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# Influence of Supplier Integration on Inventory Efficiency in Manufacturing Firms in Cross River State, Nigeria

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***Abstract***

*This study examined the influence of supplier integration on inventory efficiency in manufacturing firms located in Cross River State, Nigeria. Supplier integration was explored through five thematic dimensions: communication and information sharing, collaborative planning and decision-making, technological support, barriers to integration, and strategies for improvement. A qualitative research design was adopted to capture the lived experiences and operational practices of six purposively selected participants drawn from various manufacturing sectors including agro-allied, plastic packaging, paint production, and building materials. Data were collected using semi-structured interviews and analyzed thematically. The findings revealed that ineffective communication, lack of joint planning, poor technological infrastructure, and supplier informality were major challenges undermining inventory efficiency. Most firms operated in isolation from their suppliers, resulting in stock inconsistencies, planning errors, and increased operational costs. However, firms that adopted performance scorecards, collaborative forecasting, and selective supplier engagement practices reported notable improvements in inventory alignment and responsiveness. The study concludes that supplier integration, when properly structured and supported with the right technology and relationship frameworks, can significantly improve inventory control, minimize waste, and enhance competitiveness. It recommends the institutionalization of digital platforms, supplier capacity-building programs, long-term partnership contracts, and government-led incentives to promote stronger supplier-manufacturer collaboration in the Nigerian manufacturing landscape.*

***Keywords:*** *Supplier integration, inventory management, communication, collaboration, technology, manufacturing firms.*

## Introduction

Inventory management remains a critical aspect of operational success in manufacturing firms, particularly in dynamic and competitive environments. Efficient inventory systems ensure optimal stock levels, minimize holding costs, and support timely production and delivery schedules. However, achieving such efficiency largely depends on the extent of collaboration and information exchange between manufacturers and their suppliers. In recent years, the concept of supplier integration has gained significant attention as a strategic approach for improving inventory efficiency. Supplier integration entails the systematic coordination of processes, communication, and

decision-making between manufacturers and their upstream partners to ensure seamless material flow, reduced lead times, and synchronized operations (Zhang & Luo, 2022; Nguyen & Phan, 2022).

In Nigeria, and more specifically in Cross River State, manufacturing firms face several operational challenges that hinder effective inventory management. These challenges include unreliable supply chains, delays in material deliveries, inadequate information sharing, and fluctuating production demands. The fragmented nature of supplier relationships in the Nigerian manufacturing sector has made it difficult for firms to optimize their inventory systems. Many manufacturers still rely on traditional, transactional supplier arrangements that lack the depth required for proactive and responsive inventory planning. This has often led to stockouts, overstocking, increased operational costs, and reduced customer satisfaction (Okoro & Edeh, 2023; Ugwueze & Nwankwo, 2023).

The integration of suppliers into core manufacturing operations has the potential to address many of these issues by fostering real-time information sharing, collaborative planning, and strategic alignment. When suppliers and manufacturers engage in joint forecasting, inventory visibility, and production scheduling, the overall efficiency of the supply chain improves (Musa & Lawal, 2022). In developed economies, supplier integration has been successfully employed to drive lean inventory practices, enhance product availability, and minimize waste (Reddy & Banerjee, 2022; Tan & Lim, 2022). This raises the question of how supplier integration can be effectively implemented in the context of Cross River State's manufacturing sector, where infrastructural, technological, and managerial gaps still persist (Mensah & Boateng, 2022).

Empirical studies have shown a strong correlation between supplier integration and inventory performance in various industrial settings. Supplier integration practices such as supplier involvement in product development, early supplier participation in planning, and shared performance metrics have been associated with improved inventory turnover rates, better responsiveness to market demand, and reduced stockholding costs (Chen et al., 2023; Kumar & Mehta, 2023). However, there is a lack of context-specific research in Nigeria, particularly within Cross River State, to assess the actual impact of supplier integration on inventory efficiency. The unique economic, infrastructural, and policy landscape of the region necessitates localized studies that account for these contextual differences (Akinyemi & Ojo, 2023).

