Impact of Infrastructure Deficiency on Logistics and Supply Chain Efficiency in Nigeria: Case Study of Eddie International Limited, Lagos, Nigeria

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ABSTRACT

The study examined the impact of infrastructure deficiency on logistics and supply chain efficiency in Nigeria, using Eddie International Limited as a case study. The research employed a descriptive survey design and purposively sampled 300 staff members across various departments of the company due to their accessibility and relevance to the study. A structured questionnaire was used to collect data, and relevant conceptual, theoretical, and empirical literature was reviewed to provide contextual support. Descriptive statistics and inferential tools such as Chi-square Pearson correlation were utilized in testing the study's hypotheses. Findings revealed a significant relationship between transportation infrastructure and logistics/supply chain efficiency within Eddie International Limited. Additionally, power and ICT infrastructure were found to significantly influence warehousing and distribution performance. However, infrastructure-related costs were not found to significantly affect the competitiveness of logistics service providers in the organization. The study also established that general infrastructure deficiencies significantly hinder the operational performance of the logistics and supply chain sector in Nigeria. The study concluded that infrastructure development is a key determinant of logistics efficiency, operational cost reduction, and competitiveness in the Nigerian logistics industry. It was recommended that government and private stakeholders prioritize strategic investments in transportation, power, and ICT infrastructure to support the growth of logistics operations and supply chain effectiveness in Nigeria

INTRODUCTION

Logistics and supply chain sector serves as the lifeblood of economic activities in any nation, facilitating the efficient movement of goods, services, and information from points of origin to final consumption. In Nigeria, the sector holds significant potential to drive economic diversification, regional integration, and competitiveness in global trade. However, the full realization of this potential has been consistently hindered by glaring infrastructural deficiencies that weaken the performance and reliability of supply chain operations (Akinyemi & Adeola, 2022). The logistics industry in Nigeria suffers from systemic inefficiencies largely attributed to inadequate and poorly maintained public infrastructure, which has led to escalating operational costs, delivery delays, and widespread inefficiencies across multiple sectors and the transport system, which forms the backbone of logistics, presents a critical challenge (Ugwah, et al. 2025). Nigeria's road network, responsible for over 90% of cargo movement, is grossly inadequate in quality and coverage. Many roads are riddled with potholes, poorly designed, or completely impassable during rainy seasons, resulting in increased vehicle maintenance costs, cargo damage, and frequent accidents (Oladele & Musa, 2023). A case in point is the Apapa Port access roads in Lagos, which often witness gridlocks that extend for several kilometers, delaying cargo evacuation and leading to extended dwell times at ports. These issues have increased the cost of goods and services, thereby contributing to inflation and weakening consumer purchasing power (Bello and Ikenna, 2022). Rail transport, which could serve as a cost-effective alternative to road transport, remains underutilized and underdeveloped. Although there have been recent efforts by the Nigerian government to revamp the rail sector, including projects such as the Abuja-Kaduna and Lagos-Ibadan railway lines, these have yet to be effectively integrated into a national freight

logistics strategy (Onuchukwu, 2023) Lack of intermodal transport systems further exacerbates the situation, making it difficult to shift freight from roads to rails or waterways in a seamless and cost-efficient manner. Furthermore, Nigeria's inland waterways an untapped asset that could significantly decongest roads and improve logistics remain largely underdeveloped. Dredging activities are sporadic, and most river ports lack the necessary facilities and safety measures to support commercial navigation. The underutilization of this transport mode is a missed opportunity in enhancing supply chain efficiency, especially for bulky goods and agricultural produce originating from the hinterlands (Bello and Ikenna, 2022). Port operations, a crucial link in international logistics, also reflect the consequences of infrastructural deficiency. Nigerian ports are notorious for congestion, delays in customs clearance, manual handling of documentation, and inadequate storage facilities. The World Bank's Logistics Performance Index (LPI) consistently ranks Nigeria low in key indicators such as infrastructure quality, logistics competence, and customs efficiency (World Bank, 2023). These factors have not only led to increased turnaround time for ships but also discouraged foreign direct investment (FDI) in the manufacturing and export sectors. Equally important are warehousing and storage infrastructures, which are critical in ensuring goods are preserved, especially in agriculture, pharmaceuticals, and fast-moving consumer goods (FMCG) sectors. Inadequacy of temperature-controlled storage, combined with Nigeria’s unreliable electricity supply, has led to high post-harvest losses and spoilage of time-sensitive products (Ejairu, 2022). In rural areas, the challenges are even more pronounced, with many producers unable to access markets due to a lack of access roads and logistics services, thus weakening the value chain and impeding rural economic development Ugwah et al 2025). From macroeconomic perspective, these infrastructure challenges have broader implications for Nigeria’s trade competitiveness, business climate, and economic diversification.

