ARTIFICIAL INTELLIGENCE-DRIVEN TRADE EFFICIENCY AND INCLUSIVE ECONOMIC GROWTH IN AFRICA: OPPORTUNITIES, CHALLENGES, AND POLICY DIRECTIONS

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Abstract

This study examines the relationship between trade, economic growth, and artificial intelligence (AI) in Africa within the context of increasing globalization and digital transformation. It explores how trade liberalization initiatives, particularly the African Continental Free Trade Area (AfCFTA), interact with emerging AI technologies to influence productivity, market efficiency, and long-term economic development. The study is grounded in a qualitative synthesis of existing literature drawn from development institutions, policy reports, and peer-reviewed academic sources. Findings reveal that while trade openness enhances market access and regional integration, structural constraints such as weak infrastructure, limited industrialization, and governance challenges reduce its effectiveness. Simultaneously, AI is found to significantly improve efficiency in e-commerce, supply chains, and digital markets; however, its adoption in Africa remains limited. The study highlights the absence of integrated frameworks that jointly analyze trade and AI in Africa. It concludes that aligning trade policies with digital transformation strategies is essential for inclusive and sustainable growth in the region.

1. Introduction

Trade and economic growth in Africa have increasingly been shaped by globalization, digital transformation, and evolving trade frameworks that aim to enhance regional integration and productivity. Key policy initiatives such as the African Continental Free Trade Area (AfCFTA) represent a major milestone in reducing trade barriers and promoting intra-African commerce (African Union Commission, n.d.). Complementing this, development perspectives highlight persistent structural constraints, including infrastructure gaps and limited industrial diversification, which continue to hinder growth potential (African Development Bank, 2021). At the global level, shifts in trade governance and digital trade rules under the World Trade Organization (WTO, 2020) further influence Africa's participation in

global markets. Meanwhile, the World Bank (2021) emphasizes that Sub-Saharan Africa's growth trajectory remains uneven despite reform efforts. This study is situated within this evolving context, examining how trade dynamics interact with emerging digital technologies, particularly artificial intelligence, to shape economic outcomes in Africa.

Artificial intelligence (AI) has become a transformative force in global economic systems, reshaping production, consumption, and service delivery structures. In advanced economies, AI-driven innovations are increasingly embedded in business operations, improving efficiency, decision-making, and market responsiveness (Brynjolfsson & McAfee, 2017). In particular, AI applications in digital platforms and intelligent systems are redefining how firms engage with consumers and manage resources (Gallino & Moreno, 2020). Furthermore, AI technologies such as machine learning and predictive analytics are being integrated into commerce systems to optimize transactions and logistics processes (Li et al., 2020). Despite these advances, the diffusion of AI remains uneven globally, with developing regions lagging behind in adoption and infrastructure readiness. This technological asymmetry raises important questions about how AI can contribute to inclusive development, particularly in regions like Africa where structural and institutional constraints persist.

These systems use machine learning algorithms to streamline transactions, improve logistics, and customise customer experiences. AI can evaluate consumer behaviour and make relevant product recommendations, increasing customer satisfaction and revenue. AI also helps supply chains run more smoothly by forecasting changes in demand and suggesting the most effective shipping routes, which eventually results in lower costs and faster delivery. Access to international markets may become more accessible as a result of this AI integration. As AI-powered translation tools enable smaller enterprises in developing nations to interact with a wider audience, language boundaries are beginning to fall apart. Additionally, AI simplifies customs procedures, lowering administrative costs for companies of all sizes and improving access to global trade (International Monetary Fund, 2021

From an African perspective, trade and growth performance are strongly influenced by macroeconomic conditions, governance structures, and external shocks. The African Development Bank (2021) reports that recovery from economic disruptions remains fragile, with many economies struggling to sustain growth momentum. Similarly, the International Monetary Fund (IMF, 2021) highlights that technological progress, including AI, could serve as a catalyst for inclusive growth if properly harnessed. However, Africa's participation in global trade continues to be shaped by commodity dependence and limited value addition, constraining long-term competitiveness. The World Bank (2021) further notes that digital infrastructure deficits and institutional weaknesses limit the continent's ability to fully benefit from technological change. These conditions suggest that while trade liberalization initiatives exist, their effectiveness may depend on complementary technological adoption, particularly in emerging digital economies.

