



Evaluating the Influence of Government Policies on Nigeria's Pharmaceutical Supply Chain

Anyanwu U. Felix^{1*}, Julius Bolade Anjorin²
Ballsbridge University, Roseau, Dominica

Corresponding Author: Anyanwu U. Felix felixubanyanwu@gmail.com

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ABSTRACT

The pharmaceutical business in Nigeria is not an exception to the rule that government rules and regulations are essential to preserving efficiency and order in a variety of industries. This study investigates the effects of laws and rules on the pharmaceutical industry's supply chain. Using a survey methodology, the study first took into account 1,881 people in total, but the Raosoft sample size calculator helped them reduce that number to 320. Participants were given a structured questionnaire to complete as the main method of gathering data, and linear regression analysis was used to examine the results. The results showed that government regulations had a major effect on supply chain management effectiveness. It was observed that while technological integration might improve supply chain operations, difficulties enforcing rules can impair supply chain performance. These revelations clarified the connection between supply chain performance and regulatory frameworks in Nigeria's pharmaceutical sector. To facilitate smooth implementation of policies, it is essential to include relevant stakeholders from the pharmaceutical sector in the policy development process. Therefore, it is recommended that effective administrative structures and consistent policies be established to promote growth and development. Additionally, involving stakeholders in the supply chain process and integrating technology are critical for achieving effective supply chain performance.

INTRODUCTION

Nigeria's pharmaceutical business is shaped and regulated in large part by government policies, which support the sector's expansion, stability, and alignment with national health goals. In Nigeria, the pharmaceutical sector has played a significant part in the population's health and well-being, impacting both economic growth and public health results. Pharmaceutical producers, regulatory organizations, government agencies, distributors, healthcare professionals, and consumers are just a few of the many stakeholders that make up this complex industry. Every one of these organizations plays a part in the industry's development and operation.

Over the past five years, Nigeria's pharmaceutical industry has experienced remarkable growth, with an average annual increase of 10 to 15 percent (Ujomudyke, 2024). This growth can be attributed to several factors, including a rising demand for healthcare services, the expansion of the private healthcare market, and advancements in local manufacturing capabilities. Despite facing various health challenges, such as infectious diseases, chronic illnesses, and a growing population, the pharmaceutical sector remains a vital part of Nigeria's strategy to deliver affordable and effective healthcare solutions.

This dynamic business is heavily regulated by government rules. Government policies are intended to guarantee that pharmaceutical products meet quality, safety, and effectiveness criteria through national laws. These regulations are enforced by monitoring institutions like NAFDAC, which keep an eye on the distribution, manufacturing, and approval of medications. Furthermore, government programs like local content development policies are designed to increase pharmaceutical production in Nigeria in order to lessen reliance on imports and generate employment.

Furthermore, the government's involvement in fostering research and development in conjunction with foreign partners has remained essential to the sector's ongoing development. Sustaining the expansion of the drug manufacturing industry requires policies that support innovation, the construction of regional production facilities, and the education of qualified personnel. Achieving these goals requires cooperation from international organizations, pharmaceutical businesses, and administration agencies including the Trade Ministry of Trade & Investment and the health Ministry.

Every government has an obligation to make sure that deliberate steps are made to advance society's general development, in addition to maintaining law and order and protecting people and property. Aligning domestic initiatives with global objectives is necessary to improve health outcomes for the community of countries. Nigeria's dedication to the (SDGs) of the UN, particularly in advancing the health of its people, serves as one example. In order to meet these national and international health concerns, government policies are essential instruments. Making sure that everyone has access to essential vaccinations and medications that are safe, effective, and reasonably priced is a crucial component of the UN's third goal for sustainable development (United Nations Organization, 2019). Achieving universal healthcare coverage requires achieving this goal. Moreover, efficient health product supply networks are essential for ensuring access to high-quality drugs and vaccines (Chukwu et al., 2021). These supply chains guarantee

that medical facilities always have access to timely, reasonably priced, and high-quality pharmaceuticals, immunizations, and medical supplies (Aigbavboa and Mbohwa, 2020).

