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Lydia Okunsanya & Muhammad Azmat

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Unlocking Nigeria's potential: experts' opinion-based insights on the economic impact of logistics challenges

Lydia Okunsanya[a] and Muhammad Azmat[a,b]

[a]Engineering Management Department, College of Engineering and Physical Sciences, Aston University, Birmingham, UK; [b]Cluster of Supply Chain Management, Karachi School of Business and Leadership (KSBL), Karachi, Pakistan

ABSTRACT

From the age of the Silk Roads to industrialisation, countries with effective logistics systems have thrived economically. Despite being Africa's largest economy, Nigeria suffers from logistical inefficiencies that deter foreign investors, inflate costs, increase operational expenses, reduce revenue, and lower productivity. This study examines Nigeria's logistics challenges and their economic effects through qualitative analysis. It draws from literature-informed semi-structured interviews with eight senior experts totalling 62 years of experience. Using thematic analysis and axial coding, findings were triangulated with secondary data to ensure validity and contextual accuracy. Findings reveal that poor infrastructure, insecurity, financial instability, unstable policies, high petroleum costs, port congestion, and inadequate logistics technology and human resources significantly hamper Nigeria's growth. The study proposes investing in infrastructure, integrating advanced logistical tools, and comprehensive employee training to mitigate these challenges. This research offers valuable insights for managers and policymakers, emphasising the need to address these issues for economic improvement.

KEYWORDS

Logistics; West Africa; logistics in Nigeria; logistics challenges; economic development; expert opinion

Introduction

The logistics industry is a crucial asset to the world due to its impact on the global economy. There are many challenges facing the logistics and global supply chain industry globally. There have even been arguments that certain elements have prevented the supply chain from becoming digital. Infrastructure problems, network difficulties, lax regulations, and inadequate digital solutions are a few of them in the Nigerian context (Oguchi, 2020).

Africa has the potential to be one of the world's fastest-growing areas, but obstacles including lack of resources, political unpredictability, poor infrastructure, and a lack of skilled labour frequently prevent this from happening (Luke and Walters 2022).

In Nigeria, logistics also face significant challenges, such as inadequate infrastructure and security and a lack of support or interest from the government. The World Economic Forum (2016) suggested, 'Secure and timely delivery of goods and services to the market is made possible by effective modes of transportation, such as high-quality roads, trains, ports, and air transport. These modes also make it easier for people to travel to the best jobs for them'. Highlighting the importance of some significant challenges facing the West African nation.

Efficient and effective logistics can significantly reduce the total supply chain costs and shorten lead times, reaching markets faster and cheaper (Abrahamsson and Rehme 2010). Besides, Logistics also helps determine the growth of an economy. Therefore, in First World countries like the Netherlands, logistics is a government priority, with professional organisations supporting its development (Savy 2016). Conversely, in Third World countries, the focus has traditionally been on primary production rather than logistics, resulting in agricultural economies needing help to market their products locally and internationally.

Notably, the top ten global fashion businesses have a warehousing and retail presence mainly in Northern and South Africa. Despite Nigeria being the largest country by population and GDP in West Africa, only 10% of the top ten global businesses have direct representation there (Statista 2021).

According to the World Bank, SSA's population, which was 186 million in 1950, is projected to reach 2.7 billion by 2060 (Bakilana 2015). This rapid growth has significantly altered global market structures, presenting numerous opportunities for economic success. Consequently, West Africa is poised to become a business powerhouse and profit centre.

Despite these advantages, penetrating the West African market has proven challenging for many global companies that have succeeded in other emerging

CONTACT Muhammad Azmat m.azmat@aston.ac.uk Engineering Management Department, College of Engineering and Physical Sciences, Aston University, B4 7ET Birmingham, UK; Cluster of Supply Chain Management, Karachi School of Business and Leadership (KSBL), National Stadium Rd, Karachi, 74800, Pakistan

markets (Kuteyi and Winkler 2022). Thus, understanding the current state of logistical challenges in West Africa and recognising the hurdles and opportunities for success is a strategic objective for businesses (Kuteyi and Winkler 2022).

However, attitudes are changing due to the considerable economic role of logistics at both national and international levels. The success of the World Bank's Logistics Performance Index (LPI) reflects this growing awareness (Savy 2016). The logistics and supply chain sector is one of the fastest-growing industries in Nigeria, though still in its infancy. According to the 2018 Logistics & Supply Chain Industry Report by Vanguard, Nigeria's logistics industry was worth 250 billion naira ($696 million) in 2018, up from 200 billion naira ($556 million) in 2017 (Oritse 2019). Despite this growth, Nigeria ranked 112th in the Logistics Performance Index and 145th out of 190 countries for Ease of Doing Business in 2018 (Sergi et al. 2021). This low ranking is attributed to the logistics industry's numerous challenges, which have contributed to income decline. However, there is little research guiding supply chain managers on tackling logistics challenges in Nigeria.

A few studies have explored logistics challenges in SSA. Kuteyi and Winkler (2022) highlighted poor infrastructure and unstable government policies as significant issues. Rabiya and Edward (2016) focused on transport logistics challenges, such as poor port access in Malawi. However, these studies focused on something other than West Africa and examined the effect of logistics challenges on Nigeria's economic development.

Nigeria's logistics sector is critical to its economic growth. Despite rapid growth in the logistics industry, challenges must be addressed to unlock Nigeria's full economic potential. This study aims to fill the gap in the literature by providing evidence and opinion-based insights into these challenges and their impact on Nigeria's economic development. Consequently, the research questions to be explored are:

(1) What are the most significant domestic logistics challenges faced by SMEs and LOs in Lagos, Nigeria?
(2) How are identified logistics challenges affecting Nigeria's economic development?
(3) What are the key solutions to address and mitigate the prevailing logistics challenges in Nigeria and how can advanced technological solutions also be leveraged?

Literature review

After World War II, experts began distinguishing logistics into business and military sectors (Rutner, Aviles and Cox 2012). The increasing usage of the term 'business logistics', indicated its spread from military contexts to the corporate world (Rutner, Aviles, and Cox 2012). Today, West and Central Africa's export competitiveness is hindered by inefficient and costly logistics, which stifle economic development, isolate landlocked nations, raise import prices, and slow growth. This underscores the importance of understanding and finding ways to address these issues.

