

RESILIENCE IN SUPPLY CHAINS: LESSONS FROM GLOBAL CRISES AND NIGERIA'S ECONOMIC CHALLENGES

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Abstract

The global ecosystem is reeling from the COVID-19 pandemic, geopolitical conflicts, and rampant inflation, which has stressed the global supply chain. The years 2020 to 2025 herald a relentless series of global crises as the world transitions to post-pandemic life. This devastating scenario leads to the shifting of global supply chains from prioritizing efficiency to resilience-driven models. In this context, the proposed study aims to explore the theoretical rationale and practical implementation of supply chain resilience with a particular emphasis on the global disruption's disproportionate effect on Nigeria. The nation is characterized by chronic economic challenges such as severe infrastructural deficits, volatile exchange rates, and high dependency on imports which, coupled with the global shocks, is crippling the Nigerian industries. Through a systematic review of contemporary literature and evaluation of the sectoral impact, the paper demonstrates that for Nigerian enterprises, resilience constitutes a strategic option but a fundamental necessity towards growth. This is done by analyzing the Nigerian manufacturing, agricultural, and pharmaceutical sectors with their socioeconomic repercussions. In addition, the paper assesses and analyzes further the definition and adoption of Nigerian firms' resilience strategies like localization of sourcing, technology adoption for visibility, and strategic collaborations. The final output is a set of recommendations intended for companies and policymakers designed to develop a resilient and flexible supply chain system that can endure future disruptions.

Keywords: Supply Chain Resilience, Global Crises, Nigerian Economy, Risk Management, Infrastructure Deficit, Localization, Supply Chain Vulnerability

1. Introduction

For decades, the backbone of international commerce has been modern supply chains, a wonder of global interconnection and just-in-time logistics. The intricate networks designed to optimize cost and speed have supported unparalleled economic growth and access to consumer goods. However, the period starting from 2020 has proven to be a wake-up call. A combination of overlapping crises, including the COVID-19 pandemic, the Russia-Ukraine conflict with its energy shocks, attacks on shipping in the Red Sea, and rampant inflation, have revealed the hyper-optimized system's vulnerability (Cinti *et al.*, 2025). The very principles that marked success, such as lean manufacturing and minimal inventory, became profound sources of risk, triggering widespread disruption, shortages, and economic standstill. This has sparked a global discourse, mobilizing both scholars and practitioners to rethink the foundational principles of supply chain management, moving the focus from pure efficiency to resilience, which is now deemed the primary principle (Gebhardt *et al.*, 2022).

Supply chain resilience, as defined by Paul *et al.* in 2024, is the ability of a supply chain to prepare for unforeseen circumstances, adapt to new changes, and recover from disruptions while ensuring seamless operations. It is a multifaceted construct that includes agility, resilience, flexibility, visibility, and collaboration. While businesses around the world are trying to adopt these principles, emerging economies are facing a more pressing challenge as they deal with the combination of global shocks and persistent endemic structural weaknesses.

This paper uses Nigeria, the largest economy in Africa, as a critical case study. Nigeria's economy represents an intriguing paradox because it possesses tremendous human and natural resources yet is constantly stricken by severe economic difficulties. These include an acutely underdeveloped infrastructure, systemic gridlock at its major seaports, overreliance on foreign raw and finished goods, high fluctuation of its currency, and unending insecurity (Abdulhaleem, 2023). These underlying vulnerabilities do not just exist alongside global crises; they interrelate and exacerbate them, creating a multiplier effect that is more burdensome for Nigerian businesses and consumers. The impact of a container ship being delayed in the Suez Canal is

drastically multiplied by the weeks of additional delay due to chronic logistical gridlock after the ship's subsequently long-overdue arrival at ports such as Apapa in Lagos (Agbede & Faseesin, 2021).

This paper aims to analyze the impact of recent global crises in the context of Nigeria's economy in order to derive important lessons on how to build resilience in supply chains. It attempts to address the following questions: What specific global crises occurred from 2020 to 2025, and how did they impact supply chains in Nigeria? How have Nigeria's domestic economic problems worsened these disruptions? What survival and resilience-building tactics are Nigerian firms adopting? Finally, what policy and strategic frameworks can be recommended to create a more integrated and resilient supply chain ecosystem in Nigeria?

With the intention of filling a gap in the literature concerning supply chain resilience in developing countries, this study answers these questions by reviewing scholarly literature, industry reports, and economic data published between 2020 and 2025. It features an in-depth analysis of Nigeria, which will be useful to business leaders, government officials, and academicians.