Artificial intelligence is increasingly recognized as a key enabler of efficiency in e-commerce, logistics, and supply chain systems. Literature shows that AI enhances decision-making processes, improves customer targeting, and optimizes operational efficiency across digital marketplaces (Sarker et al., 2020). In online commerce environments, AI-powered

systems are used for personalization, demand forecasting, and automated customer interaction (Symeonidis et al., 2019). These developments demonstrate that AI not only improves firm-level productivity but also strengthens overall market efficiency. Furthermore, integrated AI applications in e-commerce platforms contribute to improved coordination across supply chains, reducing transaction costs and enhancing responsiveness (Li et al., 2020). However, most existing studies focus on developed economies, leaving limited understanding of how these innovations interact with trade structures and growth dynamics in developing regions, particularly Africa.

Despite growing literature on trade liberalization and artificial intelligence independently, there remains a significant research gap regarding their intersection in the African context. Existing studies rarely integrate trade policy frameworks, economic growth dynamics, and AI adoption within a unified analytical perspective. For instance, while AfCFTA is expected to enhance intra-African trade (African Union Commission, n.d.), little is known about how AI-enabled systems could amplify or constrain its effectiveness. Similarly, although AI is widely studied in global commerce (Brynjolfsson & McAfee, 2017), its implications for structurally constrained economies remain underexplored. This study addresses this gap by examining the combined influence of trade openness and AI diffusion on economic growth in Africa, considering the region's unique institutional and developmental characteristics.

Against this background, the study is guided by three main objectives. First, it examines the relationship between trade openness and economic growth in Africa within the context of evolving global trade systems (WTO, 2020). Second, it investigates the role of artificial intelligence in shaping economic performance and productivity dynamics across African economies (IMF, 2021). Third, it analyzes the interactive effect of trade integration and AI adoption on growth outcomes, particularly in Sub-Saharan Africa (World Bank, 2021). The structure of the article is as follows: Section One introduces the study and outlines the research problem; Section Two reviews relevant literature; Section Three presents the conceptual framework; and Section Four concludes with policy implications and directions for future research.

2. Literature

The literature on trade, growth, and artificial intelligence (AI) increasingly emphasizes the interconnectedness of global integration, technological transformation, and development outcomes, particularly in emerging economies. Trade liberalization has long been positioned as a key driver of economic expansion through market access, specialization, and productivity gains. In Africa, regional integration initiatives such as the African Continental Free Trade Area (AfCFTA) have been identified as critical instruments for enhancing intra-regional trade and industrialization (African Union Commission, n.d.). However, structural constraints such as weak infrastructure and high trade costs continue to limit Africa's full participation in global trade systems (World Bank, 2018). Additionally, external trade frameworks such as the African Growth and Opportunity Act (AGOA) provide preferential access to global markets but have produced uneven developmental outcomes across countries (African Growth and Opportunity Act [AGOA], n.d.). Broader global trade governance structures also shape Africa's trade dynamics, including tariff regimes and non-tariff barriers documented by the World Trade Organization (WTO, 2019) and the United States International

Trade Commission (USITC, 2019). These studies collectively highlight that while trade openness is beneficial in principle, its effectiveness depends on structural readiness and policy coherence.

Further literature underscores the role of external actors and geopolitical dynamics in shaping Africa's trade and development trajectory. Alden (2019) highlights China's growing economic presence in Africa, noting both opportunities for infrastructure development and concerns regarding dependency and trade imbalances. Similarly, trade policy instruments from advanced economies, such as those outlined by the United States Trade Representative (USTR, 2020), influence Africa's export competitiveness and market access conditions. The United Nations Economic Commission for Africa (UNECA, 2019) emphasizes that fiscal constraints and weak industrial bases limit Africa's ability to translate trade reforms into sustainable growth outcomes. Empirical development assessments further suggest that despite trade expansion efforts, many African economies remain reliant on primary commodity exports with limited value addition (African Development Bank, 2021). These findings suggest that trade alone may not be sufficient to drive structural transformation without complementary technological and institutional advancements, reinforcing the need to explore how emerging technologies such as AI can interact with trade systems to enhance productivity and economic diversification.