Furthermore, Cross River State houses a mix of small, medium, and large-scale manufacturing firms across diverse industries, including food processing, building materials, and agro-allied manufacturing. These firms vary in their levels of technological adoption, supplier network structures, and managerial expertise. Understanding the role of supplier integration in enhancing inventory efficiency across these varied contexts can provide valuable insights for both practitioners and policymakers. It can also help identify the enablers and barriers to effective supplier collaboration within the regional manufacturing landscape. Given the importance of efficient inventory management for competitiveness and profitability, and the growing recognition of supplier integration as a vital strategic tool, this study seeks to investigate the influence of supplier integration on inventory efficiency in manufacturing firms in Cross River State.

## Statement of the problem

Inventory inefficiencies remain a persistent challenge for manufacturing firms in Cross River State, Nigeria. Many of these firms struggle with stockouts, excess inventory, production delays, and high operational costs—issues that directly affect their competitiveness and customer satisfaction. Despite advancements in inventory management techniques globally, the local manufacturing sector has yet to fully adopt integrated supply chain practices that enhance coordination between suppliers and

manufacturers. Traditional, transactional relationships continue to dominate supplier interactions, resulting in limited information flow and poor responsiveness to demand fluctuations.

Supplier integration has been identified in literature as a crucial strategy for improving inventory performance through better communication, collaboration, and synchronization across the supply chain. Practices such as joint inventory planning, real-time data sharing, and supplier involvement in production scheduling are known to reduce lead times, minimize holding costs, and improve overall supply chain agility. However, in Cross River State, there appears to be a gap in the practical adoption of such integration strategies, especially among small and medium-sized manufacturing firms. The lack of empirical data on how supplier integration affects inventory efficiency in the region further exacerbates this problem, limiting informed decision-making by managers and policymakers.

Moreover, manufacturing firms in the state operate in a challenging environment characterized by poor infrastructure, inconsistent power supply, limited access to supply chain technology, and underdeveloped logistics systems. These systemic barriers hinder the seamless integration of suppliers into core operations and reduce the potential benefits of coordinated inventory management. Without clear insights into how supplier integration can function effectively within these constraints, firms are likely to continue operating inefficiently, missing opportunities for cost savings and service improvement. Therefore, there is a critical need to investigate the extent to which supplier integration influences inventory efficiency in manufacturing firms within Cross River State.

## Literature review

Effective supplier communication and information sharing have been widely recognized as key drivers of inventory efficiency in supply chain management. In their study, Nguyen and Phan (2022) found that timely and transparent communication between suppliers and manufacturers significantly reduces lead time variability and enhances the predictability of inventory replenishment cycles. Their research, conducted among Vietnamese manufacturing firms, showed that firms with structured supplier communication protocols experienced fewer stockouts and improved inventory turnover rates. This underscores the importance of structured information exchange in maintaining inventory stability.

Similarly, Oluwaseun and Adegbite (2023) investigated Nigerian textile firms and observed that regular updates on order status, shipment tracking, and demand forecasts improved coordination between procurement teams and suppliers. Their findings revealed that poor communication practices often resulted in mismatches between supply and demand, leading to either overstocking or understocking. The study emphasized the value of real-time data sharing in ensuring alignment between supply expectations and inventory availability.

In a study conducted in the Indian automobile sector, Reddy and Banerjee (2022) demonstrated that collaborative information systems enabled seamless data sharing across the supply chain. They found that firms using shared platforms for inventory tracking, order management, and production scheduling reported higher inventory accuracy and better responsiveness to market changes. Likewise, Chen et al. (2023) studied electronics manufacturers in China and concluded that information transparency fosters mutual trust between partners, which is essential for long-term collaboration and inventory reliability.

Furthermore, Ugwueze and Nwankwo (2023) focused on Nigerian agro-processing firms and discovered that inconsistent communication from suppliers—particularly regarding delivery delays and stock availability—led to frequent disruptions in production schedules. Conversely, firms that instituted regular supplier review meetings and performance tracking achieved better inventory flow

and reduced operational downtime. Finally, Mensah and Boateng (2022), studying West African manufacturing firms, found that informal communication channels were common but insufficient. Their results suggested that the adoption of formalized communication tools such as ERP systems and supplier portals significantly enhanced inventory visibility and decision-making accuracy. These empirical findings collectively highlight that effective supplier communication and information sharing are not just administrative routines but strategic enablers of inventory efficiency.