Logistics challenges around the world

For this study, we adopt Don Taylor (2008) definition of logistics, which encompasses planning, implementing, and controlling the efficient forward and reverse flow of goods, services, and related information to meet customer needs. The logistics industry supports trade by transporting, storing, and delivering goods through B2B, B2C, or C2C supply chains, adapting to economic changes and digitisation (Placek 2023).

Despite high growth rates, the logistics industry has recently faced increased volatility and uncertainty. Globalisation has extended and complicated supply chains (Der et al. 2008). Studies across the United States, East Europe, Asia, and Africa have identified several factors contributing to the developing world's logistical challenges.

The United States: The United States's logistics challenges are similar to those worldwide but have unique aspects. The U.S. continues to shift manufacturing to countries with lower labor costs, such as China, India, and South Korea (World Trade Organization 2019).

Asia: Even emerging powers like China face significant logistics challenges in poorer regions. For example, northern China's mountainous areas struggle with transportation, making commodity delivery complex and reducing external interaction (Li, Chen, and Wang 2021). Zhang and Figliozzi (2010) identified critical issues with congestion, entrenched regulation, local protectionism, railway capacity shortages, poor IT infrastructure, and limited use of advanced technology.

Europe: Some European countries also suffer from weak logistics systems. In Hungary, logistics are hampered by outdated production, distribution, and supply systems, poor transportation infrastructure, and inefficient third-party transportation (Abdur Razzaque, 1997).

Africa: West and Central Africa face similar logistical challenges, including bureaucratic bottlenecks, poor infrastructure, inefficiency, and corruption. West Africa's commerce relies on an eight-corridor network connecting ports in seven coastal countries (Cote d'Ivoire, Guinea, Ghana, Togo, Senegal, Benin, and Nigeria) with three landlocked countries (Niger, Burkina Faso, and Mali) (Bouraima et al., 2020). Kuteyi and Winkler (2022) highlight that ineffective port systems and weak transportation infrastructure severely impede Africa's logistics and trade development.

The Nigerian setting

Understanding Nigeria's logistics landscape is crucial for contextualising this research. As of 2022, Nigeria's population was estimated at 216.7 million, making it the most populous African country (Statista, 2022). According to the 2018 Logistics and Supply Chain Industry report, Nigeria's logistics sub-sector was valued at N250 billion ($696 million) (Ortise, 2019). Despite its abundant resources, oil-rich Nigeria faces several adverse factors, including widespread corruption, poor governance, unstable regulatory environments, restrictive trade policies, currency devaluation, global oil price drops, weakened consumer confidence, and armed rebellion (Oyedijo, Adams, and Koukpaki, 2021). While development generally raises living standards, Nigeria's complex challenges have prevented widespread beneficial progress.

Given these complexities, many companies in Nigeria outsource logistics to focus on core operations (Ogbeta, 2020). This scenario in Nigeria reflects conditions in other West African nations, providing a representative case study for regional logistics challenges.

The relationship between logistics and economic growth

It can be argued that logistics directly impacts economic growth and Country competitiveness. An effective logistics system is crucial for a Country's economy to grow steadily (Azmat and Kummer 2020). The way logistics-related aspects are perceived has also changed because of the professionalisation of logistics management and the steadfast belief that logistics contributes to economic prosperity and cost savings (Figure 1) (von der Gracht and Darkow 2013). In the context of infrastructure development and its role in economic growth, efficient logistics is critical in facilitating trade (Nguyen and Tongzon 2012).

According to Yergaliyev and Raimbekov (2016), utilising the nation's transportation and logistics resources rationally encourages the rapid growth of associated enterprises and economic sectors. For example, Kim et al. (2015) analysed the relationship between logistics and the economic growth of port cities in South Korea. They believed that accelerating the development of the port logistics industry can significantly improve the employment rate and promote economic growth.

In a recent interview with the Director General of the World Trade Organization, Anabel González, she referred to Logistics services as 'the glue' that holds value chains together. Logistics services are the 'glue' that keeps value chains together as trade becomes more and more organised through value chains, whether they are global or regional, according to the (World Trade Organization 2019). According to a recent press release by the World Trade Organization in 2019, import demand is anticipated to decline as Gross domestic product slows in significant economies. High energy costs brought on by the Russia-Ukraine conflict will also reduce family expenditures and increase European manufacturing expenses. The tightening of monetary policy in the US will affect interest-sensitive expenditures like houses, cars, and fixed investments. China is still battling COVID-19 breakouts, production setbacks, and sluggish international demand. Lastly, rising import costs for fuels, food, and fertilisers might cause food insecurity and financial turmoil in emerging nations (World Trade Organization 2019).

Advancement in logistics technology

Every aspect of life is increasingly changing due to technology, and logistics is no exception. Customer expectations are rising due to connectivity and the extensive use of social media, and businesses' ability to meet or even exceed customer expectations depends increasingly on the effectiveness of their

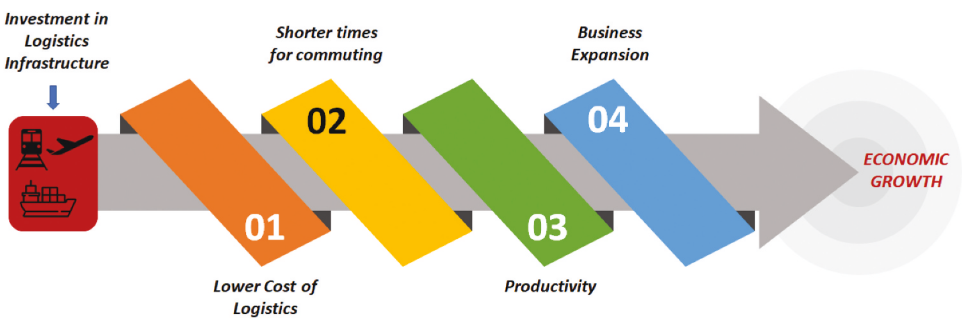

Figure 1. The impact of logistics on economic growth (authors' rendition of Sujeta and Navickas (2014)).