Providing high-quality healthcare services requires a healthy health product supply chain (Amadi and Tsui, 2018; Ogbonna, 2019). In addition to guaranteeing that the appropriate health goods are delivered to end users, this system gives health system planners crucial data on the requirements, demand, and use of these items. Consequently, it enhances the entire provision of healthcare services. Yadav (2021).

Typically, suppliers, manufacturers, distributors, retailers, storage, and consumers are important elements in supply chain management. But it's also important to take into account other important factors like supply chain, logistics, and quality control. For supply chain operations to be meaningful, incoming supply and departing product transportation must be managed well. Planning schedules and choosing the best modes and timing of transportation are inside the purview of supply chain management (SCM). This entails weighing the prices of various solutions, following legal requirements, according to the organization's requirements for timing and quantity, and taking into consideration outside variables that might result in movement delays.

The medicine supply chain contributes to a great extent to healthcare delivery by guaranteeing that medicines are available, affordable, and of high quality. To uphold ethical standards and maintain smooth operations in the pharmaceutical sector, several performance indicators are monitored. These include lead time, delivery efficiency, resource flexibility, customer satisfaction, and product value (Mogbojuri et al., 2023; Nwaogbe et al., 2020; Maneno, 2019).

Statement of Problem

Since the pre-independence era, when it mostly entailed the distribution of imported drugs by agents of different foreign firms, such as J.L Morrison, Beecham, Pfizer, Glaxo and May & Baker, the Nigerian pharmaceutical sector has seen substantial change. Approximately 130 pharmaceutical businesses are now active in Nigeria, with five indigenous companies producing 58% of the nation's pharmaceuticals. However, performance indicators for the sector reveal challenges. The capacity utilization stands at only 40%, and the industry meets just 25% of the local demand for medications. The remaining 75% is fulfilled through imports, predominantly from Asian countries. Actually, almost 70% of the medications that Nigerian pharmaceutical businesses sell are imported (Gumel, 2019). Pharmaceutical imports were valued at \$481 million in 2013, and by 2018, it was expected to reach \$789 million.

In Nigeria, inadequate logistical systems have made it extremely difficult to handle the supply chain effectively. Quality control is another significant problem. Implementing controls is crucial in supply chain management since goals are involved. According to Akpoghelie (2022), the regulation of pharmaceuticals in Nigeria is largely inadequate, characterized by inconsistent inspections, weak enforcement, and widespread violations, which lead to negative health outcomes. The government has proposed policy solutions aimed at enhancing regulatory performance to promote public health in the country.

These policies and regulations serve as necessary control measures to ensure that the system meets standards of efficiency and effectiveness. Nigeria is not one of the 17 pharmaceutical growth areas that have been identified, despite the fact that the global pharmaceutical business is growing quickly and is predicted to reach a value of over \$1.3 trillion.

In the first quarter of 2023, the contribution to nominal GDP was 0.55%. This figure is slightly lower than the 0.60% recorded in the same quarter of 2022, but it shows an increase from 0.54% in the fourth quarter of 2022. The growth in the pharmaceutical sector is mainly due to increased investments from both public and private sectors (UNIDO, 2024). While specific data on the survival rates of pharmaceutical companies is not available, the overall manufacturing industry, which includes pharmaceuticals, has a concerning survival rate. Approximately 30% of these industries have been classified as closed, 60% are considered struggling, and only 10% are operating sustainably (MAN, 2022).

The Nigeria Pharmaceutical business have been the subject of several studies, but little is known about how laws and regulations impact the supply chain in this sector. Though their precise effects on operational performance, compliance concerns, and overall results in Nigeria have not been fully investigated, these laws and regulations are crucial for improving supply chain efficiency. Therefore, the aim of this study is to assess how government policies and regulations influence Nigeria's pharmaceutical supply chain while also identifying possible obstacles and areas for development.

Research Questions

- i. How do government policies affect Nigerian supply chains' effectiveness and performance?
- ii. Does supply chain performance suffer as a result of the difficulties and restrictions encountered when implementing supply chain regulations?
- iii. What impact does technology integration have on enhancing supply chain management in Nigeria?

