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Systematic Review

Systematic Review of E-commerce Adoption Barriers among SMEs in Africa

Ishetu Yonas Mengesha [1*], Fetene Bogale Hunegnaw [2], and Tsegaye Mulugeta Habtewold [2]

[1] Department of Technology and Innovation Management, Adama Science and Technology University (ASTU), Ethiopia
[2] Department of Technology and Innovation Management, Adama Science and Technology University (ASTU), Ethiopia

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CORRESPONDING EMAIL
* ishetuyom@gmail.com

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Abstract

Digitalization facilitates more efficient communication and operations between firms, provided that businesses adopt and effectively utilize digital technologies. In developing countries, particularly in Africa, SMEs are facing significant challenges in e-commerce adoption. The studies conducted on e-commerce adoption in Africa are inadequate and fragmented with country-specific studies. This study used Technological-Organizational-Environmental factors framework and analyzed 22 peer-reviewed articles published from 2015 to 2024. The findings revealed that limited digital literacy and inadequate ICT infrastructure are the most significant technological factors affecting e-commerce adoption. Among organizational factors, top management support and commitment play a crucial role, while legal and regulatory factors, as well as security and privacy concerns, are key environmental factors influencing e-commerce adoption among SMEs in Africa. Thus, a collaborative approach involving various stakeholders in each country is essential for facilitating successful e-commerce adoption.

1 Introduction

The wave of the fourth industrialization brought about the digitalization of various sectors with significant changes in manufacturing with the help of information and communication technologies (Sarbu, 2021). The technological changes and digitalization are highly affecting the interaction of people and their daily movements including their trade activities (Gorenšek & Kohont, 2019). In the African context, the African Union has recognized and designed digital strategy for Africa named as "Digital Transformation Strategy for Africa (2020-2030)" to harness the benefits of digital revolution by appropriately utilizing digital strategy (African Union, 2020).

Digitalization has become an essential driver of business growth and competitiveness, influencing organizational processes, communication, and internationalization strategies

(Truant et al., 2021). Researches indicate that digital technologies contributes to the efficiency and effectiveness of operation of firms and their performance, although adoption remains uneven across regions (Kotiranta et al., 2024; Truant et al., 2021). With the implementation of digitalization, SMEs has got freedom of entry into global trade and compete at international level by overcoming the traditional barriers (Telukdarie et al., 2023). One of the major areas where digital transformation has had a significant impact is e-commerce whereby it is driven by technological advancements and evolving consumer preferences (Sharma et al., 2023). According to Ardito et al. (2021), digitalization is facilitating efficient communication and increased business interaction between firms. However, such business communication is largely affected by the resources, capacities and capabilities to accept digital technologies (Estensoro et al., 2022).

Goyal and Morgan (2023) indicated that the level of readiness to accept and adopt e-commerce in developing countries is very low when compared with the developed economies. Such variation occurred due to the effects of poor infrastructure, low level of digital literacy and lack of access to digital payment platforms by the firms. However, researchers like Tempest (2020) did not agree with such findings, justifying that despite the challenges, the socio-geographical spread of Africa is suitable for the implementation of digital technologies like e-commerce. The policymakers in Africa are currently focusing on the expansion and the practical use of online platforms whereby individuals and firms are selling their products online which is showing the huge potential of e-commerce adoption in the region (Tempest, 2020). The e-commerce infrastructure of the most African countries is weak; the lack of e-commerce platforms, mobile payments and logistics and transportation problems are constraints to the adoption of e-commerce (Muchie et al., 2024). The lack of awareness of the advantages of e-commerce and the reluctance towards utilization of e-commerce technology has affected SMEs businesses which indirectly affect their contribution to the economy in developing countries (Aremu & Arfan, 2023).

