

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

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 & 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. 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). E-commerce cannot exist without payment systems for any transaction to take place (Lesa & Tembo, 2016). 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 (Yu et al., 2016). Fundamentally, these risks relate to information security, fraud, and payment methods generally referred to as cyber-security risks (Toleuuly et al., 2020). Developing countries are lagging in e-commerce adoption due to internet challenges, trust, and security issues about online payment facilities (Hendricks & Mwapwele, 2023). 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).

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. Digital transformation of organizations fosters resilience, however, digital transformation of SMEs in sub-Saharan Africa has been slow (Achieng & 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 developing countries based on the Unified Theory of Acceptance and Use of Technology (UTAUT). 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 acceptance, ultimately enhancing the overall adoption and effectiveness of e-commerce in supply chain management initiatives. The article is organised as follows:

Section 1 introduces the concept of e-commerce and highlights its growing importance in supply-chain management;

Section 2 documents the literature reviewed and highlights how this research fills the critical gaps identified. It furthermore describes the theoretical and conceptual framework and outlines the hypotheses of the study;

Section 3 outlines the research design and approach which includes the sampling strategy and analysis techniques;

Section 4 documents the research findings and presents the analysis of the relationships of the constructs of the conceptual model and lastly;

Section 5 draws empirical conclusions and outlines the limitations and contributions to the body of knowledge.

2. Key Literature Review

The scope of the literature review included relevant literature relating to e-commerce adoption and supply-chain management from OECD, developing, African countries generated within the last ten (10) years.

The integration of e-commerce in supply chain management represents a transformative shift in the way businesses operate. As technological advancements have accelerated, organizations are increasingly leveraging e-commerce to enhance efficiency, reduce costs, and improve overall supply chain performance. The rapid growth of electronic commerce has driven most organizations to use information technology to facilitate business-to-consumer (B2C) interactions through a wide range of online environments (Campbell et al., 2018). Supply chain digitalization significantly allows companies to streamline their activities via sustainable supply chain practices (Sarfraz et al., 2023). Logistics and Procurement form an integral part of e-commerce operations (Amin & Hussin, 2014). The collaboration among partners and information sharing contributes to an improvement in forecasting and planning (Pulevska-Ivanovska & Kaleshovska, 2013). Security is one of the most addressed issues in implementing trust mechanisms as users worry that their confidential data such as credit card details over the network might be exposed (Mlitwa & Raqa, 2012).

Table 1 provides a summary of the findings and contextual gaps from samples of the key literature reviewed.

Through a meticulous examination of prior literature, it became evident that

Table 1. Literature review summary. Source: (Systematic Literature Review).

No.	Author	Focus of Study	Findings	Gaps
1	(Almajali et al., 2016)	The Impact of Electronic Supply Chain Management Usage on Firm's Performance.	E-SCM usage has a significant positive and direct impact on performance. Trust and communication have a positive influence on e-SCM usage. Communication is Insignificant.	The study was specific to the context of Jordan.
2	(Oluyinka et al., 2013)	A Study of Electronic Commerce Adoption Factors in Nigeria.	Poor infrastructural facilities are the major factors hindering e-commerce adoption.	Small sample size and study specific to the Nigerian context.
3	(Pulevska-Ivanovska & Kaleshovska, 2013)	Implementation of e-Supply Chain Management.	E-SCM provides benefits such as information visibility and sharing, order tracking, forecasting, cost-saving.	The study did not utilize quantitative analysis.
4	(Khan et al., 2014)	Adoption of Electronic Supply Chain Management and E-Commerce by Small to Medium Enterprises and Their Performance: A Survey of SMEs in Pakistan.	Findings suggest that E-commerce and E-SCM adoption has a significant positive influence on SMEs who have significantly higher average sales growth rates, on-time order management and delivery process than non-adopters.	The study was specific to the context of Pakistan.
5	(Alahmad, 2021)	The relationship between Supply Chain Management Practices and Supply Chain Performance in Saudi Arabian Firms.	Supply Chain Planning, Information Sharing, Customer Relationship Management and Supplier Relationship Management are positively related to Supply Chain Performance.	The study was specific to the Saudi Arabian context and the target population was selected using non-probabilistic methods.
6	(Chen et al., 2019)	Research on B2C E-Commerce Business Model based on System Dynamics.	Active users are the basis for attracting brand cooperation. User loyalty has an important impact on revenue and profit. The impact of enterprise-scale growth on enterprise development is not significant.	The study was specific to the Chinese context.
7	(Awa et al., 2015)	Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs.	The introduced constructs in the integrated framework (e.g. company mission, individual difference factors, perceived trust and perceived service quality) introduce socio-technical systems and improve the theoretical base of adoption.	Neither the adoption drivers nor the constructs in the theoretical framework are mutually exclusive and exhaustive; rather, they are complementary and could incorporate other factors.

