

**ANALYTICS IN SUPPLY CHAIN MANAGEMENT: IMPACT OF EFFICIENCY IN A
MULTI-ECONOMY ENVIRONMENT
BY**

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ABSTRACT

Supply Chain Management (SCM) plays a crucial role in economic development, particularly in multi-economy environments where diverse market dynamics influence operational success. This study examines the impact of analytics on SCM efficiency within the Federal Capital Territory (FCT), Nigeria, where formal and informal trade networks, regulatory policies, and infrastructural challenges shape supply chain operations. The adoption of analytics—including predictive modeling, big data analytics, and artificial intelligence—has the potential to enhance demand forecasting, inventory management, and logistics planning. However, despite its growing significance, the integration of analytics into SCM practices in Nigeria remains limited due to factors such as high implementation costs, lack of technical expertise, and inadequate infrastructure. Using a mixed-methods approach, this study assesses the extent to which analytics is employed in SCM and its effects on operational efficiency in a multi-economy setting. Findings indicate that while some businesses have integrated analytics into their supply chains, inefficiencies persist due to infrastructural deficits and policy inconsistencies. Empirical data reveal that analytics adoption significantly improves inventory management, customer satisfaction, and cost reduction, but barriers such as resistance to change and limited digital infrastructure hinder full implementation. The study concludes that increasing investment in digital technologies, enhancing technical capacity, and formulating supportive policies can significantly improve SCM efficiency in Nigeria. It underscores the need for a structured approach to analytics adoption, aligning with global best practices to optimize procurement, logistics, and overall supply chain operations. The findings provide valuable insights for policymakers, business managers, and supply chain professionals seeking to enhance efficiency in a complex economic environment.

Keywords: Supply Chain Management (SCM), Analytics Adoption, Multi-Economy Environment, Logistics Efficiency, Predictive Analytics

1. INTRODUCTION

Supply chain management (SCM) is a critical component of economic growth and business efficiency, particularly in complex multi-economy environments where diverse market dynamics influence operational success. In recent years, analytics has emerged as a transformative tool in SCM, facilitating data-driven decision-making, optimizing logistics, and improving overall efficiency (Chae, 2015). The Federal Capital Territory (FCT), Nigeria, represents a unique multi-economy environment where public and private sector operations, formal and informal trade networks, and domestic and international markets intersect. Given its status as the administrative and economic hub of Nigeria, efficient SCM is essential for sustaining the flow of goods and services, reducing costs, and enhancing competitiveness.

Advanced analytics, including predictive modeling, big data analytics, and artificial intelligence (AI), has significantly impacted global supply chains by enhancing demand forecasting, inventory management, and logistics planning (Ivanov et al., 2019). However, in Nigeria, the adoption of such technologies remains relatively low, constrained by infrastructural deficits, policy

inconsistencies, and limited access to data-driven tools (Adebayo & Olugbenga, 2020). In the context of FCT, where businesses operate in a highly dynamic economy influenced by regulatory frameworks, security concerns, and infrastructural bottlenecks, the integration of analytics into SCM presents both challenges and opportunities.

The increasing globalization of supply chains and the complexity of economic environments necessitate the adoption of analytics-driven SCM to enhance efficiency. In developed economies, analytics has been extensively integrated into SCM, leading to improvements in inventory turnover, customer satisfaction, and cost reduction (Christopher, 2016). However, in developing economies like Nigeria, the adoption of SCM analytics is still in its infancy. While industries in the FCT are diverse—including manufacturing, retail, logistics, and public services—the extent to which analytics has been leveraged to improve supply chain efficiency remains largely unexplored. Supply chain inefficiencies in the FCT are often attributed to poor infrastructure, inadequate data management systems, and fragmented logistics networks (Eze & Okonkwo, 2021). These challenges contribute to increased operational costs, delays in service delivery, and reduced competitiveness. By employing analytics, businesses and government agencies can optimize procurement processes, enhance demand forecasting, and improve last-mile delivery systems.

The study is significant for several reasons. First, it contributes to the growing body of knowledge on SCM analytics by providing empirical evidence on its applicability in Nigeria's multi-economy environment. Second, it aligns with Nigeria's broader economic diversification agenda, as efficient SCM is crucial for sustainable industrialization and trade facilitation (National Bureau of Statistics, 2022). Third, given the increasing digitization of global supply chains, understanding the extent of analytics adoption in the FCT can inform policy recommendations and business strategies aimed at improving logistics efficiency.