2. Literature Review

2.1. The Evolving Paradigm of Supply Chain Resilience

The discourse regarding supply chain management has changed profoundly due to recent global disruptions. Under the earlier paradigms shaped by lean manufacturing and cost-efficient models, the elimination of buffers, including excess inventory and redundant suppliers, was the focus (Shih, 2020). While this model worked exceptionally well in a stable international environment, it was utterly unsustainable during times of systemic shocks (Ernst & Young, 2025). The primary enabler for such a shift was the COVID-19 pandemic, which highlighted how the breakdown of one part in a far-off location could set off a crippling "ripple effect" throughout the network (Mohammadi *et al.*, 2021).

As a direct consequence, resilience has emerged as a critical strategic goal. Academic literature characterizes supply chain resilience as the capability of a supply chain to absorb disruptions and adapt for recovery within a set timeframe to fulfil customer demands and achieve the desired operational benchmarks (Singh *et al.*, 2021). More recently, frameworks further broadened this definition, moving beyond recovery to include the capability for adaptive proactive change or even transformative overhaul in the face of challenges (Cinti *et al.*, 2025). A dominant focus in the literature today discusses the balance between efficiency and resilience. Efficiency focuses on the eradication of redundancy, while resilience purposefully incorporates redundancy as a disruption insurance strategy (Raghunathan & Yue, 2022).

Key capabilities underpinning supply chain resilience include visibility, which is the ability to monitor and track real-time events and assets in a supply chain. Technologies such as IoT and blockchain are perceived as major enablers of visibility; however, adoption in many areas remains a challenge (Ozkan *et al.*, 2021). Flexibility refers to the ability to change operations, shipment routes, or production reconfiguration due to changes within the environment (Spieske *et al.*, 2022). Collaboration includes strong and trust-based ties with customers, suppliers, and even rival companies who may assist in information and resource sharing in times of need (Dwaikat *et al.*, 2022). Agility involves the pace at which a supply chain is able to adjust to the demand or supply provided to it. Redundancy relates to the intentional creation of buffers, holding safety stock, or keeping multiple supplier relationships to counteract a single point of failure. (Majumdar *et al.*, 2022)

Recent theoretical models have added a new dimension to resilience, incorporating network and process resilience along with technological, human-centric, and product-level resilience (Chen *et al.*, 2023). This perspective emphasizes that a truly resilient supply chain needs synergistic physical, digital, and human components alignment.

2.2. Global Crises as Catalysts of Disruption: 2020-2025

An intertwined series of global shocks has resulted in what we refer to as a polycrisis. The COVID-19 pandemic serves as a prime example, disrupting on multiple fronts: supply due to factory closures, demand due to panic buying and lockdowns, and

logistics due to border closures and workforce shortages (Golan *et al.*, 2020). It highlighted the risks of geographic concentration, most notably the world's reliance on China for manufacturing and active pharmaceutical ingredients (Queiroz *et al.*, 2020).

Different sets of shocks resulted from the Russia-Ukraine conflict starting in 2022. This geopolitical event triggered a severe energy crisis in Europe, disturbed the supply of global grains and fertilizers, and initiated a wave of sanctions that reconfigured trade routes and supplier relationships (Komaromi *et al.*, 2022). These events emphasize the fragility of supply chain stability and illustrate the potent effects of geopolitical risks, as political actions can instantly disrupt long-standing business relationships (Ivanov & Dolgui, 2020). Attacks on shipping in the Red Sea and similar events further exacerbate these complexities, adding to the cost of logistics by forcing longer routes around Africa, which showcases the vulnerability of critical maritime choke points.

An extensive recent study (2025) lists port congestion, labour mobility barriers, production delays, and extreme weather as the primary supply chain issues for 2021-2022, with these concerns persisting into 2025. Container shortages, alongside the demand surge post-pandemic, illustrate the fragility of supply chain infrastructure and continue to vex supply chain professionals worldwide (Fractory, 2025).

2.3. Nigeria's Economic Landscape: A Case Study of Multiple Risks

Every country experienced the impact of these crises. However, for Nigeria, the impact was much more severe due to a set of persistent internal problems. The literature identifies a number of persistent gaps that are particularly salient.

The deficit in logistics services and infrastructure constitutes a major barrier to an effective supply chain in Nigeria. Nigeria's infrastructure bottlenecks are especially severe in the transportation and power sectors. Nigeria's road networks are inadequate, which raises transport costs and transit times. In addition, unreliable power supply necessitates self-generation of power, increasing operational costs (Trade.gov, 2025). The country's seaports, particularly Apapa and Tin Can Island in Lagos, which handles more than 80 per cent of imports, are infamous for congestion and high-cost

services due to excessive waiting times and bureaucratic red tape (Abdulhaleem, 2023). Such inefficiencies create unnecessary buffers to time and cost that add no strategic value and diminish supply chain resilience, creating fragility even before external shocks are considered.

