PIPELINE TRANSPORTATION AND THE MARKETING OF PETROLEUM PRODUCTS IN NIGERIA: A REVIEW OF LITERATURE

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Abstract
The market for petroleum products continues to rise as a result of demand from both individuals and the industrial users, and there is a need to establish adequate solutions to this huge increase in demand. This is where pipelines transportation is essential for the effective distribution and transportation of petroleum products across Nigeria. This paper espoused extant literatures on pipeline transportation and marketing of petroleum products in Nigeria by examining the functions and importance of pipeline transportation as well as its challenges. Conceptual, theoretical and empirical literatures were reviewed in actualizing this objective. The paper observed that pipeline transportation plays a vital role in the distribution of petroleum products in Nigeria and has numerous advantages such as easy movement of large quantity of product, timely deliverance of products and cost effectiveness. The paper recommends that the Nigerian government and petroleum sector partners should invest considerably in pipeline transportation infrastructure to fulfil the huge demand of petroleum products and achieve the full potential of the industry.
Keywords: *Pipeline Transportation, Petroleum Products, Marketing, infrastructure*

INTRODUCTION

Petroleum products must be transported since they are the fuel for numerous individuals and industries, including transportation, manufacturing, and power production. An important component of the global petroleum business is pipeline transportation (Adeola & Ogunyele, 2022). Iheanyi and Chinedu (2023) posited that the marketing and distribution of petroleum products in Nigeria depend heavily on pipeline transit. Compared to other forms of transportation, it is more affordable, safe, and dependable. It has the ability to move heavy loads of goods across vast distances. Because of this, it is a preferred form of transportation in Nigeria's oil and gas industry (Olujobi, et al, 2022). According to Omoregie (2019), given the importance of the oil and gas sector to the Nigerian economy, pipeline transportation makes a major contribution to the country's gross domestic product (GDP), some of the advantages of the pipeline transport system to the economy of Nigeria generally include the influx of foreign direct investment, the supply of job opportunities, and the provision of money to the government.

Despite Nigeria being a significant producer and exporter of crude oil around the globe, Nigeria has been battling with several issues in its petroleum sector, including poor transportation infrastructure (Okoroafor, 2020). The transportation of petroleum products from the refineries to the marketplaces and end-users remains a serious concern, not only in terms of cost and safety but also in terms of its influence on the environment (Olujobi et al, 2018). Product theft, pipeline vandalism, and other types of pipeline interruptions are common occurrences in Nigeria, resulting in huge losses to the government, petroleum firms, and the economy at large (Omoregie, 2019). The continuous increase in demand for petroleum products has brought about the need to establish adequate solutions to fulfil this anticipated demand (Mathews et al, 2019). This circumstance has made pipeline transportation a vital element of the petroleum business in Nigeria. The present pipeline infrastructure in Nigeria is insufficient to supply the nation's demand for petroleum products (Itsekor, 2020). In addition, the unbearable carnages on our highways as a result of accidents of trucks transporting petroleum products from one part of the country to another, gives strong support for the use of pipeline transportation for petroleum products.

Pipeline transportation in oil and gas industry has been extensively researched in western world (Dusyk & et al, 2018; Castro-Avarez, et al, 2018; Cid-Galiot et al, 2022) and in Nigeria (Oyewunmi, 2019; Olujobi et al, 2020; Obike et al, 2020; Onokala & Olajide, 2020; Suleman, & Ennin, 2023; Umar et al, 2021), however,

all these were empirical studies on different contributions of pipeline transportation of petroleum products in various area. This study tend to bridge the gap in knowledge by having a holistic review of literatures that supports the marketability and efficiency of pipeline transportation of petroleum products in Nigeria. The main objective of this study therefore, is to review ways to which pipeline transportation will contribute in ensuring efficient distribution of petroleum products in Nigeria.