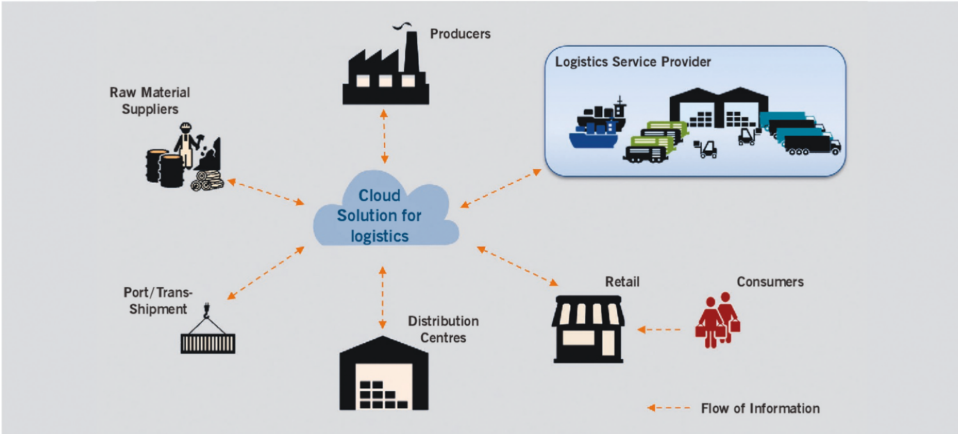

Figure 2. Technological trends in logistics (Unipart Logistics 2019).

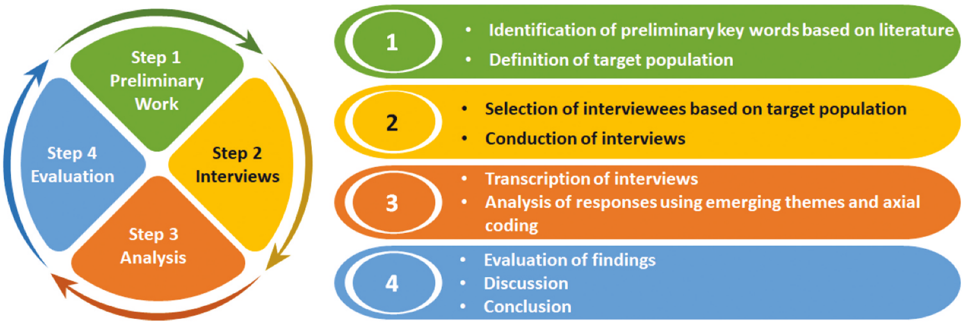

Figure 3. Research framework (created by authors).

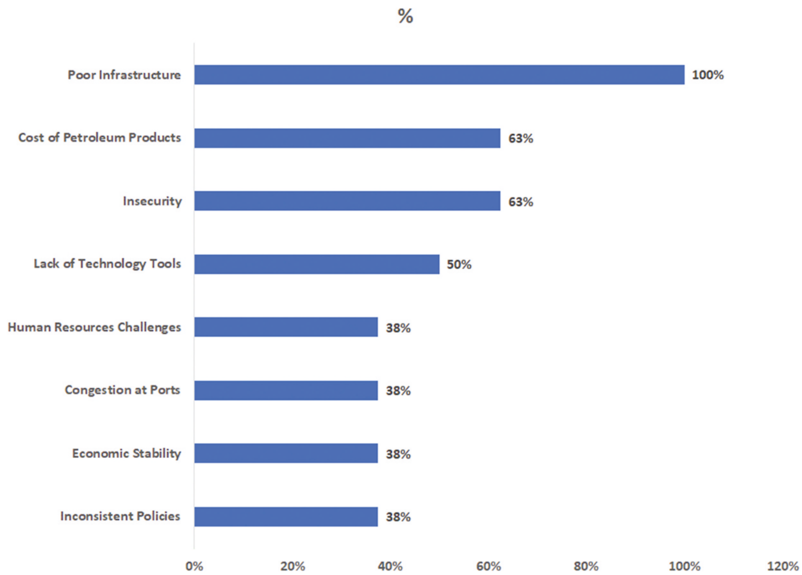

Figure 4. Summary of key logistics challenges identified by the interviewees (created by Authors).

logistics operations (Kassai, Azmat and Kummer 2020; Zhur 2022). For example, in recent years, the pharmaceutical industry in nations such as the United Kingdom, China, France, and Japan has incorporated Logistics 4.0 technologies (I. Lee and Lee 2015).

The following logistics technology trends will shape the logistics sector in 2022 and beyond.

i. **Cloud Logistics**: The future of logistics is remote-hosted data and processes, with fifty per cent of logistics companies now embracing cloud-based services and another fifth likely to. Cloud services, which provide adaptability and immediate access to vital analytics and operations software, enable the expansion of highly responsive on-demand and pay-per-use business models, quickly taking over the logistics industry (Unipart Logistics 2019).

Although data migration and security may cause setup issues and high data traffic may impair processing times, cloud logistics is becoming an increasingly appealing option due to the cost and time benefits realised (Unipart Logistics 2019). The purpose of cloud logistics is to assist in designing and managing a virtual value chain (Figure 2). The development of IT solutions that help the design and operation of a wide range of virtual supply chain members is made possible using cloud computing technologies (Bányai 2014).

Some cloud systems also update in real time, giving users and stakeholders from diverse places access to current, accurate data that can be utilised to increase consumer happiness and the efficiency of the supply chain (Xu, Xu, and Li 2018).

(i) **The Internet of Things**: The Internet of Things (IoT), often known as the Internet of Everything or the Industrial Internet, is a new technology paradigm envisioned as a global network of interconnected equipment and objects (Kalsoom et al. 2021) . IoT is recognised as one of the most crucial areas of future technology, garnering widespread attention from various industries (I. Lee and Lee 2015). It is a system made up of intelligent networking, cyber-physical systems, and a cloud computing platform that enables access, collection, and evaluation of communications as well as the real-time exchange of data from processes, goods, and services in the industry, thereby maximising production value (Boyes et al. 2018). IoT is also a critical component that builds a comprehensive network infrastructure to connect virtual systems and tangible objects through the Internet (Trappey et al. 2017). IoT can be highly advantageous to industrial organisations because it offers increased scalability, connection, reliability, time savings, cost savings through predictive maintenance, greater security and safety measures, and considerably more operational capabilities (X. Li et al. 2012). For example, A study conducted by Mambou et al. (2016) demonstrated the advantages of incorporating IoT into the pharmaceutical supply chain as it improved medication distribution to patients, thereby enhancing operations significantly.