Advent of African Continental Free Trade Area (AfCFTA), countries are expected to compete on the strength of their logistics and infrastructure systems (Sharkdam and Mohammed-ali, 2022). Nigeria risks missing out on the benefits of increased intra-African trade unless it addresses these foundational issues Improved infrastructure would lower trade costs, enhance the speed and reliability of logistics services, and improve Nigeria’s global standing as a trading partner. Moreover, increasing digitalization of supply chains globally emphasizes the need for infrastructure not only in the physical sense but also in terms of technology and connectivity (Aworemi and Abel, 2025). Digital tools like GPS tracking, warehouse management systems (WMS), and transport management systems (TMS) cannot function optimally without reliable internet access, electricity, and digital literacy, which adds another layer to the infrastructural gaps limiting Nigeria’s logistics evolution. Despite the growing body of literature on Nigeria’s infrastructure and logistics challenges, most studies have adopted a fragmented approach, often focusing on specific transport modes or regional issues without providing a comprehensive and integrative view of how these deficiencies interact to affect overall supply chain efficiency (Mukuru and Maronge, 2018). Furthermore, empirical studies that quantify the extent of these deficiencies and their economic implications on logistics costs and service delivery are limited. There is also a scarcity of updated research that incorporates the recent infrastructure development projects and policy shifts under the current administration. The present study intends to fill this gap by offering a holistic examination of infrastructure deficiencies spanning roads, rail, ports, warehouses, and digital infrastructure and their cumulative impact on logistics and supply chain efficiency in Eddie international Limited, Nigeria. Despite the country’s strategic location and economic potential, logistics infrastructure remains grossly inadequate to meet the demands of modern commerce. Persistent infrastructural challenges ranging from dilapidated roads, congested ports, insufficient rail networks, limited warehousing capacity, and unreliable electricity have collectively impaired the smooth flow of goods across the country and beyond its borders. These deficits significantly contribute to prolonged delivery times, increased product damage, and high operating costs, ultimately impacting business competitiveness and customer satisfaction (Obokoh and Goldman, 2016). Importantly, many studies have acknowledged the existence of these infrastructural challenges, but there remains a lack of comprehensive empirical research that explicitly links specific types of infrastructure deficits to measurable inefficiencies within logistics and supply chains. The few existing studies tend to treat infrastructure and logistics performance as independent issues rather than components of a highly integrated system. As a result, there is limited understanding of the cumulative and systemic effects of infrastructure deficiencies on logistics costs, reliability, and service delivery in the Nigerian context. Therefore, this study aims to investigate the impact of infrastructure deficiencies on efficiency of logistics and supply chains in Eddie international Limited, Nigeria.

Case Study Description: Eddie international Limited

Eddie international Limited, a transportation firm based in Lagos, Nigeria, has most of his operation across all state of the federation and across some West African Countries, serve a key player in logistics and supply chain sector, with focus on port-based operation, terminal logistics and inland transportation. Its strategic location close to the Apapa port complex, the busiest port in West Africa, has positioned the company to efficiently manage high-volume freight movement across Nigeria. Eddie international Limited is a modest transport firm with fleet of trucks servicing importers and exporters within Lagos metropolis. Over time, it expanded its supply chain and logistics operations beyond Lagos to serve clients in various part of Nigeria, and also in West Africa Countries, leveraging strategic partnerships and port terminal contracts to enhance its logical capabilities. A key milestone in the company's history was its engagement with the Nigeria Railway Corporation (NRC) in late 90s and early 2000s for the movement of spare part to the assembly plant of Peugeot Automobile in Kaduna. The company plays a critical role in Nigerian supply and logistics chain by facilitating trade flows, enhancing cargo handling speed, and reducing port turnaround time for vessels. The company's efficiency has the potential to boost competitiveness, support economic growth, and promote regional trade integration within West Africa. Locally, the company perform clients-specific logistics services to company like Dangote group, Promasidor Nigeria Limited, Guiness Nigeria Plc and many other more. However, despite these contributions, the company continues to face serious operational challenges largely attributed to poor external infrastructure. The surrounding road networks are frequently congested and in disrepair, resulting in long truck queues and delays in cargo evacuation. In addition, inconsistent power supply, weak intermodal transport systems, and bottlenecks in customs processes further hinder the terminal's potential to operate at optimum capacity. These systemic inefficiencies undermine the overall effectiveness of the supply and logistics chain, contributing to increased transportation costs, extended delivery timelines, and reduced reliability of the logistics ecosystem. These issues provided a practical and insightful context for understanding the broader implications of infrastructure deficits on supply chain efficiency in Nigeria. As such, Eddie international Limited serves as a compelling case study for analyzing the interplay between port terminal operations, infrastructure adequacy, and national logistics performance.

