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OPERATIONAL EFFICIENCY AND TRADE OUTCOMES OF AGRO-INDUSTRIES IN SOUTH-SOUTH NIGERIA

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Abstract
This study examined the influence of operational efficiency on trade outcomes among agro-industries in South-South Nigeria. Operational efficiency was conceptualized through stock monitoring and information sharing, while trade outcomes were measured using export growth and tariff rate exposure. A quantitative correlational survey design was adopted. The population comprised managers, logistics officers, export supervisors, and operations staff from registered agro-industrial export firms across the six states of South-South Nigeria. Using the Taro Yamane formula, a sample size of 291 respondents was determined, with 278 valid responses analyzed. Data were collected through a structured questionnaire and analyzed using descriptive statistics and multiple regression analysis. The findings revealed that both stock monitoring and information sharing significantly and positively influence export growth. Furthermore, both dimensions showed significant negative relationships with tariff rate exposure, indicating that improved operational efficiency reduces the adverse impact of trade-related costs. Information sharing emerged as the strongest predictor of export growth. The study concludes that operational efficiency constitutes a strategic driver of international competitiveness among agro-industries. It recommends investment in real-time inventory systems, digital integration platforms, and capacity-building initiatives to enhance export performance and trade resilience.

Keywords: Export Growth; Information Sharing; Stock Monitoring; Tariff Rate; Agro-Industries.

Introduction

The global trade environment has undergone significant transformation in recent years, shaped by supply chain disruptions, geopolitical tensions, and shifting development priorities. The World Bank (2023) notes that global trade resilience increasingly depends on productivity, digital integration, and supply chain coordination, particularly in developing economies. Similarly, the UNCTAD (2022) emphasizes that sustainable trade growth in emerging markets is closely linked to structural reforms and operational efficiency within domestic industries. For resource-dependent economies like Nigeria, strengthening trade

competitiveness has become a strategic imperative amid declining oil revenues and heightened global uncertainty.

In response, Nigeria has intensified efforts to diversify its export base toward non-oil sectors. The Nigerian Export Promotion Council (2023) reports consistent growth in non-oil exports, with agro-industrial products accounting for a substantial share of this expansion. The International Monetary Fund (2023) further underscores that export diversification, particularly through agro-processing, remains central to Nigeria's macroeconomic stability and foreign exchange sustainability. Complementing this view, the Food and Agriculture Organization of the United Nations (2022) highlights agricultural trade as a catalyst for rural development, employment generation, and industrial upgrading across developing economies.

Within Nigeria's South-South region, rich in agricultural resources and port infrastructure, agro-industries play a pivotal role in processing commodities such as palm oil, cassava, cocoa, rubber, and seafood for domestic and international markets. Despite this potential, trade performance among these firms remains unstable, characterized by fluctuating export volumes, inconsistent compliance with international standards, and exposure to tariff barriers. While macroeconomic and policy factors are often cited, growing evidence suggests that internal operational capabilities significantly shape firms' export performance (Abiola & Adegbite, 2021; Adebayo & Yusuf, 2020).

Operational efficiency, rooted in effective supply chain management, has been widely recognized as a driver of firm competitiveness. According to Chopra and Meindl (2021), efficient supply chains align procurement, production, inventory, and distribution processes to maximize responsiveness while minimizing cost. Christopher (2016) similarly argues that competitive advantage in global markets increasingly depends on logistical excellence and coordinated information flows. Two fundamental pillars of operational efficiency are stock monitoring and information sharing. Stock monitoring, encompassing inventory control, demand forecasting, and real-time tracking, ensures optimal inventory levels, reduces wastage, and minimizes stockouts (Wild, 2017). In agro-industries where products are often perishable and seasonal, inadequate inventory oversight can lead to spoilage, delayed shipments, and contractual penalties. Conversely, systematic inventory management improves order fulfillment rates and enhances credibility in export markets (Mangan et al., 2021).

Information sharing, on the other hand, facilitates transparency across supply chain partners, reducing uncertainty and improving coordination. Lee et al. (2004) demonstrate that limited information visibility amplifies the bullwhip effect, resulting in inefficiencies and volatility. Empirical studies (Gunasekaran et al., 2017; Li & Lin, 2020) confirm that robust information integration enhances supply chain performance and competitive advantage. Within the Nigerian context, Nwankwo and Ihedioha (2021) found that exporting firms that adopt integrated information systems experience improved delivery reliability and market responsiveness.

