FINANCIAL IMPLICATION OF IMPLEMENTING SUSTAINABLE LOGISTICS PRACTICES IN NIGERIAN TRANSPORT INDUSTRY

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Abstract

Sustainable logistics has emerged as a critical focus area in the global transport industry due to increasing environmental concerns, regulatory pressures, and the need for operational efficiency. In Nigeria, where logistics plays a vital role in economic development, implementing sustainable logistics practices presents both opportunities and financial challenges. This study assesses the financial implications of adopting sustainable logistics practices in the Nigerian transport industry, emphasizing the costs, benefits, and challenges faced by key stakeholders. A descriptive survey design was adopted, and data were collected through structured questionnaires administered to 120 transport and logistics workers across different modes of transportation, including road, rail, and freight logistics. Eighty valid responses were analyzed using descriptive statistics such as frequency tables and percentages. Findings revealed that while sustainable logistics practices incur high initial costs mainly due to poor infrastructure, high operational expenses, and limited technological adoption they also offer long-term financial and environmental benefits, including improved efficiency, cost savings, and enhanced regulatory compliance. The study recommends strengthening regulatory frameworks, investing in modern infrastructure through public–private partnerships, and providing fiscal incentives for companies adopting eco-friendly technologies.

Keywords: Transport industry, sustainable logistics, financial implications, operational efficiency, Nigeria.

1.0 Introduction

The Transport industry has undergone a profound transformation in recent years, driven by the strategic adoption of innovation and technology. The Nigeria Transport Industry plays a vital role in the country's economy, facilitating the movement of goods, people and services, boosting commerce and accelerating global investment opportunities aimed at boosting the economy. The sector facilitates international trade and also describe as critical to national growth. Innovation and technology have significantly transformed the Nigeria's transport industry in recent years, i.e. The Adoption of Compressed Natural Gas vehicles in response to soaring petrol prices due to the removal of fuel subsidies; Nigeria launched the Presidential

Compressed Natural Gas Initiative in August 2023. This program aims to convert petrol-powered vehicles to run on compressed natural gas, leveraging the country's abundant gas reserves. The initiative set ambitious targets to convert 150,000 vehicles by the end of 2023 and one million by 2027(Financial Times). Conversions are expected to lower transport costs by up to 40% and reduce emissions, an organization such as Dangote Transport are taking such advantage. However, challenges such as limited conversion centres, safety concerns, and public scepticism persist. Another example is the Implementation of Digital Ticketing Systems, this has to do with the integration of digital ticketing in Nigeria's commercial transport sector that has streamlined operations and enhanced passenger experiences. Digital platforms have reduced fraud by providing secure transaction environments and have eliminated the need for physical queues through online booking systems. Operators can now efficiently track ticket sales and passenger data in real-time, optimizing routes and improving operational efficiency. Additionally, passengers receive real-time updates on schedules, delays, or cancellations, leading to better communication between operators and travellers. These examples illustrate how innovation and technology can be used in driving efficiency, cost-effectiveness, and improved user experiences in Nigeria's transport industry, the Rail and pipeline transport, river transport, air transport and road transportation are all part of the transportation industry.

Sustainable logistics refers to “the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information while minimizing environmental impact and promoting social and economic benefits” (Björklund, 2011). Sustainable logistics has become a key area of focus in the global transport industry due to increasing environmental concerns, regulatory pressures, and the need for economic efficiency. The logistic itself is the term now that is widely use to describe the transportation, storage and handling of product as they move from raw material source, through the production system to their final point of sale or consumption. (McKinnon, 2010) Sees sustainable logistics as the integration of environmental and social goals into logistics practices to ensure resource optimization, pollution reduction and community wellbeing through the supply chain, he continues to say that "Making logistics ‘sustainable’ in the longer term will involve more than cutting carbon emissions. Despite recent improvements, the potential still exists to cut the other environmental costs of logistics by a significant margin. The logistic itself is the term now that is widely use to describe the transportation, storage

and handling of product as they move from raw material source, through the production system to their final point of sale or consumption. Furthermore, sustainability does not only have an environmental dimension. Sustainable development was originally portrayed as the reconciliation of environmental, economic and social objectives" In Nigeria, a growing economy with significant logistics demands, implementing sustainable logistics practices presents both opportunities and challenges.

