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REVERSE LOGISTICS ADOPTION AND MARKET PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES (SMEs) IN RIVERS STATE

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ABSTRACT: *This study investigates the relationship between Reverse Logistics Adoption (RLA) and Market Performance (MP) among Small and Medium Enterprises (SMEs) in Rivers State, Nigeria. Driven by resource scarcity, stringent environmental regulations (like those from NESREA), and the strategic need for circularity, RLA, encompassing returns management, remanufacturing, and recycling, is hypothesized to determine competitive advantage. Utilizing the Resource-Based View (RBV), the research employs a cross-sectional survey design targeting registered SMEs across key sectors. Data will be analyzed using Structural Equation Modeling (SEM) and Hierarchical Multiple Regression to test the direct and joint effects of RLA dimensions on MP measures (Sales Growth, Market Share, Customer Satisfaction). Expected outcomes include a validated framework linking sustainable supply chain practices to enhanced market outcomes, offering actionable strategies for SME managers and evidence-based recommendations for regulators in the Niger Delta region.*

KEYWORDS: Circular Economy, Market Performance (MP), NESREA, Resource-Based View (RBV), Reverse Logistics Adoption (RLA), Small and Medium Enterprises (SMEs), Structural Equation Modeling (SEM).

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INTRODUCTION

The global business landscape has undergone a profound transformation, moving from a traditional, linear economic model to one predicated on principles of circularity and sustainability. This transition is not merely an ethical consideration but a strategic and economic imperative, necessitated by finite resources, escalating operational costs associated with disposal, and mounting pressure from regulatory authorities and environmentally conscious consumers (Carter & Rogers, 2008). Central to this shift is the systematic implementation of Reverse Logistics (RL). As a critical element of supply chain management, Reverse Logistics involves the comprehensive planning, execution, and control of materials, finished goods, and associated information from the point of consumption back to the point of origin, with the explicit goal of recapturing economic value or ensuring environmentally compliant final disposition (Rogers & Tibben-Lembke, 1998; Stock, 1992). This includes activities such as returns management, remanufacturing, and recycling.

In Nigeria, Small and Medium Enterprises (SMEs) are the lifeblood of the national economy, contributing over 48% to the national Gross Domestic Product (GDP), accounting for 96% of businesses, and providing 84% of national employment (SMEDAN, 2023). Within this context, Rivers State stands out as a major economic powerhouse, predominantly due to its oil and gas activities and high commercial density, particularly in the capital, Port Harcourt. The confluence of high-volume commerce, industrial processing, and rapid consumption results in an enormous challenge concerning waste management and resource utilisation. Consequently, SMEs in Rivers State, across sectors like light manufacturing, electronics distribution, and trade, are increasingly exposed to operational realities that demand structured Reverse Logistics systems whether due to high rates of product returns, the need to manage packaging waste, or the mandate to comply with environmental laws.

However, the adoption of sophisticated logistics practices, particularly those involving reverse flows, is often suboptimal in Nigerian SMEs (Olorunniyi, 2020; Chukwu & Okoro, 2021). Implementation is frequently hindered by structural issues such as poor infrastructure, limited technical expertise, lack of capital for technological investment, and the perception of Reverse Logistics as a non-core, cost-intensive activity rather than a strategic resource (Olorunniyi, 2020; Chukwu & Okoro, 2021). This deficiency stands in stark contrast to the strategic benefits derived from effective Reverse Logistics, which include substantial cost reduction, improved customer service, enhanced corporate image, and the creation of new market opportunities through resource recovery (Govindan & Bouzon, 2018).

The ultimate aim of any strategic business adoption is to enhance firm performance. In the competitive landscape of Rivers State, Market Performance (MP) encompassing metrics such as Sales Growth, Market Share, and Customer Satisfaction is the key indicator of an SME's viability and success (Simpson et al., 2012). While a theoretical positive link between sustainable supply chain practices and Market Performance is assumed, the empirical validation of this relationship, specifically isolating the impact of Reverse Logistics Adoption and its various dimensions on Market Performance within the unique institutional and economic milieu of Rivers State, remains a critical lacuna in the extant management literature. This research is fundamentally motivated by the need to understand how SMEs in this key Nigerian state can leverage Reverse Logistics adoption to gain a competitive edge and simultaneously comply with growing environmental mandates.

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Statement of the Problem

The core problem addressed by this research is the empirically unverified and potentially weak translation of the strategic necessity for Reverse Logistics Adoption (RLA) into measurable Market Performance (MP) enhancements within the Small and Medium Enterprises (SMEs) of Rivers State, Nigeria.