The use of Technological-Organizational-Environmental (TOE) framework has received great attention after Tornatzky and Fleischer (1990) developed the framework. Academic research papers and studies have employed this framework in their analysis of factors affecting the adoption of technology. Such studies considered the main TOE framework dimensions including technological, organizational and environmental dimensions while adopting technologies. Without a robust digital infrastructure in place, SMEs will continue to face significant challenges when adopting e-commerce solutions (Anshari & Almunawar, 2022; Morris et al., 2022). Moreover, the environmental dimensions are the external factors that influences the technology adoption of firms. These factors include consumer behavior, peer competition and the regulatory related factors (Alraja et al., 2020; El-Haddadeh et al., 2021; Hashimy et al., 2023; Loo et al., 2025; Maroufkhani et al., 2020; Nugroho et al., 2017; Salma, 2020; Tiwari et al., 2023; Zhong & Moon, 2023).

According to Sun et al. (2024) and Su et al. (2023), the TOE framework helps examine the challenges of adoption of e-commerce among SMEs by incorporating its dimensions of TOE in such research fields. In lieu of this fact, our study employed the TOE model which helps frame the barriers of e-commerce adoption among SMEs in Africa. Using this framework, technological factors such as internet connectivity, ICT infrastructure, electronic payment methods as well as organizational dimensions were assessed which comprised of management support, innovation cultures, digital training, and employee skills. Moreover, external scenarios such as competitions, security and privacy as well as legal and e-commerce regulations were assessed using the TOE framework.

Some of the previous studies conducted in Africa described a broad range of factors affecting the e-commerce adoption that were categorized as inadequate financial requirement, peer and competitive pressures, security issues and limitations related to infrastructures (Almunawar et al., 2022; Joseph, 2019; Minayo Amugune & Oduor, 2024). Despite the special insights provided by previous studies, their findings remained frag-

mented and focused only on e-commerce adoption of specific countries in Africa and in some cases factors affecting the adoption has been addressed. Thus, this does not give the clear and relevant evidence across African countries. In addition, the lack of systematic analysis of the prior studies by integrating the barriers hindering the e-commerce adoption has limited usability of data and information among policy makers, business owners and managers as well as stakeholders (Ocloo et al., 2020).

The organization of the paper follows the structure. The next section presents the objectives of the study whereby the specific aims of the study were addressed. Section 3 describes the methodological approach of the study is presented giving detail explanation of the methods and techniques used to conduct the study. Section 4 is all about the result of the study which presents the detail of study findings. Finally, the conclusion and recommendations of the study are presented along with the future research directions.

2 Objectives of the Study

With the growing integration of digitalization in business operations, e-commerce in particular is recognized as a crucial tool for enhancing SME competitiveness. This enables more efficient communication, process optimization, and competitive advantage among business firms (Truant et al., 2021). However, evidences of the factors associated with the e-commerce adoption in Africa remained fragmented and inconsistent. Most existing studies focused on individual countries or specific industries, which makes it difficult to build a clear, region-wide understanding. In addition, there is lack of comprehensive study involving systematic literature review that brought together and evaluated the challenges of e-commerce adoption among African SMEs that are using a common analytical framework. The absence of consolidated evidence weakens the basis of policy decision and strategic plan with respect to e-commerce adoption.

Therefore, this study systematically reviewed prior research works to consolidate the dispersed findings and develop a comprehensive evidences on the barriers that SMEs are facing while adopting e-commerce in Africa. The main aim of the study is to identify the key barriers arising from technological, organizational, and environmental dimensions that are influencing the e-commerce adoption in Africa. In addition, this study generates evidence-based insights for policymakers, researchers, and other stakeholders. It, thus, examine the technological factors including internet connectivity, technological infrastructures, and electronic payment systems; organizational factors including management support, digital skills, training and finally the environmental factors such as competition, security and privacy concerns, and legal and e-commerce regulations.