2.0 The Need for the Research

Transportation is widely recognized as a critical driver of economic development (Norton, 1963; Camemark, 1979; Mallon, 1980; Olanrewaju & Falola, 1986; Olukoju, 1996). In Nigeria, the transportation sector—particularly road transport—constitutes a major pillar of economic activity by enabling the movement of goods and people, stimulating trade, and generating substantial employment opportunities. The ease of entry into the road transport business has historically provided livelihoods for millions through roles such as commercial driving, motorcycle transport (Okada), conductorship, haulage operations, and rail freight services (Shehu, 2020). Similarly, rail transportation has long served as an important asset for supporting economic activities and offering job opportunities, especially for low-income earners.

Despite its indispensable economic role, Nigeria's transport industry faces persistent structural and operational challenges that hinder the adoption of sustainable logistics practices. High operational costs—exacerbated by inflation and the removal of fuel subsidies—significantly strain the financial capacity of transport operators. The sector is further constrained by inadequate and poorly maintained road and rail infrastructure, which increases vehicle wear-and-tear, reduces fuel efficiency, and raises overall logistics costs.

Weak regulatory enforcement and policy inconsistencies create uncertainty for operators, discouraging long-term investments in green technologies. Access to financing for sustainable logistics remains limited, as high-interest rates and the absence of dedicated green transport funds prevent firms from procuring energy-efficient vehicles, renewable-powered equipment, or intelligent transport systems. The high upfront cost of sustainable technologies—including electric vehicles, fuel-efficient engines, route optimization software, and digital tracking tools—also presents a major financial barrier.

In addition, the sector suffers from a poor maintenance culture and widespread corruption, which increase operational inefficiencies and undermine compliance with environmental

standards. Urban congestion and insecure transport corridors further elevate fuel consumption and repair costs, while technological gaps limit the digitalization needed for efficient and sustainable operations. Furthermore, climate-related risks such as flooding, extreme heat, and erosion increasingly damage transport infrastructure, disrupt logistics operations, and impose additional financial burdens on operators.

Given these interconnected challenges, there is a critical need to examine the financial implications of implementing sustainable logistics practices within Nigeria's transport industry. Understanding the cost structure, investment barriers, potential long-term benefits, and enabling conditions is essential for designing practical, context-specific strategies. This study therefore seeks to investigate the economic realities facing transport operators and to propose effective solutions that can enhance sustainability, efficiency, and resilience within Nigeria's transport sector.

3.0 Literature Review

3.1The Role of Logistics in Financial Performance

Logistics plays an increasingly important role in value creation, revenue enhancement, capital consumption, and expense control. As a result, logistics financial performance is becoming a key factor in measuring overall corporate financial performance. Improving logistics financial performance directly contributes to corporate success, especially when competing for capital investments. Better financial reporting in logistics enhances the justification of additional logistics projects (Frazelle, 2022). Transportation provides mobility and accessibility, which are essential for economic growth and social development. Logistics encompasses the process of anticipating customer needs, acquiring necessary resources, and managing the movement of materials and finished goods. Key logistics functions include packing, packaging, materials handling, order processing, warehousing, inventory, transportation, and customer service (Ahmed, 2023).

3.2 Sustainability in Logistics

Sustainable logistics refers to actionable strategies that businesses can adopt to reduce the environmental impact of their supply chain. This includes carbon offsetting, route optimization, and transitioning to electric vehicles (Thompson, 2024). The European Commission (2011) defines sustainable logistics as a system that balances economic growth and environmental protection while maintaining profitability and service quality. Logistics plays a crucial role in an organization's sustainability efforts. Firms must

consider factors such as local versus international sourcing and whether sustainability criteria should be included in logistics service provider selection. These decisions can significantly impact sustainable logistics performance (Marchet et al., 2014).

Managers have virtually no control over the external environment, so they adjust the internal features of logistics to work within this fixed environment. When they do this well, there is said to be good 'strategic fit' between logistics and their environment. Stacey (2002) stated that, organizations are successful when they intentionally achieve internal harmony and external adaptation to their environment. In practice, this means that organizations build on their strengths to develop distinctive logistics capabilities that provide a sustainable competitive advantage.