Research Objectives

- i. To evaluate the impacts of government policies and regulations on the performance and efficiency of supply chains in Nigeria.
- ii. To assess if the challenges and limitations faced in the implementation of supply chain regulations hinder supply chain performance
- iii. To examine the influence of technological integration on improvement of supply chain operations in Nigeria.

Hypotheses

- i. **H₁:** Government policies and regulations have no significant impact on the efficiency of supply chain management in Nigeria.
- ii. **H₂:** Challenges in implementing supply chain regulations do not significantly hinder supply chain performance.
- iii. **H₃:** Technology integration has no significant effect on improving supply chain operations in Nigeria.

Significance of the Study

This study is important because it looks at how authority regulation influence supply chain management and offers suggestions for changes that would improve resilience, sustainability, and efficiency. This study aims to help

policymakers create policies that improve supply chain transparency, competitiveness, and operational efficiency by pointing out shortcomings in the current regulatory frameworks.

Besides, the study outlines the influence of technology and invention in modernizing supply chains, exploring how digital tools, automation, and data-driven decision-making can enhance efficiency while ensuring compliance with regulatory requirements. This panacea will help in ameliorating challenges, thereby contributing to reduction in lead times, optimizing logistics, and improving overall performance in supply chain operations.

Lastly, the study holds economic and academic significance by supporting industrial growth, reducing operational costs, and fostering a competitive business environment. It also fills gaps in existing literature by providing a foundation for further research on the direct influence of authority regulations on supply chain management. Ultimately, the findings will aid policymakers, manufacturers, industry stakeholders, and researchers in shaping reforms that build a more resilient and technologically advanced supply chain system in Nigeria.

LITERATURE REVIEW

Government Policies and Regulation

Different interpretations have been made on the concept of policy. A policy is a plan of action or principle of conduct that an organization or individual adopts or proposes, according to Astrid (2024). In a similar vein, Ikelegbe (2020) and others stress that action is at the heart of policy. Ezeani (2021) goes on to explain that policy is the suggested course of action that a government plans to follow in order to address a particular issue or circumstance that it encounters. Some perspectives view policy as a choice among multiple options from which a decision is made, while others focus on the scope of action involved. According to Abdulsalami (2022), policy is made up of established patterns for allocating resources, which are exemplified by initiatives and programs meant to solve issues that the public faces or that call for government action. Dye (2019) adds that policy is concerned with understanding why governments take certain actions and the gap between what they do and what they neglect to do.

Since it decides whether a policy will succeed or fail, execution is the most important stage in the public policy-making process. In order to produce tangible outputs like goods and services, this stage entails converting a variety of inputs, including knowledge, technical competence, materials, human resources, public demand, and support (Erninue, 2020). Akindele et al. (2021) assert that policy implementation happens subsequent to the enactment of legislation. A number of official decisions and acts are part of this process, which aims to implement specified mandates. It includes the results of governmental policy, including financing and the real provision of services. Strong administrative frameworks and a strong political commitment from the ruling class are necessary for the effective execution of policies. Allocating funding, creating structures and procedures, employing personnel, carrying out activities, and making sure that

policy goals, services, and other desired results are reached are all important components of implementation, according to Ikelegbe (2019). In order to create products and services, it entails converting both human and material resources. Governments worldwide typically impose regulations on pharmaceutical companies to safeguard the public from the potential dangers of drugs. Nevertheless, these rules frequently cause a delay in the release of novel medications.

In an effort to minimize side effects, the Food and Drug Administration (FDA) makes sure that new drugs go through extensive research to verify their efficacy and safety. Before a new medication is authorized for use in the general population, this research and testing procedure usually takes ten years or so (Ogbonna, Ilika, and Nwabueze, 2020).