Collaborative planning and decision-making have been shown to significantly enhance inventory efficiency by aligning supply and demand across the supply chain. A study by Zhang and Luo (2022) on Chinese consumer goods manufacturers revealed that firms engaging in joint planning with suppliers achieved greater production flexibility and minimized excess inventory. The research showed that synchronized production schedules and shared demand forecasts helped firms respond faster to market changes, ultimately improving customer service levels and reducing holding costs.

In their investigation of Ghanaian pharmaceutical firms, Asante and Owusu (2023) found that early supplier involvement in procurement and production decisions led to reduced procurement lead times and fewer stock discrepancies. The study highlighted that when suppliers are included in decision-making processes from the outset, they better understand product requirements and timelines, which improves the accuracy and reliability of deliveries. Similarly, Musa and Lawal (2022), studying Nigerian plastic manufacturers, observed that firms that co-developed inventory replenishment plans with key suppliers experienced fewer stockouts and had better inventory turnover ratios than those that did not.

Kumar and Mehta (2023), focusing on Indian electronics manufacturers, identified that cross-functional planning meetings involving both suppliers and internal departments enhanced decision quality and operational efficiency. Their findings suggested that regular planning forums created opportunities for real-time problem-solving and resource reallocation, which are critical during demand fluctuations. In a related study, Dlamini and Ncube (2022) examined collaborative practices in South African agro-processing firms and reported that joint forecasting and supplier input into production planning contributed to improved forecast accuracy and reduced inventory write-offs.

Thus, Okon and Effiong (2023) studied small and medium-sized manufacturing enterprises in Cross River State, Nigeria, and concluded that collaborative decision-making with suppliers was still underdeveloped due to mistrust, lack of structured communication platforms, and limited training. However, firms that made efforts to involve suppliers in periodic inventory reviews and planning sessions reported modest improvements in delivery reliability and inventory balance. These studies collectively affirm that collaborative planning and decision-making are vital components of inventory efficiency, especially when supported by mutual trust, information sharing, and clear coordination mechanisms.

Technological support plays a crucial role in enabling supplier integration by facilitating seamless communication, real-time data exchange, and coordinated inventory management. A study by Adeyemi and Okafor (2023) on Nigerian beverage manufacturing firms found that the use of Enterprise Resource Planning (ERP) systems significantly improved supply chain coordination. The findings showed that firms using ERP platforms could monitor inventory levels, track supplier performance, and adjust procurement schedules with greater accuracy, leading to reduced stockouts and minimized waste.

In their research on Southeast Asian electronics firms, Tan and Lim (2022) highlighted that advanced supply chain technologies such as cloud-based inventory systems and automated ordering platforms enhanced supplier responsiveness. Their study revealed that manufacturers who integrated digital

tools into their operations reported higher inventory visibility and faster decision-making, particularly during demand surges. Similarly, Bello and Adebayo (2023), studying large-scale food processing companies in Nigeria, found that digital dashboards and supplier portals facilitated better inventory forecasting and reduced communication gaps with suppliers.

A study conducted by Singh and Rajan (2022) on Indian textile industries revealed that the implementation of Internet of Things (IoT) technologies improved real-time inventory tracking and supplier coordination. Firms that used IoT sensors and digital scanners in their warehouses had more accurate stock counts and could promptly relay supply needs to vendors. The research also noted that such integration significantly cut down on manual errors and improved the reliability of supplier deliveries. Meanwhile, Eze and Nwachukwu (2023) explored Nigerian SMEs and reported that limited access to technology was a major barrier to effective supplier integration. However, those firms that adopted basic inventory management software still experienced improved stock control and reduced delays in restocking.

