 1.0.

Table 6 provides the correlation and significance analysis between variables.

Table 6. Correlations and significance Source: (SPSS Analysis Output)

		1	**2**	**3**	**4**	**5**	**6**
PE	Pearson Correlation	1	1				
	Sig (2-tailed)						
	N	329	329				
EE	Pearson Correlation	.777**	1				
	Sig (2-tailed)	.000					
	N	329	329				
SI	Pearson Correlation	.662**	.794**	1			
	Sig (2-tailed)	.000	.000				
	N	329	329	329			
PR	Pearson Correlation	.350**	.312**	.312**	1		
	Sig (2-tailed)	.000	.000	.000			
	N	329	329	329	329		
FC	Pearson Correlation	.242**	.442**	.442**	-.004**	1	
	Sig (2-tailed)	.000	.000	.000	.000		
	N	329	329	329	329	329	
BI	Pearson Correlation	-.488**	-.662**	-.892**	-.350**	-.242**	1
	Sig (2-tailed)	.000	.000	.000	.000	.000	
	N	329	329	329	329	329	329

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The essence of conducting correlational analysis lies in understanding the strength and direction of the relationship between two variables without assuming causality.

Table 6 shows that all five antecedents are negatively correlated with the dependent variable. The r values for the antecedents which are performance expectancy, effort expectancy and social influence are -0.488, -0.662, and -0.892 respectively suggesting a strong relationship between the variables. Correlation values for perceived risk are -0.35 suggesting a medium strength and those for facilitating conditions are -0.242 suggesting a weak relationship.

4.5.2 Multiple Regression Analysis

This section provides the results of hypothesis testing and their interpretation based on multiple regression analysis. Multiple regression allows for the prediction of a single dependent continuous variable from a group of independent variables. It can be used to test the predictive power of a set of variables and to assess the relative contribution of each variable. (Tabachnick and Fidel, 2007) provides a list of assumptions which must be met for multiple regression. Multiple regression is sensitive to multicollinearity. Multicollinearity exists when two or more of the independent variables are highly correlated with the dependent variable (r=.9 and above) (Tabachnick and Fidel, 2007). The condition of multicollinearity seems to not have been violated as there are no highly correlated variables and VIF values derived from collinearity statistics are below 10.

Table 7 provides the regression output.

Table 7. Regression Output Source: (SPSS Analysis Output)

Coefficients [a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	Correlations	Collinearity Statistics

	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	30.849	1.296		23.801	.000	28.299	33.399					
Performance Expectancy	.261	.035	.261	7.461	.000	.192	.330	-.488	.383	.158	.368	2.717
Effort Expectancy	-.079	.039	-.088	-2.041	.042	-.156	-.003	-.662	-.113	-.043	.241	4.151
Social Influence	-.949	.032	-1.057	-29.284	.000	-1.012	-.885	-.892	-.852	-.622	.346	2.890
Perceived Risk	-.232	.065	-.083	-3.589	.000	-.359	-.105	-.350	-.196	-.076	.844	1.185
Facilitating Conditions	.398	.049	.201	8.093	.000	.302	.495	-.242	.411	.172	.731	1.369

a. Dependent Variable: Behavioural Intention

Table 8 provides the regression model summary output.

Table 8. Model Summary Source: (SPSS Analysis Output)

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.924[a]	.854	.852	.05934	.854	378.773	5	323	.000

a. Predictors: (Constant), Facilitating Conditions, Perceived Risk, Performance Expectancy, Social Influence, Effort Expectancy

b. Dependent Variable: Behavioural Intention

Table 9 provides the ANOVA output.