Moreover, the study has practical implications for policymakers, business managers, and supply chain professionals seeking to enhance operational efficiency. It highlights the benefits of data-driven decision-making, the challenges of implementation, and potential strategies for overcoming barriers. Ultimately, the findings will provide insights that can aid in developing a more resilient, technology-driven supply chain ecosystem in the FCT.

Supply Chain Management (SCM) inefficiencies in Nigeria, particularly in the Federal Capital Territory (FCT), have been linked to poor infrastructure, inadequate data integration, and ineffective logistics coordination (Eze & Okonkwo, 2021). Despite the growing significance of analytics in optimizing supply chain processes globally, its adoption in Nigeria remains limited. Empirical studies have demonstrated that data analytics can enhance decision-making, improve operational efficiency, and reduce costs in SCM (Ivanov, Dolgui, & Sokolov, 2019). However, there is a lack of empirical evidence on the extent to which analytics has been integrated into SCM practices in the FCT and its actual impact on efficiency in a multi-economy environment.

Adebayo and Olugbenga (2020) found that most businesses in Nigeria rely on traditional SCM methods, which are inefficient and prone to disruptions. Their study indicated that the limited adoption of analytics is due to high implementation costs, lack of technical expertise, and infrastructural gaps. Similarly, Chae (2015) established that firms leveraging big data analytics experience significant improvements in demand forecasting and supply chain resilience. However, such advancements have not been extensively explored within Nigeria's unique economic landscape.

Furthermore, while Ivanov et al. (2019) emphasized the role of digital transformation in improving supply chain resilience, they also noted that emerging economies face significant challenges in implementing such technologies. The lack of structured data systems and policy frameworks in

Nigeria further exacerbates these challenges, leading to inefficiencies in supply chain operations. Given these gaps, this study seeks to investigate the impact of analytics on SCM efficiency in the FCT, assessing its potential to enhance performance, address inefficiencies, and drive economic growth in a complex multi-economy environment.

The study will be guided by the following research questions

- i. To what extent has analytics been integrated into Supply Chain Management (SCM) in the Federal Capital Territory (FCT), Nigeria?
- ii. What is the impact of analytics on the efficiency of supply chain operations in a multi-economy environment within the FCT?

The objective of the study is to assess the impact of analytics on Supply Chain Management efficiency in a multi-economy environment using the Federal Capital Territory (FCT), Nigeria, while other specific objectives are to;

- i. examine the extent of analytics adoption in SCM practices in the FCT.
- ii. evaluate the effect of analytics on the efficiency of supply chain operations in the FCT.

The following Hypotheses will guide the study

- H₀₁: There is no significant relationship between the adoption of analytics and the efficiency of supply chain operations in the FCT.
- H₀₂: The use of analytics does not significantly improve supply chain decision-making and operational performance in a multi-economy environment within the FCT.

2. LITERATURE REVIEW

Concept of Supply Chain Management (SCM)

Supply Chain Management (SCM) refers to the coordination and integration of key business processes, from procurement of raw materials to the delivery of final products, with the aim of optimizing efficiency and minimizing costs (Christopher, 2016). It involves the management of interconnected activities, including sourcing, production, inventory management, transportation, and distribution, ensuring that goods and services flow seamlessly across suppliers, manufacturers, and consumers (Mentzer et al., 2001).

SCM is critical to business success as it enhances operational efficiency, reduces lead times, and improves customer satisfaction. Efficient supply chains leverage modern technologies, analytics, and automation to enhance decision-making and optimize resource allocation (Chae, 2015). In developed economies, SCM relies on data-driven approaches such as artificial intelligence, blockchain, and big data analytics to improve forecasting accuracy and logistics management (Ivanov et al., 2019). However, in developing economies like Nigeria, challenges such as inadequate infrastructure, poor logistics networks, and regulatory bottlenecks hinder SCM efficiency (Eze & Okonkwo, 2021).

In the Federal Capital Territory (FCT), Nigeria, SCM operates within a complex multi-economy environment where formal and informal trade networks coexist. The efficiency of SCM in this setting is influenced by factors such as government policies, infrastructure availability, and market volatility (Adebayo & Olugbenga, 2020). The adoption of analytics in SCM presents an opportunity to enhance efficiency, minimize risks, and improve service delivery.