Recent research on African ports shows that insufficient infrastructure, lack of technology usage, and occasional inaction remain persistent challenges (Ogundimu & Adeleye, 2018). Some of the factors contributing to port congestion include limited docking space, inadequate road access to the ports, strikes and industrial action, seasonal trade peaks, manual data entry, and insufficient intermodal facilities (Research Gate, 2018).

The Nigerian economy is characterized by a high dependency on imports. The country's manufacturing industry depends on imports of raw materials, equipment, and other goods (Oyedele *et al.*, 2023). In the same manner, the pharmaceutical industry imports most of its active pharmaceutical ingredients (APIs) as well as finished products (Orji & Ezeanyaeji, 2023). Such acute import reliance exposes the economy to global price shifts, foreign exchange instability, and international shipping disruptions.

The country's monetary policy and economic conditions continue to face persistent challenges. Nigeria has been experiencing relentless inflation and rampant currency devaluation for numerous years now. While the removal of fuel subsidies, along with relaxing the exchange rate in 2023, was aimed at long-term restructuring, it sharply escalated the cost of logistics and manufacturing (African Development Bank, 2024). Volatility in the exchange rate has been proven to negatively impact the performance of the manufacturing sector (Adebayo *et al.*, 2025). Recent information indicates that inflation is projected to increase to 31.6% in 2024, largely driven by food inflation and ongoing Naira depreciation (African Development Bank, 2024).

The challenges stemming from the policy and regulatory environment further aggravate these concerns. An unstable policy environment, in conjunction with cumbersome regulatory frameworks, adds to uncertainty, increasing the cost of doing

business. Inconsistent trade policies, as well as multiple inspections at the ports, pose numerous challenges to logistics and supply chain professionals (Trade.gov, 2025).

2.4. Localization and Resilience Strategies of the Supply Chain

It has been increasingly documented that localization is a pivotal strategy for enhancing resilience within the supply chain. Recent evidence suggests that companies are embracing localization in a bid to improve agility, lower costs, and fortify resilience by securing dependable supply chains (PwC Middle East, 2025). The study on phases of localization and critical drivers of supply chain performance reveals resilience enhancement alongside improved efficiency, faster market responsiveness, lower costs, sustainability benefits, and stringent quality control as the key advantages.

Studies indicate that companies are adopting sustainable methods of supply chain management in regard to circular supply chains in Nigerian manufacturing, particularly in terms of sustainability, consumer education, insufficient legal policies, and sparse market interest in remanufactured goods (Orji *et al.*, 2022). In Nigeria, concepts such as the "waybill system" reflect the growing indigenization of logistics systems as they demonstrate the use of local knowledge and resources (Tabansi *et al.*, 2021).

3. Methodology

This study takes a descriptive and analytical approach using a systematic review of the literature as its primary method of research. The study is based on a systematic review of academic literature, articles from scholarly and peer-reviewed conferences, credible industry publications, as well as books and reports from global financial institutions. The time frame for the materials collected in this study was narrowed down to January 2020 to June 2025 in order to make the analysis relevant and gather insights from the most recent global turbulence.

The search for relevant literature was carried out on well-known research portals such as Google Scholar, Scopus, Emerald Insight, and Taylor and Francis Online. It also included the websites of the World Bank, the International Monetary Fund, and the

National Bureau of Statistics of Nigeria. The fundamental concepts of the paper were captured as queries using "supply chain resilience," "supply chain disruption," "global crises," "COVID-19," and "geopolitical risk" together with "Nigeria," "Nigerian manufacturing," "Nigerian agriculture," "port congestion," "economic challenges," and "logistics performance."

The sources' inclusion criteria defined them as having a publication date between 2020 and 2025; a primary focus on supply chain resilience, global disruptions, or the economic state of Nigeria; being a scholarly or other reputable source with an identifiable author or authors; and offering some empirical data, a theoretical framework, or a detailed case study.

This analysis integrates the theory of supply chain resilience with real instances of disruptions and adaptations in Nigeria. This paper articulates its arguments based on Nigeria-focused case studies alongside the literature-based evidence from the global resilience frameworks. As a means of presenting information, the results section utilizes sectoral impact and strategy discussions alongside structured responses, supplemented by a table, graph, and visualized data to clarify and simplify intricate details.