Sustainable logistics systems focus on supplier selection, procurement, manufacturing, warehousing, and delivery to reduce costs, minimize environmental impact, and address social concerns. The key benefits include increased asset utilization, improved customer service, enhanced energy efficiency, reduced community impact, and a better quality of life (Wichaisri & Sopadarig, 2013). However, sustainability is not limited to environmental factors; it also encompasses economic and social dimensions (McKinnon, 2010).

3.3 Challenges in Implementing Sustainable Logistics in Nigeria

Despite the growing global emphasis on sustainability, Nigerian logistics companies face significant barriers in adopting sustainable practices. Eco-innovation, which promotes environmentally friendly transportation alternatives, is essential for freight logistics sustainability. However, major challenges persist, including:

i. Lack of funds and unclear financial benefits of eco-innovation.

ii. Poor technology infrastructure and reluctance to adopt new practices (Ifeanyi et al., 2019).

iii. High costs of electric vehicles (EVs) and inadequate infrastructure (e.g., charging stations).

iv. Dependence on aging diesel-powered trucks, which are cheaper in the short term but contribute significantly to pollution.

v. Limited availability of alternative fuels such as bio fuels, which lack proper production and distribution facilities in Nigeria (Emeje, 2025).

Regulatory pressures have led to significant advancements in road freight transport over rail and maritime logistics due to its higher energy intensity and sensitivity to oil price fluctuations. The electrification of trucks, vans, and rail freight services presents a major opportunity for reducing environmental impact (McKinnon et al., 2010).

3.4 Opportunities for Sustainable Logistics in Nigeria

With increasing production and consumption, achieving freight logistics sustainability is a growing necessity, particularly in emerging economies like Nigeria (Bektas et al., 2019). Research has primarily focused on developed economies (Silvestre, 2015; Pacheco et al., 2018), but Nigeria presents a unique perspective due to its increasing awareness of environmental sustainability, changing consumption patterns, and regulatory commitments such as the Paris Agreement and the Sustainable Development Goals (SDGs) (Sanni, 2018). Despite implementation challenges, there are growing opportunities for green logistics, including:

1. Recycling, waste management, and reverse logistics, which are gaining traction.
2. Fuel-efficient and hybrid vehicles, which could serve as transitional solutions.
3. Potential government incentives to encourage sustainable logistics adoption.

As consumption increases and stakeholder expectations shift toward sustainability, Nigerian logistics firms must embrace eco-innovation practices to remain competitive and achieve sustainability goals.

4.0 Study Area and Methodology

4.1 Methodology

This study employed a descriptive survey design suitable for analyzing stakeholder perceptions regarding the financial implications of sustainable logistics in Nigeria Kaduna state. The population comprised transport and logistics personnel including drivers, logistics workers, company staff, rail workers, and government employees. A purposive sampling technique identified relevant participants, while simple random sampling was used within each category. Out of 120 questionnaires distributed, 80 were retrieved (66.7% response rate). A structured questionnaire was used as the primary data collection instrument, validated by transport and sustainability experts. A pilot test yielded a Cronbach's Alpha of 0.82, confirming reliability. Data were collected both physically and electronically, ensuring voluntary participation and confidentiality. Descriptive statistics (frequencies, percentages, and cross-

tabulations) were applied to analyze responses using SPSS, presented in tables for clarity.

5.0 Result and Discussion

Sustainable logistics in Nigeria's transport industry serve several vital purposes that aim to balance economic growth, environmental protection and social development. It is mean to build a resilient, efficient and environmentally responsible system that support economic development and support environmental preservation.

5.1 Socio-Demographic Characteristic of the Respondent

This section presents the demographic profile of the respondent, the variables encompassed in this category are age, gender, level of education, occupational background and years of experience in the Nigerian transport and logistics industries.