Overall, SCM plays a crucial role in driving economic growth, supporting industrialization, and enhancing competitiveness. As globalization and digital transformation continue to shape supply chains, the integration of analytics into SCM is increasingly becoming a necessity for businesses seeking to remain competitive in dynamic economic environments.

Concept of Analytics in Supply Chain Management

Analytics in Supply Chain Management (SCM) refers to the application of data-driven tools and methodologies to optimize decision-making, enhance efficiency, and improve overall supply chain performance. It involves the systematic use of data, statistical analysis, and advanced technologies such as artificial intelligence (AI) and machine learning to manage supply chain activities effectively (Chae, 2015). Supply chain analytics enables organizations to gain real-time visibility, predict disruptions, and optimize logistics, procurement, and inventory management.

There are three primary types of analytics applied in SCM: descriptive, predictive, and prescriptive analytics. Descriptive analytics involves analyzing historical data to identify patterns and trends in supply chain performance. It provides insights into past operations, helping organizations understand inefficiencies and areas for improvement (Ivanov et al., 2019). Predictive analytics, on the other hand, uses statistical models and machine learning algorithms to forecast demand, assess risks, and anticipate supply chain disruptions. This type of analytics helps businesses prepare for fluctuations in demand and supply uncertainties (Christopher, 2016). Prescriptive analytics goes further by recommending optimal decisions and actions based on real-time data. It uses optimization algorithms to enhance inventory management, streamline transportation networks, and improve supplier relationships (Waller & Fawcett, 2013).

Despite its proven benefits, the adoption of analytics in SCM, particularly in developing economies like Nigeria, remains limited due to factors such as inadequate technological infrastructure, high implementation costs, and a lack of skilled personnel (Adebayo & Olugbenga, 2020). However, as digital transformation accelerates, businesses that integrate analytics into their supply chains gain a competitive edge through cost reduction, improved service delivery, and increased operational agility.

Supply Chain Efficiency in a Multi-Economy Environment

Supply chain efficiency refers to the ability of businesses to minimize costs, optimize resources, and improve service delivery while ensuring seamless coordination of supply chain activities (Christopher, 2016). In a multi-economy environment—characterized by a blend of formal and informal markets, varying regulatory policies, and diverse economic activities—achieving supply chain efficiency becomes complex (Ivanov, Dolgui, & Sokolov, 2019). The Federal Capital Territory (FCT), Nigeria, exemplifies such an environment where public and private sector organizations operate alongside informal trade networks, creating unique challenges and opportunities for supply chain management.

Efficient supply chains in a multi-economy setting require robust logistics, data-driven decision-making, and infrastructure that supports uninterrupted operations. However, in Nigeria, inefficiencies such as poor transportation networks, inconsistent regulatory frameworks, and limited adoption of digital technologies hinder supply chain performance (Eze & Okonkwo, 2021). The integration of analytics into SCM can address these challenges by enhancing demand forecasting, improving inventory management, and optimizing distribution channels (Chae, 2015). According to Adebayo and Olugbenga (2020), businesses that employ analytics in their supply chains experience improved responsiveness to market fluctuations and reduced operational costs. Nonetheless, Ivanov et al. (2019) highlight that developing economies face barriers such as inadequate digital infrastructure, limited access to real-time data, and resistance to technology adoption. In the FCT, where economic activities range from high-end corporate transactions to informal market operations, analytics-driven SCM could play a crucial role in enhancing efficiency.

Thus, understanding the impact of analytics in SCM within a multi-economy environment like the FCT is essential for improving business operations, reducing inefficiencies, and fostering economic growth.

Application of Analytics in SCM Efficiency

The application of analytics in Supply Chain Management (SCM) has significantly improved efficiency by enabling data-driven decision-making, optimizing logistics, and reducing operational costs (Chae, 2015). Analytics plays a crucial role in various aspects of SCM, including demand forecasting, inventory management, logistics planning, and risk mitigation. By leveraging big data, artificial intelligence (AI), and machine learning (ML), businesses can enhance supply chain efficiency and adaptability in dynamic economic environments (Ivanov, Dolgui, & Sokolov, 2019).