The theoretical linkage between operational efficiency and trade outcomes is further supported by the firm heterogeneity model of Helpman and Melitz (2004), which posits that more productive firms are better positioned to enter and sustain export markets. Efficient

stock management reduces operational costs, improves product availability, and enhances reliability—factors that directly influence export growth. Similarly, effective information sharing strengthens negotiation capacity, compliance with international standards, and responsiveness to tariff and regulatory changes. Trade outcomes in this study are measured through export growth and tariff rate exposure. Export growth reflects a firm's expansion in international market participation and revenue generation, while tariff rate captures the trade cost environment faced by exporters. Although tariff rates are often externally determined, operational efficiency can mitigate their impact by lowering production and logistics costs, thereby preserving competitiveness (World Bank, 2023).

Despite extensive research on supply chain management and firm performance globally, limited empirical studies have examined how internal operational efficiency dimensions specifically influence trade outcomes among agro-industries in South-South Nigeria. Existing literature often emphasizes macroeconomic policy or broad export determinants, overlooking firm-level operational drivers. This gap constrains policymakers and industry stakeholders seeking practical, performance-oriented interventions.

The consequences of weak operational efficiency are evident in shipment delays, contract losses, high storage costs, and reduced export competitiveness. In contrast, agro-industries that invest in real-time inventory systems, digital communication platforms, and collaborative supply chain networks are more likely to achieve stable export growth and better manage trade costs. Understanding these dynamics is therefore critical for strengthening Nigeria's non-oil export agenda and enhancing regional industrial development.

Thus, the current study primarily aims to examine the influence of operational efficiency on trade outcomes of agro-industries in South-South Nigeria. Specifically, the study seeks to:

i. Determine the influence of stock monitoring on export growth among agro-industries in South-South Nigeria.
ii. Evaluate the influence of stock monitoring on tariff rate exposure among agro-industries in South-South Nigeria.
iii. Examine the influence of information sharing on export growth among agro-industries in South-South Nigeria.
iv. Assess the influence of information sharing on tariff rate exposure among agro-industries in South-South Nigeria.

This study contributes to the literature by providing a localized, firm-level analysis of how operational efficiency dimensions shape trade performance in a strategically important but under-researched region of Nigeria.

Literature Review

Theoretical Review

This study is anchored primarily on the Resource-Based View (RBV) and complemented by Competitive Advantage Theory. These theoretical perspectives provide a robust foundation for explaining how internal operational capabilities, specifically stock monitoring and information sharing, shape trade outcomes such as export growth and tariff rate exposure among agro-industries in South-South Nigeria. Together, they offer both a firm-level and a

trade-competitiveness lens for understanding how operational efficiency translates into improved international performance.

The Resource-Based View, advanced by Barney (1991), posits that firms achieve sustained competitive advantage when they possess valuable, rare, inimitable, and non-substitutable (VRIN) resources. Unlike external market-based explanations of performance, RBV emphasizes internal capabilities as the primary drivers of superior outcomes. Within the context of this study, stock monitoring systems and information-sharing mechanisms represent strategic organizational resources. When effectively deployed, these capabilities enhance coordination, reduce wastage, lower transaction costs, and improve responsiveness to international market demands.

Supply chain management literature reinforces this view. Li et al. (2006) argue that supply chain management practices significantly influence competitive advantage and organizational performance. Similarly, Huo et al. (2016) demonstrate that logistics capabilities positively affect firm performance through supply chain integration. In agro-industries, where perishability, seasonality, and export compliance are critical, efficient stock monitoring minimizes spoilage and stockouts, thereby improving order fulfillment and reliability in global markets. Information sharing, on the other hand, enhances transparency across suppliers, processors, and distributors, reducing uncertainty and enabling coordinated decision-making. From an internationalization perspective, Cavusgil and Knight (2015) emphasize that firms expanding into global markets rely heavily on internal capabilities to overcome resource constraints and foreign market barriers. This aligns with the productivity-based trade model of Helpman and Melitz (2004), which asserts that more productive firms are more likely to export and sustain international operations. In this regard, operational efficiency becomes a productivity-enhancing mechanism that strengthens export growth and mitigates trade costs, including tariff-related pressures.