(ii) **Transport Management Systems**: Transportation management systems are Information technologies used to plan, improve, and conduct transportation activities (Griffis and Goldsby 2007). By maximising freight flows between various facilities, tracking freight in transit, and controlling the freight payment process, a TMS can facilitate transportation management activities before, during, and after the transportation movement (Joseph Coyle, Bardi, and John Langley 2003). TMS is used to manage carriers and enhance route automation. It helps with real-time delivery driver tracking, freight cost reduction, more transparency, and general customer satisfaction scores (DispatchTrack 2021). The use of TMS systems is expanding, particularly among logistics companies. Recent studies show that approximately 35% of organisations now use the platform to manage their transportation network, supporting the claim that the TMS platform is popular (Logistics 2019).

(iii) **Big Data Analytics**: Advancement in Big data analytics (B.D.A) and other related technology solutions helps with data collection from numerous sources, collation, and extensive data analysis, culminating in real-time decision-making based on the interpretation of the results of the data analysed (Kamarul Bahrin et al. 2016). B.D.A. can provide historical data on a reusable resource previously utilised to manufacture the same product (Bag et al. 2020). This monitoring technique has been adopted in the manufacturing sector. It is used to discover failures, allowing for developing new skills such as predictive analytics (Lee, Yoon, and Kim 2017). Data quality and competent data analysis skills are critical for obtaining the desired outcomes of big data analytics (Kamble, Gunasekaran, and Gawankar 2018).

(iv) **Artificial Intelligence**: McCarthy (2004) defined Artificial intelligence (AI) as the science and engineering behind the creation of intelligent machines, particularly clever computer programs. AI resulted from discussions about how machines can partially or entirely replace humans in task performance (Weber and Schütte 2019). There is strong evidence that medical AI can help clinicians deliver health care more efficiently in the twenty-first century. There is little question that these strategies will help to improve and supplement the future clinician's 'medical intelligence' (Ramesh et al. 2004).

Methodology and design

Research design and approach

This research began by examining logistics issues in Nigeria, focusing specifically on Lagos State, and their impact on its economic development. A qualitative approach was employed, utilising semi-structured, open-ended expert interviews for primary data collection. Comprehensive thematic literature review for contextual understanding and validation (Figure 3).

According to Schostak (2006), an interview is an extended conversation designed to obtain 'in-depth information' on a specific topic. This method allows researchers to interpret phenomena based on the participants' perspectives. Semi-structured interviews were chosen for this study due to their flexibility and open-ended nature, which facilitate a deeper exploration of the unique challenges faced by interviewees in their respective industries. As Saunders (2019) notes, open-ended questions in semi-structured interviews allow participants to share their experiences and insights in their own words, providing rich, narrative data.

Primary data was extracted from interviews with logistics subject matter experts across different Industries. The data was collected through interviews based on the questions generated to address the research topic. Interviews are effective because they enable managers to comment on the many problems they face as they develop strong functional skills while also fostering relational talents (Fawcett et al., 2015).

Sampling and data collection

This study employed a purposeful sampling strategy. This approach aligns with the study's goals and objectives, as specific individuals are likely to hold diverse and significant perspectives on the topics in question (Campbell et al. 2020). Participants were logistics and supply chain managers with at least five years of experience across various industries in Lagos.

The original aim was to interview over 20 participants, as the study would have benefited from having a variety of different stakeholders participating in semi-structured interviews, h providing a wider scope of perspectives and experiences in identifying, describing and displaying gaps in health research. However, collecting data in the fragile Nigerian economy proved to be challenging, which is one of the major limitations of this study. Many prospective interviewees declined requests, and some were not granted permission by their superiors to engage in the research. Despite these obstacles, the eight participants interviewed collectively have 62 years of experience in logistics and supply chain management across different sectors, providing valuable insights into the practical realities (Table 1).

Interviews included representatives from both large organisations (LOs) and Small and Medium Enterprises (SMEs).

A closer study at the description of SME in Nigeria has found that there is no precise definition of SME in Nigeria. The implication is that the definition of SME changes over time in Nigeria, depending on the government's policy focus (Fadun, Olajide Solomon 2017). According to the Federal Ministry of Commerce and Industry, SMEs are businesses that employ up to fifty (50) people for pay and have a total investment of up to N750,000 (World Trade Center, 2023).

For this research, SMEs are defined as Organizations with fewer than 250 employees, and Los are those with more than 250 employees.

Data analysis

The analysis employed a combination of deductive and inductive approaches, beginning with predefined themes and deriving additional themes from the interviews (Saunders et al., 2016). The initial stage involved transcribing the interviews and coding the data into a Microsoft Excel spreadsheet. Subsequently, the coded data was analysed to identify themes and trends. Axial coding was then performed to further refine and categorise the data, enhancing the depth and accuracy of the analysis.

Findings and discussion

Poor infrastructure

In order of hierarchy, the most predominant logistic challenge highlighted by all interviewees was poor infrastructure. Nigeria's infrastructure is underdeveloped, poorly maintained, and occasionally unpaved. Unfortunately, most of Nigeria's rural areas lack appropriate access to roads, and those that do are often poorly constructed and maintained. The infrastructure in Nigeria is underdeveloped, poorly maintained, and sometimes untarred. Most of the industries particularly struggle with the bad roads and poor transportation system in Nigeria. Both small and medium enterprises and large organisations expressed concerns about the negative effect of poor infrastructure on their daily

Table 1. Profile of participants in the study (created by authors).