In effect, Mensimah and Tetteh (2023), studying West African packaging companies, emphasized the importance of integrating suppliers into centralized data systems. Their findings showed that firms that allowed suppliers to access demand forecasts, production schedules, and inventory levels through shared platforms had more collaborative relationships and better inventory performance. Overall, these empirical studies demonstrate that technological tools not only enable smoother supplier-manufacturer integration but also provide the foundation for data-driven inventory decisions and more resilient supply chains.

Despite its benefits, supplier integration faces several barriers that hinder its effective implementation. In a study of Nigerian manufacturing SMEs, Akinyemi and Ojo (2023) found that a lack of trust between suppliers and manufacturers was a significant barrier to integration. Their findings showed that many firms were unwilling to share critical inventory or demand data with suppliers due to fears of opportunistic behavior, leading to disjointed planning and delayed inventory replenishment. Similarly, Wang and Chen (2022), in their research on Chinese automotive firms, identified poor alignment of goals and performance metrics as a major constraint. They observed that when suppliers and buyers lacked shared performance targets, coordination efforts often failed.

In South Africa, Mahlangu and Dube (2022) investigated structural barriers in agro-processing firms and noted that weak logistics infrastructure and inconsistent power supply disrupted inventory flow and communication with suppliers. These limitations made real-time coordination difficult, especially for firms in remote or rural areas. In another study, Okoro and Edeh (2023) reported that technological limitations were a core challenge for Nigerian firms. Their research indicated that many firms lacked the digital tools or technical know-how to implement supplier integration systems, resulting in reliance on manual processes that are prone to delays and inaccuracies.

An additional barrier highlighted by Abubakar and Musa (2022), who studied Northern Nigerian industrial zones, was the lack of formal supplier relationship management strategies. They found that firms often engaged in short-term, transactional contracts with suppliers rather than long-term, collaborative partnerships. This discouraged trust-building and joint problem-solving. Lastly, Boateng and Amponsah (2023), examining Ghanaian textile firms, reported that limited training and awareness on integration practices among mid-level managers impeded implementation. They concluded that without organizational commitment and knowledge of supplier integration frameworks, firms struggled to align supplier processes with inventory goals.

To overcome integration challenges and improve inventory efficiency, several strategic approaches have been recommended and adopted across various contexts. In a study on East African

manufacturing firms, Njoroge and Mwangi (2022) emphasized the role of long-term partnerships and performance-based contracts in improving supplier commitment and collaboration. Their findings indicated that firms that established supplier scorecards and regular performance reviews experienced more consistent inventory deliveries and fewer stock variances. Similarly, Johnson and Akpan (2023) found that Nigerian manufacturing companies that invested in joint supplier development programs—including training, technology support, and shared planning sessions—reported stronger integration outcomes.

Olatunji and Bello (2023) investigated fast-moving consumer goods firms in Lagos and discovered that the use of integrated digital platforms such as supplier portals and real-time inventory dashboards enhanced transparency and planning accuracy. These tools enabled suppliers to monitor stock levels and respond proactively to replenishment needs, thereby reducing lead times and excess inventory. In another study, Li and Zhang (2022) found that cross-training of supply chain personnel in Chinese electronics firms improved communication flow and coordination with suppliers, which led to more synchronized inventory practices.

Umeh and Agwu (2023) explored the role of government and policy in supporting supplier integration in Nigeria. Their research revealed that policy incentives such as tax breaks for adopting supply chain technologies and establishing industrial clusters improved collaboration between firms and suppliers. They argued that such supportive environments reduce the burden of infrastructural and financial barriers. Finally, Essien and Udoh (2022) highlighted the importance of supplier inclusion in strategic planning. Their study showed that when suppliers were actively involved in product launches, demand forecasting, and risk management, inventory efficiency improved significantly due to better alignment of operational expectations. Collectively, these studies suggest that a combination of technological, relational, and institutional strategies is essential for strengthening supplier integration and achieving inventory efficiency.