While RBV explains how internal resources generate firm-level advantage, Competitive Advantage Theory broadens the analysis to the national and industry level. Porter (1990) argues that competitiveness stems from firms' ability to innovate and upgrade operational processes in response to competitive pressures. Efficient supply chain systems reduce cost structures and improve quality consistency — two essential determinants of international competitiveness. In agro-industrial exports, where global buyers demand strict compliance and timely delivery, operational efficiency becomes a prerequisite for sustaining export growth. Further support is found in logistics and supply chain scholarship. Gunasekaran et al. (2017) highlight the strategic role of information technology in creating competitive advantage within logistics networks. Chopra and Meindl (2021) emphasize that supply chain strategy must align with competitive priorities such as cost efficiency and responsiveness. Gereffi and Fernandez-Stark (2016), through global value chain analysis, demonstrate that firms occupying higher-value segments of international markets are typically those with superior coordination and information capabilities.

Additionally, classical and contemporary trade theories reinforce the efficiency–trade linkage. Krugman and Obstfeld (2018) explain that firms operating at lower marginal costs are better positioned to compete internationally, even in the presence of trade barriers. Efficient stock monitoring reduces excess inventory costs and working capital constraints,

while effective information sharing enhances compliance with export documentation and regulatory requirements. These capabilities collectively reduce the relative burden of tariff rates and improve firms' ability to expand export volumes.

Resource-Based View and Competitive Advantage Theory provide complementary explanations for the framework of this study. RBV clarifies how stock monitoring and information sharing function as strategic internal resources that enhance productivity and operational efficiency. Competitive Advantage Theory extends this understanding by linking efficiency to export growth and cost competitiveness within global markets. In unison, these theories offer a multi-layered analytical lens for examining how operational efficiency influences trade outcomes among agro-industries in South-South Nigeria. While RBV explains the internal capability-performance relationship, Competitive Advantage Theory situates these capabilities within the broader dynamics of international trade and competitiveness. This theoretical synthesis strengthens the conceptual grounding of the study and ensures a comprehensive evaluation of how firm-level operational excellence translates into measurable trade performance improvements.

Conceptual Review

Operational Efficiency

Operational efficiency broadly refers to a firm's ability to optimize its internal processes, resources, and systems in order to deliver goods or services at minimal cost while maintaining quality, responsiveness, and reliability. Within supply chain scholarship, operational efficiency is conceptualized as the coordinated management of procurement, production, inventory, logistics, and information flows to achieve superior performance outcomes (Chopra & Meindl, 2021; Mentzer et al., 2001). In export-oriented industries—particularly agro-industries where perishability, seasonality, and compliance requirements are critical—operational efficiency becomes a strategic capability rather than merely a cost-control mechanism.

Christopher (2016) argues that in globally competitive markets, firms no longer compete as isolated entities but as integrated supply chains. Efficiency in this context depends on synchronization, visibility, and information accuracy across the chain. When internal processes are fragmented or poorly monitored, distortions arise, costs escalate, and export reliability declines. Conversely, firms that embed monitoring systems and collaborative information platforms into their operations enhance delivery precision, reduce waste, and improve responsiveness to international demand fluctuations.

Within the framework of this study, operational efficiency is conceptualized as a two-dimensional construct comprising stock monitoring and information sharing. These dimensions are mutually reinforcing capabilities that determine the extent to which agro-industries in South-South Nigeria can achieve stable export growth and manage tariff-related trade pressures. Rather than isolated practices, they represent integrated operational mechanisms that enhance supply chain reliability, reduce uncertainty, and strengthen export competitiveness. Empirical evidence in Nigerian agro-based enterprises supports this positioning. Afolayan and Olayanju (2022) found that inventory discipline significantly predicts export performance among agro-SMEs. Similarly, Okoro and Ogu (2020)

demonstrate that effective inventory control systems enhance export supply efficiency by reducing delivery delays and production disruptions. These findings reinforce the proposition that operational efficiency is central to trade performance in emerging-market agro-industries.

Stock Monitoring

Stock monitoring is often referred to as inventory visibility or inventory control. It represents the systematic tracking, measurement, and regulation of raw materials, work-in-progress, and finished goods within a firm's supply chain (Chong et al., 2017; Kumar & Rajesh, 2020). Wild (2017) describes inventory management as a balancing act between service level and cost minimization, requiring continuous monitoring of stock levels, demand forecasts, and replenishment cycles.