Participants	Organizational Role	Experience (Years)	Industry	Enterprise
1	Logistics Manager	7	Logistics	Large
2	Supply Channel Manager	8	Oil and Gas	Large
3	Logistics Manager	5	Courier	SME
4	Operations Manager	10	Hospitality	SME
5	Operations Manager	8	Transport	SME
6	Regional Fleet Operations Manager	14	Fleet Management	Large
7	Country Logistics Planning Manager	5	Manufacturing	Large
8	Logistics Manager	5	Pharmaceutical	SME

operations. Customers treasure the timely delivery of goods or services, but sometimes, defaulting to deliver less than excellent service due to unpredictable circumstances beyond their control has proven detrimental to their businesses. Logistics Manager 4, an SME in the Hospitality industry, said,

> We face many transportation difficulties in our line of work due to unpredictable traffic congestion and bad roads. We deal with perishable goods and as such time lost due to traffic and navigating bad roads can be very detrimental to the service we deliver.

Many roads in Nigeria have been described as deplorable, serving as deathtraps for their users. These roads host Large Companies, and many of them have complained about the negative effect the state of these roads has had on their business operations. It has increased maintenance costs for some Companies, spending huge amounts on vehicle repairs. Logistics Manager 5 from the Oil and Gas Industry said,

> Our Company Trucks break down from time to time due to the bad roads, raising our logistics cost through constant repairs of our vehicles. We spend as much as NGN1,000,000 on repairs monthly.

Furthermore, poor infrastructure has also obstructed delivery timelines some companies have in place with their suppliers; hence strategies like Just in Time (JIT) are challenging to implement in some Companies in Nigeria. Logistics Manager 4 also said,

> The impact of these challenges on our business is massive. We have a Just in Time (JIT) plan in place with some of our suppliers due to storage issues, and sometimes this goes wrong because of gridlocks on bad roads, resulting in further production delays for us.

Insecurity

Another emerging theme from the interviews was insecurity. This insecurity theme aligns with Olabanji and Ese's (2014) findings which explained that the severity of insecurity in Nigeria has grown over time, fuelling crime and terrorist attacks across the nation, thereby posing a serious threat to lives and property, impeding business operations and deterring both domestic and foreign investors, all of which are detrimental to the country's socioeconomic development (Olabanji and Ese 2014). The situation with insecurity has not seen a lot of improvement. Nigeria's rising wave of insecurity threatens lives, property, businesses, and economic development. Since the country's independence, security issues in Nigeria have appeared in several contexts, including political, social, and religious ones. The manifestations of this dimension include militancy, kidnapping, armed robbery, political crises, the proliferation of firearms, piracy, tribal crises, and ethno-religious conflicts. There have been incidences of abductions, terrorist attacks, and inter-communal clashes, which threaten peace and safety. Due to these issues, some companies have extra security measures they have had to implement, such as employing additional security personnel to secure their people, products, and equipment, and this has resulted in increased operating expenses for businesses that they cannot pass on to their customers. Logistics Manager 2 in the Oil and Gas Industry said,

> Due to the insecurity in the Nation, we have had to hire armed escorts to secure our products, personnel, and equipment in transit. This drives up our operating costs significantly. Also, in cases of kidnapping, even though secretly, we have had to pay huge ransoms to retrieve our employees. There is no account to officially charge this to. Given the fact that our prices are regulated by the government, these costs cannot be passed on to the customer.

Furthermore, some areas in the Country, such as the North-East areas, have been classified as high-risk areas due to the high insecurity rate. As a result, very few Small and Medium Enterprises and Large Organisations are willing to do business in these areas. Logistics Manager 5 in the Transport industry said,

> Due to the high rate of insecurity in the Country, we have had to employ security personnel with every one of our vehicles, and even then, there are certain areas in the Country that we do not service.

Another adverse effect of insecurity is our inability to maximise the use of our logistics assets. Billions of naira have been invested in ports of entry (sea and air), only to be able to use them during the daytime. Because of insecurity, ports with 24-hour capacity can only be used for 10–12 hours maximum. Logistics Manager 1 in the Logistics Industry said,

> Insecurity in the Nation is another major challenge for us, as the already congested ports do not operate on a 24-hour basis. This has further increased waiting times.

Economic instability

Economic instability has led to inflation, which has, in turn, increased the prices of commodities, equipment, etc. Logistics Manager 3, an SME in the Logistics sector in Lagos said,

> Economic instability is a major challenge. Inflation has caused an increase in the cost of vehicles and bikes. For example, Motorcycles have gone from NGN280,000 in 2019 to NGN500,000 in present-day 2022.

Further effects of economic instability identified the global shortage of commodities and vehicles. The impact is massive for the Fleet Management sector, as they have been forced to deal with the alternative of leasing vehicles locally in a double-interest environment, which is tripling their fleet costs. As per Logistics Manager 4 in the fleet management industry said,

> There is a global shortage of cars from Manufacturers, thereby making it difficult to get new units. This has also contributed to massive waiting times from Manufacturers. It used to be 20–60 days from the date of order, but currently, it ranges from 150–180 days. We now have to lease vehicles locally in a double-interest environment and that is tripling our fleet cost.

Economic instability has brought adverse effects, such as inflation, which has increased the cost of goods. When prices rise for production inputs, businesses lose purchasing power and risk seeing their margins decrease. This is consistent with the suggestion that Companies often increase the cost of their goods or services due to inflation, resulting in customers paying higher costs (Mckinsey & Company 2022). The challenge for many businesses is to balance the need to raise prices to cover rising input costs with the need to avoid raising them to the point that demand is stifled. Dare (1997) attributed the instability in Nigeria to the continuous revision of the Nigerian Constitution, the seemingly endless establishment of new states, and the dysfunctional policies and programmes of the Nigerian government have all contributed to the country's instability. These interviews prove that, 25 years later, the country has not entirely seen a turnaround in this condition.

Unstable government policies

One significant constraint to economic growth and improvement is government policy instability and implementation gaps. This was seen to affect both Large Organizations and Small businesses. Businesses thrive on the predictability and consistency of government policy. This makes it easy for them to function in any environment. The constant policy summersault of the government in Nigeria, especially on issues regarding logistics, i.e. haulage and shipping, has made Nigeria a complex and unpredictable business terrain. Logistics Manager 3 said,

> Policies in Nigeria can be erratic and implemented without warning. For example, in 2020, an incident led to the Government suddenly banning motorcycle operations in some parts of Lagos. These were major routes for our delivery business, negatively impacting our revenue.