Objectives of the Study

The main aim of this study is to examine the impact of infrastructure deficiencies on logistics and supply chain efficiency in Eddie international Limited, Nigeria, a transportation industry. Specific objectives of the study include;

1. To identify the types and extent of infrastructure deficiencies affecting logistics and supply chain operations of Eddie international Limited in Nigeria.

2. To assess the relationship between public transportation infrastructure (roads, rail, and ports) and supply chain efficiency concerning logistics operation at Eddie international Limited.

3. To examine the impact of power supply and ICT infrastructure on warehousing and distribution efficiency in Eddie international Limited.

4. To evaluate the effect of infrastructure-related costs on overall performance and competitiveness of logistics service providers in Eddie international Limited.

LITERATURE REVIEW

This chapter reviews existing literature on the relationship between infrastructure and supply chain efficiency. It discusses the conceptual understanding of infrastructure deficiency and logistics operations, theoretical frameworks that guide the research, empirical studies conducted in both local and international contexts, and identifies the gaps the current study seeks to fill.

Conceptual Review

In building a solid foundation for this study, some concepts have to be well stated which show the relationships that exist between different concepts (dependent and independent variables). These concepts are highlighted and explained below;

Infrastructure Deficiency

Infrastructure deficiency remains a major developmental obstacle in Nigeria, severely impacting economic productivity, trade facilitation, and operational efficiency across multiple sectors, particularly logistics and supply chain management. The term "infrastructure" encompasses a wide range of physical and institutional facilities essential for economic development and societal functioning, including roads, railways, ports, airports, electricity, water supply, and information and communication technologies (ICT). Infrastructure becomes "deficient" when these systems are unavailable, inadequate, poorly maintained, or inefficient in supporting economic activities (World Bank, 2021). In the Nigerian context, infrastructure deficiency is especially pronounced in transport and logistics systems, where dilapidated roads, congested seaports, inadequate rail networks, and erratic power supply disrupt the smooth movement of goods and services

Majorly for Logistics and Supply chain operation in Nigeria--railway infrastructure, which should serve as a cost-effective alternative to road transport, remains underdeveloped and underutilized, though recently revitalized in parts through public-private partnerships, still covers only a fraction of the country and does not effectively link industrial zones with key ports and markets (Nwanze, 2002). The limited cargo capacity and inefficiency of rail transport have forced businesses to rely heavily on road haulage, placing undue stress on an already overburdened system.

Logistics and Supply Chain Efficiency

Logistics and supply chain efficiency refer to the seamless integration and effective coordination of various activities involved in the movement, storage, and distribution of goods and services from the point of origin to the point of consumption. Efficiency in this context implies the ability to minimize costs, reduce lead times, enhance service quality, and ensure timely delivery while maintaining flexibility to adapt to dynamic market demands. Performance of logistics and supply chain operations is a critical determinant of a nation's competitiveness and economic development, particularly in a globalized economy where speed and responsiveness are key success factors (Zijm et al, 2019). Logistics and supply chain management in developing economies like Nigeria face numerous challenges that hinder their efficiency. These challenges stem from systemic infrastructure deficits, regulatory constraints, technological limitations, costs and socio-economic factors (Afolabi, 2024)

a. Poor Transportation Infrastructure

One of the most prominent challenges is the poor state of transportation infrastructure, including dilapidated roads, congested ports, and inefficient rail networks. Most Nigerian roads, which serve as the primary means of goods movement, are in severe disrepair, leading to delays, higher vehicle maintenance costs, and frequent accidents

b. Power Supply Deficiencies

Unreliable electricity supply poses a significant hindrance to logistics efficiency. Cold-chain logistics, warehousing, and manufacturing all require consistent power to maintain operations. In Nigeria, electricity supply is erratic, forcing companies to rely on expensive generators, which increases operational costs and affects service delivery. Warehouses storing perishable items like pharmaceuticals and food products are especially vulnerable, with product spoilage risks due to power outages (Okeke, 2020).