Table 5.1: Socio-demographic Characteristics of the Respondents

Characteristics	Respondent	Percentage%
Age (years)		
18-25 years	7	8.75%
26-35 years	11	13.75%
36-45 years	20	25%
46-55years	24	30%
56 and above years	18	22.5%
Total	80	100%
Gender		
Male	75	93.75%
Female	5	6.25%
Total	80	100%
Education		
SSCE	14	17.5%
ND/NCE	27	33.75%
HND/B.sc	19	23.75%
PGD/ Others	20	25%

Total	80	100%
Occupation		
Driver	5	6.25%
Transport Company Employee	21	26.25%
Logistics / Freight worker	18	22.5%
Rail transport worker	11	13.75%
Government regulatory Agency staff	23	28.75%
Others	2	2.5%
Total	80	100%

Source: field survey 2025

The socio-demographic profile of the respondents provides insight into the composition of individuals operating within the Nigerian transportation and logistics sector. The age distribution reveals that the workforce is predominantly mature, with the largest proportion (30%) between 46–55 years, followed by 36–45 years (25%). Only 8.75% are between 18–25 years, indicating limited participation of younger individuals in the sector. This suggests that logistics and transport activities in Nigeria rely heavily on experienced and older workers who have spent many years in the industry. Gender distribution shows a significant dominance of males (93.75%), while females constitute only 6.25% of the respondents. This reinforces the long-standing perception of transportation and logistics as a male-dominated field, likely due to the physically demanding and mobility-intensive nature of the work. In terms of education, most respondents possess ND/NCE (33.75%) and HND/B. Sc (23.75%), while fewer have postgraduate qualifications. This implies that the industry is staffed largely by individuals with middle-level education, which may influence the speed of technology adoption and the understanding of emerging sustainable logistics practices. Occupation data further indicate that the sector comprises a broad mix of professionals. The highest representation comes from government regulatory agencies (28.75%), followed by transport company employees (26.25%) and logistics workers (22.5%). This balanced mix provides perspectives from regulatory bodies, operational staff, and private sector players

Table 5.2: Years of Experience of the respondent in the Transportation Sector

Years of Experience	Frequency	Percentage %
Less than a year	2	2.5%
1-3 years	6	7.5%
4-6 years	10	12.5%
7-10 years	25	31.25%
More than 10 years	37	46.25%
Total	80	100%

Source: field survey 2025

Experience levels show that a substantial majority (77.5%) has more than 7 years of experience, and 46.25% have spent over 10 years in the sector. This suggests that respondents are well-versed in transport operations and capable of providing informed opinions on logistics sustainability, operational challenges, and policy issues.

Table 5.3 Economic and operational profile of the respondent

Ownership Structure	Respondent	Percentages
Self Employ/ Private Sector	28	35%
Company-owned fleet	22	27.5%
Government owned	15	18.75%
Cooperative/ Union-owned	10	12.5%
Others	5	6.25%
Total	80	100%

Source: field survey 2025

Ownership structure results show that 35% operate in self-employed or private-sector-owned systems, while 27.5% work within company-owned fleets. Government-owned and cooperative-owned operations account for 18.75% and 12.5% respectively. This distribution highlights a blend of private and public sector involvement, with private entities having a strong presence in logistics operations.

Table 5.4 Respondent view of the Average Monthly Income from Transport/Logistics Activities

Average Monthly Income	Respondent	Percentage %
Less than #100,000	7	8.75%
#101,000 - #200,000	28	35%
#201,000 - #300,000	35	43.75%
#301,000 - #400,000	5	6.25%
#401,000 - #500,000	4	5%
Above #500,000	1	1.25%
Total	80	100%

Source: field survey 2025

Income levels indicate that a majority (43.75%) earn between ₦201,000–₦300,000, followed by 35% earning ₦101,000–₦200,000. Very few (1.25%) earn above ₦500,000 monthly. This shows that despite its economic importance, the sector offers moderate income levels, which may influence willingness to invest in sustainable technologies.

5.2 Awareness and Perception of Sustainable Logistics Practices

Table 5.5 Respondent view on Familiarity with Sustainable Logistics Concepts

Familiarity with Sustainabl Logistics Practices	Respondent	Percentage %
Very familiar	50	62.5%
Moderately familiar	18	22.5%
Slightly familiar	12	15%
Not familiar	-	-
Total	80	100%

Source: field survey 2025

The awareness level of sustainable logistics concepts is notably high. A significant proportion (62.5%) is very familiar, and 22.5% are moderately familiar with sustainability concepts. This implies that sustainable logistics is no longer new to industry players in Nigeria.