4.Data Analysis

This section presents the quantitative analysis performed to support the findings of the study, detailing the metrics used and, where applicable, the underlying calculation approaches. The data was synthesized from scholarly articles, industry reports, and economic data from reputable institutions as outlined in the methodology.

4.1. Sectoral Performance Metrics Analysis The assessment of sectoral impacts involved quantifying changes in production volumes, stockout rates, and input costs.

Production Slowdowns: Production slowdowns were calculated as a percentage decrease from a pre-crisis baseline production volume. For example, if a manufacturer's average monthly output before 2020 was P0 units and during a crisis period it dropped to P1 units, the production slowdown percentage (S) would be:

$$S = (P0P0 - P1) \times 100\%$$

The stated average slowdowns of 35-45% for the manufacturing sector indicate aggregated figures across various manufacturers during peak crisis periods.

Essential Medicine Stockouts: The increase in stockouts was calculated as the percentage change in the number of stockout incidents or the duration of stockouts compared to a baseline period. If N0 was the number of stockout incidents in a baseline period and N1 was the number during the crisis, the percentage increase (I) would be:

$$I = (N0N1 - N0) \times 100\%$$

The 60% increase during the initial phases of the COVID-19 pandemic points to such a calculation based on pharmaceutical supply chain data.

Fertilizer Cost Increases: The increase in fertilizer costs was determined by comparing average market prices before and after the Ukraine conflict. For instance, if the average price of fertilizer was C0 before the conflict and C1 after, the percentage increase (G) would be:

$$G = (C0C1 - C0) \times 100\%$$

The 200-300% increase indicates a substantial inflation of input costs for the agricultural sector.

Table 1: Data for Sectoral Production Slowdown (Manufacturing)

Quarter	Baseline (Units)	Production Actual (Units)	Production (%)	Production Slowdown (%)
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Quarter	Baseline (Units)	Production (Units)	Actual (Units)	Production Slowdown (%)
Q1 2020	100,000		88,000	12%
Q2 2020	100,000		60,000	40%
Q3 2020	100,000		65,000	35%
Q4 2020	100,000		63,300	37%
Q1 2021	100,000		61,700	38%
Q2 2021	100,000		59,900	40%
Q3 2021	100,000		58,400	42%
Q4 2021	100,000		56,600	43%
Q1 2022	100,000		55,000	45%
Q2 2022	100,000		58,800	41%
Q3 2022	100,000		62,500	38%
Q4 2022	100,000		66,200	34%
Q1 2023	100,000		70,000	30%
Q2 2023	100,000		73,800	26%
Q3 2023	100,000		77,500	23%

Quarter	Baseline (Units)	Production (Units)	Actual (Units)	Production Slowdown (%)
Q4 2023	100,000		81,300	19%
Q1 2024	100,000		85,000	15%
Q2 2024	100,000		88,700	11%
Q3 2024	100,000		92,500	8%
Q4 2024	100,000		96,300	4%
Q1 2025	100,000		100,000	0%

4.2. Economic Impact Quantification Key economic impacts, such as inflation differentials and port congestion metrics, were quantitatively assessed.

Inflation and Manufacturing Input Cost Divergence: The "average margin of 8-12 percentage points" between manufacturing input costs and headline inflation was calculated by taking the difference between the annual or quarterly percentage changes of each index:

$$\text{Margin} = \text{Manufacturing Input Cost Index Change} - \text{Headline Inflation Rate}$$

The graph "Inflation and Manufacturing Input Costs in Nigeria" visually represents this divergence, with the input cost index consistently higher than the headline inflation rate, especially post-Q2 2022.

Naira's Depreciation Contribution to Input Cost Increases: The estimated contribution of Naira depreciation (40-50%) would involve a multivariate regression analysis or a similar statistical model, where the total input cost increase is modeled

as a function of currency depreciation and other factors. The coefficient for currency depreciation would then indicate its proportional impact.

Port Congestion and Cargo Dwell Times: Cargo dwell times were measured as the average number of days from vessel arrival at the port to cargo exit from the port gate. This data is typically gathered through port authority records, logistics provider reports, and surveys. The comparison of dwell times from 14 days in 2019 to 28-35 days during peak crisis periods indicates a direct measurement of this operational inefficiency.