LITERATURE REVIEW

Overview of Pipeline Transportation in Nigeria

Nigeria has traditionally depended on pipeline transportation to deliver crude oil and processed products around the country since it is an oil-producing country, (Onuh et al, 2021). The pipeline transportation system has suffered a number of difficulties over the last 10 years, including pipeline theft, vandalism, and poor maintenance. To enhance the pipeline transportation system, it is important to have a better knowledge of these issues, which have had substantial economic and environmental effects on the nation. Using subterranean pipes, pipeline transportation includes moving gas and oil. Since it began operating in Nigeria in the early 1970s, the pipeline transportation system has emerged as one of the main ways to move crude oil from producing wells to export ports (Johnson, 2022). The administration and operation of Nigeria's pipeline transportation infrastructure are under the control of the Nigerian National Petroleum Corporation (NNPC).

Advantages of Pipeline Transportation

Pipeline transportation is a way to move different kinds of liquids, gases, and other goods across great distances via a pipeline system (Itsekor, 2020). It is a reliable, economical, and energy-efficient technology that has established itself as an essential link in the world's energy supply chain (Suleman, & Ennin, 2023). Numerous businesses like this form of transportation since it uses less energy and has lower transportation costs than other modes of transportation, (Shaheen & Cohen, 2019).

Transportation through pipelines has several benefits compared to traditional modes of transportation, such as complete automation of loading and unloading processes, flexibility, and cheap operating costs. It is also, a secure way to move things like chemicals, natural gas, and oil. This is so that environmental risks won't be created by leaks or other damage to the pipes, which are built to guard against such things. (Agarwal & Gupta, 2021). Additionally, since pipeline transportation can move enormous quantities of cargo, it is especially well suited for moving crude oil and natural gas. In 2019, crude oil was carried globally through pipelines with a capacity of about 7 billion barrels per day, International Energy Agency (IEA, 2020). The low cost of pipeline transportation is another benefit. Pipeline transportation is much less expensive than rail or truck transportation. Although studies have shown that pipeline transportation is a more cost-effective means of transportation in the long run, the up-front capital cost of pipeline construction may be substantial. Pipeline transport for bulk liquids may sometimes be up to four times less expensive than truck transport, (Kurnia et al, 2022).

The fact that pipeline transportation uses less energy than other modes of transportation is another significant benefit (Chen & Yang, 2021). Less energy is needed to transport goods via pipelines than to move them by road or rail. This is due to the fact that pipelines can move a much greater amount of cargo in a single trip, which reduces the number of trips needed to move the same amount of cargo (Albert, & Haigh, 2019). Additionally, pipeline transportation is a green method of transportation since it emits fewer hazardous pollutants and carbon dioxide than other routes of transportation (Umar et al, 2021)

Disadvantages of Pipeline Transportation

Despite these benefits, pipeline transportation has disadvantages as well (Johnson, 2022). The rigidity of pipeline transportation is one of its main drawbacks. It is difficult and costly to reroute or decommission a pipeline after it has been built. Due to this lack of adaptability, pipeline infrastructure may go underused or even stranded as a result of changes in the market or supply chain. If the market for their goods changes, this may make it difficult for pipeline firms to recoup their expenditures. Furthermore, a pipeline must have a constant flow of commodities to function, and any disruption in that supply might cause the pipeline to

become inactive. Due to the erratic nature of oil and gas pricing and demand, this might be troublesome, (Odeyemi, 2022) The vulnerability of pipeline transportation to spills and leaks is another significant disadvantage (Bashir, 2021). Even with safety precautions in place to stop spills and leaks, they nevertheless happen periodically. These spills may sometimes be serious, endangering nearby populations and animals (Olujobi et al, 2018). Since a single incident may result in severe reputational harm, astronomical environmental cleanup costs, and a decline in investor trust, this is a serious worry for pipeline firms (Serdar, & Al-Ghamdi, 2022).