During this process, drugs must go through human trials to identify any potential side effects and accurately assess their effectiveness. If, at any stage of the testing, a new drug is found to be ineffective or causes unwanted side effects, the company may choose to conduct additional laboratory research to improve the results. However, since this can be expensive, companies often weigh the financial implications of continuing their efforts against the option of reallocating their resources to other projects (Samson and Stanley, 2021). Managers of pharmaceutical distribution companies recognize that numerous challenges impact their supply chains, many of which are beyond their control as individual businesses. Therefore, they believe there is a pressing need for stronger government support to address some of these issues (Hughes et al., 2019).

Businesses in Nigeria are supervised and governed by the government through a number of laws and institutions. In addition to safeguarding the interests of their clients, this rule seeks to make doing business easier for investors, entrepreneurs, and other business-minded people.

Supply Chain Management

A network of facilities that manage different aspects of product manufacturing, storage, distribution, and transportation from suppliers to final consumers is commonly referred to as supply chain management, or SCM. Due to their substantial market potential and cheap labor costs, many developing nations are becoming desirable locations for many businesses as the global economy grows rapidly. Due to increased competition, the market is now more unclear and riskier (Mathiyazhagan et al., 2020).

Supply chain risk and uncertainty have received a lot of attention lately, especially during times of global crisis (Rajak et al., 2021). The pandemic and similar events have highlighted vulnerabilities in supply chains worldwide. To address these uncertainties, organizations are increasingly modifying their supply chain systems in various ways. This transformation often includes the adoption of new technologies, strategies, and processes that help manage risks, enhance efficiency, and maintain flexibility in operations (Mbanefo, 2020). The size of the company, its manufacturing capacity, the type of business it conducts, and its network of wholesalers, retailers, and distributors all have a significant impact on how much these changes will occur (Rajak et al., 2018).

Unexpected occurrences that interfere with the regular flow of resources and commodities along the supply chain are known as supply chain disruptions. The performance of businesses may be greatly impacted by these disturbances. According to Son and Orchard (2013), these disruptions are becoming more frequent and can be costly for businesses. According to Macdonald and Corsi (2013), supply chain interruptions also result in increased costs for items sold, which lowers profit margins and impairs overall performance, thereby diminishing shareholder value.

Managing the supply chain presents a number of challenges for businesses. Sustainability must be maintained by putting into practice an integrated, process-oriented design and effective management strategies that put an emphasis on cost cutting, cargo control, and customer service enhancement (Chand and Agarwal, 2019). Additionally, by facilitating quicker responses and better fleet utilization, a strong logistics framework with continuous tracking may help minimize supply chain disruptions (Chand and Agarwal, 2020).

An organization's capacity to be creative is essential to its survival in a cutthroat business climate (Yurov and Botella, 2019). Furthermore, Tolmay and Badebhorst (2020) claimed that a creative strategy for optimizing supply chain operations will lower inherent risk while simultaneously enhancing supply chain performance. Examples of innovative supply chain management strategies include, for example, creating a checklist of workplace processes inside the company's value chain and regularly assessing one's own performance (Wolfs et al., 2022).

Government Regulations on Supply Chains: Challenges and Limitations

Although the importance of supply chain management is well acknowledged, access to high-quality vital medications is still a major obstacle in developing nations like Nigeria (Chukwu et al., 2021). The literature points to a number of problems with Nigeria's pharmaceutical supply chain, including poor infrastructure, inefficient enforcement of laws and regulations, and the availability of inferior or fake drugs (Amadi and Tsui, 2018). Stock shortages, subpar supply chain procedures (such as inadequate inventory control and forecasting), and a lack of personnel are other issues (Hasan and Wanyanga, 2022).

Numerous tactics have been proposed to solve some of these problems and improve the effectiveness of Nigeria's pharmaceutical supply chains. Among these include the creation of initiatives and policies like the National Policy on Drugs, the Nigerian Pharmaceutical Supply Chain Policy, and the National Drug Administration Standards. Additionally, initiatives have been made to engage professionals with the requisite abilities and control human resource development (Ogbonna et al., 2020). Nigeria's supply chain system remains inadequate and ineffective in spite of these efforts (Fatokun, 2024).