c. Inadequate Adoption of ICT and Technological Tools

Modern supply chains depend heavily on technology for tracking, planning, and coordinating logistics activities. However, in Nigeria, the adoption of ICT tools remains low among many firms, particularly small and medium-sized enterprises (SMEs). The lack of integrated supply chain management systems, poor internet connectivity, and limited technical skills among employees reduce the visibility and responsiveness of logistics operations. This limits firms' ability to engage in real-time inventory monitoring, demand forecasting, and route optimization.

d. Regulatory and Bureaucratic Hurdles

Another critical barrier to logistics efficiency in Nigeria is the burden of excessive regulation and inefficient government procedures. Delays in customs clearance, redundant inspections, and inconsistent policy implementation discourage smooth cross-border trade and disrupt supply chain timelines. Many logistics firms cite extortion, corruption, and unnecessary bureaucratic bottlenecks at ports and checkpoints as serious impediments to their operations.

e. Safety and Security Concerns

Security challenges, including armed robbery, kidnapping, and cargo theft, are pervasive in some parts of Nigeria, especially along key logistics corridors such as the Lagos-Kano and Kaduna-Abuja routes. These security threats increase the cost of transportation and insurance and discourage private investment in logistics infrastructure. Moreover, drivers and logistics operators face high personal risk, which affects morale and service reliability.

f. Skilled Manpower Shortage

Efficient logistics operations require a skilled workforce with knowledge in supply chain management, warehousing, transportation planning, and ICT. However, Nigeria faces a dearth of trained professionals in this field. Educational institutions offer limited specialized logistics training, and there is a gap between industry needs and academic curricula. The result is poor decision-making, inefficiencies in handling logistics operations, and an inability to innovate or adopt best practices.

g. High Cost of Logistics Operations

The cumulative impact of bad roads, unreliable electricity, security expenses, and bureaucratic inefficiencies is the high cost of logistics. According to the African Centre for Supply Chain, logistics costs in Nigeria can be as high as 40–50% of the total value of goods for some sectors, compared to the global average of 8–15%. This excessive cost burden reduces the competitiveness of Nigerian goods in both domestic and international markets

h. Fragmented Logistics Market

The Nigerian logistics sector is highly fragmented, with numerous small-scale operators lacking the capacity to provide end-to-end services. This fragmentation leads to poor coordination, duplication of services, and lack of standardization in processes and documentation. Without strong collaboration and integration, the potential for creating efficient and resilient supply chains remains limited.

Theoretical Review

Theoretical review can be critically explained by the following theories;

Systems Theory

Systems Theory, initially developed by Ludwig von Bertalanffy in the 1940s, provides a holistic framework for understanding the interdependence and integration of components within an organized structure (von Bertalanffy, 1968). In the context of logistics and supply chain management, Systems Theory posits that every

part of the supply chain—from suppliers and manufacturers to distributors and customers—functions as a subsystem within a larger, dynamic whole. These subsystems interact through the flow of materials, information, and financial resources, and the efficiency of the entire supply chain depends on the effective coordination of these components (Mentzer et al., 2001).

Resource-Based View (RBV)

The Resource-Based View (RBV) is a strategic management theory that emphasizes the importance of a firm's internal resources as the foundation for achieving sustained competitive advantage. Developed by scholars such as Barney (1991), the RBV posits that firms that possess valuable, rare, inimitable, and non-substitutable (VRIN) resources can achieve superior performance relative to their competitors. In the context of logistics and supply chain management, resources such as infrastructure, information technology, human capital, and organizational capabilities are considered critical enablers of supply chain efficiency and effectiveness.

Institutional Theory

Institutional Theory provides a sociological lens through which organizational behavior and strategic decisions can be understood as responses not only to economic imperatives but also to regulatory, normative, and cultural pressures in their environment (Scott, 2001). In the realm of logistics and supply chain management, especially in developing countries like Nigeria, Institutional Theory explains how organizations are influenced by the rules, norms, and expectations of the institutional environment in which they operate. These influences shape how logistics practices are adopted, how infrastructure challenges are addressed, and how supply chain systems evolve over time. At its core, Institutional Theory argues that organizations seek legitimacy by conforming to the expectations of stakeholders, government regulations, and professional standards (DiMaggio & Powell, 1983). In the Nigerian logistics sector, this means that companies often align their operations with public policies, industry norms, and global practices to gain credibility and market access. However, this alignment is not always easy or straightforward, especially when institutional frameworks are weak, inconsistent, or underdeveloped conditions that often characterize logistics infrastructure governance in Nigeria (Uzonwanne, 2020).

