
REVERSE LOGISTICS AND FIRM PERFORMANCE OF OIL AND GAS FIRMS IN RIVERS STATE, NIGERIA

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Abstract

This study examined the relationship between reverse logistics and firm performance of oil and gas firms in Rivers State, Nigeria. Specifically, the study investigated the relationship between reverse logistics and sales growth, as well as the relationship between reverse logistics and market share of oil and gas firms operating in Bonny, Rivers State. The increasing pressure on oil and gas firms to adopt environmentally responsible operational practices, alongside growing strategic imperatives for revenue optimisation and market competitiveness, provided the impetus for this inquiry. Grounded in the Resource-Based View (RBV) theory (Barney, 1991; Hart, 1995), the study posited that reverse logistics constitutes a strategic internal resource capable of generating competitive advantage and improving firm performance outcomes. A cross-sectional survey design was adopted, and structured questionnaires were administered to 57 senior staff of four oil and gas firms in Bonny, Rivers State. A total of 53 usable questionnaires were retrieved and analysed. The Spearman Rank Order Correlation Coefficient was employed to test the stated hypotheses using SPSS version 26. The findings revealed a very strong positive and statistically significant relationship between reverse logistics and sales growth ($r_s = 0.975$, $p < 0.01$), and a strong positive and statistically significant relationship between reverse logistics and market share ($r_s = 0.754$, $p < 0.01$), both significant at the 0.01 level. The study concludes that reverse logistics practices significantly improve firm performance in the oil and gas industry and recommends that oil and gas firms formalise and strategically integrate reverse logistics into their operational frameworks as a critical driver of performance improvement.

Keywords: Firm Performance; Market Share; Oil and Gas Industry; Resource-Based View; Reverse Logistics; Sales Growth.

Introduction

The global drive towards environmental sustainability has intensified regulatory and market pressures on firms operating in extractive industries, compelling oil and gas companies to reconsider their operational practices and adopt greener approaches to logistics management (Hart, 1995; Srivastava, 2007; McKinnon, Browne, Whiteing, & Piecyk, 2014). Within

Nigeria's petroleum sector, which constitutes the dominant engine of national revenue and a principal source of employment in Rivers State, the environmental footprint of production, processing, and distribution activities has attracted escalating scrutiny from regulatory authorities, host communities, and international investors. Against this backdrop, reverse logistics has emerged as a critical operational strategy that enables firms to recover value from returned materials, remanufacture components, recycle waste streams, and responsibly dispose of end-of-life products, thereby converting environmental compliance into operational and financial advantage (Rogers & Tibben-Lembke, 1999; Govindan & Bouzon, 2018).

Outbound logistics, the activities associated with finished goods distribution, order handling, transportation, and reverse flow management, constitutes one of the most consequential dimensions of green logistics practice. Among its constituent elements, reverse logistics has received increasing scholarly attention for its dual capacity to reduce the environmental impact of firm operations and to generate measurable improvements in firm performance (Lili et al., 2023; Govindan et al., 2020; Azevedo, Carvalho, & Machado, 2011). Firm performance, evaluated through financial and market-based metrics such as sales growth and market share, reflects how effectively an organisation translates its resource base and operational capabilities into competitive and commercial outcomes (Armstrong, 1987; Kerning & Jaeger, 1990; Morgan & Rego, 2006).

Despite the growing body of literature on green logistics and firm performance globally, empirical studies focusing specifically on the relationship between reverse logistics and firm performance within the Nigerian oil and gas sector remain limited. Studies in the Nigerian context have tended to examine environmental compliance dimensions rather than the financial and market performance implications of reverse logistics adoption (Viola, Noor, & Kennedy, 2021; Lameck & David, 2016). This study therefore addresses that empirical gap by examining the relationship between reverse logistics and two key performance indicators, sales growth and market share, among oil and gas firms in Bonny, Rivers State, Nigeria.

The specific objectives of the study are to:

- i. Examine the relationship between reverse logistics and sales growth of oil and gas firms in Rivers State.
- ii. Determine the relationship between reverse logistics and market share of oil and gas firms in Rivers State.

The corresponding null hypotheses are:

H₀₁: There is no significant relationship between reverse logistics and sales growth of oil and gas firms in Rivers State.

H₀₂: There is no significant relationship between reverse logistics and market share of oil and gas firms in Rivers State.