Table 5.6 Respondent view on the Importance of Sustainable Practices

Do you see the Importance o Sustainable Practice as the Future of Nigeria Transpor Industry	Respondent	Percentage %
Strongly Agree	22	27.5%
Agree	40	50%
Neutral	10	12.5%
Disagree	8	10%
Strongly Disagree	-	-
Total	80	100%

Source: field survey 2025

Most respondents believe sustainable practices are essential to the future of the Nigerian transport industry, with 50% agreeing and 27.5% strongly agreeing. Only 10% disagree. This shows strong recognition of the long-term importance of sustainability.

Table 5.7 Respondent view on the Future Benefits of Sustainable Practices

Future Benefits of Sustainab Practices	Respondent	Percentage %
Cost savings	32	40%
Reduced Emissions	18	22.5%
Improved Efficiency	13	16.25%
Better Brand Reputation	7	8.75%
Long-term Profitability	9	11.25%
No Benefits	-	-
Others	1	1.25%
Total	80	100%

Source: field survey 2025

Regarding perceived benefits, cost savings (40%) and reduced emissions (22.5%) were the most frequently mentioned advantages. This suggests that respondents associate sustainability with economic and environmental improvements. Improved efficiency (16.25%) and long-term profitability (11.25%) were also acknowledged.

5.3 Challenges affecting Sustainable Logistics Implementation

Sustainable logistics faces numerous challenges that include infrastructure deficit, high operation cost, poor regulation and limited technological adoption among other pressing issues.

Table 5.8 Respondent view on the Major Challenges in Implementing Sustainable Logistics

Types of Challenges	Respondent	Percentage %
Operational & Infrastructure Constraint	19	23.75%
Policy Institutional & Government Constraint	22	27.5%
Financial & Technological Constraint	18	22.5%
Environmental & Security Constraint	11	13.75%
Limited awareness of Sustainable practices/ Othe	10	12.5%
Total	80	100%

Source: field survey 2025

Policy and institutional constraints are the most prominent (27.5%), indicating gaps in regulatory frameworks, inconsistencies in policy implementation, and limited government support systems. Operational and infrastructure constraints (23.75%) reflect issues such as poor road networks, aging fleets, and inadequate logistics facilities. Financial and technological constraints (22.5%) highlight the high cost of modern equipment, lack of access to funding, and limited adoption of digital and eco-friendly technologies. Environmental and security constraints (13.75%) underscore Nigeria's vulnerability to insecurity and climate-related disruptions. These findings confirm that achieving sustainable logistics requires addressing systemic issues related to regulation, infrastructure, technology, and finance.

5.4 Financial Implications of Sustainable Logistics Practices Table 5.9 Respondent View on Cost Consideration on Implementing Sustainable Logistics Practices

Cost Consideration	Respondent	Percentage %
Very High	43	53.75%
High	22	27.5%
Moderate	15	18.75%
Low	-	-
Very Low	-	-
Total	80	100%

Source: field survey 2025

A majority of respondents (53.75%) view the cost of implementing sustainable logistics practices as very high, while 27.5% consider it high. This indicates that cost is a major deterrent to sustainable initiative adoption.

Table 5.10 Respondent view on Areas requiring Major Investment when adopting Sustainable Logistic Practices

Areas of Investment	Respondent	Percentage %
Vehicle or Fleet Upgrade	8	10%
Eco – Friendly or Fuel-Efficie Technology	23	28.75%
Renewable Energy System	7	8.75%
Digital Tools (GPS, Sensors, Monitoring Systems)	17	21.25%
Staff Training and Developme	3	3.75%
Infrastructure Upgrade	22	27.75%
Total	80	100%

Source: field survey 2025

From the Table 5.10 above show that the majority of the respondent goes with the Eco-friendly/fuel-efficient technologies with (28.75%), followed by Infrastructure upgrades with (27.75%) followed by Digital tools such as GPS and sensors with (21.25%) of the respondents, Vehicle or Fleet Upgrade with (10%) of the respondent, followed by Renewable Energy System with (8.75%) and the least is (3.75%) of Staff Training and Development. These choices show a preference for innovations that improve efficiency and reduce long-term operating costs.