Table 9. ANOVA Source: (SPSS Analysis Output)

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.668	5	1.334	378.773	.000[b]
	Residual	1.137	323	.004		
	Total	7.805	328			

a. Dependent Variable: Behavioural Intention

b. Predictors: (Constant), Facilitating Conditions, Perceived Risk, Performance Expectancy, Social Influence, Effort Expectancy

The R-value in the model summary in Table 9 depicts the coefficient of correlation (quality of prediction of the dependent variable) as positively correlated at 92.4%. This means that the model with its predictors based on the model can predict the dependent variable. The R Square value explains how much of the variance of the dependent variable (Behavioral Intention) is explained by the model (all constructs together). The value, in this case, is 85.4% which means that the model that includes all the predictors explains 85.4% of the variance in Behavioral Intention to adopt e-commerce for supply chain management.

To assess the statistical significance of the result, it is necessary to look at the ANOVA table. The model in this example reaches statistical significance (Sig. = .000) which tells us that the model's constructs in unison are all highly significantly contributing to the prediction of the dependent variable.

The significant behaviour and direction of beta values of independent variables tend to change in a regression model when more variables are included and values which individually were significant and positively correlated may become insignificant with regards to unique contribution and negatively correlated when more variables are added to the model or vice

versa. This occurs due to the introduction of new variables which are more significant. (Falk and Miller, 1992) states that when the path coefficient (regression coefficient) and the correlation between latent constructs do not have the same sign, the original relationship between the two has been suppressed. With real suppressor effects the correct sign interpretation is that given by the path coefficient (pp. 75-76). The hypotheses testing according to regression analysis are confirmed as follows:

H1: Performance Expectancy has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.

The results in Table 4 indicate a positive and significant relationship between Performance Expectancy and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = 0.261$, $p < 0.05$). A positive and significant relationship between two variables signifies that as one variable increases, the other variable also increases. A significant relationship implies that the observed correlation between the variables is unlikely to have occurred by chance. In statistical terms, it means that the correlation coefficient or regression coefficient is statistically significant at a chosen level of significance.

H2: Effort Expectancy has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.

The results in Table 4 indicate a negative and significant relationship between Effort Expectancy and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = -0.088$, $p < 0.05$). A negative and significant relationship between two variables signifies that as one variable increases, the other variable decreases.

H3: Social Influence has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.

The results in Table 4 indicate a negative and significant relationship between Social Influence and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = -1.057$, $p < 0.05$).

H4: Facilitating conditions have a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.

The results in Table 4 indicate a positive and significant relationship between Facilitating Conditions and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = 0.201$, $p < 0.05$).

H5: Perceived Risk has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.

The results in Table 4 indicate a negative and significant relationship between Perceived Risk and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = -0.083$, $p < 0.05$).

4.6 Chapter Summary

This chapter presented the results of the study and interpreted their significance. The research relied on the use of correlations and multiple regression analysis to establish the relationships between variables. The chapter addresses the research objective which is to explore the relationship between the main constructs of the conceptual model (performance expectancy, effort expectancy, social influence, perceived risk and facilitating conditions) and the behavioural intention to adopt e-commerce systems for supply chain management in the Zambian context. The next chapter discusses the findings and interprets the results in light of the research questions and objectives. It shall compare and contrast findings with existing literature and identify any trends or relationships observed.

CHAPTER 5

DISCUSSION OF RESEARCH

5.1 Introduction

The preceding chapter presented the findings of the research and provided concise descriptions of each finding accompanied by relevant statistical information. The chapter concluded by confirming the assumptions of the hypotheses through the use of correlation and multiple regression. This chapter will discuss the research findings by interpreting the results in light of the research objectives and will compare and contrast the findings with existing literature from previous research studies.

5.2 Discussion

This chapter presents answers to the study questions in the first chapter. The conclusions and answers to the study questions are founded on descriptive, regression and correlation analysis results.

5.2.1 Objective 1 Discussion

The main objective of the study was to investigate the factors affecting the adoption of e-commerce for supply chain management by retail and consumer goods traders in Zambia.