Increasing research shows that inconsistency in government policy is one of the main obstacles to economic growth and social welfare improvement. It was claimed that the country's variable interest rates, inconsistent policies, corruption, and political instability have affected foreign investment (Popoola 2018). An example was the ban on commercial motorcycles in Lagos in 2020 (Ezeamalu 2020). Participants noted that this single policy affected several logistics micro-businesses and Small and Medium Enterprises operating in the state. The permissible motorcycles were later changed by this policy's amendment, necessitating the purchase of new motorcycles by many enterprises in this sector to comply with the latest requirements (Ezeamalu 2020).

Lastly, due to insufficient rail network for the movement of goods from one part of the country to the other, the primary mode of transportation for moving goods from the port into different parts is via heavy vehicles (trailers carrying containers). Most of the government policies are targeted towards placing some form of limitation on the movement of these heavy vehicles. This has become a massive challenge for the small, medium, and large businesses that operate the logistics service. Logistics Manager 6 in the Fleet Management Industry said,

> As part of the business, we must send vehicles to eligible staff across the Country once the cars have been cleared at the ports. Currently, due to the limited appropriate options for haulage of vehicles, we are forced to use large trailers carrying actual containers across the Country. This is a high risk for us.

The increasing cost of petroleum products

Nigeria's petroleum products market is the most regulated in the country. Prices in the oil industry are set by a combination of product marketers and government agencies, given that the nation is the sixth-largest crude oil producer in the world. Successive Governments have tried over the years to reduce the extent of the subsidy on petroleum products leading to an increase in pump prices. Studies by Emeka Arinze (2011) showed that the successive Nigerian regimes raised fuel and diesel prices 18 times between 1978 and 2007. He further explained that much of the increase happened between 1990 and 2007 when prices occasionally increased twice yearly (Emeka Arinze 2011).

Interviewees were most dissatisfied with diesel and fuel prices and how they affected their business operations. Fuel and diesel increase is an everyday and regular occurrence in Nigeria. In most cases, these increases have a resultant effect on the economy. Transportation goes up, as do the prices of goods and services. However, the interviews show that not all businesses can reflect these increases in their final goods or services. Logistics Manager 4 in the hospitality sector said,

> Another logistics challenge is the fluctuating and constant increase in petroleum costs. We are not able to pass this cost on to the Client because we have fixed prices for our services which are agreed upon from the onset of the job. As such, when these hikes suddenly occur, we are unable to revert to the Client.

Also, for manufacturing companies with plants that run on diesel or gas, the increase in petroleum products means increased operating costs. Logistics Manager 7 from the Manufacturing Industry explained,

> The increase in the price of diesel is also a challenge for us because we make large use of petroleum products. We had a fixed contract with some diesel suppliers where they supplied diesel and fuelled our cars at a fixed price. We fixed it at the time for NGN256/litre, but now we are having to refund a lot of money to them because the supply is now NGN850/litre. Also, a percentage of our plants run on diesel so the increase in diesel price is significantly affecting production.

Congestion at the ports

Nigeria has three significant seaports; Apapa, Tin-Can Island, and Onne. Of these ports, only two are in major use and they are currently congested, with hundreds of ships idly queueing to offload their containers. Lagos port congestion is affecting port operations and creating a severe backlog at ports, causing carriers' containers to be held in port for extra days and creating several miles of truck traffic at roads that link to port gates. This is seen in data collected from about 30% of the participants in the Transport and Fleet Management business. Logistics Manager 6 in the Logistics Industry said,

> Roads to all Nigerian ports are in dire need of urgent intervention. As a result of this, trucks stay in queues for as long as 3–4 days. There are only two major ports in use in Nigeria and there is congestion.

The poor road and rail infrastructure at the ports has negatively impacted businesses. This shows the extent to which port congestion and freight handling delays have severely hampered Nigeria's ports' operational effectiveness.

Businesses now deal with increased man hours, idle inventory, and product prices. Logistics Manager 6 in the Fleet Management industry said,

> In recent times, there have been challenges with the road infrastructure and the zero-rail infrastructure has contributed to the massive gridlocks around the port. Therefore, getting your consignment out of the port upon clearing has become a nightmare. Sometimes the delays take up to about 62 days after clearing to get your consignment out of the port. Time is Money. When a process that should take 30 days takes 90 days, that is 60 extra days. That is 60 extra days of man hour which comes at a cost. 60 extra days of idle inventory comes at a cost, and the list goes on. It drives up our costs. It drives up the price of the product.

Limited use of logistics technological tools

During the interviews, forty per cent of participants had never heard of logistics technological tools. Lack of awareness and insufficient skill force are related. This finding aligns with Masood and Sonntag (2020) report, which claims that a lack of knowledge might cause employee resistance, a lack of workforce skills, and a substantial comprehension gap regarding the economic benefits of new technologies.

For large organisations, one of the significant obstacles highlighted in implementing logistics technologies in Nigeria was poor infrastructure. This aligns with the findings, which state that the significant and biggest obstacle to implementing logistics technologies is a lack of infrastructure (Kumar, Bhamu, and Sangwan 2021). There are Logistics technological tools available that can help with the logistics operations of businesses in Nigeria. However, when asked, some Small and Medium Enterprises were unaware of their existence, while others were barely scratching the surface. Logistics Manager 5, from an SME in the Transport Industry, said,

> Yes. We use a tracker called Synotracking to track our vehicles, however, our riders are aware of these trackers, and they are quite easy to remove and fit back.

One of the reasons highlighted by Small and Medium Enterprises for not yet adopting Industry 4.0 Technology was the high cost of purchase and implementation, as well as the concept that there is not one suitable for Small and Medium Enterprises. According to Logistics Manager 5 in the Transport Industry,

> Yes, we have heard of Industry 4.0, however, none of these solutions seems to be suitable for SMEs, especially in the cost of purchase and implementation. This is the reason we as a Company have not invested in any yet.

Some companies implementing some Industry 4.0 technologies complained about challenges encountered during implementation. Change management, uniform adoption of technologies implemented globally, and downtime because of glitches were some of the issues highlighted. Logistics Manager 7 in the Manufacturing Industry said,

> We have had to deal with Change management. Sometimes it is hard to run the systems concurrently. We recently introduced a Distribution Management System and we had to spend a lot of time on the idiot curve. Sometimes we experience glitches and there is downtime because the managers of these technologies are in India. Sometimes uniform adoption does not happen for technologies implemented globally.