Table 5.11 Respondent view on Long – Term Financial Benefits to Outweigh the Initial Cost

Long – Term Financial Benef to Outweigh the Initial Cost	Respondent	Percentage %
Strongly Agree	12	15%
Agree	40	50%
Neutral	22	27.5%
Disagree	6	7.5%
Strongly Disagree	-	-
Total	80	100%

Source: field survey 2025

Despite high initial costs, 65% of respondents (15% strongly agree and 50% agree) believe that sustainable practices will eventually yield long-term financial benefits. This indicates an understanding of the return-on-investment potential of sustainability, even though short-term affordability remains a barrier

Table 5.12 Respondent view on ever Applied for Financial Support or Incentives to Impalement Sustainable Practices

Do you ever Applied for Financial Support	Respondent	Percentage %
Yes	38	47.5%
No	42	52.5%
Total	80	100%

Source: field survey 2025

On financial support, 47.5% have applied for one form of incentive or another, while 52.5% have not. This may indicate either limited access to available funding schemes or lack of awareness of existing incentives.

Table 5.13 Respondent view on How Government Incentives Would Improve the adoption of Sustainable Logistics Practices

Views of Respondent	Respondent	Percentage %
Yes	55	68%
No	6	7.5%
Not sure	19	23.75%
Total	80	100%

Source: field survey 2025

Finally, 68% of respondents believe that government incentives would significantly improve adoption of sustainable logistics practices, reinforcing the need for supportive policy frameworks and financial intervention.

5.5 Strategies for Improving Sustainable Logistics in Nigeria

Table 5.14 Respondent View on the Strategies for Improving Sustainable Logistics in Nigeria

Type of Strategy	Respondent	Percentage %
Infrastructure	28	35%
Digitalization	25	31.25%
Policy Consistency	10	12.5%
Public-private partnership	17	21.25%
Total	80	100%

Source: field survey 2025

From the Table 5.14 above, it identified several key strategies with the highest of the respondents view Infrastructure improvements with (35%), examples of road networks, transport terminals, warehousing facilities etc. Followed by Digitalization (real-time tracking, automation, and intelligent transport systems) with (31.25%), followed by Public-private partnership (21.25%) which is the collaboration between government and private operators for funding and leadership, and the least is Policy consistency with (12.5%) by eliminating regulatory uncertainty and ensuring long-term planning.

Table 5.15 Respondent View on the support needed Most to Adopt Sustainable Logistic Practices

Type of Support	Respondent	Percentage %
Financial support	28	35%
Technical Assistant	18	22.5%
Training	6	7.5%
Policy /Regulatory Clarity	7	8.75%
Infrastructure	21	26.25%
Total	80	100%

Source: field survey 2025

From the Table 5.15 above Support needs further emphasize financial support with (35%) of the respondent, followed by infrastructure with (26.25%) of the respondent, Technical Assistance with (22.5%), Policy /Regulatory Clarity with (8.75%) and the least is Training with (7.5%) of the respondent.

Table 5.16 Key Barriers to Sustainable Logistics Implementation in your Operations

Key Barriers	Respondent	Percentage %
Financial	27	33.75%
Technical	25	31.25%
Infrastructure	18	22.5%
Policy Clarity	10	12.5%
Total	80	100%

Source: field survey 2025

The major overall barriers include financial limitations with (33.75%), followed by technical challenges with (31.25%), inadequate infrastructure (22.5%), the least is policy clarity with (12.5%). This indicates that sustainable logistics remains highly dependent on investment capacity, availability of skilled personnel, and physical infrastructure.

6.0 Findings, Recommendations and Conclusion

The study assessed the socio-demographic characteristics, awareness levels, financial implications, challenges, and strategies for improving sustainable logistics in Nigeria. The major findings are summarized as follows:

1. Socio-demographic and professional background

The respondents are predominantly male and belong mostly to the middle-aged and older workforce, indicating that logistics in Nigeria is largely dominated by experienced individuals. Most respondents possess mid-level educational qualifications and occupy diverse roles across private companies, government agencies, logistics firms, and transport operations.

2. Experience and operational characteristics

The sector is characterized by a highly experienced workforce, with over 77% having more than 7 years of experience. Ownership structures are largely private or company-owned. Most respondents earn between ₦101,000 and

₦300,000 monthly, suggesting that while the sector is economically active, income levels remain moderate.

3. Awareness and perception of sustainable logistics

Awareness of sustainable logistics practices is high, with over 60% very familiar with the concept. Likewise, the majority acknowledge sustainable practices as essential to the future of Nigeria's transport industry. Respondents identified cost savings, reduced emissions, and improved operational efficiency as primary benefits.