3 Research Methodology

This study employed systematic review of literatures to synthesize scientific evidence in answering the research questions and designed to examine the barriers of e-commerce adoption among SMEs in Africa. The authors identified, extracted, analyzed, and synthesized the findings of the previous studies to gain comprehensive and detailed understanding of the investigated domain during the review process (Van Dinter et al., 2021). The authors preferred this method to provide compiled information and a big pictures for policy makers and practitioners to base their decisions on evidence (Bangdiwala, 2024). This study was conducted by analyzing various studies while conducting the systematic review focusing on e-commerce adoption. The systematic literature review was thus applied to systematically identify, select and analyze the research articles retrieved from the ScienceDirect research database on the specific area of e-commerce adoption among

SMEs in Africa. This review is intended to examine the barriers of e-commerce adoption among SMEs with African context. The study enables policy makers, business owners or managers and academicians to make fruitful decisions with respect to e-commerce adoption (Ardito et al., 2021; Tolstoy et al., 2021).

3.1 Data Sources

This study used an internationally recognized research database, ScienceDirect, as its data source which is Scopus-indexed and also provides high-quality and scientifically accepted research papers and articles. In addition, to obtain the relevant research papers for this systematic review, the search terms were selected depending on the title of the study, 'Systematic Review of E-commerce Adoption Barriers among SMEs in Africa', with the study objective of examining the barriers of e-commerce adoption in Africa.

3.2 Inclusion and Exclusion Criteria

While undertaking this study, it is important to set criteria for the inclusion and exclusion that helps focus on relevant data and information. The study identified and used the journal articles that are related to this study and has a detailed description of the barriers of e-commerce adoption in Africa. As it is crucial to set inclusion and exclusion criteria for the data extraction and to use the data for the study, the authors have considered research articles specifically conducted on e-commerce adoption among SMEs in Africa and published at ScienceDirect scientific research database. Apart from this, the research articles conducted on developing countries were included to get additional data and information on the area of concern. The study included research articles published from 2015 to 2024 to provide more recent knowledge of e-commerce.

On the other hand, this study excluded research articles published before 2015, unpublished researches, case reports, discussions, editorials and others to make the study more scientific, academic and attractive. Moreover, the authors excluded the studies that are not written in the English language and do not have full texts to be used for the review of literatures. As far as the systematic review is aimed at assessing barriers of e-commerce adoption in Africa, the authors used the papers done specifically on Africa or African countries and developing countries that discuss the subject area in the context of Africa. Finally, research articles that did not have full content were excluded.

This study considered the journal articles published from 2015 to 2024 using the search terms based on Boolean operators and phrase search prepared for this purpose depending on the title of the study. Among the Boolean operators, this study used AND and OR and developed a clear and unambiguous grouping of search terms as (barriers) AND ("e-commerce adoption" OR electronic commerce adoption") AND ("SMEs" OR "small and medium enterprises") AND (Africa OR developing countries) to retrieve relevant research articles. The date of the last search was conducted on October 25, 2025.

3.3 Bias and Quality Assessment

The authors have tried to minimize the different types of bias arising from the data sampling and the data itself. The scope and design bias was addressed by carefully collecting data on e-commerce adoption in Africa focusing on the challenges that SMEs are currently facing. This was undertaken through extensive consideration of the objectives of the study. On the other hand, location bias was handled by including only the

peer-reviewed articles that were conducted on Africa or African countries or developing countries.

Moreover, the selection bias, which may occur during review, was minimized since the review was done by the three authors, including the corresponding author and the other two co-authors. This ensured a common and multidimensional understanding of the study contents among different authors. Thus, to handle the bias associated with the weighting of evidence, the study employed CASP (Critical Appraisal Skills Programme) to assess the quality and risk of bias associated with qualitative studies. It, thus, provides a simple and structured framework. The CASP tool contained 10 questions that are relevant to the studies and data included. The summary of the CASP questions was conducted for all the 22 selected studies as shown in Annex 1 and the summary of the CASP score and quality ratings is presented in Table 1.