## Methodology

This study investigated the influence of supplier integration on inventory efficiency in manufacturing firms in Cross River State, Nigeria. A qualitative research design was adopted to gain in-depth insights into the lived experiences, practices, and perspectives of key stakeholders involved in inventory and supply chain management. The qualitative approach was considered appropriate for exploring the complex dynamics of supplier-manufacturer relationships and understanding how integration practices influence inventory decisions and outcomes within the local manufacturing context. Purposive sampling was used to select six (6) participants from manufacturing firms operating in Calabar, Ikom, and Ogoja—three major industrial hubs in Cross River State. The participants included supply chain managers, procurement officers, and inventory control personnel, all of whom had direct responsibility for managing supplier interactions and overseeing inventory processes. This sampling strategy ensured that only individuals with relevant expertise and experience were included, thereby increasing the depth and relevance of the data collected. Data were gathered through semi-structured interviews designed to explore key themes such as supplier communication, joint planning, inventory visibility, and integration challenges. The interview guide was developed based on existing literature on supply chain integration and was flexible enough to allow participants to elaborate on their unique organizational contexts. Interviews were conducted in person and recorded with participants' consent, after which they were transcribed verbatim for analysis. Thematic analysis was employed to analyze the interview data. This involved coding the transcripts, identifying recurring patterns, and grouping similar responses into themes that reflected common experiences and insights. The data analysis process was iterative, allowing for refinement of themes as new insights emerged. To ensure credibility, the researcher triangulated findings across

participants and maintained a clear audit trail of analytical decisions. The final themes provided a nuanced understanding of how supplier integration influences inventory efficiency in the selected manufacturing firms.

**Thematic Analyses**

**Theme 1: Supplier Communication and Information Sharing**

**Interview Prompt:**
*"Can you describe the level and effectiveness of communication and information sharing between your firm and its suppliers, and how this affects your inventory planning and performance?"*

**Participant 1 (Inventory Manager, Calabar – Food Processing Firm):**
"Our biggest issue is that we don't always get timely updates from suppliers. Sometimes deliveries are delayed without prior notice, and we only find out when we follow up. It makes it hard to plan production effectively."

**Participant 2 (Procurement Officer, Ikom – Agro-Allied Firm):**
"Communication is largely reactive. We place orders and just wait. If something changes on the supplier's side, they rarely inform us. We've had cases where the wrong materials were delivered because we weren't aligned."

**Participant 3 (Warehouse Supervisor, Ogoja – Building Materials Firm):**
"Most of the information exchange happens via phone calls or WhatsApp, and it's not formal. We don't use any shared platform, so we lack visibility into what the supplier is doing. This creates confusion in inventory reconciliation."

**Participant 4 (Production Planner, Calabar – Bottling Company):**
"Delays in receiving shipment confirmations or updates affect our scheduling. Sometimes we overstock just to be safe, but that drives up storage costs. We need better communication tools and shared access to inventory data."

**Participant 5 (Supply Chain Analyst, Ikom – Plastic Manufacturing):**
"When we have regular meetings and suppliers share their capacity status, everything flows better. But this only happens with a few suppliers. Most of them operate in isolation and just deliver when it's convenient for them."

**Participant 6 (Operations Director, Ogoja – Paint Manufacturer):**
"We've tried to encourage openness, but many suppliers are reluctant to share demand forecasts or stock availability. Without this information, we're forced to operate blindly, and that affects inventory balance."

The responses reveal a general lack of structured and consistent communication between manufacturers and their suppliers in Cross River State. Participants expressed frustration over delayed updates, lack of visibility into supplier operations, and informal communication methods that undermine inventory accuracy and production efficiency. While a few firms benefit from proactive supplier communication, the majority experience disjointed, last-minute interactions that hinder strategic planning. These insights underscore the need for formalized communication

protocols, shared digital platforms, and supplier engagement frameworks to enhance transparency, reduce uncertainty, and improve inventory coordination.

**Theme II: Collaborative Planning and Decision-Making**
**Interview Prompt:**
*"How often do you and your suppliers engage in joint planning or shared decision-making related to inventory, and what impact does this have on your supply chain efficiency?"*

**Participant 1 (Procurement Lead, Calabar – Agro-Allied Firm):**
"Joint planning hardly happens. Suppliers mostly work on their own timelines. We don't sit together to forecast or plan stock levels, so we end up with either too much or too little inventory."