Technological Integration in Supply Chain Management

The advent of cutting-edge technology has transformed supply chain management and allowed employees to make amazing progress. Consequently, a new stage of supply chain management is currently beginning (Gunasekaran and Ngai, 2019). This transition has been expedited by the introduction of several

cutting-edge technology, which has resulted in notable adjustments to supply chain management procedures. Blockchain is one of the major technologies that is becoming more and more popular; it improves supply networks' transparency and monitoring capabilities. Blockchain is a decentralized, secured ledger system that keeps a thorough and safe record of the whole supply chain while guaranteeing the legitimacy of transactions (Chand and Agarwal, 2020).

With the advent of cutting-edge technologies like blockchain, the World Wide Web, and computational intelligence (CI), supply chain management has undergone tremendous change. Blockchain technology is being used by pharmaceutical firms like Pfizer and Biogen. They took part in the Clinical Supply Blockchain Working Group (CSBWG), which developed a proof of concept for pharmaceutical inventory management and tracking.

Through the connection of sensors and physical equipment, the Internet of Things (IoT) has also revolutionized the supply chain. Businesses may get real-time information about the whereabouts, state, and activities of their items thanks to this connection. By improving traceability, guaranteeing product quality, boosting security, and offering a transparent record of transactions, blockchain technology assists pharmaceutical firms in addressing supply chain difficulties (Koçoğlu et al., 2024).

To increase supply chain operations' efficiency, artificial intelligence (AI) and machine learning are crucial. These tools assist in spotting trends, forecasting consumer preferences, and figuring out the most effective inventory management techniques. Businesses may obtain important insights by analyzing the vast amounts of data produced across the supply chain using sophisticated analytics tools and methodologies. Examples from the real world show how businesses may utilize these technologies to improve their responsiveness, flexibility, and visibility, which will eventually lead to greater commercial success.

Theoretical Framework

This study presents Strategic Supplier Partnership Theory (SSP) and The Resource-Based View (RBV) as the basis of theoretical framework. However, this study is grounded on Strategic Supplier Partnership Theory (SSP).

Strategic Supplier Partnership Theory (SSP)

The Strategic Supplier Partnership (SSP) framework is widely recognized in the field of strategic management. While no single person is credited as the sole originator of the Strategic Supplier Partnership Theory, many researchers and practitioners have played important roles in its development and understanding. This theory was primarily introduced by Kenneth K. Boyer and R. L. Verma in the 1990s. Its core principle is that a company's strategy shapes its administrative structure and processes (Galunic and Eisenhardt, 1994; Miles and Snow, 1978).

The theory highlights the importance of strategic alignment between suppliers and buyers, ensuring that both parties work together to create value through shared objectives, enhanced communication, and collaborative problem-solving. When a firm's strategy aligns with its supply chain, it leads to improved performance, as the strategy facilitates the effective implementation of supply

chain processes (Grinyer, Yasai-Ardekani, and Al-Bazzaz, 1980; Habib and Victor, 1991).

The SSP paradigm has been modified for use in supply chains by logistics and supply chain management (SCM) researchers. For example, Christophe's (2005) claim that supply chain efficiency is essential for service delivery served as the foundation for Defee and Stank's (2005) expansion of the SSP idea. According to Chow, Heaven, and Hennksson (1995), suitable laws are necessary to guarantee efficiency across business borders across the whole supply chain. As a result, building a relationship that meets the needs of all parties involved is essential to the success of supply chain process integration. This supports Thompson's (1967) argument that supply chain management should take external linkages into account. The role of the government as a regulator and stakeholder is also made clear by efficient supply chain process management. Government rules and regulations must be in line with the strategic emphasis of supply chain operations, especially when it comes to how they affect Nigeria's pharmaceutical supply chain.

In relation to this study, the Strategic Supplier Partnership (SSP) theory suggests that stakeholders in the supply chain should develop collaborative, lasting relationships with key suppliers. This approach aims to foster trust and facilitate resource sharing, which can lead to greater efficiency, innovation, and quality improvements, ultimately resulting in a more competitive and resilient supply chain.