Performance Expectancy

Multiple regression analysis reveals a positive relationship and a significant unique contribution between Performance Expectancy and Behavioural Intention to Adopt E-commerce. This finding indicates that as the perceived level of performance expectancy increases, the participants' intention to engage in a certain behaviour also tends to increase. Therefore to enhance the uptake of e-commerce systems there is a need to conduct increased awareness which would make retail and consumer traders believe that adoption of the systems would improve the overall supply chain management experience and increase productivity and effectiveness. The findings support the studies of (Tarhini et al., 2017) conducted in the United Kingdom (UK) on Factors influencing students' adoption of e-learning systems based on the UTAUT 2 model in which 366 participants were interviewed and the findings although based on the UK context revealed that behavioural intention (BI) was significantly influenced by performance expectancy. The findings also coincide with the results from a study on the factors affecting adoption of e-services in which it was established that there was a positive and

significant relationship between perceived usefulness and user intention to use the system (Sakala and Phiri, 2019).

Effort Expectancy

Multiple regression analysis reveals a negative relationship and a significant unique contribution between Effort Expectancy and Behavioural Intention to Adopt E-commerce. This result implies that as the perceived effort required to perform a certain behaviour (total effort expectancy) increases, the participants' intention to engage in that behaviour (behavioural intention) tends to decrease. Possible interpretations of the negative relationship could include perceptions of task complexity or attraction towards alternative behaviours with lower effort expectancy. High effort expectancy means that individuals perceive the task or behaviour as difficult, complex, or requiring significant effort on their part to accomplish. Therefore to enhance the uptake of e-commerce systems there is a need to conduct increased awareness which would make the traders believe that the benefits of using e-commerce systems for supply chain management outweigh the effort required to learn how to use them. The findings resonate with the findings of (Masri and Tarhini, 2017) where it was concluded that Effort expectancy and social influence lead to an increase in students' adoption in developing countries. The results also coincide with those of Mooya and Phiri (2021), in which it was established that perceived ease of use significantly influenced the behavioural intention to use e-systems.

Social Influence

Multiple regression analysis reveals a negative relationship and a significant unique contribution between Social Influence and Behavioural Intention to Adopt E-commerce. The results imply that as the perceived level of social influence increases, the participants' intention to engage in a certain behaviour tends to decrease. Several possible interpretations of a negative relationship between social influence and behavioural intention to adopt e-commerce could be considered:

1. Reactance: High levels of perceived social influence might trigger a psychological reactance response in individuals. Reactance occurs when people feel that their freedom to choose is threatened by external pressure, leading them to resist or reject the behaviour being influenced.

2. Perceived Autonomy: Increased social influence might be perceived as an attempt to control behaviour. This perception of reduced autonomy could lead to lower intentions to

engage in the behaviour, as individuals prefer to act in ways that align with their sense of independence.

The findings resonate with an investigation conducted in Lebanon on Factors Affecting Developing countries based on a structural equation modelling approach in which 569 students were interviewed using the TAM framework and it was revealed that amongst other factors, social norms were significant determinants (Tarhini et al., 2013). Findings further resonate with those of Lesa and Tembo (2016) in which it was established that social influence has a significant impact on behavioural intention to adopt e-commerce systems.

Perceived Risk

Multiple regression analysis reveals a negative relationship and a significant unique contribution between Perceived Risk and Behavioural Intention to Adopt E-commerce. The results imply that as the perceived level of risk increases, the participants' intention to engage in a certain behaviour tends to decrease. Perceived risk is closely linked to trust in technology. If individuals perceive e-commerce systems as untrustworthy or unreliable, it erodes their confidence in the technology's ability to deliver benefits without negative consequences. This lack of trust can significantly impact the intention to adopt the system. The findings resonate with those conducted in South Africa in which the socio-technical dynamics of e-commerce adoption were studied and in which it was established that perceived risk significantly affected e-commerce adoption (Mlitwa and Raqa, 2012)

Facilitating Conditions

Multiple regression analysis reveals a positive relationship and a significant unique contribution between Facilitating Conditions and Behavioural Intention to Adopt E-commerce. The results imply that facilitating conditions are necessary to ensure behavioural intention to adopt e-commerce systems and that an increase in infrastructure, training and other technical support may further increase this behavioural intention to adopt the systems for supply chain management. Findings agree with those of a literature review conducted to establish factors influencing e-commerce adoption in which it was established that the technological environment significantly affected the intention and adoption of e-commerce (Hendricks and Mwapwele, 2023).