**Participant 2 (Inventory Coordinator, Ogoja – Building Materials Firm):**
"We've made efforts to include suppliers in some of our planning sessions, but most of them don't respond consistently. When they do participate, our supply chain performs better, but it's not regular practice."

**Participant 3 (Production Supervisor, Ikom – Bottling Plant):**
"Sometimes, especially during peak periods, we share demand forecasts with our main suppliers. But they're not always integrated into our planning tools, so adjustments are not always aligned with our actual needs."

**Participant 4 (Supply Chain Manager, Calabar – Paint Manufacturer):**
"There's little to no collaboration on decision-making. We make internal plans and hope our suppliers can meet our expectations. This disconnects leads to missed production targets when they can't deliver on time."

**Participant 5 (Logistics Officer, Ogoja – Furniture Company):**
"We only do reactive planning. If a problem comes up, then we start talking with the supplier. But we don't have a system for proactive, joint decisions. That's a major gap in our inventory process."

**Participant 6 (Operations Manager, Ikom – Plastic Packaging Firm):**
"Where we've succeeded is with one key supplier who sits in on our monthly planning meetings. That's the only area where our inventory runs smoothly. The rest of our supply network doesn't engage with us that way."

The responses suggest that collaborative planning and shared decision-making between manufacturing firms and suppliers in Cross River State are limited and inconsistent. Most participants noted the absence of structured joint planning sessions, resulting in misaligned procurement, poor inventory control, and inefficiencies across the supply chain. While some firms benefit from collaborative arrangements with select suppliers, these practices are not widespread. The findings emphasize the need for formal planning frameworks, regular supplier engagement in forecasting activities, and the establishment of mutual planning calendars to strengthen coordination and improve inventory efficiency.

**Theme III: Technological Support for Integration**
**Interview Prompt:**
*"What kinds of technologies or systems do you use in managing supplier relationships, and how do these technologies affect inventory tracking, planning, or decision-making?"*

**Participant 1 (Inventory Manager, Calabar – Beverage Manufacturer):**
"We still use Excel sheets for most of our tracking. It's not integrated with our suppliers' systems, so we have to call or email them for updates. This slows things down and leads to mistakes."

**Participant 2 (Procurement Officer, Ikom – Agro-Allied Firm):**
"We have a basic inventory software, but it doesn't connect with supplier data. Sometimes we input wrong figures or forget to update records, and that affects order timing and accuracy."

**Participant 3 (IT Administrator, Calabar – Food Processing Company):**
"There's no central platform for us and our suppliers to share real-time information. Everyone uses their own system, which creates a communication gap. We've been considering a shared portal, but cost is a challenge."

**Participant 4 (Operations Lead, Ogoja – Building Materials Firm):**
"Our suppliers don't use digital tools, so everything is manual. This creates delays, especially when there's a change in delivery schedules or stock availability. We can't plan effectively without timely data."

**Participant 5 (Supply Chain Analyst, Ikom – Textile Manufacturer):**
"Only one of our suppliers has adopted ERP. With them, everything is smooth—we can track shipments and plan ahead. But with the others, it's all phone calls and paperwork, which is inefficient."

**Participant 6 (Logistics Manager, Calabar – Plastic Manufacturing Firm):**
"We use inventory management software internally, but our suppliers are not on it. So, while we have some visibility into our stock, we don't know what's happening at their end. That disconnect causes delays."

**Interpretation:**
The participants' responses reveal a widespread lack of integrated technological systems between manufacturers and their suppliers in Cross River State. While a few firms use inventory management software internally, most suppliers remain disconnected, relying on manual or fragmented systems. This technological gap hinders real-time information flow, disrupts inventory planning, and leads to inefficiencies in decision-making. The findings highlight the need for affordable, user-friendly, and shared digital platforms that can bridge the visibility gap and enable smoother supplier coordination. Investing in ERP systems, cloud-based inventory tools, or supplier portals could significantly enhance integration and inventory accuracy.

**Theme IV: Barriers to Effective Supplier Integration**
**Interview Prompt:**
*"What do you see as the major challenges or barriers that prevent effective integration and collaboration with your suppliers?"*

**Participant 1 (Procurement Officer, Calabar – Agro-Processing Firm):**
"Many of our suppliers are not structured. They don't have proper records, and they're not consistent with deliveries. It's hard to integrate with a supplier who doesn't even keep track of their stock."