The Resource-Based View (RBV)

According to a firm's resource-based view (RBV), businesses are assemblages of distinct resources (Wernerfelt, 1984). According to this viewpoint, businesses may create unique resources and skills to gain a competitive edge and make money (Barney, 1991; Day, 1994).

While Barney's RBV is crucial, it was significantly influenced by earlier strategic management theories, particularly Edith Penrose's "The Theory of the Growth of the Firm" (1959). Penrose's work examined how a company's core possessions add to its growth, laying the foundation for the RBV framework. Additionally, Richard Rumelt's research on firm-specific advantages and strategic decision-making further enhanced the theory's development. These contributions highlight the RBV's complexity and its interdisciplinary origins.

The Resource-Based View (RBV) has long been recognized by scholars as being crucial to supply chain management (SCM) and logistics research. For example, RBV was thoroughly reviewed by Olavarriets and Ellinger (1997), who also recommended its use in strategic logistics research. A company's resource allocation and utilization are greatly influenced by logistics, which encompasses a variety of vital procedures and activities across several functional domains. According to Bowersox, Closs, and Stank (2000), businesses may also gain a competitive edge by creating distinctive logistical capabilities.

Although the company's internal capacities were the main focus of conventional RBV literature, scholars have started to emphasize the importance of external resources that are available through networks (Gulati, 1999; Hunt and Davis, 2008; Zaheer and Bell, 2005). Businesses' success is significantly impacted

by their involvement in external connection networks (Gulati, Nohria, and Zaheer, 2000). RBV is therefore clearly relevant to this study: manufacturers, wholesalers, retailers, and other supply chain participants should use both internal and external resources to improve supply chain operations' efficiency.

METHODOLOGY

Research Design

A quantitative research approach was adopted for this study, using a survey research design. This design ensures the objectivity and reliability of the data by focusing on scientific measurement of human behavior through statistical analysis. Data were collected through structured questionnaires administered covering the Manufacturing, Wholesale and Distribution and Retail of pharmaceutical products.

Population of Study

Table 1. Population Distribution of Firms Involved in Pharmaceutical Supply Chain Process

Pharmaceutical Firm	Supply Chain Level of Involvement	Location
Vincal Pharmaceutical Company	Manufacturing	Benue State
New Heights Pharmaceuticals	Wholesale and Distribution	Lagos State
De- Elbon Pharmacy	Wholesale	Port Harcourt State
4th Man Pharmacy	Retail	Abuja
Quenthall Pharmacy	Retail	Akwa Ibom State

Table 1 above detailed the population of study to cover employees of five (5) pharmaceutical firms located in different states in Nigeria.

Sampling Method

Five pharmaceutical firms were selected based on convenience and ease of access for questionnaire administration. Moreover, the selected firms' activities collectively cover states of pharmaceutical supply chain process of Manufacturing, Wholesale and Retail.

Determination of Sample Size

The Raosoft sample size calculator was employed to select a sample size of Three Hundred and Twenty (320) employees from the total population of One Thousand, Eight Hundred and Eighty-one (1,881). The data is guaranteed to be representative of the total population with this sample size.

Methods of Data Collection

Data collection involved administering a questionnaire designed in a 5-point Likert Scale format. With approval from the appropriate authorities and

Team Heads, the questionnaires were distributed to the selected employees. The collected responses were subsequently analyzed using regression analysis to evaluate the operational hypotheses.

RESULTS AND DISCUSSION

Test of Hypotheses

1. Hypothesis One

H₁: Government policies and regulations have no significant impact on the efficiency of supply chain management in Nigeria.

Table 1. Regression Analysis on Impact of Government Policies and Regulations on Efficiency of Supply Chain Management

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
(Constant)	1.325	.962		1.378	.172
Govt. Policies & Regulations	.540	.090	.730	6.027	.000

Dependent Variable: Efficiency of SCM

Source: Researcher's computation, 2025.