In agro-industrial settings, stock monitoring assumes heightened importance due to product perishability and export quality standards. Inefficient inventory systems may lead to spoilage, stockouts, or overstocking — each of which undermines export reliability and increases operational costs (Wild, 2017). Kumar and Rajesh (2020) emphasize that inventory visibility enhances supply chain performance by reducing uncertainty and improving decision accuracy. Similarly, Lee et al. (2004) demonstrate that poor monitoring contributes to the bullwhip effect, where minor demand fluctuations generate amplified distortions along the supply chain.

From a strategic perspective, effective stock monitoring improves order fulfillment rates, reduces working capital constraints, and ensures timely export shipments. Chopra and Meindl (2021) argue that accurate inventory data enables firms to align supply with demand, improving responsiveness in international markets. Christopher (2016) further notes that logistical efficiency, anchored in inventory discipline, strengthens competitive positioning in global trade.

Within the Nigerian context, Okoro and Ogu (2020) report that agricultural exporters with structured inventory control systems experience fewer shipment delays and improved export readiness. Afolayan and Olayanju (2022) likewise found a positive association between inventory management practices and export growth among agro-based SMEs. Thus, stock monitoring in this study is conceptualized as a core operational mechanism that enhances reliability, reduces cost inefficiencies, and strengthens firms' capacity to compete in international markets.

Information Sharing

Information sharing refers to the extent to which firms exchange timely, accurate, and relevant operational data with supply chain partners, including suppliers, distributors, logistics providers, and export agents. It encompasses demand forecasts, production schedules, shipment tracking, compliance documentation, and market intelligence (Gunasekaran et al., 2017). Li and Lin (2020) establish that information sharing significantly improves supply chain performance by enhancing coordination and reducing uncertainty. Similarly, Gunasekaran et al. (2017) argue that information technology investments generate competitive advantage when they facilitate transparency and real-time decision-making

across supply networks. Chong et al. (2017) further demonstrate that IT-enabled integration strengthens both operational and financial performance by streamlining communication flows.

Digital integration plays a particularly critical role in export operations. Kache and Seuring (2017) highlight that digital information systems improve supply chain resilience and agility, enabling firms to respond swiftly to disruptions or regulatory changes. Neubert et al. (2018) show that collaborative technologies foster alignment among supply chain actors, thereby enhancing overall performance. Towill (2017) adds that dynamic supply chains depend on synchronized information flows to prevent instability and inefficiencies.

Within Nigeria's exporting landscape, Nwankwo and Ihedioha (2021) found that supply chain information integration positively influences performance among exporting firms. Agro-industries that maintain transparent communication channels with suppliers and export intermediaries are better positioned to comply with international standards, anticipate demand shifts, and manage tariff-related documentation efficiently. Conceptually, information sharing in this study extends beyond basic communication; it reflects the depth of digital integration and collaborative coordination within agro-industrial supply chains. Firms that cultivate strong information-sharing networks reduce operational uncertainty, improve responsiveness to global buyers, and enhance export growth potential.

Trade Outcomes in The Agro-Industry

Trade outcomes broadly refer to the measurable results of a firm's participation in international markets. Within export-oriented industries, these outcomes capture the extent to which firms successfully penetrate, sustain, and expand their presence in foreign markets while managing external trade-related costs and barriers. Export literature conceptualizes trade outcomes as multidimensional, encompassing financial, strategic, and operational performance indicators (Katsikeas et al., 2000; Zou & Stan, 1998).

Shoham (1998) argues that export performance should be assessed using objective indicators—such as export sales growth and market share—as well as strategic indicators reflecting competitive positioning. In emerging economies, where export diversification and foreign exchange stability are national priorities, firm-level trade outcomes become critical contributors to broader economic development. From a productivity standpoint, Helpman and Melitz (2004) demonstrate that only firms with sufficient efficiency and competitiveness can overcome trade costs and sustain export participation. This underscores the relevance of examining internal operational capabilities in relation to measurable trade results.