One major area where analytics enhances SCM efficiency is demand forecasting. Predictive analytics uses historical data and real-time market trends to estimate future demand, allowing firms to adjust procurement and production schedules accordingly. This reduces instances of overstocking and stockouts, ultimately improving service delivery (Waller & Fawcett, 2013).

Another key application is inventory management, where descriptive and prescriptive analytics enable organizations to track stock levels, predict optimal reorder points, and prevent inventory shortages (Christopher, 2016). Advanced analytics can also enhance logistics and transportation planning by optimizing delivery routes, reducing transit time, and minimizing fuel costs (Tiwari, Wee, & Daryanto, 2018).

Furthermore, risk mitigation is enhanced through real-time data analysis, which helps organizations detect supply chain disruptions early and implement contingency plans (Singh & Misra, 2021). In multi-economy environments like the Federal Capital Territory (FCT), where regulatory inconsistencies, infrastructure deficits, and fluctuating market conditions affect supply chains, analytics-driven insights can improve resilience and adaptability.

Despite these benefits, the adoption of analytics in SCM faces challenges such as high implementation costs, lack of technical expertise, and inadequate data infrastructure (Adebayo & Olugbenga, 2020). Addressing these barriers is crucial for businesses in Nigeria to leverage analytics for improved supply chain efficiency.

Empirical Review

Adebayo and Olugbenga (2020) examines the role of digital analytics in improving supply chain performance in Nigeria, with a specific focus on logistics, inventory management, and demand forecasting. Using a mixed-methods research approach, the study collected primary data from 150 supply chain professionals across manufacturing, retail, and logistics sectors in Lagos and Abuja. Secondary data were obtained from industry reports and existing literature on digital analytics adoption. The findings revealed that firms leveraging digital analytics experienced improved operational efficiency, with a 23% reduction in stockouts and a 19% decrease in lead times. Additionally, businesses employing predictive analytics for demand forecasting reported higher customer satisfaction due to better inventory management. However, the study also identified significant barriers to analytics adoption, including high implementation costs, a lack of skilled personnel, and inadequate technological infrastructure. Despite these challenges, organizations that integrated analytics-driven decision-making processes demonstrated enhanced responsiveness and cost savings in their supply chain operations. The study concludes that digital analytics is a critical enabler of supply chain performance in Nigeria, offering significant opportunities for optimizing logistics and inventory processes. It recommends increased investment in digital infrastructure, targeted training programs for supply chain professionals, and government

incentives to facilitate the widespread adoption of analytics. This research contributes to the growing body of literature on supply chain digitalization and provides practical insights for businesses seeking to enhance their supply chain efficiency through data-driven strategies.

Chukwuma and Yusuf (2020) investigates the impact of predictive analytics on supply chain efficiency among retail firms in Abuja, Nigeria. Using a mixed-methods approach, the research collected primary data from 150 retail firms through structured questionnaires and in-depth interviews with supply chain managers. The study employed descriptive and inferential statistical techniques to analyze the data, including regression analysis to determine the relationship between predictive analytics adoption and key supply chain performance indicators. Findings revealed that firms leveraging predictive analytics for demand forecasting experienced a 25% reduction in stockouts and a 30% improvement in order fulfillment rates. Additionally, businesses using real-time data analysis reported enhanced decision-making, reduced operational costs, and improved responsiveness to market fluctuations. However, the study identified challenges such as high implementation costs, limited technical expertise, and resistance to technology adoption, which hinder the widespread use of predictive analytics in Abuja's retail sector. The research concludes that predictive analytics significantly enhances supply chain efficiency by improving demand forecasting, inventory management, and logistics optimization. It recommends that retail firms invest in capacity-building programs, cloud-based analytics tools, and government-supported incentives to facilitate wider adoption of predictive analytics in supply chain management. Furthermore, policymakers are urged to develop frameworks that encourage the integration of data-driven technologies to boost Nigeria's retail sector. The study contributes to the growing body of literature on supply chain analytics in developing economies and underscores the need for strategic interventions to enhance digital transformation in Nigeria's retail industry.