In parallel, the global literature on artificial intelligence highlights its transformative impact on economic systems, productivity, and organizational efficiency. The European Commission (2018) identifies AI as a strategic technology capable of reshaping industrial competitiveness, while the OECD (2019) emphasizes ethical governance and policy frameworks necessary for responsible AI deployment. Brynjolfsson and McAfee (2017) argue that AI represents a new general-purpose technology that fundamentally alters business models and labor markets. In addition, Choudhary and Basavarajappa (2020) and Gao et al. (2019) demonstrate how AI is embedded in digital marketplaces to enhance decision-making and customer interaction. Harrison et al. (2019) further show that AI-driven supply chain systems improve efficiency, reduce operational costs, and strengthen logistics coordination. Bassamboo et al. (2014) provide earlier analytical foundations for personalized digital systems that underpin modern AI-driven commerce. Collectively, these studies establish that AI is not merely a technological tool but a structural force influencing productivity and market efficiency across sectors.

Within the domain of e-commerce and digital trade, research consistently demonstrates that AI enhances market efficiency through automation, personalization, and predictive analytics. Li et al. (2020) provide a comprehensive review showing that AI applications in e-commerce include recommendation systems, intelligent pricing, and customer behavior prediction. Teraoka and Katayama (2021) further highlight the role of big data and AI in optimizing online marketplace design and improving transaction efficiency. Zhao et al. (2017) illustrate how AI-driven image recognition and classification systems improve product search and consumer experience in digital platforms. These developments are reinforced by Choudhary and Basavarajappa (2020), who emphasize AI's role in improving online marketplace functionality and cybersecurity resilience. Additionally, Harrison et al. (2019) show that AI integration into supply chains enhances coordination between producers and consumers, reducing

inefficiencies in global value chains. This body of literature indicates that AI is central to the evolution of digital commerce systems, yet its implications for developing regions remain underexplored.

From a macroeconomic and development perspective, studies highlight persistent growth challenges in Africa despite reforms in trade and governance. The International Monetary Fund (IMF, 2021) argues that technological progress, including AI adoption, has the potential to enhance inclusive growth if supported by appropriate institutional frameworks. The World Bank (2021) similarly notes that Sub-Saharan Africa continues to face structural constraints, including low productivity and limited technological diffusion. The African Development Bank (2021) further emphasizes that post-crisis recovery in Africa is uneven, with many economies struggling to achieve sustained industrial growth. The World Economic Forum (2018) adds that technological disruption is reshaping labor markets globally, with significant implications for employment structures in developing economies. Meanwhile, WHO (2021) underscores that health and human capital development are also essential for long-term economic productivity. Together, these studies suggest that Africa's growth trajectory is influenced by multiple interacting factors, including technology, human capital, governance, and trade openness.

Despite the growing body of literature on trade and artificial intelligence independently, there remains limited integration between these two domains, particularly in the African context. While WTO (2020) and WTO (2019) focus on trade governance and tariff structures, they do not explicitly incorporate the role of AI in shaping trade efficiency. Similarly, OECD (2019) and European Commission (2018) provide extensive discussions on AI governance but largely exclude developing country contexts. UNECA (2019) and Alden (2019) highlight Africa's structural and geopolitical constraints but do not systematically examine how digital technologies may alter trade-growth linkages. The literature also remains fragmented between macroeconomic studies (IMF, 2021; World Bank, 2021) and micro-level AI applications (Li et al., 2020; Gao et al., 2019). This fragmentation creates a clear gap in understanding how AI and trade interact to influence economic growth in Africa.

In summary, the literature reveals three key gaps. First, there is limited empirical and conceptual integration between trade openness and AI-driven digital transformation in Africa. Second, most AI studies focus on advanced economies, with insufficient attention to structural constraints in developing regions (Brynjolfsson & McAfee, 2017; OECD, 2019). Third, existing African development literature emphasizes trade or macroeconomic performance but rarely incorporates AI as a mediating or enabling factor (African Development Bank, 2021; UNECA, 2019). Addressing these gaps, this study conceptualizes the interaction between trade, AI, and growth as an interconnected system influencing economic performance in Africa. The review establishes the foundation for analyzing how digital transformation can complement trade liberalization to enhance inclusive and sustainable growth across African economies.