Within the context of this study, trade outcomes are conceptualized through two key measures: export growth and tariff rate exposure. Export growth reflects the expansionary dimension of trade performance, while tariff rate captures the cost-related and policy-driven dimension of international trade engagement. Together, these measures provide a comprehensive view of how agro-industries in South-South Nigeria perform within the global trade environment. Empirical studies in Nigeria reinforce this linkage. Abiola and Adegbite (2021) found that supply chain performance significantly predicts export growth among Nigerian firms. Similarly, Adebayo and Yusuf (2020) established that supply chain

management practices positively influence agricultural export performance, particularly through improved logistics coordination and operational reliability.

Export Growth

Export growth refers to the increase in a firm's export sales volume, export revenue, or market expansion over a specified period. It represents the dynamic aspect of export performance, reflecting a firm's ability to penetrate new markets, retain foreign buyers, and scale international operations (Krugman & Obstfeld, 2018). Katsikeas et al. (2000) emphasize that export growth is one of the most widely accepted objective measures of export performance because it directly captures international competitiveness. Zou and Stan (1998), in their review of export performance determinants, identify internal capabilities—such as operational efficiency and strategic orientation—as critical drivers of sustained export expansion.

From a theoretical standpoint, Helpman and Melitz (2004) posit that more productive firms self-select into export markets due to their capacity to absorb fixed and variable trade costs. This productivity-export nexus implies that operationally efficient firms are more likely to record consistent export growth. In agro-industrial contexts, growth is often linked to timely delivery, quality assurance, and the ability to meet fluctuating international demand—all of which are influenced by supply chain performance.

In Nigeria, Abiola and Adegbite (2021) report that firms with stronger supply chain coordination exhibit higher export growth trajectories. Adebayo and Yusuf (2020) similarly find that agricultural exporters that adopt structured supply chain management practices experience improved foreign market expansion. Accordingly, export growth in this study is conceptualized as a tangible indicator of improved trade performance resulting from enhanced operational efficiency.

Tariff Rate Exposure

Tariff rate exposure refers to the extent to which firms are affected by customs duties and trade policy regulations imposed on exported goods. Tariffs represent one of the most direct forms of trade barriers, influencing pricing competitiveness, profit margins, and market accessibility (Adewuyi, 2016). According to the World Trade Organization (2021), tariff structures vary significantly across product categories and trading partners, often affecting agricultural and agro-processed goods more heavily than manufactured items. From a classical trade perspective, Krugman and Obstfeld (2018) argue that tariffs increase the relative price of exported goods, potentially reducing competitiveness in foreign markets.

In the Nigerian context, Oladipo and Akinbobola (2020) observe that higher tariffs negatively influence export efficiency in the agricultural sector, particularly when firms operate with high production and logistics costs. Kraay and Ventura (2020) further highlight the macroeconomic implications of tariff fluctuations on Nigeria's trade balance and industrial competitiveness. Although tariff rates are externally determined policy instruments, firms' internal capabilities can moderate their impact. Operationally efficient firms—through cost reduction, inventory optimization, and coordinated logistics—are better positioned to absorb or offset tariff burdens. Thus, tariff rate exposure in this study is not treated merely as a

macroeconomic variable, but as a trade outcome reflecting how well firms navigate policy-induced cost pressures.

Operational Efficiency Influence on Trade Outcomes

Abiola and Adegbite (2021) conducted an empirical investigation into the relationship between supply chain performance and export growth among agricultural firms in Nigeria. The study sought to determine whether internal supply chain capabilities significantly influence firms' export outcomes. Using a survey research design, data were collected from managers of agro-based firms engaged in export activities. Regression analysis was employed to test the hypothesized relationships. The findings revealed that efficient supply chain practices—particularly logistics coordination, inventory control, and supplier integration—positively and significantly influenced export growth. The study concluded that internal operational efficiency is a critical determinant of export expansion in Nigeria's agricultural sector.

Similarly, Adebayo and Yusuf (2020) examined the impact of supply chain management practices on agricultural export performance in Nigeria. The study adopted a quantitative approach, utilizing structured questionnaires distributed to agricultural exporting firms across selected regions. The researchers found that supply chain coordination, information flow, and inventory management significantly enhanced export performance indicators, including export sales and foreign market penetration. The findings underscore the importance of structured supply chain systems in improving international competitiveness.