Demographic Data

Demographic data analyzed suggests that there is no significant difference in the behavioural intention to adopt e-commerce between male and female respondents and that respondents within the age group of 30 – 39 are more inclined to adopt e-commerce for supply chain management. This resonates with findings by Munafumpa and Phiri (2023) in which it was found that age and gender were not significantly associated with adoption.

Table 10 provides the summary of Hypothesis tests.

Table 10. Hypothesis Results Source: (SPSS Analysis Output)

	Hypothesis	**Statistics**	**Test**	**Results**
H1	Performance Expectancy has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	(β = 0.261, $p < 0.05$).	Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative
H2	Effort Expectancy has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	(β = -0.088, $p < 0.05$).	Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative

			Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative
H3	Social Influence has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	(β = -1.057, $p < 0.05$).		
			Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative
H4	Facilitating conditions have a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	(β = 0.201, $p < 0.05$).		
			Multiple Regression	Supported. P value less than the significance level therefore we reject the null
H5	Perceived Risk has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	(β = -0.083, $p < 0.05$).		

	hypothesis in favour of the alternative

5.2.2 Objective 2 Discussion

The second objective was to provide insights and recommendations for retail and consumer business houses and policy-makers to enhance e-commerce adoption for supply chain management in Zambia based on the findings.

Enhancing e-commerce adoption for supply chain management in Zambia requires a multifaceted approach that involves collaboration between retail and consumer business houses, policy-makers, and various stakeholders. Here are insights and recommendations to facilitate this process:

1. Infrastructure Development:

Retail and consumer goods traders must take advantage of the technological landscape and Investments must be made in improving the technological infrastructure, including internet connectivity and reliable power sources, to support seamless e-commerce operations.

2. Education and Training

The findings suggested that limited awareness and skills may hinder e-commerce adoption. Policymakers and business owners must therefore implement training programs for businesses and consumers on the benefits and efficient use of e-commerce.

3. Financial Inclusion

Findings suggest that limited access to digital payment methods may hinder transactions. Financial inclusion must be promoted by collaborating with banks and mobile money providers to expand digital payment options and ensure accessibility for a broader population.

4. Logistics Optimization:

Studies suggest that inefficient logistics can impact the reliability of e-commerce services. Partnerships with local logistics providers to enhance delivery networks must be explored.

5. Consumer Trust and Security:

Concerns about online security and trust may deter SMEs from adopting E-commerce for SCM on a large scale. Recommendations to implement robust cybersecurity measures, provide secure payment gateways, and establish consumer protection mechanisms must be put in place

By addressing these insights and recommendations, retail and consumer business houses, along with policy-makers, can collectively contribute to fostering a conducive environment for e-commerce adoption in supply chain management in Zambia

5.3 Chapter Summary

The chapter investigates the factors influencing the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems. The study's findings reveal that Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and Perceived Risk all have significant effects on traders' intentions to embrace e-commerce. Performance Expectancy, which refers to the belief that using e-commerce will enhance job performance, and Effort Expectancy, the ease of use associated with the technology, both positively influence Behavioral Intention. Social Influence, the impact of others' opinions, also plays a critical role. Additionally, Facilitating Conditions, the availability of resources and support, significantly affect adoption intentions. Lastly, Perceived Risk, the potential negative consequences of e-commerce use, also significantly influences traders' Behavioral Intention.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

In this chapter, we provide conclusions and recommendations based on the comprehensive analysis and discussion of the research findings obtained through our study. The main objective of this research was to investigate the factors that influence the adoption of e-commerce for supply chain management in Zambia. To accomplish our research goals, we employed a quantitative cross-sectional study and this methodology allowed us to collect relevant data from a diverse sample population, ensuring a comprehensive representation of the target group.