The result in the table shows that implementation of government policies and regulations has high positive significant effect on efficiency of supply chain management ($R = 0.730$, $R\text{-squared} = 0.281$, $\text{Adjusted } R\text{-squared} = 0.273$). This implies that the variation in efficiency of SCM is caused by government policies and regulations of 28.1%. Also, an F-value of 36.327 reveal that the whole model is imperative at (at significant level $=0.000$; $P < 0.05$). Therefore, the study rejects the null hypothesis which states that Government policies and regulations have no significant impact on the efficiency of supply chain management in Nigeria.

2. Hypothesis Two

H₂: Challenges in implementing supply chain regulations do not significantly hinder supply chain performance.

Table 2. Regression Analysis on Implementation of Supply Chain Regulations and Supply Chain Performance

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
(Constant)	1.461	.962		3.001	.003
Govt. Policies & Regulations	.463	.788	.788	12.399	.000

Dependent Variable: Efficiency of SCM

Source: Researcher's Computation, 2025

With a correlation coefficient (R) of 0.788, the findings in the table show that the performance of the supply chain process is significantly impacted by the application of supply chain rules. With an R-squared value of 0.621, the application of these laws is responsible for 62.1% of the variance in supply chain performance. Furthermore, the overall statistical significance of the model is

confirmed by the F-value of 152.240 (significance level = 0.000; $P < 0.05$). Consequently, the study accepts the alternative hypothesis and rejects the null hypothesis, which holds that difficulties in enforcing supply chain laws have no discernible impact on supply chain performance.

3. Hypothesis Three

H₃: Technological integration has no significant effect on the improvement of supply chain operations in Nigeria.

Table 3. Regression Analysis on Effect of Technological integration on improvement of Supply chain Operations in Nigeria

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
(Constant)	1.143	.397		2.882	.005
Govt. Policies & Regulations	.484	.030	.858	16.135	.000

a. Dependent Variable: Improvement if Supply Chain Operations

Source: Researcher’s Computation, 2025.

With a correlation value (R) of 0.858, the table's findings show that technology integration greatly improves supply chain operations in Nigeria. According to the R-squared value of 0.737, technology integration is responsible for 73.7% of the improvement in supply chain operations. Furthermore, the overall statistical significance of the model is confirmed by the F-value of 260.350 (significance level = 0.000; $P < 0.05$). As a result, the study accepts the alternative hypothesis and rejects the null hypothesis, which holds that technology integration has no discernible impact on the enhancement of supply chain operations in Nigeria.

This methodology and analysis clearly establish the significant relationships between the studied variables, with robust statistical support through regression analysis. A performing supply chain function as established in this study, commences with identification of reliable suppliers who have the capacity to ensure provision of materials in an economic manner as much as possible, implementation of government policies on performance monitoring of supply chain, overcoming the hurdles in implementation of government policies and integration of technological innovation into supply chain operation.

The Administration for food and drugs must ensure proper testing of drugs to ascertain efficacy and safety to reducing or eliminate resulting harmful effects (Ogbonna, Ilika and Nwabueze, 2020). The policies of government on pharmaceutical supply chain should be well strengthened through relevant government agencies (Ogbonna, et al. 2020).

Technology integration, according to Ugoani and Ugoani (2017), lowers production costs and boosts profitability for the company, allowing it to opt to cut prices and draw in more clients. This results in a more efficient manufacturing process. The main goals of senior management in the majority of Nigerian companies—competition, globalization, and profitability—lead to ongoing productivity gains. Consequently, it is thought that increased productivity necessitates efficient supply chain management.

CONCLUSIONS AND RECOMMENDATIONS

The government acts as a regulator by developing policies and regulations aimed at fostering a supportive, coordinated, and monitored business environment. Ezeani (2021) noted that the government suggests a course of action when it encounters specific problems or situations. This is consistent with the study's findings, which show a strong correlation between supply chain management in Nigeria's pharmaceutical industry and governmental laws and regulations.

The main challenge in Nigeria lies more in the execution of policies rather than their formulation, and this issue also affects the pharmaceutical sector and its supply chain performance. The situation is shaped by various factors, including differing interests. Consequently, it is vital that policies are not only thoughtfully designed but also properly monitored to avoid failures (Samson and Stanley, 2024). Strong governmental policies' development and implementation are directly related to the supply chain's efficacy. Consequently, comprehensive and well-thought-out policy and regulatory frameworks are necessary for pharmaceutical industry strategies to greatly improve supply chain performance.