Pipeline vandalism is one of the main problems impacting pipeline transportation in Nigeria. Pipeline vandalism is the willful destruction or damage of pipelines, usually for one's own financial advantage by stealing oil or gas (Aluko, & James, 2022). According to the Nigerian National Petroleum Corporation 2022, between January 2019 and September 2020, revenue losses due to pipeline vandalism cost Nigeria over $2 billion. Numerous pipeline criminals have turned to advanced tactics, such as digging into the pipeline and utilising trucks or barges to transfer stolen oil, which has further complicated the problem (Paki, & Agusomu, 2018). Theft through pipeline vandalism is not Nigeria's sole issue with pipeline transportation. Pipeline ruptures, spills, and explosions have all been caused by improper maintenance of the pipeline transportation infrastructure in the past (Olujobi et al, 2018). The major causes of improper maintenance are a lack of resources, including money, labour, and tools. Over 4.5 million barrels of oil were lost in Nigeria's 1,300 oil accidents between 2006 and 2010 (Kadafa et al, 2012).

However, improvements are being made to the pipeline transportation infrastructure by the government and other partners, (Onuh et al, 2021), however, a measure that seeks to impose harsher penalties for pipeline vandals and anyone implicated in oil theft was recently adopted by the Nigerian Senate (Olujobi et al, 2022). The proposed law calls for a mandatory minimum sentence of 21 years in jail for anyone found guilty of damaging pipelines. Additionally, the NNPC has expanded its efforts to enhance pipeline security by using cutting-edge technology to monitor the pipeline system, such as drones and surveillance cameras. These technologies have proven to be very good at spotting and preventing pipeline vandalism, (Ayeni, 2020; Aibin, 2022).

Empirical Review

Castro-Alvarez and Kammen, (2018) investigated the effect of pipeline transportation on the marketing of petroleum in Texas, United States. The goal of the research was to ascertain how well pipelines worked in supplying the rising demand for petroleum products and how that affected the entire marketing plan. Data were gathered from important participants in the petroleum business, such as oil firms, distributors, and consumers, via interviews and surveys. Furthermore, statistics on manufacturing, shipping, and sales were gathered from a variety of industry publications and databases. The researcher used a mixed-methods approach, combining quantitative and qualitative research techniques. The study's conclusions showed that the marketing of petroleum products depends heavily on pipeline transportation. It also offers a dependable and economical way to transport goods from refineries to numerous distribution centres around the nation. The study found that pipelines' effectiveness and capacity allow prompt delivery and lower transportation costs, improving marketing tactics and boosting market share for oil corporations. The study recommended that in order to meet the rising demand for petroleum products, more investment should be made in pipeline infrastructure.. It also emphasised the need for routine maintenance and monitoring to guarantee the security and effectiveness of pipeline systems.

Olujobi et al (2020) examined the role that pipeline transportation plays in the domestic marketing of petroleum products. Key industry stakeholders were surveyed and interviewed to get the data. To interpret the data and draw conclusions, statistical analysis was carried out. The study's conclusions showed that pipeline transportation is essential to Nigeria's effective petroleum product distribution. The report suggested that, in order to improve the marketing of petroleum products, the government increase spending on pipeline infrastructure upkeep and growth.

Umar et al, (2021) examined "The Economic Impact of Pipeline Transportation on the Marketing of Petroleum Products in Nigeria". The purpose of the research was to evaluate the financial advantages of pipeline transportation for the promotion of petroleum products. Data was gathered via surveys and conversations with consumers and business professionals. To analyse the data and ascertain the financial effects of pipeline transportation, econometric analysis was used. The results show that pipeline transportation enables the efficient distribution of petroleum products at a lower cost, resulting in lower costs for consumers and higher profits for marketers. The report proposed that the government give pipeline infrastructure upkeep and growth top priority in order to increase the economic advantages of the petroleum marketing industry.