Nwankwo and Ihedioha (2021) investigated the effect of supply chain information integration on the performance of Nigerian exporting firms. The study focused specifically on how digital communication systems and coordinated information exchange among supply chain partners affect firm performance. The researchers found that firms with higher levels of information integration experienced improved delivery reliability, reduced operational delays, and enhanced export outcomes. The study concluded that information sharing serves as a strategic enabler of export competitiveness. In an international context, Li and Lin (2020) examined the impact of information sharing on supply chain performance among manufacturing firms in China. The study established that timely and accurate information exchange significantly improves supply chain coordination, reduces uncertainty, and enhances overall performance.

Furthermore, Kumar and Rajesh (2020) explored the role of inventory visibility in enhancing supply chain performance. The researchers focused on how real-time inventory tracking and monitoring systems improve coordination and operational outcomes. The study found that firms with higher inventory visibility recorded improved demand forecasting accuracy, reduced stockouts, and better service levels. The study concluded that effective stock monitoring enhances supply chain stability and performance reliability. These findings are particularly relevant to agro-industrial exporters, where stock imbalances can disrupt production schedules and export commitments. By demonstrating that inventory visibility strengthens supply chain outcomes, Kumar and Rajesh (2020) provide empirical support for conceptualizing stock monitoring as a critical operational capability influencing export performance. Collectively, the reviewed studies establish a consistent empirical pattern:

internal supply chain practices—particularly inventory management and information integration—significantly influence organizational and export performance.

Methodology

This study employed a quantitative correlational survey design to examine the relationship between operational efficiency (stock monitoring, information sharing) and trade outcomes (export growth, tariff exposure) among agro-industrial firms in South-South Nigeria. The design was chosen to measure the strength of associations between defined variables without manipulation, using standardized data suitable for statistical testing.

The population comprised managers, logistics officers, export supervisors, and operations staff in 212 registered agro-export firms across Rivers, Bayelsa, Akwa Ibom, Cross River, Delta, and Edo States (approx. 1,060 staff). Using the Taro Yamane formula with 5% precision, a sample size of 291 respondents was determined. Stratified random sampling ensured proportional representation across states and job categories.

Primary data were gathered via a structured questionnaire covering demographics and four constructs: stock monitoring, information sharing, export growth, and tariff exposure. Items were adapted from established literature and rated on a 5-point Likert scale. Content validity was ensured through expert review, while reliability was confirmed via pilot testing, with all constructs achieving Cronbach's Alpha > 0.70.

Responses were analyzed using SPSS (v26). Descriptive statistics summarized respondent characteristics, while Pearson correlation and multiple regression tested hypotheses at a 5% significance level. Participants gave informed consent, confidentiality was assured, and withdrawal rights respected. Data were used strictly for academic purposes in line with research ethics.

Results

Demographic Profile of Respondents

A total of 291 questionnaires were distributed, and 278 were returned duly completed and usable, representing a response rate of 95.5%. The demographic characteristics of the respondents indicate a diverse representation of professionals across agro-industrial export firms in South-South Nigeria. In terms of gender distribution, 62% of the respondents were male, while 38% were female. This distribution reflects the operational structure of agro-industrial export firms, where logistics and export operations are often male-dominated.

Regarding age distribution, 41% of respondents were within the 31–40 years age bracket, 33% were between 21–30 years, 18% were between 41–50 years, and 8% were above 50 years. This indicates a relatively youthful but professionally mature workforce. With respect to educational qualification, 56% possessed bachelor's degrees, 27% held Higher National Diplomas (HND), 11% had master's degrees, and 6% had secondary education or equivalent. This suggests that most respondents had adequate educational grounding to understand operational and export management processes.

In terms of work experience, 48% had between 3–7 years of experience in agro-industrial export operations, 29% had more than 7 years of experience, and 23% had less than 3 years.

Overall, the respondents can be described as experienced and knowledgeable personnel directly involved in operational and export activities.

Descriptive Statistics of Study Variables

Descriptive statistics were computed to assess respondents' perceptions of the major constructs: stock monitoring, information sharing, export growth, and tariff rate exposure. All items were measured on a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The results show that mean scores for all variables were above the midpoint value of 3.00, indicating generally positive perceptions of operational practices and trade performance.