With the Internet of Things (IoT) being the second most popular technology, artificial intelligence (AI) is becoming more and more important in modern supply chain management. Although these technologies improve cooperation with partners and suppliers, a lack of qualified people, budgetary limitations, and opposition to change sometimes prevent their widespread implementation.

These challenges highlight the various obstacles organizations face. Despite a strong consensus among most participants that technology has improved supply chain operations, there is still a need for greater technological integration in the pharmaceutical sector. The distribution of resources for technological integration is unequal, with a large percentage of those resources going toward continuous enhancements, claim Wang and Wei (2020).

Recommendations for Strengthening Nigeria's Pharmaceutical Supply Chain

1. Strengthening Regulatory Framework and Enforcement

Strict enforcement of pharmaceutical supply chain regulations is necessary to mitigate drug counterfeiting and the circulation of substandard products. Regulatory agencies such as NAFDAC, SON, and PCN should harmonize efforts to enhance compliance. Additionally, the digitalization of drug tracking systems should be prioritized to improve monitoring and enforcement.

2. Enhancing Policy Formulation and Stakeholder Engagement

Pharmaceutical policy formulation should be inclusive, involving manufacturers, distributors, healthcare professionals, and consumers. Regular consultative meetings, policy reviews, and feedback mechanisms should be established. Public-Private Partnerships (PPP) should be encouraged to address gaps in pharmaceutical logistics and infrastructure.

3. Boosting Domestic Drug Production and Manufacturing Capacity

The government should provide tax incentives and healthcare grants to local

manufacturers to encourage domestic drug production and reduce import dependency. Streamlining regulatory requirements for pharmaceutical products and operations will further enhance local manufacturing capacity.

4. Providing Financial Incentives and Funding for Pharmaceutical Technology Acquisition

The pharmaceutical industry should receive financial support for acquiring modern drug manufacturing equipment and digital supply chain solutions, such as blockchain and AI. These technologies will enhance traceability, efficiency, and fraud prevention within the supply chain.

5. Deploying Specialized Training Programs

Training programs should be designed and implemented to equip supply chain professionals with digital and technical expertise, particularly in pharmaceutical logistics. This will enhance efficiency and innovation in supply chain management.

6. Improving Supply Chain Resilience and Infrastructure

Measures should be taken to optimize the transportation and storage of pharmaceutical products, thereby minimizing losses due to inefficient logistics services. Robust emergency preparedness strategies should be developed to ensure the continuous supply of pharmaceuticals during crises such as pandemics or economic downturns.

7. Tackling Corruption and Bureaucratic Bottlenecks

Transparency should be promoted in regulatory approvals, importation processes, and procurement to reduce corruption in the supply chain. To guarantee efficiency and compliance, clear policies and accountability procedures should be put in place.

8. Aligning with Global Pharmaceutical Best Practices

Nigeria's pharmaceutical policies should align with international best practices (e.g., WHO, GMP) to boost industry credibility. Collaboration with regional and global regulatory bodies should be encouraged for unified pharmaceutical governance. Additionally, environmentally and socially responsible supply chain practices should be promoted.

9. Ensuring Policy Continuity and Effective Implementation

To effectively enforce policies and regulations, it is essential to establish sustainable administrative structures. Strong political will is vital for ensuring accountability and dedication to implementing these policies. State and the law maker should pass laws that ensure the ongoing support of beneficial policies, allowing for their continuation unless they are shown to be ineffective or against the public's best interests.

10. Raising Awareness on the Role of Technology in Supply Chain Management

It is important to inform stakeholders about how technology may enhance supply chain performance, cooperation, and international best practices. Better industrial cooperation and more efficient operations will result from promoting the use of digital technologies

FURTHER STUDY

Future research should examine how Nigerian pharmaceutical supply chain operations are impacted by micro environmental influences. A more thorough understanding of supply chain dynamics and enhancements will result from knowing how these controllable factors interact.

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