Cid-Galiot et al (2022) investigated "Pipeline Transportation and Supply Chain Integration: A Study on the Mexican Petroleum Industry" In Mexico City. The goal of the research was to determine the potential and problems related to pipeline transportation, as well as how it will affect the Mexican supply chain and marketing tactics. Interviews with specialists in the field, including those from oil corporations, logistical service providers, and governmental organisations, were used to gather data for the study. In addition to the interviews, a survey of the literature on pipeline transportation and supply chain management in the petroleum sector was conducted. The study's conclusions showed that pipeline transportation was crucial to integrating the Mexican petroleum industry's supply chain. It aided in the efficient flow of products, cut down on transportation expenses, and improved coordination amongst the many parties engaged in the marketing process. The report suggested investments in pipeline infrastructure based on these results to close the gap between Mexico's petroleum production and consumption centres. It also emphasised the need for industry participants to work together to achieve efficient supply chain operations. The report also emphasised the need for pipelines to be continuously maintained and monitored in order to guarantee their dependability and sustainability.

Obike and Emori (2020) studied "The Role of Pipeline Transportation in Reducing Product Losses in the Marketing of Petroleum Products in Nigeria". The goal of the research was to ascertain how much product loss in the marketing of petroleum products is reduced by pipeline transportation. Site visits, inspections, and expert interviewing were used to gather the data. The results showed that, compared to other forms of transportation, pipeline transportation dramatically minimises product losses. To further reduce product losses, the report advised the implementation of larger

Onokala and Olajide (2020) examined "The Environmental Implications of Pipeline Transportation on the Marketing of Petroleum Products in Nigeria" was undertaken by The goal of the research was to evaluate how pipeline transportation for the purpose of selling petroleum products affected the environment. Data were gathered through environmental evaluations, soil and water samples, and environmental expert interviews. The conclusions showed that the transit of pipelines involves threats to the environment, including pollution and oil spills. To lessen the impact of pipeline transportation on the environment, the report suggested enacting stringent environmental rules, performing routine maintenance on pipeline infrastructure, and using cutting-edge technology.

Oyewunmi (2019) examined "The Role of Pipeline Transportation in Promoting Energy Security and National Development. The purpose of the research was to assess how pipeline transportation affects national development and energy security. Data were gathered via surveys, interviews, and secondary data analysis from government and business report sources. According to the research, pipeline transportation improves energy security by guaranteeing a steady supply of petroleum products and lowering reliance on other forms of transportation. To support energy security and general national growth, the research advised additional investment in pipeline infrastructure, strategic storage facilities, and the diversification of energy sources.

In Calgary, Canada, Dusyk and Dullemond (2018) investigated "Environmental Impacts of Pipeline Transportation on the Marketing of Petroleum Products: A Study in Canada. The goal of the research was to evaluate the long-term feasibility and sustainability of pipeline transportation in relation to the country's oil corporations' chosen marketing approaches. Interviews with environmentalists, business professionals,

and oil company officials served as the primary source of information for the study. To learn more about the ecological impact of pipeline traffic, the research also examined secondary data from environmental reports and official publications. The study's conclusions showed that pipeline transportation has both beneficial and detrimental environmental effects. In comparison to previous types of transportation, pipelines provided a comparatively safer and more effective way to move petroleum products, but they also presented concerns, including the possibility of oil spills and damage to ecosystems. Based on these results, the research suggested the establishment of strong safety measures to reduce environmental dangers. It also emphasised the need for incorporating sustainable practises into marketing plans, such as advocating for cleaner forms of energy and spending money on greener technology R&D. These suggestions attempted to lessen the environmental effects of pipeline transportation while ensuring its long-term sustainability in Canada's petroleum product marketing.

Theoretical Review

Resource-based view (RBV) theory

The RBV theory was developed in the 1950s and 1980s, respectively, by Barney in 1991. According to Sullivan et al (2018), a firm's resources must satisfy four requirements in order to be valuable: they must be uncommon, non-replaceable, exploitable, and non-tradable. The RBV theory's fundamental tenet is formed by these requirements. The essential premise of the RBV theory is that if a firm's resources match the VRIO criteria—value, rarity, imitability, and organisation—they may generate a sustainable competitive advantage (SCA) (Sullivan et al, 2018). A pipeline transportation is a firm's important resource that will generate profit from its unique technology, ease of movement, and cheaper in the long run which would be difficult to duplicate. The theory that resources are dispersed differently among enterprises is one of the assumptions made by the RBV theory. According to this theory, the SCA that determines a company's competitive position is made up of resources that are valuable, uncommon, unique, and non-replaceable (Almada & Borges, 2018).