Empirical Review

Adewole and Struthers, 2019 examined the freight logistics and supply chain activities performed with a view to identifying the key prospects for development of trade and conducting business in Africa. This study adopts a descriptive research philosophy to analyze the nature of logistics infrastructure in the continent of Africa. The findings reveal that inadequate infrastructural facilities, lack of continent-wide regulatory framework, the absence of political will and a limited application of technology, to a great extent, are contributory inhibiting factors to the development of logistics infrastructure in Africa. The study therefore recommends that adequate freight transport facilities and regulatory reforms are essential to logistical infrastructure development in Africa.

Underpinning Theory for the Study

The **Resource-Based View (RBV)** is adopted as the underpinning theory for this study on the impact of infrastructure deficiency on logistics and supply chain efficiency in Nigeria. The RBV provides a robust and strategic framework for examining how internal capabilities particularly in terms of infrastructure-related assets contribute to organizational performance within logistics systems. This theory is especially relevant in environments where external infrastructure is inadequate, forcing firms to rely on internal or proprietary resources to achieve efficiency and competitiveness.

RESEARCH METHODOLOGY

Research Design

This study employed a descriptive survey design, suitable for examining the challenges of logistics and supply chain efficiency in Nigeria. This design allowed the researcher to systematically collect, describe, and analyze data concerning the perceptions, challenges, and experiences of stakeholders involved in supply chain activities.

A quantitative approach enabled the researcher to quantify opinions and generate statistical inferences that reflect the broader population's views. The methodology was chosen to identify and understand recurring patterns in operational and strategic logistics challenges. It also facilitated the exploration of the impact of infrastructure deficiencies on logistics firms and service providers. A specific case study approach was integrated, focusing on Eddie international Limited, to draw deeper insights from real-life operations within Nigeria's most prominent logistics corridor.

Method of Data Analysis

The quantitative data obtained from the questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics such as frequencies, percentages, and mean scores were used to summarize the data. Inferential statistics, including Pearson correlation and Chi-square tests, were employed to test the study's hypotheses and establish relationships between variables. A decision rule of a mean score threshold of 2.5 was adopted for interpreting the data. Items with mean scores of 2.5 or higher were considered significant, while those below 2.5 were deemed negligible. This approach ensured the results were systematically analyzed and aligned with the study's objectives.

FINGINGS

Findings from the study revealed the following

1) There is a significant relationship between transportation infrastructure and logistics/supply chain efficiency in Nigeria.

2) Power and ICT infrastructure will significantly impact the performance of warehousing and distribution in Nigeria.

3) Infrastructure-related costs have no significant effect on the competitiveness of logistics service providers in Nigeria.

4) Infrastructure deficiencies will significantly hinder the operational performance of the Nigerian logistics and supply chain sector in Nigeria.

CONCLUSION

The study examined the impact of infrastructure deficiency on logistics and supply chain efficiency in Nigeria, using Eddie International Limited as a case study. Relevant conceptual, theoretical, and empirical literature was reviewed. Findings revealed that there is a significant relationship between the availability of public transportation and the efficiency of logistics/supply chain operations in Eddie International Limited. Findings of the study also revealed that power and ICT infrastructure significantly impact the performance of warehousing and distribution operations within the company. Furthermore, findings of the study revealed that infrastructure-related costs associated with public transportation and mobility have a significant effect on the competitiveness of logistics service providers in Eddie International Limited. Finally, findings of the study further revealed that infrastructure deficiencies significantly hinder the overall operational performance of the Nigerian logistics and supply chain sector. It was therefore concluded that infrastructure deficiency significantly affects logistics and supply chain efficiency in Nigeria, particularly within indigenous firms such as Eddie International Limited.

Finally, by linking infrastructure deficiencies to overall operational performance in the Nigerian logistics and supply chain sector, the study contributes a holistic and grounded perspective to the academic discourse. It strengthens the argument for a comprehensive logistics policy in Nigeria and provides a valuable reference point for both scholars and policymakers seeking to understand and improve supply chain operations within the country. In summary, this study extends the theoretical and empirical boundaries of logistics and infrastructure research in Nigeria by foregrounding a local firm's experience and presenting nuanced insights that have practical, academic, and policy implications.

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