Eze and Okonkwo (2021) examines the persistent challenges affecting supply chain efficiency in Nigeria, with a specific focus on logistics inefficiencies. The research highlights key bottlenecks in the Nigerian supply chain, including poor transportation infrastructure, inconsistent regulatory policies, and limited adoption of digital analytics. Using a mixed-methods approach, the study collected data from 150 logistics firms across major commercial hubs, including Lagos and Abuja. The findings indicate that 72% of surveyed firms experience delays due to road network deficiencies, while 65% cite bureaucratic bottlenecks at checkpoints as a significant hindrance to seamless logistics operations. Additionally, the study reveals that only 38% of firms utilize advanced analytics tools for route optimization and demand forecasting, limiting their ability to enhance supply chain performance. Furthermore, the research identifies inadequate warehousing facilities and inefficient inventory management systems as critical factors exacerbating supply chain disruptions. Companies that invested in data-driven logistics solutions reported a 25% improvement in delivery times and a 20% reduction in operational costs. The study underscores the need for policy reforms aimed at improving transportation infrastructure, harmonizing regulatory policies, and incentivizing technology adoption in supply chain operations. The authors recommend a multi-stakeholder approach involving the government, private sector, and international partners to address systemic inefficiencies in Nigeria's logistics sector. The study contributes to the growing body of knowledge on supply chain management in developing economies by providing empirical insights into the barriers limiting logistics efficiency. The findings offer practical recommendations for businesses seeking to enhance supply chain performance through digital transformation and strategic infrastructure investments.

Ibrahim, Bello, and Musa (2021) examines the extent to which prescriptive analytics influences cost reduction in logistics firms operating in Nigeria's Federal Capital Territory (FCT). Using a

mixed-methods approach, the study collected quantitative data from 150 supply chain professionals through structured questionnaires and conducted qualitative interviews with industry experts. The findings reveal that logistics firms leveraging prescriptive analytics for route optimization, demand forecasting, and inventory management experienced a significant reduction in operational costs, with savings reaching up to 18%. Moreover, the study highlights that firms utilizing real-time data and advanced algorithms to adjust delivery routes based on traffic patterns and fuel efficiency achieved a 25% reduction in transportation costs. Additionally, organizations that implemented analytics-driven inventory management strategies minimized holding costs by 15%, reducing excess stock and improving warehouse efficiency. However, the research identifies key challenges to prescriptive analytics adoption, including high implementation costs, lack of skilled personnel, and data security concerns. The study concludes that while prescriptive analytics significantly enhances cost efficiency in supply chain logistics, widespread adoption remains limited due to infrastructural and technological barriers. The authors recommend targeted government policies, increased investment in analytics training, and enhanced data security frameworks to facilitate broader adoption. Future research should explore the long-term financial impact of prescriptive analytics on different segments of the supply chain.

Nwankwo and Adeyemi, (2022) examines the impact of real-time analytics on supply chain responsiveness within Nigerian e-commerce businesses. With the rise of e-commerce in Nigeria, supply chain management (SCM) has faced significant challenges related to efficiency, inventory management, and customer satisfaction. Real-time analytics, which leverages the continuous flow of data for immediate decision-making, has been identified as a potential solution to these challenges. This research explores the extent to which the adoption of real-time data analytics influences supply chain performance, particularly in terms of order fulfillment, delivery lead times, and overall customer satisfaction. A mixed-methods approach was employed, combining a survey of 120 e-commerce firms in Nigeria with in-depth interviews with supply chain managers. The results indicate that businesses using real-time analytics experience a 40% reduction in delivery lead times, a significant improvement in order accuracy, and enhanced customer satisfaction levels. Moreover, the study finds that the integration of real-time analytics allows for more dynamic inventory management and more responsive logistics, ultimately improving the agility of supply chain operations. However, the research also highlights challenges related to data security, infrastructure limitations, and the high costs of implementation. These barriers impede broader adoption, particularly among small and medium-sized enterprises (SMEs). The study concludes by recommending policy interventions to foster greater adoption of real-time analytics in Nigerian e-commerce and calls for further research on overcoming technological and financial barriers. The findings contribute to the growing body of literature on digital transformation in supply chain management and provide actionable insights for Nigerian e-commerce firms aiming to enhance supply chain responsiveness.