3. The Case for Africa

3.1 The Economic Landscape of Sub-Saharan Africa

Sub-Saharan Africa, comprising 48 countries with diverse economies, faces a complex economic landscape characterized by both opportunities and challenges. While the region

boasts abundant natural resources, including oil, minerals, and arable land, its economic growth has been hindered by various factors such as inadequate infrastructure, political instability, and socio-economic disparities. According to the World Bank, Sub-Saharan Africa's economic growth has been modest, with GDP growth rates averaging around 3% in recent years, below the global average (World Bank, 2021). Moreover, the COVID-19 pandemic has exacerbated existing vulnerabilities, leading to economic contractions and exacerbating poverty and inequality across the region (IMF, 2020).

Moreover, the demographic dynamics of Sub-Saharan Africa influence its economic trajectory, presenting both opportunities and problems due to the region's fast expanding population. The young population in the area offers a potential demographic benefit by offering a valuable labour force and customer base, but it also brings with it difficulties related to healthcare, education, and unemployment. Furthermore, the region's economic prospects are highly dependent on the prices of commodities globally, especially those of minerals and oil, which can cause instability and increase susceptibility to outside shocks. Unlocking the region's full potential for economic growth and prosperity necessitates a multidimensional approach that includes investments in infrastructure, education, healthcare, and sustainable development.

3.2 Analysis of trade patterns and challenges faced in the region

Trade plays a crucial role in the economic development and growth of Sub-Saharan Africa, a region endowed with abundant natural resources and a youthful population. However, despite its potential, the region faces numerous challenges that impede the realization of its trade objectives. In this article, we will delve into the trade patterns of Sub-Saharan Africa, examining the dynamics of intra-regional trade, its relationship with global markets, and the obstacles hindering trade growth. By identifying these challenges and proposing potential solutions, we aim to shed light on ways to foster sustainable and inclusive economic development in the region.

Sub-Saharan Africa's trade landscape is characterized by a combination of intra-regional trade and external trade with global partners. Intra-regional trade accounts for a relatively small share of total trade in the region, with most countries relying heavily on exports to markets outside Africa. According to data from the United Nations Economic Commission for Africa (UNECA), intra-African trade constituted only about 17% of total trade in Sub-Saharan Africa in 2019 (UNECA, 2019). This low level of intra-regional trade is attributed to various factors, including poor infrastructure, high trade barriers, and limited diversification of exports.

Despite these limitations, there are signs of success in encouraging intra-regional trade within Sub-Saharan Africa. Efforts like the African Continental Free Trade Area (AfCFTA), which went into force in January 2021, are designed to promote economic integration throughout the continent, allow capital and person mobility, and provide a unified market for products and services. The goal of the AfCFTA is to boost intra-African trade and increase the continent's competitiveness in international markets by doing away with tariffs and non-tariff trade barriers. However, in order for the AfCFTA to be implemented successfully, it must solve important issues such bureaucratic roadblocks, political disputes among member states, and infrastructure deficiencies.

Trade Challenges in Sub-Saharan Africa Many obstacles prevent Sub-Saharan Africa

from growing its trade and integrating into international markets. One of the main challenges is the lack of proper infrastructure, which includes ports, energy supplies, and transportation networks. According to World Bank estimates, Africa needs to finance infrastructure at a rate of roughly $93 billion a year, with large investments needed to close gaps in the energy, telecommunications, and transportation sectors (World Bank, 2018). The high cost of doing business in Sub-Saharan Africa prevents trade from being competitive and restricts exporters' access to markets. This is due to a lack of proper infrastructure.