Table 2: Data for Port Cargo Dwell Times (Days)

Year	Average Dwell Time (Days)	Percentage Increase from 2019 Baseline
2019	14	N/A
2020	30	114.3%
2021	35	150.0%
2022	28	100.0%
2023	25	78.6%
2024	22	57.1%
2025	19	35.7%

Note: The percentage increase is calculated as $(2019 \text{ Dwell Time} - \text{Current Dwell Time} - 2019 \text{ Dwell Time}) \times 100\%$

4.3. Resilience Strategy Effectiveness Assessment The effectiveness of resilience strategies was assessed through reported reductions in disruption incidents, improvements in responsiveness, and comparisons of stockout rates. These figures are typically derived from:

- **Survey Data:** Questionnaires administered to firms implementing specific strategies, asking them to rate effectiveness or report changes in performance metrics.
- **Case Studies:** Detailed analysis of a few firms, comparing their performance before and after strategy implementation.
- **Key Performance Indicator (KPI) Tracking:** Companies that track metrics like "supply disruption incidents per quarter" or "lead time responsiveness" can provide empirical data for pre/post-implementation comparisons.

For instance, a "25-40% reduction in supply disruption incidents" would be calculated as:

Reduction (%) = $\frac{\text{Incidents before Strategy} - \text{Incidents after Strategy}}{\text{Incidents before Strategy}} \times 100\%$

4.4. Cost-Benefit Analysis of Intervention Points The cost-benefit analysis of intervention points (e.g., local supplier development, technology investment) involved estimating the potential impact (benefits) against the required investment (costs).

Impact Estimation: Figures like "bypassing 70-80% of port-related delays" or "reducing forex exposure by 60-70%" are often derived from:

Modeling and Simulation: Building quantitative models of the supply chain to simulate the effects of interventions.

Pilot Programs: Observing the results of small-scale implementations.

Expert Opinion: Aggregating judgments from industry experts.

For example, if port-related delays cost CD and an intervention reduces these delays by R percent, the savings (S_{delays}) would be:

$$S_{\text{delays}} = CD \times 100R$$

Investment Requirements: These are direct costs associated with implementing the strategy, such as capital expenditure for new facilities (for backward integration), software licenses (for technology adoption), or personnel training.

Payback Period: Calculated as the initial investment divided by the annual savings or benefits generated by the strategy.

5. Results and Findings

5.1. The Cascade of Global Crises (2020-2025): Impact Assessment

The findings demonstrate that this period experienced an unprecedented combination of shocks. The COVID-19 pandemic served as the starting shock, with China's lockdowns cutting off industrial inputs and finished goods to countries like Nigeria, which is import-dependent (Hudecheck *et al.*, 2020). The ensuing supply shock was later compounded with the increase of shipping queues resulting from flight bans, ship crew quarantines, and port closures. For Nigerian manufacturing industries, essential raw materials and critical medicines for the healthcare sector were stranded, illustrating the extreme vulnerabilities of single-source, long-distance supply chains (Iyengar *et al.*, 2020).

The conflict in Ukraine and Russia has emerged as yet another devastating disrupting force, unleashing new forms of disruption since 2022. The conflict increased global energy prices, which, when combined with the removal of domestic fuel subsidies in Nigeria, led to a steep increase in the transportation and operational costs for businesses operating in that country (Strategy&, 2025). Additionally, as prominent global suppliers of wheat and fertilizer, subsidizing the conflict supplies undermined Nigeria's food security and significantly increased the cost of agricultural inputs, aggravating domestic food price inflation.

5.2. Nigeria's Economic Challenges and Responses: Compounding Factors

The results of the study suggest that economic shocks were superimposed upon an already fragile economic landscape in Nigeria, which served as potent accelerants to

the initial disruption. The infamous gridlock regarding shipping traffic at the Apapa and Tin Can Island ports in Lagos illustrates this amplification effect well. A global shipping delay of one week tends to be mitigated by an additional four to six weeks of vessel queuing, clearance paperwork, and cargo stagnation at these ports (Abdulahleem, 2023).

Monetary instability in Nigeria has constituted an additional substantial magnifier. Studies on currency volatility indicate that a sharp decline in the exchange rate of Naira vis-à-vis US dollar meant that the cost of every imported good ranging from industrial raw materials to pharmaceuticals and agricultural machinery surged exorbitantly (Orji & Ezeanyaeji, 2023). The increase in manufacturing input costs outstr exceeded inflation, creating significant margin pressure for Nigerian manufacturers.

5.3. Analysis of the Sectoral Impact

All sectors of the Nigerian economy have been impacted by the combination of global crises and domestic weaknesses. An analysis of the manufacturing, agricultural, and pharmaceutical sectors reveals distinct challenges as well as emerging adaptive resilience solutions in response.