Table 1: CASP (Critical Appraisal Skills Programme) Checklist

No.	Citation	Country/Region	Study Design	CASP Score (Out of 10)	Quality Rating
1	Faiz et al. (2024)	Indonesia	Partial least square structural equation modeling, artificial neural network (ANN)	8	High Quality
2	Gaglio et al. (2022)	South Africa	Two-Stage Least Squares Regression Model	7	Moderate Quality
3	Peter et al. (2023)	Nigeria, Uganda, Kenya, and South Africa	Focused group discussion method	7	Moderate Quality
4	Dahbi and Benmoussa (2019)	Morocco	Case study research method	8	High Quality
5	Hussain et al. (2020)	Pakistan	Partial least square structural equation modeling	8	High Quality
6	Zhao et al. (2024)	China	Partial least square structural equation modeling	8	High Quality
7	Salah and Ayyash (2024)	Palestine	Partial least square structural equation modeling	8	High Quality
8	Singh and Sahu (2022)	Ethiopia	Descriptive statistical analysis	8	High Quality
9	Gupta et al. (2023)	Not indicated	Integrated two-phase decision-making model	7	Moderate Quality
10	Menaouer et al. (2021)	Algeria	Descriptive statistics	4	Low Quality
11	Yadav et al. (2022)	Developing countries	Fuzzy DEMATEL approach	8	High Quality
12	Xiao et al. (2024)	Developing countries	Two-factor fixed effects model	8	High Quality
13	Awotunde et al. (2022)	Nigeria	SEM and ANFIS approach	8	High Quality
14	Singh et al. (2016)	Ethiopia	Survey (online)	8	High Quality

Continued on next page

Table 1 – continued from previous page

No.	Citation	Country/Region	Study Design	CASP Score (Out of 10)	Quality Rating
15	Ayawei et al. (2023)	South African and Nigerian	Partial least squares structural equation model	8	High Quality
16	Kabanda and Brown (2017)	Tanzania	Interpretivist framework	4	Low Quality
17	Badran (2021)	Egypt	Analytical framework	3	Low Quality
18	Morsi (2023)	Egypt	Analytic hierarchy process (AHP)	8	High Quality
19	Kabanda and Matsinhe (2019)	Mozambique	Thematic cross-case analysis	4	Low Quality
20	Adel (2024)	Africa, Asia, Latin America	General Methods of Moments (GMM) model	8	High Quality
21	Akintoye et al. (2022)	Nigeria	Exploratory research method	3	Low Quality
22	Kabo-Bah and Bannor (2025)	Ghana	Inverse probability weighted regression adjustment (IPWRA)	8	High Quality

CASP score and quality ratings: 8–10 => High quality; 6-7 => Moderate quality; 0-5 => Low quality
Source: Derived from CASP (2018)

Table 1 shows that out of the 22 studies included in the systematic literature study, 14 studies had High Quality scores, above 8 points out of 10, implying that these studies meet most or all of the key methodological and criteria of the CASP checklist. On the other hand, 5 studies have shown Low Quality rating with cumulative of less than 5 out of 10, which shows limited methodological rigor and insufficient data reporting.

In addition to the CASP checklist, this study employed a Fleiss' kappa (k) to validate inter-rater reliability among the three authors while selecting journal articles. Fleiss' kappa (k) is a chance-corrected statistic designed for the measurement of agreement among more than two raters using categories (Moons & Vandervieren, 2025). This tool was selected because it provides well-established method for assessing agreement among more than two raters when compared to Cohen's kappa (Dumas et al., 2022; Fleiss, 1971). Thus, the authors identified 561 journal articles based on the criteria set during data extraction and used Fleiss kappa k-statistics to screen the studies for inclusion in the analysis. Based on the detail of Fleiss' kappa (k), the total number of ratings was 1,683 (561*3) with 977 "Include" ratings, and 706 "Exclude" ratings. Thus, as shown in Table 2, the calculated value of k was 0.6242, indicating substantial agreement among the authors and a high level of consistency in inclusion and exclusion decisions beyond chance.