Theoretical Framework

Resource-Based View (RBV) Theory

This study is anchored on the Resource-Based View (RBV) theory, whose origins lie in the strategic management tradition. RBV explains that the identification, possession, and

effective deployment of internal strategic resources contributes to a firm's ability to create and sustain competitive advantage and improve performance (Barney, 1991; Hart, 1995; Crook, Ketchen, Combs, & Todd, 2008). A resource is considered strategic if it satisfies four criteria: it must be valuable, non-substitutable, rare, and inimitable (Barney, 1991). Value refers to the extent to which resources are aligned with the external environment to exploit opportunities and neutralise threats. Substitutability refers to the difficulty competitors face in creating equivalent resources. Rareness denotes the perceived scarcity of a resource in factor markets. Inimitability reflects the extent to which competitors are unable to obtain or replicate the resource without significant cost disadvantage (Hoskisson et al., 1999).

Hart (1995) extended the RBV framework to assert that environmental management in organisations constitutes a strategic resource, because proactive environmental strategies can lead to superior firm performance. Environmental management, Hart (1995) argued, supports pollution prevention, product stewardship, and sustainable growth, all of which can generate competitive advantages that improve financial and market performance outcomes. Sharma and Vredenburg (1998) further argued that proactive business strategies incorporating green practices and environmental orientations can be considered valuable organisational resources. In the context of this study, reverse logistics, as a component of green outbound logistics, constitutes a strategic resource under the RBV framework. Its systematic adoption enables oil and gas firms to reduce operational costs, recover value from used materials, and improve their competitive positioning, thereby generating improvements in sales growth and market share.

Furthermore, early research (Vachon & Klassen, 2008; Zhu & Sarkis, 2004) demonstrated that firms deploying green practices within their supply chains are in a stronger position to improve firm performance outcomes, consistent with the RBV prediction that internally managed strategic resources generate sustainable competitive advantages. The RBV thus provides the theoretical rationale for expecting a positive relationship between reverse logistics practices and firm performance indicators in the oil and gas industry.

Conceptual Clarifications

Reverse Logistics

Reverse logistics encompasses the set of activities involved in planning, implementing, and controlling the efficient and cost-effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption back to the point of origin for the purpose of recapturing value or ensuring proper disposal (Rogers & Tibben-Lembke, 1999; Stock, 1992). In contrast to forward logistics, which concerns the downstream movement of materials from supplier to end user, reverse logistics manages the upstream return flow, including product returns, component retrieval, material recycling, equipment remanufacturing, and waste stream management.

According to recent studies (Rizki et al., 2022; Saini, Kumar & Shankar, 2023), the essence of reverse logistics is an effort to recover value from products that are no longer in active use. When a product has lost its primary use value, reverse logistics activities can restore economic utility by recycling components, remanufacturing parts, or responsibly disposing

of residual waste. Reverse logistics includes all activities associated with the planning, reduction, and disposal of hazardous or non-hazardous waste arising from production, packaging, and product use. All such activities constitute the process of reverse distribution: the flow of goods moves contrary to the conventional forward supply chain direction, which is why reverse logistics is also commonly termed 'backward logistics' (Gechevski et al., 2016; Lutfi et al., 2023; Liu et al., 2023).

In the oil and gas industry, reverse logistics assumes particular strategic significance due to the capital-intensive nature of equipment and the stringent regulatory environment governing waste management. Key reverse logistics activities in this sector include the collection and sorting of used drilling fluids and cuttings for treatment or reuse, retrieval and remanufacturing of recoverable downhole equipment, recycling of steel, copper, and alloy materials from decommissioned structures, and controlled treatment of chemical process residues (Srivastava, 2007; Govindan & Bouzon, 2018). These activities generate multiple streams of economic value through cost avoidance, material savings, and secondary revenues.

Sales Growth

Sales growth refers to the incremental increase in a firm's revenue from product or service sales over a defined period, commonly expressed as a percentage change (Morgan & Rego, 2006; Didia & Nwokah, 2015). In the strategic management and marketing literature, sales growth is recognised as one of the most important indicators of firm performance and market competitiveness, reflecting the combined effect of pricing efficiency, market penetration, output capacity, customer acquisition, and product quality (Patterson, 2007; Ateke & Kalu, 2016).

Sales growth indicates the relative measure of change in sales volume over recorded periods and is affected by complex factors including price levels, seasonal variations, income levels, quality standards, changes in consumer preferences, technological change, environmental factors, and company values (Didia & Nwokah, 2015). For oil and gas firms, sales growth reflects not only commodity price dynamics but also the firm's internal operational capacity to expand output, reduce per-unit costs, and maintain competitiveness. Successful implementation of operational improvements, including reverse logistics, can contribute to an improved cost structure that enables competitive pricing and output expansion, thereby driving sales growth (Ateke & Kalu, 2016).