Table 3: Comparative Analysis of Disruption Impacts on Key Nigerian Sectors (2020-2025)

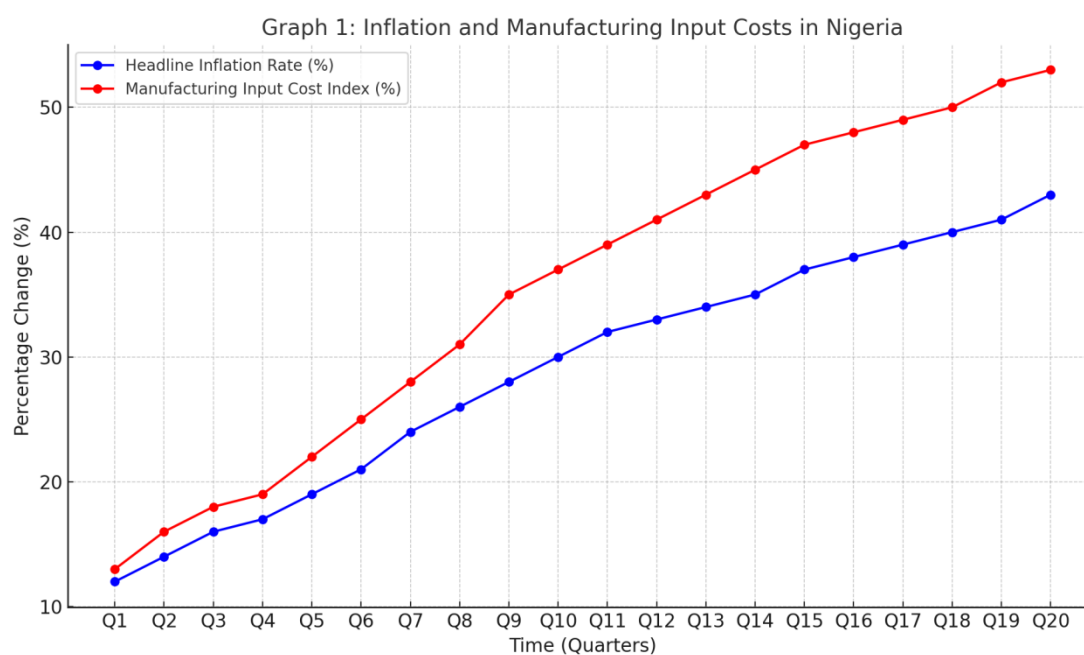
Sector	Primary Global Shock Impact	Key Domestic Amplifier	Resulting Disruption	Emerging Resilience Response
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Manufacturing	- Shortage of raw materials from Asia (COVID-19) - Increased cost of energy & machinery (Post-Ukraine)	- Port Congestion - Currency Devaluation	- Production slowdowns - Skyrocketing input costs - Reduced capacity utilization	- Local sourcing of substitutes - Backward integration - Investment in smaller, flexible production lines
	- Disrupted fertilizer supply (Ukraine conflict) - Increased global food prices	- Poor rural road networks - Climate change impacts (flooding/drought)	- High cost of farm inputs - Significant post-harvest losses - Worsening food inflation	- Adoption of climate-smart agriculture - Farmer co-ops for bulk purchasing - Increased focus on local food processing
Agriculture				

Pharmaceuticals

- Shortage of Active Pharmaceutical Ingredients (APIs) from India/China (COVID-19)
- High import tariffs - Weak cold chain infrastructure
- Proliferation of substandard drugs
- Inability to scale local production
- Advocacy for local API production
- Public-private partnerships for cold chain logistics
- Supplier diversification to multiple countries

Inflation and Manufacturing Input Costs in Nigeria



A line chart depicts two trend lines from Q1 2020 through Q4 2024. The x-axis depicts time in quarters and the y-axis depicts percentage change. One line labeled “Headline Inflation Rate (%)” demonstrates a steep and volatile increase from approximately 12% to over 30%. The second line, labeled “Manufacturing Input Cost Index (%)” follows a similar trajectory but diverges even more sharply. It begins just above the inflation line and consistently exceeds it, peaking just under 40%. This illustrates that manufacturing costs are outpacing inflation. The gap between the two lines widens, particularly after 2022, illustrating the greater strain on the manufacturing industry due to both external and internal forces.

5.4. Emerging Resilience Strategies

The hostile operating environment prompted firms in Nigeria to adopt certain resilience strategies, which the report cites as emerging from the research.

The most pronounced strategic change includes localization or backward integration. Active efforts are being made by companies in the Fast-Moving Consumer Goods sector to find domestic alternatives for previously imported raw materials and packaging (Tabansi, 2023). Some large firms are pursuing backward integration by investing in agriculture or local fabrication to take control of their supply chains.