3.4 Data Extraction and Search Terms

The authors conducted data extraction and completed in October 2025. They searched the research articles from the ScienceDirect research database using advanced search, where the terms were linked with Boolean operators "AND" and "OR". The study used the search terms: (challenges) AND ("e-commerce adoption" OR "electronic commerce adoption") AND ("SMEs" OR "small and medium enterprises") AND (Africa OR "developing countries"), entered in the field 'Find articles with these terms' in ScienceDirect database. In general, 609 research articles were found from the database from 2015 to 2024. Among these, 561 journal articles were selected for extraction after removing duplicates, and excluded 172 with no full documents and remained with 389 papers.

Table 2: Summary of Fleiss' kappa (k)

Summary of Fleiss' kappa (k)	
Number of studies (N)	561
Number of reviewers (n)	3
Number of Include	977
Number of Exclude	706
Overall agreement ($\bar{P}$)	0.816993464
p_include	0.580510992
p_exclude	0.419489008
Expected agreement ($\bar{P}_e$)	0.51296404
Fleiss' Kappa (κ)	0.624244305

Source: Author Analysis, 2026

Moreover, the search result excluded journal articles not relevant to the title of the study or contains only one or two search terms in the title. The studies that are not conducted in Africa, any African countries or developing countries including Africa were also excluded. Using these search terms, 275 journal articles were excluded and only 114 studies were included. After thoroughly reading abstracts and findings, 76 studies were excluded since they did not mention e-commerce adoption, SMEs, Africa or African countries. Thus, 38 research articles were evaluated for full text content analysis and relevancy of the research sections and thus 22 final studies were included in this systematic research, as shown in Figure 1.

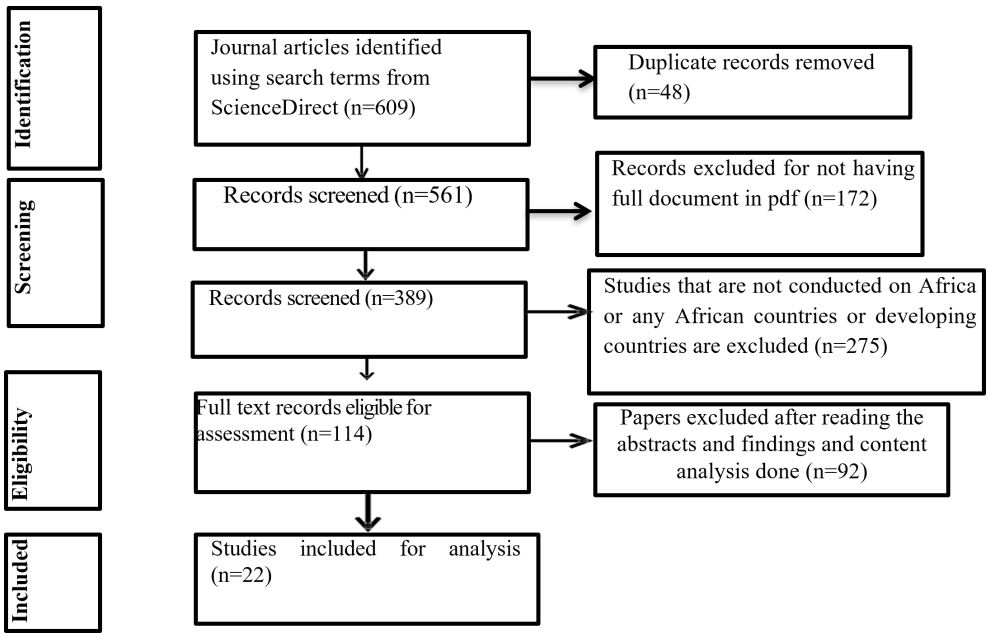

Figure 1: PRISMA flowchart

3.5 Data Analysis

In this systematic literature review, thematic data analysis was used to identify the challenges associated with e-commerce adoption among SMEs in Africa. Thematic analysis was conducted due to its simplicity in analyzing patterns or themes of e-commerce adoption challenges (Naeem et al., 2023). This study aims at identifying the challenges of e-commerce adoption among SMEs in Africa. When conducting the thematic analysis,

all the identified journal articles were read, and the findings of each paper were summarized in table format. After summarizing the findings, the authors manually grouped each challenge identified by the studies. The findings of each study were then compiled and categorized into technological, organizational and environmental factors using the TOE framework.