Ogunleye, Ajayi and Ojo (2022) The adoption of analytics in supply chain management (SCM) has become a critical factor for enhancing efficiency, reducing costs, and improving decision-making in businesses worldwide. However, in Nigeria, the integration of analytics into SCM practices, particularly in the manufacturing and distribution sectors, has been slow. This study examines the extent to which analytics has been adopted in these sectors and its impact on operational efficiency. A mixed-methods approach, combining a survey and in-depth interviews, was used to collect data from 120 supply chain professionals across manufacturing and distribution companies in Lagos and Abuja. The results indicate that while a significant proportion of manufacturing firms (62%) have adopted analytics for demand forecasting and inventory

management, only 38% of distribution firms have integrated analytics into their supply chain operations. Factors influencing the adoption of analytics include the complexity of supply chain operations, company size, and available technological infrastructure. Additionally, the study found that the adoption of analytics in manufacturing led to significant improvements in operational efficiency, such as reduced inventory holding costs and improved demand-supply alignment. Conversely, distribution companies faced challenges related to data quality, lack of skilled personnel, and high implementation costs, which limited their ability to leverage analytics effectively. The study concludes by recommending that Nigerian companies invest in training and infrastructure to overcome these barriers and enhance the adoption of analytics in SCM. Furthermore, policy interventions by the government could provide incentives for small and medium-sized enterprises (SMEs) to embrace analytics in their supply chain processes. These findings contribute to the understanding of analytics adoption in Nigeria and provide a basis for further research in the field of SCM.

Theoretical Framework

The Supply Chain Operations Reference (SCOR) Model is a widely recognized framework designed to assess, manage, and improve supply chain performance. Developed by the Supply Chain Council, the SCOR Model provides a comprehensive structure that outlines the key processes involved in supply chain management, including Plan, Source, Make, Deliver, and Return (Bolstorff & Rosenbaum, 2007). It offers a standardized approach to measuring supply chain efficiency, identifying bottlenecks, and optimizing performance through benchmarking and best practices. The SCOR Model also integrates metrics such as cost, quality, and delivery, making it a valuable tool for organizations seeking to enhance supply chain visibility and collaboration. It is applicable across various industries, enabling businesses to align operations with strategic goals and drive continuous improvement (Stevenson, 2018).

The Supply Chain Operations Reference (SCOR) Model assumes that supply chain processes are interrelated and can be optimized through standardized practices. It assumes that companies can improve their performance by benchmarking against best practices and using metrics to track progress. The model also assumes that alignment of supply chain strategies with organizational goals is essential for success, and that continuous improvement, through data-driven insights, leads to greater efficiency, cost reduction, and enhanced customer satisfaction (Bolstorff & Rosenbaum, 2007).

The Supply Chain Operations Reference (SCOR) Model is highly applicable to this study, particularly in assessing the efficiency of supply chain operations in the Federal Capital Territory (FCT), Nigeria. The SCOR Model's emphasis on five core processes—Plan, Source, Make, Deliver, and Return—provides a structured approach for evaluating the different stages of supply chain management (Bolstorff & Rosenbaum, 2007). By applying this model, the study can assess how analytics adoption impacts each of these processes, identifying areas for improvement and optimization in SCM practices in the FCT.

The model's focus on performance metrics such as cost, quality, and delivery times aligns with the objectives of this study to evaluate the effect of analytics on supply chain efficiency. Using SCOR, the study can benchmark SCM practices in the FCT against global best practices, providing insights into where analytics can improve operational efficiency. For example, predictive analytics in demand forecasting can optimize the "Plan" process, while data-driven logistics can improve the "Deliver" process (Stevenson, 2018). Additionally, the SCOR Model's continuous improvement framework complements the study's goal of identifying strategies for enhancing supply chain performance through analytics in a multi-economy environment like the FCT.

3. METHODOLOGY

This study adopted a mixed-methods research design, combining both quantitative and qualitative approaches. The quantitative component will allow for the measurement and analysis of the extent of analytics adoption and its impact on supply chain efficiency, while the qualitative component will provide deeper insights into the factors influencing adoption and the challenges faced by businesses in the Federal Capital Territory (FCT), Nigeria. This approach enables a comprehensive exploration of the research problem, combining statistical analysis with contextual understanding. The target population for this study includes businesses operating in the manufacturing and distribution sectors within the FCT, Nigeria. Specifically, the population comprised supply chain managers, logistics professionals, and other key decision-makers involved in the implementation of analytics within their organizations. A sample of 150 businesses (75 from manufacturing and 75 from distribution) were selected using stratified random sampling. Stratification will ensure that the sample includes a balanced representation of small, medium, and large enterprises, reflecting the diversity of supply chain practices in the FCT.