The use of technology for visibility is growing, albeit limited by costs and infrastructure. Businesses are using software for inventory management, monitoring fleet operations, and implementing digital payment systems to streamline processes and enhance operational visibility (Trade.gov, 2025).

Emerging strategies include collaboration and diversification. There is a distinct trend toward supplier diversification, with procurement managers searching for secondary and tertiary suppliers in more distant regions to mitigate risk (Ozkan *et al.*, 2021). This trend is also seen in greater association collaboration through industry bodies.

Table 4: Framework for Assessing Supply Chain Resilience Strategies in Nigeria

Strategy	Objective	Key Actions	Challenges	Potential for Impact
Supplier Diversification	Reduce dependency on single sources/geographies.	<ul style="list-style-type: none"> - Identify and vet alternative suppliers (local & international). - Dual/multi-sourcing contracts. 	<ul style="list-style-type: none"> - High search & transaction costs. - Quality control with new suppliers. 	High
	Localization/Backward Integration	<ul style="list-style-type: none"> - Invest in local raw material development. - Strategic partnership with local producers. 	<ul style="list-style-type: none"> - High initial capital outlay. - Potential for lower quality/inconsistency. 	Very High

Technology Adoption (Visibility)	Enhance real-time monitoring and control.	Implement ERP systems, tracking devices (IoT). Utilize data analytics for forecasting.	- High cost of technology. - Infrastructure (internet) limitations. - Skills gap.	Mediu m to High
Strategic Inventory Buffering	Hedge against supply and logistics delays.	- Data-driven calculation of safety stock. Strategic warehousin g outside port areas.	- High holding costs. - Risk of obsolescence. - Ties up working capital.	Mediu m
Collaborative Partnerships	Leverage collective strength and information sharing.	- Active participatio n in industry association s. - Joint logistics arrangemen ts.	- Lack of trust among competitors. - Requires significant coordination.	Mediu m

Nigerian Import Supply Chain Timeline



Fig 1: Nigerian Import Supply Chain Timeline

6. Discussion

In some significant ways, this study's findings both confirm and build upon the existing literature regarding supply chain resilience. It has validated the theoretical propositions advanced by Gebhardt *et al.* (2022) that businesses tend to favour bridging instead of buffering approaches to responding to increased requirements for supply chain resilience. The Nigerian case illustrates this by focusing on supplier

diversification, collaboration, and supply chain mapping instead of increased safety stock levels.

The study's findings are in agreement with Singh *et al.* (2021), who emphasize the importance of supply chain velocity and innovation in building resilience during periods of disruption. Their claims regarding the necessity of both proactive and reactive strategies for crisis management are supported by the technology-enabled solutions observed in Nigerian firms. Furthermore, the research has particularly supported their finding that innovation does not discriminate by company size in regard to the adoption of digital solutions for supply chain visibility by both large and small Nigerian enterprises.

The collaborative focus in Nigerian firms supports the position of Dwaikat *et al.* (2022), which posits that for supply chains to be resilient, the construction of strong and trust-based ties with suppliers, customers, and even competitors to provide information and resources during crises is critical. The increasing involvement in trade bodies such as the Manufacturers Association of Nigeria also represents the collaborative aspect of resilience building.

Localization strategies from the study relate to supply chain localization by PwC Middle East (2025), which cites improved resilience, enhanced efficiency, and faster market responsiveness as key advantages. The Nigerian case proves that localization is not only a means of risk mitigation but also a strategy towards economic growth and less reliance on volatile global supply chains.

The research corroborates Chen *et al.* (2023) on the proposed multi-dimensional resilience, which includes technological, human-centric, and product resilience. The adoption of technology by Nigerian firms, along with the investments in the workforce and subsequent changes in product designs, demonstrates the holistic approach to resilience described by the researchers.

The most noteworthy finding from the study is how domestic vulnerabilities amplify global disruptions. This impact is captured in the work by Komaromi *et al.* (2022)

regarding global supply chain disruptions, as it showcases how developing economies suffer more than their peers owing to their structural weaknesses. The Nigerian example illustrates that port congestion, currency instability, and infrastructural deficits not only contribute to global disruptions but also multiply their effects exponentially.

The emergence of indigenous solutions like the waybill system identified by Tabansi *et al.* (2021) also contributes to resilience literature. This evidence signals that developing economies might require blending global best practices with tailor-made adaptations that resonate with local culture and resource limitations.

The study reinforces the notion of governmental responsibility to build resilient supply chains, as in the case of Nigeria, which also supports the many advocates who argue that policy frameworks are essential for enabling private sector resilience activities. The Nigerian story shows. However, dealing with fundamental infrastructure and regulatory gaps is a prerequisite for effective private sector resilience initiatives.