Furthermore, significant trade barriers, such as import restrictions, taxes, and onerous customs processes, plague Sub-Saharan Africa. The World Trade Organisation (WTO) reports that in 2019, Sub-Saharan Africa's average imposed tariff rate was 9.4%, which was higher than the average global rate of 6.7% (WTO, 2019). In addition to driving up the cost of imported goods, these trade restrictions prevent African companies from exporting by obstructing their access to international markets. Further impediments to trade facilitation and integration in the region are non-tariff obstacles such import licencing procedures, sanitary and phytosanitary standards, and technical rules. Moreover, Sub-Saharan Africa faces significant structural constraints that limit its trade diversification and competitiveness. The region remains heavily reliant on the export of primary commodities, such as oil, minerals, and agricultural products, which are susceptible to price volatility and external shocks. This overreliance on a narrow range of export commodities exposes Sub-Saharan African economies to significant risks, undermining their resilience and long-term growth prospects. Diversifying exports into higher value-added products and services is crucial for enhancing the region's competitiveness and reducing its vulnerability to external economic shocks.

3.3 Potential for Growth and Development in Africa

Despite the region's many difficulties, Sub-Saharan Africa still has a lot of promise for economic growth and development. Given its wealth of natural resources, rapidly growing youth population, and rising rates of urbanisation, Sub-Saharan Africa offers many prospects for promoting sustainable economic development. The African Development Bank (AfDB) projects that increased investment in infrastructure and digital technologies, along with a rise in commodity prices and agricultural productivity, would propel the region's GDP growth back to 3.4% in 2021 (African Development Bank, 2021). Furthermore, there is hope that the African Continental Free commerce Area (AfCFTA) will increase intraregional commerce, promote industrialization, and promote economic diversity throughout the continent.

Unlocking Sub-Saharan Africa's economic potential and promoting long-term prosperity require investments in human capital development, which includes healthcare, education, and skill development. Countries in the area can provide their workforce with the knowledge and skills necessary to engage in the global economy and keep up with technological improvements by investing in education and skill development. Moreover, raising general well-being, lowering healthcare costs, and increasing productivity all depend on investments in healthcare infrastructure and access to necessary services. The World Health Organisation (WHO) states that spending $1 on healthcare can result in up to $20 in additional revenue due to higher productivity and

economic expansion (World Health Organisation, 2021).

In addition, the promotion of innovation, entrepreneurship, and private sector development is vital in order to unleash the economic potential of Sub-Saharan Africa and facilitate sustainable progress. Governments may promote innovation, employment development, and economic diversification by fostering an atmosphere that is supportive to corporate expansion and investment. The development of startups and small and medium-sized firms (SMEs) can be aided by programmes like the creation of innovation hubs, incubators, and venture capital funds, which will promote innovation and increase economic prospects. Furthermore, developing infrastructure, liberalising trade, and encouraging regional integration are critical for raising trade costs, raising competitiveness, and advancing inclusive prosperity throughout Sub-Saharan Africa.

4. Conclusions and Recommendations

The study on trade, growth, and artificial intelligence (AI) in Africa highlights the evolving relationship between globalization, digital transformation, and economic development. Trade liberalization initiatives such as the African Continental Free Trade Area (AfCFTA) have created new opportunities for market integration and intra-African commerce, yet structural constraints continue to limit their full impact. At the same time, the literature shows that AI is reshaping global production systems, enhancing efficiency, and transforming digital markets. However, Africa's ability to fully benefit from these developments remains constrained by infrastructure deficits, weak technological capacity, and institutional limitations. The synthesis of evidence suggests that trade and AI are not independent forces but mutually reinforcing drivers that can significantly influence economic outcomes when effectively combined.

A key conclusion emerging from the literature is that artificial intelligence has the potential to act as a catalytic force in enhancing trade efficiency and economic productivity in Africa. AI-driven innovations in e-commerce, logistics, and supply chain management improve market coordination, reduce transaction costs, and support better decision-making processes. However, the benefits of AI are unevenly distributed globally, with developing economies facing adoption barriers such as limited digital infrastructure, skills gaps, and weak regulatory frameworks. Consequently, the interaction between trade openness and AI adoption remains underdeveloped in African economies. This underscores the importance of creating enabling environments that support both digital transformation and trade integration to ensure inclusive and sustainable growth outcomes.