Market Share

Market share is defined as the percentage of a market, measured either in units sold or revenue, accounted for by a specific entity (Morgan & Rego, 2006). Market share is widely recognised as a key indicator of market competitiveness, reflecting how effectively a firm performs relative to its competitors. Supplemented by changes in sales revenue, market share enables managers to evaluate both primary and selective demand dynamics in their markets, assessing not only overall market growth or contraction but also competitive positioning trends (Giovanni & Vinzi, 2012).

Increasing market share is one of the foremost strategic objectives of firms operating in competitive industries. One significant advantage of market share as a performance measure is its relative insulation from macro-environmental variables such as general economic conditions or changes in tax policy, making it a comparatively reliable indicator of competitive firm performance (Morgan & Rego, 2006). It is now widely recognised in the empirical literature that market share is among the principal determinants of firm profitability and long-term viability; enterprises that achieve high market share in their served markets are generally more profitable than smaller-share rivals (Barney, 1991).

Firm Performance

Firm performance refers to how well an organisation achieves its strategic and operational objectives (Kerning & Jaeger, 1990). Good performance is an indicator of organisational success and development. According to Armstrong (1987), performance is the ability to achieve organisational goals more effectively and efficiently. Today, best-practice evaluation frameworks assess firm performance across multiple dimensions, including sales growth, market share, product innovation, customer loyalty, and human resource development.

Performance is a fundamental concern for all organisations, as it determines the competitive standing of the firm within its industry. If an organisation is to meet its goals effectively and efficiently, it must implement accurate and comprehensive performance measurement systems. The measures most widely used in the literature include sales growth, profitability, market share, competitive advantage, and customer satisfaction ratings (Ubeku, 1983; Morgan & Rego, 2006). In the oil and gas industry specifically, performance can also be assessed by the efficiency of project completion relative to planned duration and financial budgets.

Empirical Review

Several studies have demonstrated the positive impact of green logistics on organizational and supply chain performance across different contexts. Viola, Noor, and Kennedy (2021) found that adopting practices such as green raw materials, supplier green purchasing, and recycling significantly improved the performance of Kenyan state corporations. Similarly, Lameck and David (2016) reported a strong positive relationship between green logistics and supply chain outcomes in multinational organizations in Kenya, recommending wider adoption of such practices. In Indonesia, Lili et al. (2023) showed through a PLS-SEM analysis of 670 SMEs that reverse logistics and green procurement both had significant positive effects on green supply chain performance. Complementing these findings, Tran (2021) highlighted in a case study of IKEA Finland and Zalando that green outbound logistics, particularly renewable fuels, sustainable transport vehicles, and eco-friendly packaging, offered more opportunities than challenges, reinforcing the strategic value of green logistics in enhancing sustainability and performance outcomes.

The research gap addressed by this study lies in the limited empirical evidence on how reverse logistics influences firm performance within Nigeria's oil and gas sector, particularly in Rivers State. While prior studies in Kenya, Indonesia, and other contexts have established

positive links between green logistics practices and organizational or supply chain performance, most Nigerian research has focused narrowly on environmental compliance rather than examining financial and market-based outcomes such as sales growth and market share. Consequently, there is insufficient understanding of whether reverse logistics, as a strategic resource under the Resource-Based View framework, can directly enhance competitive performance indicators in the oil and gas industry. This study therefore fills that gap by empirically investigating the relationship between reverse logistics and firm performance, specifically sales growth and market share, among oil and gas firms in Rivers State.

Methodology

Research Design

This study adopted a cross-sectional survey research design to examine the relationship between reverse logistics and firm performance, specifically sales growth and market share, of oil and gas firms in Bonny, Rivers State. The cross-sectional design was selected because it enables simultaneous data collection on all study variables from a defined sample at a single point in time, facilitating relational analysis without incurring the costs and logistical demands of repeated measurement intervals (Creswell & Creswell, 2018).

Population and Sample Size

The population for this study comprised senior staff of four oil and gas firms operating in Bonny, Rivers State, Nigeria. The total accessible population was 57 staff members drawn from Bonny Oil and Gas Terminal, SEPLAT Finima Bonny River Terminal, Mazigan Limited, and Tides Oil & Gas. Given the manageable size of the population, a census approach was adopted in which all 57 senior staff members constituted the sample. This approach ensured complete population coverage and eliminated sampling error (Ahiazu & Asawo, 2016). Individual firm sample sizes were determined using the Bowley (1964) proportional allocation formula.