6.2 Conclusions

In conclusion, this thesis has delved into the critical realm of e-commerce adoption for supply chain management among retail and consumer goods traders in Zambia. Through an exploration of factors influencing adoption, challenges faced, and potential solutions, a comprehensive understanding of the landscape has been achieved. The findings underscore the importance of addressing infrastructure limitations, promoting digital literacy, and establishing a conducive regulatory environment to propel e-commerce adoption

The contribution of the study based on the identified knowledge gaps can be summarized in the following ways:

1. Academic Contribution: The study contributes to the academic literature by exploring the contextual factors that influence e-commerce adoption in Zambia. It adds to the existing body of knowledge by focusing specifically on the Zambian context, which has been relatively under-researched in terms of e-commerce adoption for supply chain management.
2. Policy and Decision-Making: Understanding the contextual antecedents can inform the formulation of policies, strategies, and interventions that promote and support e-commerce initiatives. The study can guide decision-making processes and resource allocation to enhance the adoption
3. Institutional Planning and Support: Business houses can benefit from the study's findings to plan and implement effective e-commerce adoption programs and support structures. The study's insights can inform professional development programs and training for educators and instructors involved in supply chain management.

6.3 Recommendations

1. Performance Expectancy according to the results positively influences behavioural intention to adopt e-commerce for supply chain management. Therefore to enhance the uptake of e-commerce systems there is a need to conduct increased awareness which would make traders believe that adoption of the systems would improve the overall learning experience and increase productivity and effectiveness.
2. Effort Expectancy according to the results negatively influences behavioural intention to adopt e-commerce for supply chain management and therefore to enhance the uptake of e-commerce systems there is a need to conduct increased awareness which would make traders believe that the benefits of using e-commerce systems outweigh the effort required to learn how to use them.
3. Facilitating conditions according to the results positively influences behavioural intention to adopt e-commerce for supply chain management and therefore to enhance the uptake of e-commerce systems there is a need to ensure that basic infrastructure, training and technical support are available for students to use e-commerce systems seamlessly
4. Social Influence according to the results negatively influences behavioural intention to adopt e-commerce for supply chain management and therefore to enhance the uptake of e-commerce systems there is a need to conduct structured awareness which would not trigger Reactance which is a state that occurs when people feel that their freedom to choose is threatened by external pressure, leading them to resist or reject the behaviour being influenced.
5. Perceived risk according to the results negatively influences behavioural intention to adopt e-commerce for supply chain management and therefore to enhance the uptake of e-commerce systems there is a need to conduct increased risk awareness campaigns which would make traders believe that the systems are safe to use.

6.4 Future Works

The limitation of this study lies in its geographical context as the survey was only targeted at retail and consumer goods traders operating in the catchment area of Lusaka, Zambia. Future research must consider including respondents from other major cities to improve the probability of generalization of results. The study also acknowledges the establishment of a negative correlation between social influence and the behavioural intention to adopt e-commerce for supply chain management. Future works must therefore consider the use of a

mixed methods research design in order to capture qualitative data which might further explain this occurrence.

This study contributes to the body of knowledge by investigating the factors of e-commerce adoption for supply chain management by retail and consumer goods traders in developing countries. Understanding the contextual antecedents can inform the formulation of policies, strategies, and interventions that promote and support e-commerce for supply chain management initiatives.

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APPENDICES

Appendix 1 - Questionnaire

The University of Zambia

Graduate School of Business

Contextual Antecedents of E-commerce Adoption for Supply Chain Management by Retail and Consumer Goods Traders in Zambia

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Jonathan Vincent Ngwira

MSC Operations Projects and Supply Chain Management

For more information or any queries, kindly get in touch on 0972827841

Dear respondent,

I am a student at the University of Zambia pursuing a Master of Science in Operations, Projects and Supply Chain Management. As partial fulfilment for the award of a Master's degree, I am conducting a baseline study on:

CONTEXTUAL ANTECEDENTS OF E-COMMERCE ADOPTION FOR SUPPLY CHAIN MANAGEMENT BY RETAIL AND CONSUMER GOODS TRADERS IN ZAMBIA

You have been randomly sampled to provide information for the topic indicated above. The information being collected is purely for academic purposes as such, it will be treated with maximum confidentiality. Subsequently, you are not supposed to indicate your name or any personal information that can lead to the revealing of your identity.