Human resources challenges

No universities offer Logistics and supply chain management as an undergraduate course option in Nigeria. As a result, there is a considerable lack of knowledge in this area, and many Logistics Managers must learn on the job and seek formal education outside the Country. Logistics Manager 1 said,

> In the recruitment process, we have also noticed that most of the recruits do not have a formal background education in logistics management. No universities offer courses in the country. Very good Logistics Managers must learn in the field while we also endeavour to offer some training. We liaise with HR to find courses they can take online while on the job. This is a huge challenge for us.

Many Companies have had to invest in training their employees to perform at the required standard. Adolph, Tisch, and Metternich (2014) argued that the most crucial competitive variables determining a company's success or failure are the shortage of skilled labour and the need to retrain employees to fit the new environment (Figure 4).

Effects of logistics challenges on economic development

The effects of these logistics challenges on Nigeria's economic development are the exit of foreign investors, increased cost of goods and services, high cost of doing business in Nigeria, loss of revenue for businesses, and less productivity.

The exit of foreign investors

The level of insecurity has also contributed to the exit of foreign investors from Nigeria (Adegbami 2013). buttressed this by emphasising that the rise of kidnapping in some parts of Nigeria has caused investors, businesses, and manufacturing companies to relocate to other safe locations within the country or even to leave altogether. Over the past decade, foreign companies exiting the Nigerian market due to the challenging operating environment have included Africa's most prominent retail grocery retailers, Shoprite, Mr Price, Woolworths, and many more.

High cost of doing business in Nigeria

The logistics challenges treated above have also resulted in a high cost of doing business in Nigeria. As a result of the epileptic power supply in Nigeria, most large companies are forced to depend on diesel-powered generators. At the same time, small and medium enterprises settle for generators powered by premium motor spirits (PMS), also known as petrol. The two primary energy sources for powering generators in Nigeria are petrol and diesel. As of 2002, both petroleum products were selling for around the same price of 30 Nigerian Naira (NGN) per litre (Eregha, Mesagan, and Ayoola 2015). As of September 2022, prices of diesel and PMS have increased by 2530% and 530%, respectively, with the price of diesel at 789 Nigerian naira (NGN) per litre and PMS at 191 Nigerian naira (NGN) per litre (Sasu 2022). These huge increases are almost impossible for any business to pass to its customers (Orji et al. 2016). also highlighted the electricity access deficit in Nigeria as the most significant barrier impeding the smooth operation of commercial activities in Nigeria.

Loss of revenue for businesses

The participants described how insecurity reduced their target market and, thus, potential revenue because there are parts of the nation that they cannot serve. Participants also explained the impact of insecurity in their daily operations because they have had to invest in security personnel to protect their employees, goods, and equipment. This comes at an extra cost, which hurts their revenue (Omoyibo and Akpomera 2012). emphasised that a nation's development cannot be achieved without first addressing insecurity.

Regarding congestion at the ports, participants explained how the issues have caused them to attempt to pass the cost to their consumers through increased prices of goods and services. Even then, they cannot pass these costs on completely, which has resulted in significant revenue losses. Nigerian manufacturers and retailers must include these higher expenses in their pricing, lowering their competitiveness internationally and raising consumer prices (Onyema 2015).

Less productivity for Nigeria

The economic implication of issues at the Nigerian ports is that Shippers now divert traffic (capital flight) to ports in nearby countries, including Cotonou in Benin, Lomé in Togo, Tema in Ghana, and Abidjan in Cote d'Ivoire (Mohammed Gidado 2015). Additionally, delays and limitations divert trade and reduce the tax base, which deprives the state of substantial revenue. African Centre for Supply Chain (ACSC) practitioners supported this by disclosing that Nigeria's port congestion negatively impacts the nation's GDP, losing \$14.2 billion annually (Onyenucheya 2021). Ultimately, these situations result in less business for the economy and the country.

The northern region of Nigeria, comprising the states of Adamawa, Bauchi, Borno, Katsina, Kano, and Kebbi, has seen the kidnapping of several foreign nationals and humanitarian workers (Foreign & Commonwealth Office 2013). The effect of acts of terrorism and kidnapping in the nation has resulted in most businesses steering clear of these areas and sometimes the Country at large. It has been said that when the foundation of national security is fragile, the structure trembles and sends signals to those who occupy it and those who might want to. This is the case with the Nigerian entity, where the nation's economy and investments continue to be threatened by the insecurity and persistent violence perpetrated by various terrorist groups (Adebayo 2014).

Recommended solutions for most significant logistics challenges

The key solutions to these challenges in Nigeria are improving infrastructure, introducing logistics technological tools, and investing in training employees to use these tools.

Improvement of infrastructure

Creating the infrastructure required to adopt logistics technologies will be one of the biggest challenges, but its solution will significantly and positively impact the nation. As some participants indicated, if logistics technologies are deployed in the current state of the Country's infrastructure, it may be set up to fail. Many underdeveloped countries must catch up before being prepared for this kind of technology since they lack even the most basic infrastructure (Asghar et al. 2020). The effectiveness of infrastructure services and their accessibility impact the success or failure of all other industrial endeavours to a considerable extent. Infrastructure investments in energy, water, transportation, and communication aid economic development, reduce poverty and enhance living circumstances in emerging nations (Ashley and Cashman 2006). Raj et al. (2020) argued that for logistics technology to be fully adopted, all channel members must be connected; as a result, infrastructure cannot be ignored.

Investment in education and training

The government of Nigeria and the rest of Africa must raise the standard of education provided to pupils and emphasise science and technology in both the public and private sectors (Simbanegavi et al. 2019).

Nwankwo and Ifejiofor (2014) corroborated this finding; they state that the development of the required skills and initiatives should be of the utmost importance given the high rate of unemployment in Nigeria, particularly in the higher education sector to facilitate the employability of graduates who will increasingly be required to be not only job seekers but also job creators. Therefore, the need to provide required foundational training for Logistics and Supply Chain Managers cannot be overlooked. Furthermore, according to Lyakurwa (2007), human capital development can increase people's options and opportunities, improve healthy living by acquiring skills and knowledge, and ultimately foster growth in the country's gross domestic product through increased productivity.