4 Results

4.1 Technological Factors

Technological factors are among the critical challenges in any technology adoption process, including e-commerce. Dahbi and Benmoussa (2019) argued that business leaders often prefer traditional ways of doing business over adopting new technologies. This implies that the intentions and interests of company owners and business managers determine how such factors are addressed. Accordingly, the lack of employee soft skills and knowledge of e-commerce significantly affects companies during e-commerce adoption. Apart from the employee digital skills, customers' lack of technological knowledge highly affects the adoption process (Dahbi & Benmoussa, 2019). Similarly, Salah and Ayyash (2024) argued that customers' technological savviness strongly affects e-commerce adoption among SMEs, because individuals with higher technological interest can more easily use of e-commerce platforms. This finding emphasizes on the importance of tech-savviness in facilitating adoption of e-commerce by SMEs in Palestinian.

Moreover, Singh and Sahu (2022) focused on the lack of ICT infrastructure stating that e-commerce adoption is based on the development of digital technology and ICT infrastructure including internet connectivity. In addition, technological infrastructure is not an end by itself but must be supported by digital literacy, as well as computer knowledge. The low digital literacy, lack of IT expertise, and gaps in computer knowledge make e-commerce adoption difficult for SMEs to operate, and sustain e-commerce (Awotunde et al., 2022; Kabanda & Brown, 2017; Singh & Sahu, 2022). Singh et al. (2016) conducted a study on Ethiopian apparel manufacturing and indicated that the lack of e-commerce infrastructure primarily prevents consumers from shopping online for apparel product. In addition, Xiao et al. (2024) revealed that high illiteracy contribute to low level of technology adoption implying that literacy is the fundamental factor for the technology adoption. Improving SMEs' digital literacy and their accessibility to technology is thus very important for creating a base for extensive use of e-commerce. The limited experience of SMEs with digital communication and technologies also shows a negative effect on the direct online sales (Gaglio et al., 2022).

4.2 Organizational Factors

The TOE framework clearly highlights the importance of organizational factors in technology adoption. Among these, Ayawei et al. (2023) showed that organizational culture with (p-value = 0.041) is significantly and positively related to e-commerce adoption by business to business SMEs, as organizational culture sets boundaries in which organizational activities may occur. E-commerce, as a key organizational activity, is influenced by the established norms, operational practices, and cultural values shaped by the firm's culture. A digital culture that embraces technology and innovation is particularly critical for SMEs (Badran, 2021; Faiz et al., 2024). The study by Faiz et al. (2024) further justified that digital culture has substantial effect on the adoption of e-commerce by SMEs' when compared to other variables. The firms with strong digital culture can integrate new technologies into their plans, use flexible governance structures, and make digital

platforms that can change as needed (Salah & Ayyash, 2024). This is reinforced by the top management support which is a major factor in technology adoption.

Quantitative study conducted by Hussain et al. (2020) and Badran (2021) confirmed that top management support has significant positive effect (beta = 0.358; $p < 0.05$) on the adoption of e-commerce and its utilization. This implies that with the low level of top management engagement, the firms unable to successfully adopt e-commerce and this will be a critical barrier. The top management decision determine whether SMEs implement and enhance services through e-commerce adoption (Awotunde et al., 2022; Yadav et al., 2022). Dahbi and Benmoussa (2019) further explained that most employees are unaware of e-commerce, relying on traditional methods, which highlights crucial role of management direction. The quality of information, systems and services highly influences consumers' preference to adopt e-commerce (Adel, 2024; Zhao et al., 2024).

4.3 Environmental Factors

The SMEs face several barriers that must be addressed to ensure business success including data privacy and security, market conditions and competition (Gupta et al., 2023). Moreover, competitive pressure and pressure from customers and suppliers significantly affects the e-commerce adoption among SMEs (Ayawei et al., 2023; Dahbi & Benmoussa, 2019; Hussain et al., 2020; Salah & Ayyash, 2024). The studies conducted on Moroccan SMEs indicated that competitive pressure is not a determinant, as current competition among SMEs does not significantly affect their market shares (Faiz et al., 2024; Kabanda & Matsinhe, 2019; Kabo-Bah & Bannor, 2025).