Your co-operation will be greatly appreciated.

Contact: Jonathan Vincent Ngwira

Email: jonathanvincentngwira@gmail.com.

Phone: +260954434871

Project Supervisor: Dr. Jackson Phiri (0966 693 731)

SURVEY QUESTIONNAIRE

PART ONE: DEMOGRAPHIC INFORMATION (PLEASE TICK [√])

1. What is your Gender?

[ ] Male (1)

[ ] Female (2)

2. What is your Age Group?

[ ] 18 or under (1)

[ ] 19-29 (2)

[ ] 30-39 (3)

[ ] 40-49 (4)

[ ] 50 and above (5)

PART TWO: EXPERIENCE AND VOLUNTARINESS (PLEASE TICK [√])

4. I have previous experience using e-commerce systems.

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

5. My past experiences with e-commerce systems have been positive

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

6. The quality of my previous experiences with e-commerce systems affects my intention to use them in the future

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

7. I feel a sense of autonomy and choice in deciding to adopt e-commerce systems

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

8. My intention to adopt e-commerce systems is driven by my interest and desire to learn

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

9. I am voluntarily choosing to adopt e-commerce systems because I believe in their benefits

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

10. I am enthusiastic about adopting e-commerce systems and actively choosing to do so

[ ] Strongly Disagree (1)

[ ] Disagree (2)

[ ] Neutral (3)

[ ] Agree (4)

[ ] Strongly Agree (5)

PART THREE: E-COMMERCE ADOPTION FACTORS

Using a rating scale from the lowest point of 1 to the highest point of 5, please circle the number that indicates your level of agreement or disagreement with the following statement.

SD = strongly disagree | D = Disagree | N = Neutral | A = Agree | SA = Strongly Agree

Performance Expectancy		**SD**	**D**	**N**	**A**	**SA**
11	I believe that using e-commerce systems will improve my overall SCM experience	1	2	3	4	5
12	I expect that using e-commerce systems will positively impact my learning outcomes.	1	2	3	4	5
13	Using e-commerce in supply chain management would lead to improved efficiency in my operations	1	2	3	4	5
14	E-commerce systems are likely to increase my productivity and effectiveness in managing my supply chain.	1	2	3	4	5
15	Using e-commerce in supply chain management would enhance the performance of my retail/consumer goods business	1	2	3	4	5
Effort Expectancy		**SD**	**D**	**N**	**A**	**SA**
16	I believe that using e-commerce systems for supply chain management will be easy and convenient for me	1	2	3	4	5
17	I anticipate that integrating e-commerce into my current supply chain management processes would be relatively easy	1	2	3	4	5
18	I believe that the benefits of using e-commerce systems outweigh the effort required to learn how to use them	1	2	3	4	5

19	I anticipate that using e-commerce systems will save me time and effort compared to traditional SCM methods	1	2	3	4	5
20	I expect that using e-commerce systems will be user-friendly and intuitive and without challenges	1	2	3	4	5
Social Influence		**SD**	**D**	**N**	**A**	**SA**
21	The opinions of my peers and colleagues influence my intention to adopt e-commerce systems	1	2	3	4	5
22	recommendations from industry peers influence my decision to consider adopting e-commerce systems	1	2	3	4	5
23	I feel pressured to adopt e-commerce systems for SCM because my peers are using them	1	2	3	4	5
24	The positive experiences and success stories shared by others regarding managing SC using e-commerce systems affect my intention to use them	1	2	3	4	5
25	The support and encouragement from my social network will influence my decision to adopt e-commerce systems for SCM	1	2	3	4	5
Facilitating Conditions		**SD**	**D**	**N**	**A**	**SA**
26	I have access to the necessary technology and resources to effectively use e-commerce systems for SCM.	1	2	3	4	5
27	The infrastructure and technical support are available for me to use e-commerce systems seamlessly	1	2	3	4	5
28	I feel confident in my ability to overcome any barriers or challenges related to using e-commerce systems for SCM	1	2	3	4	5
29	The policies and procedures in place make it easy for me to adopt and integrate e-commerce systems into my work routine	1	2	3	4	5