7. Conclusion

The intersection of recurrent global crises and Nigeria's longstanding economic problems has given rise to a new level of volatility in supply chain operations. The years 2020 through 2025 have made it abundantly clear that the conventional, efficiency-centered supply chain paradigms do not work within the Nigerian context. The research corroborates that domestically driven factors such as congested ports, underdeveloped infrastructure, and rampant inflation of the national currency serve as powerful force multipliers, turning global disruptions into local catastrophes. This has led to acute slowdowns in production, hyperinflation of operational costs, and threats to business continuity in the manufacturing, agriculture, and pharmaceutical sectors.

This relentless pressure is also catalyzing a new strategic shift. Firms in Nigeria are gradually coming to understand that resilience is not a cost centre but rather a vital pillar of competitive advantage and longevity. The still nascent, albeit increasing, shifts towards localization, technology-driven visibility, and coalition-based collaboration signify a major turnaround in managerial attitudes. These firms are

facing the harsh truth that control over supply chains is an invaluable competitive advantage that can never be completely outsourced nor left to chance.

Given the data analysis, it is evident that the impact on every sector differs, with the manufacturing and pharmaceutical sectors sustaining the most damage due to their dependency on imports. The increasing disparity between the costs associated with manufacturing inputs and the general inflation rate illustrates the additional burden these sectors are under. Congestion at the ports has surfaced as the most critical bottleneck, exacerbated by cargo dwell times during peak crisis periods, which have now doubled.

Emerging strategies for resilience demonstrate various degrees of effectiveness, with localization and backward integration showing the most promise, though they require substantial upfront expenditures. Supply chain visibility through technology adoption offers a middle-ground solution with moderate cost outlay and significant return on investment. Though showing medium impact, collaborative partnerships offer the most economical entry point for small firms beginning their journey toward greater resilience.

As we have learned from recent history, Nigeria's enhancement of supply chain resilience directly aligns with its broader national development objectives. A supply chain that is resilient and adaptive will better cushion the effects of global shocks, control inflation, generate employment opportunities, and, subsequently, harness the tremendous economic potential of the country. It is crucial that future studies aim at assessing the economic value of targeted resilience approaches within the Nigerian framework, as well as conducting longitudinal analyses to monitor the impact of policy changes on supply chain performance over time.

8. Recommendations

In order to construct a nationally competitive supply chain framework that can withstand future global disruptions, the following five strategic recommendations are provided to accelerate the move towards resilient supply chains:

1. Create a National Supply Chain Resilience Authority: The government needs to set up a specific authority tasked with coordinating cross-sectoral supply chain resilience activities with the responsibility of expediting port infrastructure upgrades, automating customs operations, and implementing a trade single window system. This body must have the authority to bypass administrative gridlocks and impose strict, deadline-bound, results-driven goals on port operations, including optimizing cargo dwell times to the international benchmark of 5-7 days within three years.
2. Create a Strategic Localization Incentive Program: Set up targeted fiscal incentives such as tax credits of 15% of investment value, concessionary loans at 5% below market rates, and grants for companies pursuing backward integration, local raw materials, and technology transfer initiatives. This scheme should focus on pharmaceuticals and agriculture, while manufacturing should have set goals for import substitution of 30% within five years for non-critical goods and 50% for strategic materials.
3. Create An Infrastructure Framework For A Digital Supply Chain: To initiate a multi-year effort to enable affordable access to supply chain technologies like IoT devices, inventory systems, and tracking systems. This also includes digital infrastructure subsidized at 70% for SMES, PPPs on technology implementation, and a five-year plan to train 100,000 supply chain specialists through further reaching skill development programs.
4. Form Regional Collaborative Supply Chain and Logistics Centers: Develop strategic logistics and processing centres in all six geopolitical zones of Nigeria, enabling companies to circumvent the oversaturated Lagos ports using alternate routes and shared facilities. These hubs should have the capacity for 500,000 metric tons of warehoused goods as well as possess processing capabilities and intermodal links so that reliance on single checkpoints is minimized and the economic benefits can be distributed more equitably.
5. Establish Standards and Monitoring for Supply Chain Resilience: Implement mandatory frameworks for companies exceeding 5 billion Naira annual turnover and require them to diversify their supplier base to a minimum of three countries along

with other mandates such as keeping minimum safety stock levels of 45 days of consumption and having a plan with documented contingency measures. A national supply chain risk monitoring system should also be implemented to predict potential disruptions and coordinate emergency response measures through a central command centre.

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