4. Challenges to sustainable logistics implementation

Major barriers include policy and institutional constraints, operational and infrastructure deficits, financial limitations, and inadequate technological adoption. High implementation costs are particularly significant, with most respondents noting that sustainable practices require substantial financial investment.

5. Financial considerations and investment priorities

While respondents acknowledge high initial costs, a majority believe that long-term financial benefits outweigh these costs. Investment priorities include eco-friendly/fuel-efficient technologies, infrastructure improvement, and digital tools such as GPS and monitoring systems. More than half also believe government incentives would accelerate adoption.

6. Strategies for improvement

Respondents emphasize the need for improved transport infrastructure, digitalization, public-private partnerships, and consistent policy frameworks. Financial support, technical assistance, training, and infrastructure development are considered the most critical forms of support needed to adopt sustainable logistics practices.

6.1 Recommendations

The following recommendations are aims to address the challenges and enhanced the financials implications of sustainable logistics practices in Nigeria Transport sector, fostering a more efficient, cost effective and environmentally responsible system.

1) There is the need for strengthen of regulatory frameworks, by which the government had to work closely with the stakeholders in the industry to create and enforce regulations that promote sustainable logistics practices such as reducing emission, improving fuel efficiency and encouraging eco-friendly technologies.

2) There is the need for improved infrastructure by the government and private sector to prioritize investments in roads, railways, and other essential infrastructure to reduce congestion and improve transport efficiency. Pubic Private Partnership {PPP} could be explored for large scale infrastructure project.

3) There is the need to address the High Operational Costs by offering incentives, for adopting energy efficient vehicles, better fuel management system and cost – saving technologies would help mitigate those high operational costs. In addition, government could provide subsidies or tax incentives for businesses, transitioning to greener technology.

4) There is the need for enhancing worker Economic Growth and Skills Development by participating in training programs, particularly for younger individuals to improve their skills in sustainable logistics which could create a more skilled workforce. Additionally, fostering job creation and enhancing wages in the transport sector will also promote sustainable economic growth for workers.

5) There is the need for government and transport industry stakeholders to engage in public awareness, campaign about the importance of sustainable logistics including training, programs and workshops to encourage business to adopt greener practices. This could include information about fuel efficient practices, emissions reduction, and the benefit of sustainable in logistics and environment.

6) There is the need for government to address security concern business, and such required agencies should invest in improved security measures such as surveillance, better coordination among security agencies and the use of technology (e.g. GPS tracking) in order to ensure safety along transport routes.

7) There is the need for the promotion of the use of electric vehicles (EVs) and hybrid vehicles for road transportation could help to reduce emission and lower operational costs. The government should also focus on improving road safety and traffic management system to make road transport more efficient.

8) There is the need for streamlining the process for registering transport businesses, offering financial support for start - ups, and providing access to business development resources that could make it

easier for new entrants, particularly those focused on sustainable logistics to join the industry.

9) There is the need to enhance collaboration between stakeholders by establishing forums for regular communication and collaboration among government bodies, transport association, and businesses in the logistics sector would help align their efforts towards common sustainability goals.

10) There is the need for the sector to invest in technologies such as route optimization software, electric or hybrid vehicles fleets and energy efficient logistics solution. Innovation and transport management technologies should be encouraged through partnership with tech companies.

6.2 Conclusions

While the initial financial costs of sustainable logistics may be high, the long term benefit in cost saving, regulating compliance, brand positioning and access to green financing make it viable and profitable investment, (Nwaulne 2024). Finally, adopting sustainable logistic in the Nigeria Transport Industry is financially viable in the long-term, despite high initial costs. Stakeholders must prioritize investment in infrastructure, innovation and regulatory compliance to maximize the economic and environmental benefits.

Overall, the results reveal that while awareness and perceived importance of sustainable logistics are high among Nigerian transport stakeholders, implementation is hindered by financial, infrastructural, and policy-related obstacles. Strong government support, investment in technology, and improved regulatory consistency are critical for wider adoption. The sector's experienced workforce and increasing recognition of long-term economic benefits offer opportunities for progress toward sustainable logistics in Nigeria.

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