Data were collected through structured questionnaires and review of existing data. The questionnaire were designed to gather quantitative data on the extent of analytics adoption in supply chain processes, including demand forecasting, inventory management, and logistics. It also assessed the perceived impact of analytics on operational efficiency, using Likert scale items. For the qualitative aspect, review of document was conducted to explore the barriers to analytics adoption, the benefits experienced, and the role of analytics in enhancing supply chain efficiency.

4. RESULT AND DISCUSSION

To what extent has analytics been integrated into Supply Chain Management (SCM) in the Federal Capital Territory (FCT), Nigeria?

Table 1: How would you rate the level of analytics adoption in your supply chain operations

Responses	Frequency	Percentage (%)
Very High	33	22
High	46	30.6
Moderate	26	17.3
Low	31	20.6
Not Adopted	14	9.3
Total	150	100

Source: Computed by Author, 2025

The analysis of analytics adoption in supply chain operations reveals varied levels of implementation. A significant proportion (30.6%) rated adoption as "High," while 22% rated it as "Very High," indicating that over half (52.6%) acknowledge strong analytics integration. However, 17.3% consider adoption "Moderate," and 20.6% rate it as "Low," suggesting room for improvement. Notably, 9.3% reported no adoption, highlighting gaps in implementation. These findings suggest that while analytics is widely recognized, challenges may hinder full utilization. Organizations should enhance investment in analytics-driven decision-making to optimize supply chain efficiency, address barriers, and improve overall operational performance.

Table 2: Which supply chain process in your organization utilizes analytics the most

Responses	Frequency	Percentage (%)
Demand Forecasting	29	19.3
Inventory Management	58	38.7
Logistics & Distribution	25	16.7
Procurement	31	20.7

Other (please specify)	7	47
Total	150	100

Source: Computed by Author, 2025

The analysis reveals that Inventory Management is the most analytics-driven process in the organization, accounting for 38.7% of responses. This suggests a strong focus on optimizing stock levels, reducing holding costs, and preventing stockouts. Procurement (20.7%) and Demand Forecasting (19.3%) also heavily rely on analytics, indicating efforts to enhance supplier selection and anticipate market trends. Logistics & Distribution (16.7%) ranks lower, suggesting room for improvement. The Other (47%) category highlights potential diverse applications of analytics beyond the listed processes.

Table 3: What are the key barriers to adopting analytics in your supply chain management

Responses	Frequency	Percentage (%)
High Cost of Implementation	35	23.3
Lack of Skilled Personnel	48	32
Poor Technological Infrastructure	26	17.3
Resistance to Change	37	24.7
No Major Barriers	4	2.7
Total	150	100

Source: Computed by Author, 2025

The key barriers to adopting analytics in supply chain management are primarily a lack of skilled personnel (32%) and high implementation costs (23.3%), which hinder data-driven decision-making. Poor technological infrastructure (17.3%) further limits adoption, while resistance to change (24.7%) suggests organizational reluctance. Notably, only 2.7% reported no major barriers, indicating widespread challenges. Addressing these barriers through investment in training, cost-effective solutions, and digital transformation strategies is essential for enhancing supply chain efficiency in a multi-economy environment

What is the impact of analytics on the efficiency of supply chain operations in a multi-economy environment within the FCT?

Table 4: To what extent has the adoption of analytics improved the efficiency of your supply chain operations?

Responses	Frequency	Percentage (%)
Very High Improvement	31	20.7
High Improvement	62	41.3
Moderate Improvement	23	15.3
Low Improvement	28	18.7
No Improvement	6	4
Total	150	100

Source: Computed by Author, 2025

The analysis indicates that 62% of respondents reported a high or very high improvement in supply chain efficiency due to analytics adoption, signifying a strong positive impact. Moderate improvement was noted by 15.3%, while 18.7% observed low improvement. Only 4% saw no improvement, suggesting minimal resistance or inefficacy. Overall, the data highlights that analytics significantly enhances efficiency, though some areas may require further optimization for broader effectiveness.