Table 1: Oil and Gas Firms in Bonny, Rivers State and Sample Allocation

Oil and Gas Firms	Population	Sample
Bonny Oil and Gas Terminal	18	18
SEPLAT Finima, Bonny River Terminal	12	12
Mazigan Limited	11	11
Tides Oil & Gas	16	16
Total	57	57

Methods and Sources of Data

The study employed a primary data collection approach using a structured questionnaire with closed-ended questions, administered to respondents using the drop-and-pick-later method.

The questionnaire was divided into three sections containing a total of twenty-six (26) items. Section A comprised four (4) demographic questions providing background information on respondents. Section B contained twelve (12) items, with three (3) items each testing the dimensions of green outbound logistics practices (reverse logistics and green packaging). Section C contained six (6) items, with three (3) items each measuring the dimensions of firm performance (sales growth and market share). All items were measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire was designed to be anonymous to encourage candid and confidential responses. Secondary data from the Manufacturing Association of Nigeria (MAN) were also utilised to complement the primary data.

Method of Data Analysis

Data were analysed using both descriptive and inferential statistical methods. Descriptive statistics, including frequency counts, percentages, tables, and charts, were applied to demographic data. Inferential statistics, specifically the Spearman Rank Order Correlation Coefficient, were used to test the stated hypotheses. The Spearman Rank Order Correlation was selected because it is appropriate for ordinal Likert-scaled data and does not require assumptions of normality (Field, 2018). All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 26 at a 0.05 level of significance.

Results

Questionnaire Administration and Response Rate

Table 2: Questionnaire Dissemination and Recovery

Description	Count
Administered questionnaires	57
Retrieved questionnaires	53
Not retrieved	4
Usable questionnaires	53

As presented in Table 2, 57 copies of the questionnaire were administered, of which 53 were retrieved and found usable for analysis, while 4 copies were not returned due to respondents being unavailable. This represents a response rate of 92.98%, which is considered adequate for survey-based research (Sekaran & Bougie, 2019).

Demographic Analysis

Analysis of respondents' demographic characteristics revealed that the majority (47.2%) were aged between 36 and 45 years, followed by 32.1% aged between 26 and 35 years, 11.3% aged below 25 years, and 9.4% aged above 47 years. Regarding gender, 56.6% of respondents were male and 43.4% were female. In terms of marital status, 50.9% were married, 26.4% were divorced, and 22.6% were single. Concerning educational qualification, 64.2% held an

HND/B.Sc./B.Ed./B.Tech. degree, 32.1% held a Master's degree, and 3.8% held a PhD, confirming that respondents possessed the educational background to provide informed responses on the study variables.

Test of Hypotheses

Hypothesis Two (H₀₁): There is no significant relationship between reverse logistics and sales growth of oil and gas firms in Rivers State.

Table 3: Spearman Correlation — Reverse Logistics and Sales Growth (H₀₁)

Variables		Reverse Logistics	Sales Growth	N
Spearman's rho	Reverse Logistics – Correlation Coefficient	1.000	.975**	53
	Sig. (2-tailed)	.	.000	
	Sales Growth – Correlation Coefficient	.975**	1.000	53
	Sig. (2-tailed)	.000	.	

** Correlation is significant at the 0.01 level (2-tailed).

Table 3 presents Spearman Rank Order Correlation results for the relationship between reverse logistics and sales growth based on 53 respondents. The result shows a very strong positive and statistically significant relationship between reverse logistics and sales growth ($r_s = 0.975, p < 0.01$). Based on these empirical findings, the null hypothesis H₀₁ is rejected and the alternate hypothesis accepted. Thus, there is a significant relationship between reverse logistics and sales growth of oil and gas firms in Bonny, Rivers State.

Hypothesis Two (H₀₂): There is no significant relationship between reverse logistics and market share of oil and gas firms in Rivers State.

Table 4: Spearman Correlation — Reverse Logistics and Market Share (H₀₂)

Variables		Reverse Logistics	Market Share	N
Spearman's rho	Reverse Logistics – Correlation Coefficient	1.000	.754**	53
	Sig. (2-tailed)	.	.000	
	Market Share – Correlation Coefficient	.754**	1.000	53
	Sig. (2-tailed)	.000	.	

** Correlation is significant at the 0.01 level (2-tailed).

Table 4 presents Spearman Rank Order Correlation results for the relationship between reverse logistics and market share based on 53 respondents. The result shows a strong positive and statistically significant relationship between reverse logistics and market share ($r_s = 0.754, p < 0.01$). Based on these empirical findings, the null hypothesis H_{02} is rejected and the alternate hypothesis accepted. Thus, there is a significant relationship between reverse logistics and market share of oil and gas firms in Bonny, Rivers State.