The environmental factors such as legal frameworks, government regulations, policies and security issues are the major factors affecting e-commerce adoption (Akintoye et al., 2022; Singh & Sahu, 2022). The regulatory inconsistencies across different regions hinder adoption, while security and privacy issues significantly affect customers from online purchases (Kabanda & Brown, 2017; Singh et al., 2016). In addition, poor connectivity and customer trust are currently affecting the e-commerce adoption in Nigeria (Akintoye et al., 2022). This is in opposite of the study done by Xiao et al. (2024) and Morsi (2023) which shown that the higher perceived privacy and security risks hinder the adoption of digital technologies, underscoring that apprehensions about data protection and system security act as substantial barriers to technological adoption. Most importantly, security and safety, and legal factors are significantly affecting the adoption of appropriate technology and new technologies among African manufacturing SMEs. In their study of drop shipping in e-commerce, Menaouer et al. (2021) and Peter et al. (2023) argued that e-commerce is partially implemented due to lack of personal data protection and inadequate information about the provider, warranty guarantees, and consumers' legal rights.

This study identified and examined the barriers of e-commerce adoption using TOE framework tracing the studies conducted in Africa. Accordingly, the dominant factors of technological dimensions are identified as inadequate digital literacy and inadequate knowledge of digital skills among employees of SMEs. Among the 22 studies selected for analysis, this study revealed that 12 (twelve) studies have indicated that issues related with digital skills and digital literacy as well as related trainings are significantly affecting the e-commerce adoption in Africa. These factors are also persistently recurring in the studies conducted by different scholars throughout the period 2015 - 2024. In addition, among the organizational factors indicated in different studies, top management support and management commitment were addressed 5 times and this shows that management support and commitment is affecting the e-commerce adoption (Table 3).

Table 3: Summary of Dominant Factors (Frequency, trends of TOE factors)

Category	Dominant Factors	Frequency (Studies)	Example Citations
Technological	Digital literacy, digital skills	High (12/22)	Faiz et al. (2024); Gaglio et al. (2022); Singh and Sahu (2022); Xiao et al. (2024); Badran (2021); Adel (2024); Ayawei et al. (2023); Morsi (2023); Dahbi and Benmoussa (2019); Gupta et al. (2023); Awotunde et al. (2022); Singh et al. (2016)
Organizational	Top management support and commitment	Low (5/22)	Faiz et al. (2024); Hussain et al. (2020); Yadav et al. (2022); Awotunde et al. (2022); Kabanda and Matsinhe (2019)
Environmental	Legal & Regulations factors; privacy and security issues	Low (6/22)	Peter et al. (2023); Singh and Sahu (2022); Xiao et al. (2024); Akintoye et al. (2022); Singh et al. (2016); Kabanda and Matsinhe (2019)

Source: Authors Compilation, 2026

5 Conclusions

This study investigated the e-commerce adoption among SMEs in Africa with the dynamics of analyzing the technological, organizational, and environmental factors hindering e-commerce adoption. The evaluation was conducted using the TOE framework. Apart from technological readiness, SMEs' decisions to adopt e-commerce depend on broader factors including capacity, capability, and e-commerce skills. Among such factors, technological barriers highly affect e-commerce adoption by SMEs in Africa. Inadequate technological infrastructure and low digital skills are found to be the most important technological factors that affect the adoption and effective use of e-commerce among SMEs in Africa. Thus, such technological factors bring about structural barriers that hinder SMEs from adopting e-commerce.