Stock Monitoring recorded a mean of 4.08 (SD = 0.76), suggesting that most agro-industrial firms maintain relatively structured inventory tracking and monitoring systems. Information Sharing had a mean of 3.97 (SD = 0.82), indicating moderate to high levels of coordination and communication among supply chain partners. Export Growth recorded a mean of 3.89 (SD = 0.85), reflecting steady but not overly aggressive export expansion among the firms. Tariff Rate Exposure had a mean of 3.72 (SD = 0.88), suggesting that respondents moderately perceive tariff-related costs as influencing export competitiveness. Overall, the descriptive results indicate that operational efficiency practices are fairly established among the sampled firms and that trade outcomes are positively trending, albeit within a challenging tariff environment.

Inferential Statistics: Hypotheses Testing

To examine the predictive influence of operational efficiency (stock monitoring and information sharing) on trade outcomes (export growth and tariff rate exposure), multiple regression analysis was conducted. The results are summarized in Table 1.

Table 1: Summary of Regression Analysis (N = 278)

Hypothesis	Predictor	Outcome Variable	β	t	p-value	Decision
H1	Stock Monitoring	Export Growth	0.341	5.12	0.000**	Supported
H2	Stock Monitoring	Tariff Rate Exposure	-0.268	-3.94	0.000**	Supported
H3	Information Sharing	Export Growth	0.387	5.76	0.000**	Supported
H4	Information Sharing	Tariff Rate Exposure	-0.301	-4.28	0.000**	Supported

Source: *IBM SPSS version 26.0..*

**$p < 0.05$

The results indicate that:

- Stock monitoring has a significant positive influence on export growth ($\beta = 0.341$, $p < 0.05$), suggesting that firms with stronger inventory control systems experience higher export expansion.
- Stock monitoring shows a significant negative relationship with tariff rate exposure ($\beta = -0.268$, $p < 0.05$), implying that efficient inventory systems help firms better manage or absorb tariff-related costs.

- Information sharing significantly and positively influences export growth ($\beta = 0.387$, $p < 0.05$), indicating that coordinated information exchange strengthens international market performance.
- Information sharing also has a significant negative influence on tariff rate exposure ($\beta = -0.301$, $p < 0.05$), suggesting that firms with stronger communication and integration systems are better positioned to mitigate trade-cost pressures.

Among the predictors, information sharing demonstrated the strongest influence on export growth, while stock monitoring also showed substantial predictive power. The negative beta coefficients for tariff rate exposure indicate that improved operational efficiency reduces the adverse impact of tariff-related costs on firms' trade performance. Overall, the findings confirm that operational efficiency, through both stock monitoring and information sharing, significantly influences trade outcomes among agro-industries in South-South Nigeria.

Discussion of Findings

The results of this study demonstrate clearly that operational efficiency (through stock monitoring and information sharing) exerts a significant influence on trade outcomes among agro-industries in South-South Nigeria. Both dimensions of operational efficiency showed strong predictive relationships with export growth and tariff rate exposure, confirming the central proposition of the study that internal process capabilities shape international trade performance. Information sharing emerged as the strongest predictor of export growth. This finding aligns with the argument that integrated communication systems and transparent coordination across supply chain actors enhance responsiveness, reliability, and market competitiveness (Gunasekaran et al., 2017; Li & Lin, 2020). The result also corroborates the Nigerian-based evidence of Nwankwo and Ihedioha (2021), who found that information integration positively influences the performance of exporting firms.

Stock monitoring also demonstrated a significant positive relationship with export growth. This suggests that firms with structured inventory tracking systems are better positioned to meet delivery timelines, minimize spoilage, and ensure consistent supply to international markets. The finding supports Kumar and Rajesh (2020), who established that inventory visibility enhances supply chain performance, as well as Abiola and Adegbite (2021), who linked supply chain efficiency to export growth among Nigerian agricultural firms. Efficient stock monitoring improves demand forecasting accuracy and reduces operational disruptions, thereby strengthening firms' export readiness and competitiveness.

In relation to tariff rate exposure, both stock monitoring and information sharing exhibited significant negative relationships. This implies that firms with higher levels of operational efficiency are better able to mitigate or absorb the adverse effects of tariff-related costs. Although tariffs are external policy instruments, efficient internal systems reduce avoidable costs, improve productivity, and enhance cost control — thereby cushioning the financial impact of trade barriers. This finding is consistent with the trade-productivity framework and observations of prior studies (Adebayo & Yusuf, 2020; Helpman & Melitz, 2004). The study thus empirically validates that Firms that possess and effectively deploy these capabilities achieve superior trade outcomes. Overall, the study confirms that agro-industries in South-South Nigeria can enhance export growth and better manage tariff-related pressures by

investing in structured inventory systems and integrated information platforms. Operational efficiency is therefore not merely an internal administrative concern; it is a strategic lever for international competitiveness and trade resilience.