In conclusion, the reviewed literature identifies a critical research gap in the combined analysis of trade liberalization and artificial intelligence within the African context. While existing studies extensively explore trade policy and AI independently, few integrate these dimensions to examine their joint impact on economic growth. This study therefore contributes to bridging this gap by emphasizing the need for a holistic framework that links trade, technology, and development. Future research and policy direction should prioritize strengthening digital infrastructure, enhancing human capital, and improving institutional quality to maximize the benefits of AI-enabled trade systems. Ultimately, Africa's growth trajectory will depend on its ability to strategically harness both trade openness and artificial intelligence as complementary engines of transformation.

For businesses and stakeholders involved in trade relations between the US and SSA, several recommendations can help navigate the complexities of the market and capitalize on opportunities:

1. Adopt Digital Transformation: To take advantage of AI technology and improve their competitiveness in online marketplaces, businesses should give digital transformation efforts top priority. Decision-making processes, customer interaction, and operational efficiency can all be enhanced by investing in AI-powered analytics, automation, and personalisation. Businesses may promote growth, keep ahead of the competition, and respond to changing market dynamics by adopting digital innovation.

2. Encourage Collaboration and Partnerships: To promote trade and investment between the US and SSA, collaboration and partnerships between companies, governments, and other stakeholders are crucial. To negotiate regulatory frameworks, break into new markets, and take advantage of local knowledge, businesses should look to form strategic alliances with regional businesses, trade associations, and governmental organisations. Furthermore, cooperation with educational institutions and research centres can promote innovation and knowledge sharing, promoting long-term development and progress.

3. Give Market study and Adaptation Top Priority: Companies should carry out in-depth market study to comprehend the particular requirements, inclinations, and difficulties of target marketplaces in SSA. Analysing customer behaviour, market trends, legal needs, and competitive environments are all part of this. Businesses can increase sales and market penetration by customising their goods, services, and marketing tactics to the unique needs of African consumers by learning about the dynamics of the local market.

4. Address the Challenges with Infrastructure and Logistics: In SSA, trade and investment are still severely hampered by deficiencies in infrastructure and logistical issues. To meet these issues, businesses should invest in logistics infrastructure and create strong supply chain management strategies. This could entail collaborating with regional logistics companies, streamlining transportation systems, and utilising technology to boost dependability and efficiency. In order to efficiently reach remote and underserved regions, organisations need also investigate alternate distribution channels, such as e-commerce platforms and mobile marketplaces.

5. Ensure Compliance and Ethical Practices: Lastly, in order to gain credibility and confidence in the marketplace, companies should give top priority to adhering to national and international laws as well as ethical standards. This entails abiding by consumer protection statutes, trade agreements, and data privacy rules. Additionally, companies ought to exhibit ethical business conduct and corporate social responsibility through community involvement, sustainable environmental practices, and fair labour standards. Businesses in SSA can improve their reputation, reduce risks, and build lasting relationships with stakeholders by maintaining high standards of honesty and openness.

In conclusion, the opportunities presented by AI-enhanced online marketplaces for trade relations between the US and SSA are vast and promising. By embracing digital transformation, fostering collaboration, prioritizing market research, addressing infrastructure challenges, and ensuring compliance with ethical practices, businesses and stakeholders can unlock new avenues for growth and development. However, realizing the full potential of AI-enhanced online marketplaces requires continued research and development efforts to explore emerging technologies, understand socio-economic implications, inform policy and regulatory frameworks, foster cross-cultural understanding, and promote sustainable trade practices. By addressing these key areas, stakeholders can navigate the complexities of trade relations effectively and capitalize on opportunities for mutual prosperity and inclusive economic development between the US and SSA in the digital age.

References

Alden, C. (2019). China in Africa: Presence, Perceptions, and Prospects. *The South African Journal of International Affairs,* 26(1), 3-20.

African Union Commission. (n.d.). African Continental Free Trade Area (AfCFTA). Retrieved from https://au.int/en/afcfta.

African Development Bank (AfDB). (2021). African Economic Outlook 2021: From Debt Resolution to Growth: The Road Ahead for Africa. Abidjan: AfDB Group.

African Growth and Opportunity Act (AGOA). (n.d.). U.S. Department of State. Retrieved from https://agoa.info/about-agoa/agoa.html.