This theory also contend that a firm's internal resources may provide a long-lasting competitive advantage that leads to better financial and operational performance when they are valued, rare, and difficult to replicate (Donnellan & Rutledge, 2019). Pipeline transportation is an important assets of Nigeria's petroleum sector. It entails the safe transportation of crude oil and other refined products from the production site to the refineries and end users. In Nigeria's petroleum business, the importance of pipeline transportation is shown by its capacity to satisfy both domestic and global market needs.

Some academics have criticised the RBV theory for being excessively simple and failing to take into consideration outside variables like the market environment and governmental regulations. They contend that an effective marketing strategy goes beyond a company's internal resources since it also relies on external elements like client preferences and the general business climate (Tallman el al, 2018). The RBV theory, however, has also gained a lot of support from other academics who point out how important it is for examining the connection between a firm's strategic resources, its competitive environment, and its performance. One scholar argues that a firm's competitive advantage is determined by its unique resources and capabilities, which cannot be easily replicated by competitors (Greve, 2021). In this regards Pipeline transportation is unique and its capabilities enormous such that can be used to gain a competitive advantage over other firms in the same industry. This was collaborated by Kinyagu (2021) who opined that RBV theory gives a firm's competitive advantage arising from its ability to effectively allocate and leverage its resources, leading to superior performance.

The resources that the firms in the oil industry have access to, plays a significant role in determining whether those firms succeed or fail. Resource-based theory, when applied to the study of pipeline transportation and its importance to the marketing of petroleum products in Nigeria gives the firms control over managing pipelines, refineries, and gas supply. This RBV theoretical framework may provide fresh insights into the elements that might affect the performance of oil industry firms by relating it to the study of pipeline transportation and its importance to the marketing of petroleum products in Nigeria, (Agarwal & Gupta, 2021).

Institutional Theory

In order to survive and succeed, Scott (1995) argues that organizations must adhere to the laws and values of the environment. He also claimed that institutional theory should be applied as an evolutionary lens to examine how institutions emerged within society. The foundation of the theory's development was the conviction that institutions have a big influence on how society is shaped. The social, economic, and political processes of society are shaped by institutions, according to the institutional theoretical paradigm. The framework is focused on interpreting the effects of institutions on social norms, practises, and processes (Mishra & Mohanty, 2022).

In applying this theory to pipeline transportation, institutional elements, including government laws, corruption, and the existence of strong interest groups, have a significant impact on Nigeria's pipeline transportation and sale of petroleum products. Researchers can examine how these institutions affect the effectiveness, viability, and sustainability of the pipeline transportation system and the marketing of petroleum products in Nigeria by utilising this theoretical frame. This viewpoint enables a thorough comprehension of the intricate web of connections, dynamics of power, and factors that affect how Nigeria's petroleum sector operates.

An appropriate viewpoint for examining the relationship between pipeline transportation and the marketing of petroleum products in Nigeria is provided by the institutional theoretical framework. The institutional theoretical framework, which focuses on the role of formal and informal institutions in influencing business behaviour and outcomes (Papageorgiadis, & Konara, 2020). It is essential for analysing how organisations, such as legal systems and oil companies, affect the efficacy and efficiency of pipeline transportation. The social, political, and economic issues that affect the distribution of petroleum products through pipelines could also be examined by the institutional framework (Donnellan & Rutledge, 2019). The institutional theoretical framework offers a workable framework to investigate the importance of pipeline transportation to Nigerian petroleum product marketing. The theory will enables a thorough examination of Nigeria's institutional setting for petroleum marketing and sheds light on the possibilities and constraints that must be overcome to create a successful system (Almada & Borges, 2018).