Implications of The Study

Theoretical Implications

This study contributes to the growing body of literature linking internal operational capabilities to international trade performance. By empirically validating the influence of stock monitoring and information sharing on export growth and tariff rate exposure, the study strengthens the explanatory relevance of the Resource-Based View (RBV) in export-oriented agro-industrial contexts. The findings demonstrate that operational efficiency dimensions constitute strategic firm-level resources capable of generating measurable trade advantages.

Additionally, the study extends Competitive Advantage Theory by situating operational efficiency within the broader discourse of trade resilience and cost competitiveness in emerging economies. Unlike prior studies that focus primarily on export sales or financial outcomes, this research integrates tariff rate exposure as a complementary trade outcome, thereby offering a more nuanced and multidimensional understanding of export performance.

Managerial Implications

For managers of agro-industrial export firms in South-South Nigeria, the findings underscore the strategic importance of investing in real-time inventory systems and integrated information platforms. Structured stock monitoring enhances shipment reliability and reduces avoidable operational losses, while effective information sharing improves coordination with suppliers, logistics partners, and foreign buyers.

Managers should view operational efficiency not merely as a cost-control mechanism but as a competitive strategy for export growth and trade sustainability. Firms that embed digital tracking systems and collaborative communication frameworks into their operations are better positioned to expand into international markets and withstand tariff-related cost pressures.

Policy Implications

For policymakers and trade development agencies, the study highlights the need to support digital integration and logistics modernization within the agro-industrial sector. Capacity-building programs, export readiness training, and incentives for technology adoption can significantly enhance firms' operational capabilities and export competitiveness. Strengthening institutional support for supply chain digitization could accelerate Nigeria's non-oil export diversification agenda.

Conclusion

This study examined the influence of operational efficiency, measured through stock monitoring and information sharing, on trade outcomes, specifically export growth and tariff rate exposure, among agro-industries in South-South Nigeria. Using a correlational survey design and regression analysis, the study found that both dimensions of operational efficiency

significantly influence trade performance. Information sharing emerged as the strongest predictor of export growth, while both stock monitoring and information sharing demonstrated significant negative relationships with tariff rate exposure, indicating that improved operational systems reduce the adverse impact of trade costs. The findings affirm that internal operational capabilities are critical determinants of international competitiveness. Agro-industrial firms that invest in inventory visibility and digital coordination systems are more likely to achieve sustained export expansion and improved trade resilience. Operational efficiency, therefore, represents a strategic pathway for strengthening Nigeria's agro-export performance in an increasingly competitive global environment.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Adoption of Real-Time Inventory Systems: Agro-industrial firms should invest in automated stock monitoring systems to improve inventory accuracy, minimize waste, and enhance export reliability.
2. Strengthening Digital Information Integration: Firms should deploy integrated information platforms that facilitate real-time communication among suppliers, logistics providers, and export agents.
3. Capacity Building and Staff Training: Regular training programs should be organized to enhance employees' competence in inventory management technologies and digital communication tools.
4. Policy Support for Supply Chain Digitization: Government agencies should provide financial incentives, grants, or tax relief to encourage technology adoption among agro-export firms.
5. Collaborative Export Networks: Firms should develop strategic alliances with logistics providers and international distributors to improve supply chain coordination and reduce trade-related inefficiencies.

Suggestions for Future Studies

- Future research could adopt a longitudinal design to examine how operational efficiency influences export growth over time.
- Subsequent studies may incorporate additional dimensions of operational efficiency, such as logistics optimization or supplier relationship management.
- Comparative studies could be conducted across other geopolitical zones in Nigeria to determine regional variations in operational practices and trade outcomes.
- Future researchers may explore moderating variables such as government policy support, firm size, or technological intensity in the operational efficiency–trade outcome relationship.
- Qualitative approaches could also be employed to gain deeper insights into managerial decision-making processes in agro-export firms.

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