Bala, R., Al-Qurishi, M., & Sharma, S. (2021). A Framework for Analyzing Predictive Analytics Capabilities in E-commerce. *Journal of Organizational and End User Computing, 33(4), 23-40.*

Bassamboo, A., Liao, Q., Sheng, X., &Tsitsiklis, J. (2014). Personalized Assortments with Multinomial Logit Models. *Management Science,* 60(9), 2187-2207.

Brynjolfsson, E., & McAfee, A. (2017). The Business of Artificial Intelligence. *Harvard Business Review*, 95(1), 60-67.

Choudhary, A., &Basavarajappa, M. (2020). *Artificial Intelligence in Online Marketplaces*. In B. Mehta & D. Raval (Eds.), Handbook of Research on Modern Cryptographic Solutions for Computer and Cyber Security (pp. 251-271). IGI Global.

European Commission. (2018). *Artificial Intelligence for Europe*. Brussels: European Commission.

Gao, J., Li, A., Deng, Y., & Li, S. (2019). E-commerce Chatbot: A Framework and Case Study. Decision Support Systems, 124, 113060.

Gallino, S., & Moreno, A. (2020). The Age of Artificial Intelligence: Implications for ECommerce. *Journal of Marketing Research,* 57(1), 1-20.

Harrison, T., Luo, J., & Pan, Z. (2019). Artificial Intelligence in Supply Chain Management: Theory and Applications. *International Journal of Production Research*, 57(15-16), 51175132.

International Monetary Fund. (2020). Regional Economic Outlook: Sub-Saharan Africa.Washington, DC: International Monetary Fund

International Monetary Fund (2021) Technological Progress, Artificial

Intelligence, and Inclusive Growth in: IMF Working Papers Volume 2021 Issue 166 (2021)

Li, C., Su, J., Yan, W., Li, J., & Xiong, H. (2020). Artificial Intelligence in E-commerce: A Comprehensive Survey. *ACM Computing Surveys*, 53(4), 1-35.

OECD. (2019). *OECD Principles on Artificial Intelligence. Paris*: OECD Publishing.

Sarker, S., Sarker, S., Sahaym, A., & Bjørn-Andersen, N. (2020). Exploring the Role of Artificial Intelligence (AI) in E-commerce: A Literature Review. Decision Support Systems, 135, 113334.

Symeonidis, P., Efthymiou, V., & Athanasopoulos, E. (2019). Artificial Intelligence in Online Shopping: A Comprehensive Review and Future Directions. Expert Systems with Applications, 129, 36-86.

Teraoka, Y., & Katayama, Y. (2021). Online Marketplace Design with Big Data and Artificial Intelligence: A Survey. Electronic Commerce Research and Applications, 49, 100989.

United Nations Economic Commission for Africa (UNECA). (2019). Economic Report on Africa 2019: Fiscal Policy for Financing Sustainable Development in Africa. Addis Ababa: UNECA.

United States International Trade Commission. (2019). Recent Trends in U.S. Services Trade: 2019 Annual Report. Washington, DC: U.S. International Trade Commission.

United States Trade Representative. (2020). 2020 National Trade Estimate Report on Foreign Trade Barriers. Washington, DC: Office of the United States Trade Representative.

World Economic Forum. (2018). The Future of Jobs Report 2018. World Economic Forum.

World Bank. (2018). Africa's Infrastructure: A Time for Transformation. Washington, DC: World Bank Group.

World Bank. (2021). Worldwide Governance Indicators. Washington, DC: World Bank Group.

World Bank. (2021). Sub-Saharan Africa: Overview. Washington, DC: World Bank.

World Trade Organization (WTO). (2019). World Tariff Profiles 2019. Geneva: WTO Secretariat.

World Health Organization (WHO). (2021). Investing in Health: The Economic Case for Health Systems Strengthening. Geneva: WHO Press

World Trade Organization. (2020). World Trade Report 2020: Government Policies to Promote Innovation in the Digital Age. Geneva: WTO Secretariat.

Zhao, B., Mao, J., & Ahuja, N. (2017). Hierarchical Attention Networks for Information Extraction from Online Product Images. IEEE Transactions on Image Processing, 26(8), 3837-3849.