Use of advanced logistics technological tools

Participants from the transportation and oil and gas industries who were conversant with using some of these logistical and technological tools identified the increased operational efficiency that their use has produced. These logistics managers think that implementing these new technologies will strengthen their operational procedures. This result aligns with those of (Müller, Kiel, and Voigt 2018), who found that implementing logistics technologies can enhance an organisation's business operations. The company's operations will benefit from this adoption, which will make real-time data accessible across whole supply chains, coordinate commodities based on demand, and reduce stockpiles. The respondents also concurred that implementing these new technologies has improved their supply chain processes, including inventory management. These results align with those of (A. Zhang et al. 2021), who claimed that embracing logistics technology has benefited organisations through efficient supply chain planning, execution, and forecasting.

Conclusion

This study aimed to explore the logistics challenges in West Africa while recognising their effect on economic development. The Federal Republic of Nigeria was used as the main case study. This has been achieved by examining the logistics challenges faced by various industries in the economic sectors of Nigeria. This research builds on previous studies about logistics challenges in Africa (Kuteyi and Winkler 2022). Highlighted the logistics challenges in Sub-Saharan Africa, while (Rabiya and Edward 2016) highlighted transport logistics challenges in Sub-Saharan Africa. However, these works of literature neither focused on West Africa nor explored the effect of logistics challenges on economic development in Nigeria. Using a variety of respondents from various sectors of Nigeria's economy, this research sought to fill that gap by assessing the current logistics challenges across these sectors. These viewpoints provided an excellent foundation for understanding these challenges and their economic impact.

This study discusses the logistics challenges currently being experienced in Nigeria as well as the effect on its economic development, notably around trade. Despite the country's enormous potential, which has a large population and a wealth of natural and mineral resources, logistical obstacles in Nigeria have an equally devastating impact on small and large organisations. For example, the issues with poor road network and zero infrastructure was highlighted by both organisations. Regarding advanced logistical tools, while both small and large organisations were aware of their existence in some cases, high cost of purchase and implementation was highlighted as a deterrent. This research has demonstrated that by eradicating these logistical bottlenecks, more companies will be able to provide more goods and services, fostering the growth and expansion of numerous sectors. By utilising logistics technologies, the country's underserved communities will be able to receive services with more speed, transparency, and efficiency.

Logistics challenges and the extent of their effect on economic development are intriguing and justify more research. Additional research could explore how the Nigerian government can solve the problem of infrastructure and the adoption of logistics technologies to solve economic development issues. Future studies should include a larger sample of companies from various Nigerian industries. More importantly, future research can consider the additional and peculiar logistics challenges Nigeria will face as it starts to focus more on moving its economy from one that is import-dependent to one that is both agricultural and industrialised. While prior research has provided insight into some logistics challenges in different industries and countries, there are no published studies on logistics challenges and economic development in Nigeria. The findings from this research also revealed that, in some cases, some logistics challenges were peculiar to the industry. For example, the issue of port congestion was peculiar to those in the Fleet management and Import Industry. Further research could explore logistics challenges peculiar to specific sectors in Nigeria.

Research implications

This study contributes to the knowledge in a variety of ways. Firstly, it contributes to understanding the logistics challenges businesses encounter in Nigeria by utilising real-world data from interviews with companies that have not been explored much in literature. Additionally, this study contributes massively to the logistics field in Nigeria. Concerns in the operating business environment, such as poor infrastructure, unstable economic instability, and unstable government policies, emerged as significant logistical challenges. Government policymakers may need to provide organisations with incentives and take on various projects, such as policies to boost government investment in basic infrastructure, eliminate excessive taxation, and support a stable macroeconomic environment, all of which, in turn, help businesses survive longer and advance the nation by solving the logistical challenges that businesses in Nigeria face.

Managerial implications

These results will help mobilise resources to address the highlighted logistics challenges. Addressing logistics issues within an organisation and the country can improve operational and financial performance, so managers should prioritise addressing these issues. Managers can persuade management to invest in logistics technology due to its profitability. This study would also be useful for other supply chain specialists operating in similar contexts, as it would facilitate their comprehension of logistical challenges and their economic effects.

Policy implications

This research suggests that improving transportation infrastructure, such as roads, railways, and ports, in Nigeria and Lagos State is crucial to reducing logistics challenges and improving economic performance. Policy initiatives that focus on infrastructure development can enhance the efficiency of supply chains, reduce transportation costs, and facilitate the movement of goods across Lagos State. However, in the case of Nigeria, significant policy changes may be needed to simplify regulatory processes and reduce bureaucracy within government functions that hamper the seamless flow of goods and services. Streamlining customs procedures, harmonising regulatory requirements across the State, and reducing red tape can help improve the ease of doing business and drive the inflow of foreign direct investment in logistics infrastructure.

Embracing technology solutions such as digital tracking systems, automated warehouses, online customs clearance platforms, and drone technology to enhance logistics solutions in hard-to-reach areas can improve access and enhance the efficiency and transparency of logistics operations. Policy support for adopting technology, including investment incentives and the recent Nigeria Data Protection and Governance Law, which stipulates the requirement for data privacy and security, can accelerate the modernisation of the logistics sector. The research paper's findings can inform policymakers in Lagos State about the peculiar challenges facing the logistics sector and guide the design of bespoke policy interventions to unlock its potential for driving economic development.

Future research

Nigeria is the most populous black nation, with a population of 208 million. Given its share size and the volume of resources available within the country, the upcoming African Continental Free Trade Area agreement will facilitate intra-regional commerce throughout the largest free trade area in the world. An option for future research could be to study how Nigeria might evolve into a global logistics powerhouse as it dominates trade among the countries participating in the African Continental Free Trade Area agreement. This is inevitable as many other countries will strive to get constant access to Nigeria's huge market for goods and services. A reasonable justification for future study will be to study Nigeria as it overcomes its logistics challenges and, as a result, becomes a dominant player along the African Continental Free Trade Area trade route.

Disclosure statement

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