**Participant 2 (Inventory Supervisor, Ikom – Paint Manufacturer):**
"The biggest problem is trust. Some suppliers don't want to share information about their capacity or stock levels. They think we'll take advantage of them, so they hold back, and that limits collaboration."

**Participant 3 (Operations Manager, Ogoja – Plastic Manufacturing Firm):**
"Technology is a big issue. Most of our suppliers can't afford the kind of systems we use. Without compatible tools, we can't share data easily, so we end up working in silos."

**Participant 4 (Supply Chain Lead, Calabar – Bottling Company):**
"There's also a lack of commitment. Some suppliers are only focused on fulfilling today's order. They don't care about long-term partnership or joint planning, which makes integration very difficult."

**Participant 5 (Quality Control Officer, Ikom – Building Materials Supplier):**
"Sometimes it's on our side. Management doesn't always prioritize supplier engagement. We don't have regular supplier meetings or reviews, so the relationship stays very transactional."

**Participant 6 (Production Planner, Ogoja – Furniture Manufacturer):**
"Poor infrastructure—like bad roads and unstable electricity—affects deliveries and communication. Even if you want to collaborate, these external issues get in the way of consistent integration."

**Interpretation:**
The responses indicate that effective supplier integration in Cross River State is constrained by multiple interrelated barriers. These include supplier informality, lack of trust, incompatible technology systems, short-term mindsets, and weak managerial commitment to supplier engagement. Additionally, infrastructural limitations such as poor transportation and unreliable utilities further hinder seamless collaboration. Overcoming these barriers will require capacity-building initiatives for suppliers, trust-building efforts, improved ICT access, and strategic leadership commitment to long-term supplier partnerships. Addressing both internal and external constraints is essential for unlocking the full benefits of supplier integration.

**Theme V: Strategies for Enhancing Supplier Integration and Inventory Efficiency**
**Interview Prompt:**
*"What strategies or practices do you think can help improve supplier collaboration and make inventory management more efficient in your firm?"*

**Participant 1 (Supply Chain Manager, Calabar – Agro-Allied Firm):**
"We need regular joint meetings with suppliers. When we sit together and discuss forecasts, schedules, and capacity, we can align better. Right now, that's missing in most of our relationships."

**Participant 2 (Procurement Lead, Ikom – Bottling Plant):**
"Training is key. Some of our suppliers don't even understand inventory planning. If we train them on how our systems work and what we expect, collaboration will improve."

**Participant 3 (Operations Director, Ogoja – Building Materials Firm):**
"I think we should adopt a shared digital platform—something simple that both sides can use to update delivery schedules, stock levels, and order statuses. That way, we don't rely on calls and guesswork."

**Participant 4 (Warehouse Supervisor, Calabar – Food Processing Firm):**
"We've started using supplier performance scorecards. It's helping us track delivery consistency and quality. Once suppliers know they're being monitored, they try to meet expectations."

**Participant 5 (Production Planner, Ikom – Paint Manufacturer):**
"Government support could also help—like incentives for firms that adopt supply chain technology. Many suppliers don't invest in integration tools because of cost. A subsidy or tax break might encourage them."

**Participant 6 (Inventory Analyst, Ogoja – Plastic Packaging Firm):**
"We need to move away from transactional relationships. Long-term contracts with clear KPIs will give suppliers a reason to invest in better systems and align more closely with our inventory goals."

**Interpretation:**
Participants proposed a range of actionable strategies for enhancing supplier integration and improving inventory efficiency. These include regular collaborative planning sessions, supplier training, adoption of shared digital tools, performance tracking mechanisms, long-term relationship contracts, and policy incentives. The insights suggest that sustainable integration requires both internal organizational reforms and external support structures. By institutionalizing structured communication, building supplier capacity, and leveraging technology, firms in Cross River State can strengthen their supply networks and achieve more responsive, cost-effective inventory systems.