30	I believe that the institutions responsible for managing the e-commerce sites provide adequate training and support for using e-commerce systems	1	2	3	4	5
	Perceived Risk	**SD**	**D**	**N**	**A**	**SA**
31	I am concerned about potential financial risks associated with adopting e-commerce in my supply chain management					
32	Implementing e-commerce in SCM poses significant security risks (e.g cyberattacks, data breaches)					
33	There is a perceived risk of disruption to existing SC processes and workflows if e-commerce is integrated					
Behavioural Intention		**SD**	**D**	**N**	**A**	**SA**
34	I am highly motivated to adopt and use e-commerce systems.	1	2	3	4	5
35	I am committed to actively engaging with e-commerce systems to achieve my SCM goals	1	2	3	4	5
36	I intend to use e-commerce systems regularly as part of my work routine.	1	2	3	4	5
37	I am likely to recommend e-commerce systems to others based on my positive intention to use them.	1	2	3	4	5
38	I am confident that I will follow through on my intention to adopt and utilize e-commerce systems	1	2	3	4	5

Appendix 2: Introduction letter

Appendix 3: Publications

Ngwira, J.V. and Phiri, J. (2024), "Contextual Antecedents of E-Commerce Adoption for Supply Chain Management by Retail and Consumer Goods Traders in Developing Countries", pp. 472–489, doi: 10.4236/ojbm.2024.121029.

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Acceptance Notification

Dear Author(s), January 25, 2024

Thanks for your contribution to Open Journal of Business and Management. We are pleased to inform you that your paper:

ID: 1533454
Title: Contextual Antecedents of E-commerce Adoption for Supply Chain Management by Retail and Consumer Goods Traders in Developing Countries
Authors: Jonathan Ngwira, Jackson Phiri

has been accepted for publication. Congratulations!

The paper will be ready for publication in **Vol. 12 No.1 in January 2024** if everything goes smoothly.

If you have any questions, please feel free to contact us.

Best regards,
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Contextual Antecedents of E-Commerce Adoption for Supply Chain Management by Retail and Consumer Goods Traders in Developing Countries

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Abstract

E-commerce, as a transformative technological innovation, offers unparalleled opportunities for enhancing supply chain management efficiency and effectiveness. This study was conducted to investigate the factors influencing the behavioural intention of retail and consumer goods traders to adopt e-commerce for supply chain management in developing countries. The research employs a quantitative design with the data being collected through the administration of questionnaires to a randomly selected sample size of 329 registered retail and consumer goods traders in Zambia. The sample size was determined using the Yamane formula and the data collected was analysed using statistical methods based on correlation and multiple regression analysis in Statistical Package for Social Sciences (SPSS). The findings indicate that the core constructs of the adapted Unified Theory of Acceptance and Use of Technology Model (UTAUT) and Theory of Perceived Risk (TPR) proposed model such as Performance Expectancy ($\beta = 0.261$, $p < 0.05$), Effort Expectancy ($\beta = -0.088$, $p < 0.05$), Social Influence ($\beta = -1.057$, $p < 0.05$), Perceived Risk ($\beta = -0.083$, $p < 0.05$) and Facilitating Conditions ($\beta = 0.201$, $p < 0.05$) have a significant effect on the Behavioural Intention of retail and consumer goods traders to adopt e-commerce for supply-chain management. The study aims to contribute to the existing body of knowledge by providing insights into the unique factors, challenges and opportunities facing retail and consumer goods traders in developing countries with regard to adopting e-commerce for supply chain management.

Keywords

E-Commerce, Supply Chain Management, UTAUT, Theory of