Table 5: What specific area of supply chain operations has seen the most improvement due to analytics

Responses	Frequency	Percentage (%)
Reduced Costs	32	21.3
Improved Customer Satisfaction	47	31.3
Faster Delivery Times	25	16.7
Enhanced Inventory Management	39	26
Other	7	4.7
Total	150	100

Source: Computed by Author, 2025

The analysis indicates that improved customer satisfaction (31.3%) has seen the most significant improvement due to analytics in supply chain operations. This suggests that companies leverage data-driven insights to enhance service quality, order accuracy, and responsiveness. Enhanced inventory management (26%) follows closely, highlighting the role of analytics in optimizing stock levels and reducing shortages. Reduced costs (21.3%) and faster delivery times (16.7%) also show notable improvements. The other category (4.7%) suggests additional benefits. Overall, analytics significantly enhance efficiency, service quality, and cost management in supply chains.

Table 6: How would you rate the overall impact of analytics on the decision-making process in your supply chain management

Responses	Frequency	Percentage (%)
Very Significant Impact	30	20
Significant Impact	48	32
Moderate Impact	28	18.7
Low Impact	37	24.7
No Impact	7	4.7
Total	150	100

Source: Computed by Author, 2025

Table 6 reveals that analytics significantly influences decision-making in supply chain management. A majority (32%) rated its impact as "Significant," while 20% viewed it as "Very Significant," highlighting widespread recognition of its benefits. Additionally, 18.7% perceived a "Moderate Impact," suggesting room for improvement. However, 24.7% reported a "Low Impact," and 4.7% saw "No Impact," indicating challenges in analytics adoption or effectiveness. Overall, while analytics plays a crucial role, its full potential may not be realized due to implementation barriers, resource constraints, or varying levels of technological integration across organizations.

Discussion

Analytics integration into Supply Chain Management (SCM) in the Federal Capital Territory (FCT), Nigeria, is varied. Table 1 shows that 52.6% of respondents perceive a "Very High" or "High" adoption level, suggesting significant integration. However, 9.3% report no adoption, indicating gaps in implementation. This finding aligns with empirical studies, such as those by Jabbour et al. (2015), which found that while some firms exhibit strong analytics use, challenges like cost and skills gaps hinder broader adoption. Table 2 highlights Inventory Management as the leading process utilizing analytics, which mirrors findings from Kache & Seuring (2017), who emphasized the importance of data-driven inventory optimization. Barriers such as high costs (23.3%) and a lack of skilled personnel (32%) further complicate adoption, consistent with the findings of Choi et al. (2020), who identified similar constraints in developing economies. Overcoming these barriers requires strategic investments in infrastructure and personnel development to fully harness the potential of analytics in SCM.

The adoption of analytics in supply chain management has led to substantial improvements in efficiency, particularly in the Federal Capital Territory (FCT). As shown in Table 4, 62% of respondents reported significant improvements in operational efficiency due to analytics adoption, with 20.7% noting "Very High Improvement." These findings align with studies such as that of Choi et al. (2019), who emphasize that data-driven decisions enhance operational efficiencies. Table 5 reveals that analytics has particularly enhanced customer satisfaction (31.3%), inventory management (26%), and cost reduction (21.3%). This supports empirical research by Azevedo et al. (2020), which shows that analytics significantly optimizes inventory levels and customer service. However, despite its success, some areas still report moderate or low improvements, indicating room for further optimization (Khan et al., 2021). Thus, while analytics is transforming supply chains, its full potential in the FCT remains to be maximized.

5. CONCLUSION AND RECOMMENDATIONS

The findings of this study indicate that while analytics adoption in Supply Chain Management (SCM) in the Federal Capital Territory (FCT), Nigeria, is considerable, challenges persist. Over half of the respondents report high levels of integration, particularly in inventory management, demonstrating the positive impact of data-driven decisions. However, barriers such as high costs and a lack of skilled personnel hinder broader implementation. Despite improvements in operational efficiency, customer satisfaction, and cost reduction, there remains untapped potential for further optimization. These results align with existing literature, highlighting both the progress and challenges in analytics adoption.

Based on the findings, the following recommendations are proffers;

- i. **Invest in Skill Development and Training:** To bridge the skills gap, there should be targeted training programs for personnel in the supply chain sector, ensuring they are equipped to leverage advanced analytics tools effectively.
- ii. **Strategic Investment in Infrastructure:** Government and private sector stakeholders should prioritize investments in the necessary infrastructure, such as data management systems and analytics tools, to support widespread adoption across supply chains in the FCT.

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