Decision Summary

Table 5: Summary of Hypotheses Testing Decisions

Hypothesis	Decision	Basis for Decision	Remark
H ₁	There is no significant relationship between reverse logistics and sales growth of oil and gas firms in Bonny.	Null hypothesis rejected	$r = 0.975, p < 0.01$. Very strong positive relationship.
H ₂	There is no significant relationship between reverse logistics and market share of oil and gas firms in Bonny.	Null hypothesis rejected	$r = 0.754, p < 0.01$. Strong positive relationship.

The study found that reverse logistics has a powerful impact on firm performance in the oil and gas sector, with Hypothesis One showing a very strong positive relationship with sales growth ($r_s=0.975,p<0.01$) and Hypothesis Two revealing a strong positive relationship with market share ($r_s=0.754,p<0.01$). Systematic practices such as product return management, recycling, remanufacturing, and responsible disposal not only drive revenue growth but also strengthen competitive positioning by enhancing reputation and operational reliability. These results support the Resource-Based View (RBV) that reverse logistics is a strategic resource yielding competitive advantage, and they align with prior studies across different contexts (Azevedo et al., 2011; Lili et al., 2023; Viola et al., 2021), which consistently demonstrate that green logistics and supply chain practices significantly improve both financial and market performance.

Implications of The Study

The findings of this study generate important theoretical, managerial, and policy implications for the oil and gas sector in Rivers State and for the broader green logistics and supply chain management literature.

Theoretically, the study enriches the Resource-Based View by demonstrating empirically that reverse logistics, as an internal strategic resource, generates significant positive relationships with both sales growth and market share in the oil and gas sector. This extends the RBV's predictive scope to the Nigerian extractive industry context, confirming that the theory's core proposition, that strategically valuable, rare, inimitable, and non-substitutable resources drive performance, holds in the context of green logistics practices. The study further demonstrates that environmental management, as conceptualised by Hart (1995)

within the RBV framework, produces measurable commercial performance outcomes and is not merely a compliance mechanism.

For managers and executives in oil and gas firms, the findings highlight the strategic commercial value of reverse logistics investments. Rather than treating reverse logistics as a regulatory obligation, managers should recognise it as a value-generating operational capability that contributes directly to revenue growth and competitive market positioning. Operations directors should therefore integrate reverse logistics performance metrics, including material recovery rates, return processing efficiency, and waste reduction percentages, into operational performance dashboards and connect these explicitly to sales growth and market share targets.

For policymakers, particularly the Nigerian Content Development and Monitoring Board (NCDMB) and the Department of Petroleum Resources (DPR), the results support the development of incentive frameworks that reward oil and gas firms for achieving reverse logistics performance benchmarks. Such incentives, including tax reliefs on certified reverse logistics investments, mandatory reverse logistics reporting requirements, and green procurement preferences in public oil sector contracts, would strengthen the commercial case for reverse logistics adoption and accelerate its performance benefits across the sector.

Conclusion

This study examined the relationship between reverse logistics and firm performance of oil and gas firms in Rivers State, Nigeria, focusing specifically on the performance indicators of sales growth and market share. Grounded in the Resource-Based View theory, the study hypothesised that reverse logistics, as an internally managed strategic resource, would positively relate to firm performance outcomes. The empirical findings confirmed a very strong positive and statistically significant relationship between reverse logistics and sales growth and a strong positive and statistically significant relationship between reverse logistics and market share among oil and gas firms in Bonny, Rivers State.

These findings affirm that the systematic adoption of reverse logistics practices, encompassing product return management, material recycling, component remanufacturing, and responsible waste disposal, substantially contributes to the improvement of sales growth and market share performance of oil and gas firms. The study concludes that green outbound logistics practices, particularly reverse logistics, significantly influence the performance of oil and gas firms in Rivers State. For performance improvement to be sustained, green logistics practices must be formalised and progressively adopted as a framework of operational best practice within the Nigerian oil and gas industry.

Recommendations

Based on the study's findings, it is recommended that oil and gas firms in Rivers State institutionalise reverse logistics programmes as part of their operational planning to systematically recover value from used materials and by-products, while management should establish clear performance indicators (such as recovery rates, return efficiency, and waste reduction) directly linked to sales growth and market share targets. Firms are advised to

invest in technical infrastructure like remanufacturing facilities, certified recycling partnerships, and digital tracking systems to maximise benefits, while regulatory bodies such as the NCDMB and DPR should create incentive frameworks that reward verifiable reverse logistics achievements through measures like preferential contract awards and tax relief. Finally, future research should adopt longitudinal designs and advanced methods such as Structural Equation Modelling to better capture causal relationships and explore moderating factors including regulatory pressure, firm size, and technology adoption.

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