Stakeholder Theory

In Nigeria, the country with the greatest economy in Africa at the moment, pipeline transportation will be a crucial component in the distribution of petroleum products. It is essential for the transfer of crude oil and petroleum products through pipelines between various states (Onokala & Olajide, 2020). The importance of this transportation infrastructure cannot be understated since it has a direct impact on the distribution and marketing of petroleum products throughout the nation. As a means of addressing organisational challenges, academics started to create stakeholder management theories in the late 20th century. The stakeholder theory is one of the most popular theories (Freeman et al, 2020).

The theory offers a moral and ethical framework for making decisions that takes into account the needs of all parties engaged in a business or organization (Nicholson & Kurucz, 2019). The core tenet of the stakeholder theory is that businesses should not just prioritise maximising profits for shareholders but also consider the interests of other parties engaged in their operations, including workers, clients, suppliers, and the community (Onokala & Olajide, 2020). It emphasises that a company's success relies on generating value for all stakeholders as well as satisfying the needs of its shareholders. The stakeholder theory holds that stakeholders have a big effect on an organisation's performance. Therefore, in order to succeed in the long run, businesses must manage these connections. The theory also contends that organisations should take stakeholder opinions into account when making choices and that stakeholders have an ethical right to participate in decision-making processes that impact them. When the stakeholder theory is applied to the investigation of pipeline transportation in Nigeria, it is clear that a number of stakeholders' interests are involved (Onokala & Olajide, 2020). The government, oil and gas firms, small villages, and the environment are some of these stakeholders. Stakeholders must manage the environmental effects of the community in a responsible manner. Therefore, the use of the stakeholder theory in the transportation of pipelines will guarantee that the interests of all parties concerned are taken into consideration, leading to operations that

are sustainable and efficient (Donnellan & Rutledge, 2019). The distribution of petroleum products in Nigeria mostly relies on pipeline transportation (Freeman et al, 2020). A moral and ethical framework for decision-making that takes into account the interests of all parties participating in an organisation is proposed by stakeholder theory (Tallman et al, 2018). The theory's application to pipeline transportation in Nigeria would guarantee that the interests of all concerned parties are taken into consideration, leading to operations that are sustainable and efficient

Resource dependency Theory

Pfeffer and Salancik (1978) initially proposed the theory in 1978 in their influential book The External Control of Organisations. A major theory in organisational management, the resource dependency theoretical framework helps to understand the variables that affect how organisations and their environment interact as proposed by Pfeffer and Salancik (1978) This theory contends that crucial resources like cash, labour, and knowledge, among others, are reliant on an organisation's external environment. In order to guarantee that organisations survive and succeed, resource dependency theory aims to explain how they might minimise these external dependencies (Sherer et al, 2019).

The essential tenet of the theory, according to these writers, is that organisations need resources from their surroundings in order to exist, flourish, and achieve their goals. A company must depend on a range of resources from its external environment in order to flourish, including consumers, suppliers, labour, and capital (Kholmuminov, & Wright, 2019) The resource dependency theory is predicated on a number of premises, such as the notion that organisations are open systems, the presence of environmental turbulence, and the scarcity of resources. According to the theory, organisations continually interact with their environment, which is characterised by complexity, uncertainty, and dynamism, and that contact has a substantial influence on the behaviour and performance of the organisation (Akpoviroro & Owotutu 2018). The resource dependency theory is effective in describing the connection between pipeline transportation and the sale of petroleum products in Nigeria. Pipeline carriers are necessary for the distribution of petroleum products to different marketing locations across Nigeria (Onokala & Olajide, 2020) It is important to understand how resource dependency theory is applied to the study of pipeline transportation and the marketing of petroleum products in Nigeria. Given that the majority of the oil produced depends on pipelines for transit to different marketing outlets both within and outside the nation, the theory illustrates how pipeline transportation is crucial to the Nigerian petroleum sector. The theory also emphasises the dangers of relying only on pipeline transportation, such as pipeline vandalism, which messes up the supply chain and hurts petroleum product marketing (Almada & Borges, 2018). The theoretical framework of resource dependency sheds light on how organisations interact with their surroundings. Its application to the investigation of pipeline transportation and the promotion of petroleum goods in Nigeria provides insight into how these two factors interact and how pipeline transportation affects the promotion of petroleum goods.