Continued

8	(Amin & Hussin, 2014)	E-commerce Adoption in SME Retail Sector.	There is a significant relationship between technological, organizational and environmental factors and E-commerce adoption.	The study was specific to the Malaysian context and not all constructs relevant to the thematic area were included in the proposed conceptual model.
9	(Mlitwa & Raqa, 2012)	The Socio-Technical Dynamics of e-Commerce Adoption in Mainstream Grocery Supermarkets in South Africa.	E-commerce offerings by retail supermarkets are not well known by most customers hence usage is limited. Lack of access to E-payment and fear of cybercrime remains a threat to widespread usage.	The study was specific to the South African context.
10	(Campbell et al., 2018)	Breaking the Ice in B2C Relationships: Understanding Pre-Adoption E-commerce Attraction.	Results demonstrate that the e-commerce attraction model provides additional insight for understanding how website design affects e-commerce attraction and adoption.	The study was specific to 345 undergraduate students thus the results cannot be generalized to other contexts.

several empirical investigations focused on specific geographical contexts. This research bridged the gap by delving into e-commerce and supply chain management in the Zambian context and expanding the framework surrounding the subject matter.

2.1. Conceptual Framework

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**).

2.2. Theoretical Framework

1) The Unified Theory of Acceptance and Use of Technology (UTAUT)