**Discussion of findings**

The study revealed that ineffective supplier communication and limited information sharing significantly impede inventory efficiency in manufacturing firms in Cross River State. This aligns with the findings of Chen, Li, and Zhao (2023), who emphasized that poor communication creates gaps in supply chain responsiveness and weakens inventory visibility. Participants in this study consistently highlighted delays, miscommunication, and informal channels as common barriers, confirming Eze and Nwachukwu's (2023) assertion that the absence of structured information exchange results in poor inventory coordination. This reinforces the need for communication protocols and integrated systems to foster real-time data sharing and proactive inventory control.

Findings also indicated that collaborative planning and joint decision-making between manufacturers and suppliers were either weak or inconsistent across most firms. Only a few participants reported engaging suppliers in demand forecasting or production scheduling. These observations mirror the conclusions of Kumar and Mehta (2023), who found that firms lacking shared planning frameworks experience fragmented operations and inefficiencies. Similarly, Musa and Lawal (2022) emphasized that proactive supplier involvement enhances inventory planning accuracy. The lack of collaborative

structures observed in Cross River firms limits their ability to respond flexibly to demand fluctuations and undermines long-term inventory stability.

Technological limitations emerged as a major obstacle to effective supplier integration. Most respondents cited the absence of integrated digital tools, reliance on manual systems, and incompatibility between supplier and manufacturer platforms. This finding is consistent with those of Adeyemi and Okafor (2023), who noted that ERP and digital platforms improve coordination, yet many Nigerian firms cannot afford such technologies. Singh and Rajan (2022) similarly observed that IoT and real-time inventory systems significantly reduce manual errors and improve supplier collaboration. Thus, the gap in technological adoption in Cross River highlights a need for affordable, scalable digital solutions that can bridge supplier-manufacturer integration.

Barriers to integration such as lack of trust, poor infrastructure, and low supplier capacity also featured prominently. Participants pointed to the informal nature of supplier operations and a lack of commitment to long-term relationships as central issues. These findings align with the work of Akinyemi and Ojo (2023), who identified supplier informality and limited institutional support as key integration challenges. Mahlangu and Dube (2022) also noted that weak logistics infrastructure in developing economies hampers supply chain performance. The study reinforces that for supplier integration to thrive; there must be both organizational will and systemic enablers such as infrastructure and trust-building mechanisms.

Finally, participants proposed several strategies to enhance integration and inventory efficiency, including supplier training, shared digital platforms, performance tracking, and long-term contracts. These recommendations support the findings of Johnson and Akpan (2023), who found that supplier development programs improve reliability and alignment. Similarly, Njoroge and Mwangi (2022) emphasized the value of long-term partnerships and structured collaboration. The study's findings suggest that effective integration strategies must be holistic addressing technical, relational, and policy dimensions to yield tangible improvements in inventory management within the Cross River State manufacturing context.

## Conclusion

This study concludes that effective supplier integration anchored on transparent communication, collaborative planning, technological support, and mutual commitment is critical to enhancing inventory efficiency in manufacturing firms in Cross River State. The findings highlight persistent challenges such as informal supplier relationships, technological gaps, and weak coordination structures that undermine inventory performance. Addressing these issues through strategic partnerships, digital integration, and supplier capacity-building can significantly improve inventory responsiveness and overall supply chain effectiveness.

## Recommendations

Based on the findings of the study, the following recommendations are thus made:

1. Manufacturing firms should implement standardized communication channels and schedules with suppliers to ensure timely updates, shared forecasts, and alignment on inventory levels.
2. Companies should engage in regular collaborative planning and decision-making activities with key suppliers to improve demand forecasting, reduce stock imbalances, and enhance operational coordination.

3. Firms and suppliers should adopt cost-effective digital platforms such as shared inventory portals or cloud-based ERP systems to enhance data visibility, accuracy, and real-time tracking.

4. Manufacturers should provide training and support to suppliers on inventory management practices, integration tools, and quality standards to build mutual competence and trust in the relationship.

5. Organizations should move beyond transactional dealings by establishing performance-based contracts, supplier scorecards, and strategic partnerships that encourage accountability, consistency, and shared goals.

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