On the other hand, among the organizational factors of TOE, managerial support has emerged as the most decisive determinant of e-commerce adoption. The top managers of SMEs that are equipped with a strong digital culture prioritize innovation, encourage digital experimentation, and allocate resources for technology adoption like e-commerce. Moreover, the environmental factors such as strong legal and regulatory conditions, high levels of security issues and peer competition influence e-commerce adoption. In general, successful e-commerce adoption involves the integration of all factors of TOE dimensions. A coordinated, multi-level strategy is required to strengthen e-commerce adoption among SMEs. The business owners along with their business managers should focus on enhancing digital literacy for their staff and create awareness for customers.

In addition, SME owners should strengthen a digital culture and improve IT capabilities to sustain e-commerce adoption and utilization. Above all, governments and intergovernmental organizations working for the continent of Africa including the African Union should give attention to adjusting regulatory frameworks, strengthening security and consumer protection mechanisms. Finally, the digital ecosystem players such as telecom providers, financial institutions and digital platforms should be included in e-commerce

adoption. In this regard, Ministries of Science, Technology and Innovations in African countries as well as similar ministries which share the same role should discharge their responsibility of promoting intra-African integration in e-commerce and digital trade. This can be mainly achieved through a wider participation of SMEs in the national, regional and international e-commerce adoption especially in cross-border trade activities.

6 Theoretical and Policy Implications

6.1 Theoretical Implications

With the use of TOE framework, this study validates the understanding of the barriers to e-commerce adoption including the technological, organizational, and environmental factors that are given priority by the researchers and academicians. This study has emphasized on technological capabilities such as digital literacy and skills were remained the major barriers of e-commerce adoption among SMEs. In terms of organizational dimensions of TOE framework, this study has given more focus to the management support and commitment towards e-commerce adoption by SMEs in Africa. Among the environmental dimensions of TOE framework, the legal and regulatory framework has limited the capacity of SMEs to adopt e-commerce for their businesses.

6.2 Policy Implications

The findings of the study indicate the roles of policy makers in shaping the digital capacity and skill development for SME owners, managers and employees in advancing the e-commerce adoption in Africa. In addition, government bodies play a crucial role in facilitating legal and regulatory frameworks that are supportive for e-commerce adoption among SMEs. The government has the capacity of creating a favorable legal, regulatory, and secure environment that can strengthen firms' confidence in adopting and integrating e-commerce into their business operations thereby improving their business performance. In this sense, enabling the environment that promotes SMEs' sustainable adoption of e-commerce can be greatly supported by cooperation between government agencies, businesses, and digital service providers.

7 Future Research Recommendations

The analysis of this study depended mainly on secondary data using existing research articles on e-commerce adoption among SMEs in Africa which are obtained from published research articles. However, the lack of high-quality articles focusing on Africa or developing countries has limited the scope of the study to only focus on the barriers of e-commerce adoption among SMEs. In addition, most researches were published in local journals with low scientific acceptance and have constrained the authors to focus on a limited area of e-commerce adoption. The future researchers may consider using primary and secondary data to conduct empirical analysis of the barriers of e-commerce adoption among SMEs in Africa. In addition, future studies would better use firm-level data collected through surveys and interviews, employing both quantitative and qualitative research approaches. This would help to show the multidimensional nature of e-commerce adoption by SMEs and give clearer understanding of TOE factors and establish a cause-effect relationship among the dependent and independent variables.

Moreover, future research should give focus on comparative analysis of e-commerce adoption among different regions of Africa to identify similarities and differences on adoption levels, factors affecting e-commerce adoption and SMEs' responses to adopting e-commerce. Furthermore, there is still a huge gap in research findings based on sector-specific analysis and SMEs' business performance before and after the adoption of e-commerce. Thus, future studies are highly encouraged to include topics such as 'Impact of E-commerce Adoption on SME Business Performances in Africa or any country in Africa', 'Comparative Analysis of E-commerce Adoption in Africa with specific to Regional compartments', and also 'The Role E-commerce Adoption in Manufacturing Sectors and Export Performance of SMEs' to enable policy makers in the process of decision-making process.

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Data Availability

Data can be made available on the behavior of the request

Declaration of interests' statement

The author declare no competing interests.

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