The 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

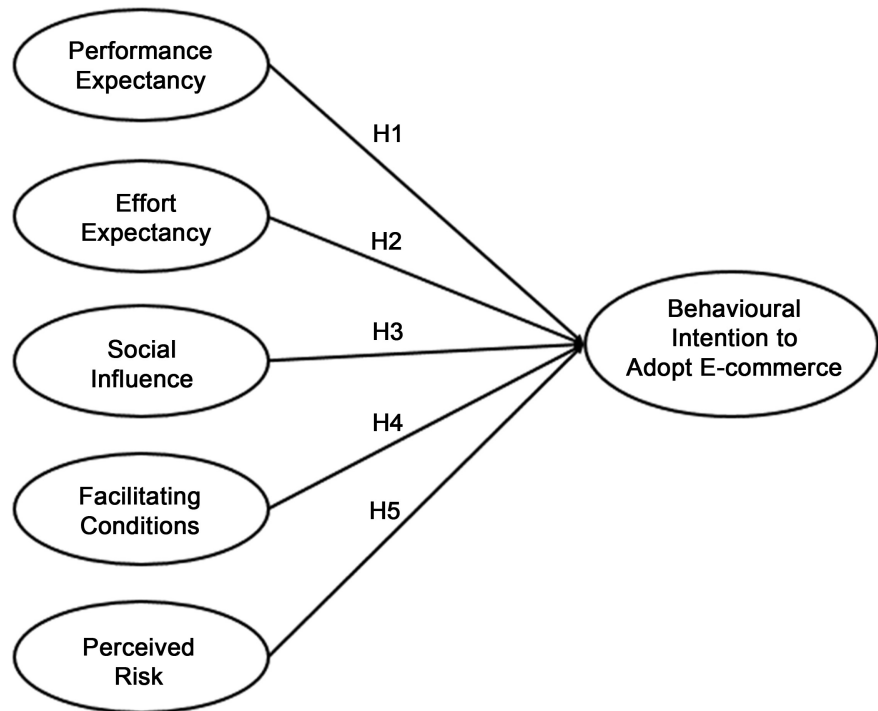


Figure 1. Adapted conceptual model. Source: (Chao, 2019).

whose intention was to improve the predictive powers of the behaviour of intentions to use technology (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., 2003) 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., 2003). 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) Theory of Perceived Risk

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 & 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 & 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 & Huang, 2009).

3) The Supply Chain Operations Reference Model (SCOR)

SCOR brings about a standard alignment of features and functionality in the supply chain (Milambo & Phiri, 2019). It is a framework developed by the Supply Chain Council to standardize and streamline supply chain management processes. It provides a set of best practices and key performance indicators (KPIs) that organizations can use to optimize and assess their supply chain operations.

2.3. Hypothesis Formulation

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 Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.

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

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

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

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

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

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

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

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

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

3. Research Methodology

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 rigorously and ethically.

3.1. 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 adopted a quantitative research design.

3.2. Data Collection

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 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. The target population was determined from a public list of 1854 registered dealers operating within the catchment area. 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).

3.3. Sample Size

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
- e is the margin of error

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

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.

3.4. Reliability of Data

The reliability of a scale indicates how free it is from random error (Pallant, 2016) 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 & 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 $\alpha < 0.5$ 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 2 provides a summary of Cronbach Alpha reliability statistics.

Table 2. Reliability statistics. Source: (SPSS reliability statistics output).

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of items
0.712	0.759	17

4. Analysis and Results

4.1. Descriptive Statistics

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 3 provides a summary of the demographic profile of the respondents.

4.2. 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 0.05) indicates normality. In this case, the Sig. value is 0.000, suggesting a violation of the assumption of normality. This is quite common in larger samples of $n > 300$ (Pallant, 2016).

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

4.3. Inference Statistics

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, 2016). The size of the absolute value provides information on the strength of the relationship. Hemphill (2003) suggests the following interpretation guidelines: Small $r = 0.10$ to 0.29 ; Medium $r = 0.30$ to 0.49 and large $r = 0.50$ to 1.0 .

Table 5 provides the correlation and significance analysis between variables.

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

Table 5 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.

Table 3. Demographic profile. Source: (SPSS descriptive analysis output).

Variable	Frequency	Percentage	Mean	Standard Deviation	Minimum	Maximum
Gender						
Male	195	59.3				
Female	134	40.7				
Total	329	100.0	1.4073	0.49208	1.00	2.00
Age Group						
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
Performance Expectancy	329		19.9757	0.15426	19.00	20.00
Effort Expectancy	329		19.9696	0.17193	19.00	20.00
Social Influence	329		19.9696	0.17193	19.00	20.00
Perceived Risk	329		14.9970	0.5513	14.00	15.00
Facilitating Conditions	329		19.9939	0.07785	19.00	20.00
Behavioural Intention	329		20.0243	0.15426	20.00	21.00

Table 4. Normality tests. Source: (SPSS descriptive analysis output).

	Kolmogorov - Smirnov		
	Statistic	df	Sig.
Performance Expectancy	0.538	329	0.000
Effort Expectancy	0.540	329	0.000
Social Influence	0.540	329	0.000
Perceived Risk	0.519	329	0.000
Facilitating Conditions	0.525	329	0.000
Behavioural Intention	0.538	329	0.000

4.4. Hypothesis Testing, Results and Interpretation

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 (2013)* provide 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 ($r = 0.9$ and above) (*Tabachnick & Fidel, 2013*). 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 5. Correlations and significance. Source: (SPSS analysis output).