Networks theory

Network theory is one of the disciplines of network science and has become a platform for active exploration of interdisciplinary research areas because relationship networks are visible in almost every area of human and non-human activity (Fould, 2012). The network theoretical framework is a useful tool for examining the interactions between various system components (Akour, & Salloum, 2022). A network theoretical framework may shed light on the connections between pipeline transportation and the marketing of petroleum products in the context of the Nigerian petroleum sector (Tallman et al, 2018). Network analysis has grown in importance as a field of study in many different businesses nowadays (Akour, & Salloum, 2022). The fundamental tenet of network analysis is that knowing how the many components of a system interact is essential to comprehending how that system functions. It is crucial to look at the links between a system's components as well as its individual parts. Graph theory or social network analysis are two methodologies that may be used to map these linkages (Donnellan & Rutledge, 2019).

When using the theory of network analysis to analyse a particular system, there are a number of assumptions that need to be taken into consideration. First, every component of the system is in some way interrelated.

The network has patterns or structures that may be examined, too. Third, these patterns may provide information about how the system works. Last but not least, changes to the network (such as the elimination or addition of components) may have a big effect on how the system behaves (Sun et al, 2018).

Understanding how these elements interact may be useful by using the theory of network analysis to the study of pipeline transportation and its importance to the marketing of petroleum products in Nigeria (Wickert et al, 2021). Researchers may better comprehend the difficulties and possibilities the Nigerian petroleum business faces by looking at the connections between transportation networks, storage spaces, and marketing outlets. In addition, network analysis may assist pinpoint places where enhancing transportation or infrastructure might result in more effective and efficient marketing of petroleum products. Understanding complicated systems, such as the Nigerian petroleum sector, is made easier with the use of network analysis theory. Researchers may acquire a clearer knowledge of how the system functions and where changes might be made, it is nevertheless a crucial topic of research with real-world implications in many different industries.

CONCLUSION AND RECOMMENDATIONS

The study looked at the pipeline transportation and the marketing of petroleum products in Nigeria by reviewing the extant literature. The study stated that the Nigeria's population expansion and industrial advancement are driving a continual spike in demand for petroleum products, which highlights the need for a strong pipeline system. The study opined that effective marketing and distribution of petroleum products in Nigeria could be made better through pipeline transportation. It highlighted the crucial function of pipelines in enabling the smooth transit of various items across very long distances within Nigeria. It noted that, despite the fact that pipeline transportation is more reliable and cost-effective than other routes, the industry still faces difficulties, including vandalism, poor infrastructure, and governance problems. It reviewed conceptual, theoretical and empirical literatures to substantiate these points. Finally, it observed that the Nigerian government and petroleum sector partners should invest considerably in pipeline transportation infrastructure to fulfil the huge demand of petroleum products and achieve the full potential of the industry.

Consequently, it is recommended that the Nigerian government and petroleum sector partners should invest considerably in pipeline transportation infrastructure to fulfil the huge demand of petroleum products and achieve the full potential of the industry. This may involve, replacing outdated pipes, and expanding the present pipeline network to include new areas, particularly in some part of the country that are fast industrialising. Regulatory agencies should strict enforce adherence to rules and regulations guiding the petroleum industry by ensuring that pipelines are run in compliance with acceptable standard, safety and environmental requirements, routine audits, inspections, and assessments. An appropriate modern technology should be employed for surveillance and checkmating the prevalence of theft, vandalism, pipeline leakages and other pipeline-related interruptions.

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