		1	2	3	4	5	6
Performance Expectancy	Pearson Correlation	1	1				
	Sig (2-tailed)						
	N	329	329				
Effort Expectancy	Pearson Correlation	0.777**	1				
	Sig (2-tailed)	0.000					
	N	329	329				
Social Influence	Pearson Correlation	0.662**	0.794**	1			
	Sig (2-tailed)	0.000	0.000				
	N	329	329	329			
Perceived Risk	Pearson Correlation	0.350**	0.312**	0.312**	1		
	Sig (2-tailed)	0.000	0.000	0.000			
	N	329	329	329	329		
Facilitating Conditions	Pearson Correlation	0.242**	0.442**	0.442**	-0.004**	1	
	Sig (2-tailed)	0.000	0.000	0.000	0.000		
	N	329	329	329	329	329	
Behavioural Intention	Pearson Correlation	-0.488**	-0.662**	-0.892**	-0.350**	-0.242**	1
	Sig (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	329	329	329	329	329	329

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

Table 6 provides the regression output.

Table 7 provides the regression model summary output.

Table 8 provides the ANOVA output.

The R-value in the model summary in **Table 5** 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. = 0.000) 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)**

Table 6. Regression output. Source: (SPSS analysis output).

Model	Unstandardized Coefficients		Standardized Coefficients		Correlations		Collinearity Statistics		
	Std. Error	Beta	t	Sig	Zero-Order	Partial	Part Tolerance	VIF	
(Constant)	1.296		23.801	0.000					
1 Performance Expectancy	0.035	0.261	7.461	0.000	-0.488	0.383	0.158	0.368	2.717
Effort Expectancy	0.039	-0.088	-2.041	0.042	-0.662	-0.113	-0.04	0.241	4.154
Social Influence	0.032	-1.057	-29.284	0.000	-0.892	-0.852	-0.62	0.346	2.890
Perceived Risk	0.065	-0.083	-3.589	0.000	-0.350	-0.196	-0.76	0.844	1.185
Facilitating Conditions	0.049	0.201	8.093	0.000	-0.242	0.411	0.172	0.731	1.369

Table 7. Model summary. Source: (SPSS analysis output).

Model	R	R Square	R Square Change
1	0.924	0.854	0.854

Table 8. ANOVA source: (SPSS analysis output).

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	6.668	5	1.334	378.773	0.000
	Residual	1.137	323	0.004		
	Total	7.805	328			

state 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 6** indicate a positive and significant relationship between Performance Expectancy and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = 0.261, p < 0.05$).

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 6** indicate a negative and significant relationship between Effort Expectancy and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = -0.088, p < 0.05$).

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 6** indicate a negative and significant relationship between Social Influence and Behavioral Intention to adopt e-commerce systems for

Table 9. 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.	($\beta = 0.261$, $p < 0.05$).	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.	($\beta = -0.088$, $p < 0.05$).	Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative.
H3	Social Influence has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	($\beta = -1.057$, $p < 0.05$).	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.	($\beta = 0.201$, $p < 0.05$).	Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative.
H5	Perceived Risk has a significant effect on the Behavioral Intention of retail and consumer goods traders to adopt e-commerce systems.	($\beta = -0.083$, $p < 0.05$).	Multiple Regression	Supported. P value less than the significance level therefore we reject the null hypothesis in favour of the alternative.

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 6** 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 6** indicate a negative and significant relationship between Perceived Risk and Behavioral Intention to Adopt e-commerce systems for Supply Chain Management ($\beta = -0.083$, $p < 0.05$).

Table 9 provides the summary of Hypothesis tests.

5. Discussion and Conclusions

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.

1) 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.

2) 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.

3) 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:

a) 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.

b) 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.

4) 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.

5) 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.

6. Limitations and Contributions

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. 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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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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