Despite the compelling global evidence that Reverse Logistics Adoption is a pivotal strategy for cost reduction, value recovery, and competitive advantage, most SMEs in Rivers State continue to operate with fragmented, *ad hoc*, or non-existent reverse flow mechanisms. The structural impediments encountered by these firms including capital constraints, infrastructural deficiencies, lack of trained personnel, and, critically, inconsistent policy enforcement lead to several interconnected detrimental outcomes:

Economic and Resource Inefficiency: Valuable resources embedded in end-of-life or returned products (e.g., materials for remanufacturing, serviceable components) are habitually discarded as waste. This represents a significant opportunity cost, forcing SMEs to rely solely on costly primary materials and increasing operational expenditure related to waste disposal, thereby constraining profitability and Sales Growth.

Environmental Externalities and Regulatory Vulnerability: The poor management of product returns and waste, particularly in a sensitive environment like the Niger Delta (NDDC, 2021), exacerbates pollution (e.g., electronic waste, plastic runoff). While national bodies like the National Environmental Standards and Regulations Enforcement Agency (NESREA) and state environmental agencies exist, the variable enforcement of the regulatory framework means that SMEs often neglect costly but necessary compliance, yet remain vulnerable to unpredictable sanctions, which ultimately impacts brand perception and Customer Satisfaction.

Customer Experience Deficit: A failure to implement robust Returns Management leads to protracted and frustrating experiences for customers regarding faulty or unwanted products. In a market increasingly driven by service quality, this deficiency erodes Customer Satisfaction, diminishes loyalty, and restricts the potential for expanding Market Share.

Empirical and Contextual Deficit: A glaring knowledge gap persists regarding the specific nature and magnitude of the relationship between distinct Reverse Logistics Adoption dimensions; Returns Management, Remanufacturing, and Recycling and specific Marketing Performance metrics; Sales Growth, Market Share, Customer Satisfaction, within the specific institutional and commercial context of Rivers State. Without this empirical grounding, strategic advice for SME managers and policy instruments remain speculative and may fail to address the specific contextual constraints prevalent in the region.

Thus, the problem is not merely whether Reverse Logistics is adopted, but *which* dimensions of Reverse Logistics Adoption are strategically viable and *how* they measurably translate into competitive market success for SMEs in Rivers State, and whether the local Regulatory Environment facilitates or hinders this critical link.

Study Variables and Conceptual Framework

The variables for this study will be factors that exist and can change in differing situations; they are largely divided into independent, dependent and moderating variables. The

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independent variable also called the "predictor variable" for this research is 'Reverse Logistics Adoption (RLA).'

Reverse Logistics Adoption is a multidimensional construct representing the systematic incorporation of processes dedicated to handling the reverse flow of products and materials. It is operationalised by:

Returns Management (RM): The effectiveness and efficiency of procedures for product recall, receipt, inspection, and return authorisation (Panigrahi et al., 2018).

Remanufacturing: The organisational capability and investment dedicated to restoring used products or components to a specified functional standard for resale or reuse (Govindan & Bouzon, 2018).

Recycling: The formal processes implemented for the environmentally compliant breakdown of materials for resource recovery, and the safe, legal final disposal of non-recoverable residuals (Govindan & Bouzon, 2018).

The dependent variable also called the "criterion variable" for this study is "Market Performance (MP)." Market Performance is the measure of an SME's competitive success and effectiveness within its chosen market. It is operationalised by three key indicators appropriate for the SME context (Simpson et al., 2012):

Sales Growth (SG): The year-on-year increase in total sales revenue or volume, serving as a key financial performance indicator.

Market Share (MS): The firm's percentage of total industry sales or total customers, reflecting competitive positioning.

Customer Satisfaction (CS): A non-financial measure capturing the customer's perceived quality of the SME's offerings and service, particularly post-sale logistics.

In this study, each variable's relationship will be assessed through empirical examination. The conceptual framework below is a diagrammatic representation that shows the relationship among the study variables. It clearly shows how variables relate and interact (Best & Young, 2009). In this study, the conceptual model was developed from findings from literature review.

Conceptual Framework

The conceptual framework illustrates the hypothesised direct, joint, and moderating relationships between the variables. It posits that the three dimensions of Reverse Logistics Adoption individually influence the respective measures of Market Performance, and jointly influence overall Market Performance.

The proposed framework allows for a rigorous testing of specific, nuanced relationships, moving beyond generic correlations to establish strategic causality.

The Figure below illustrates the various variables for this study. It shows that the independent variables—Reverse Logistics Adoption with dimensions (Returns Management, remanufacturing, and recycling)—have a direct relationship with the dependent variable, which is Market Performance with measures (Sales Growth, market share and customer satisfaction).

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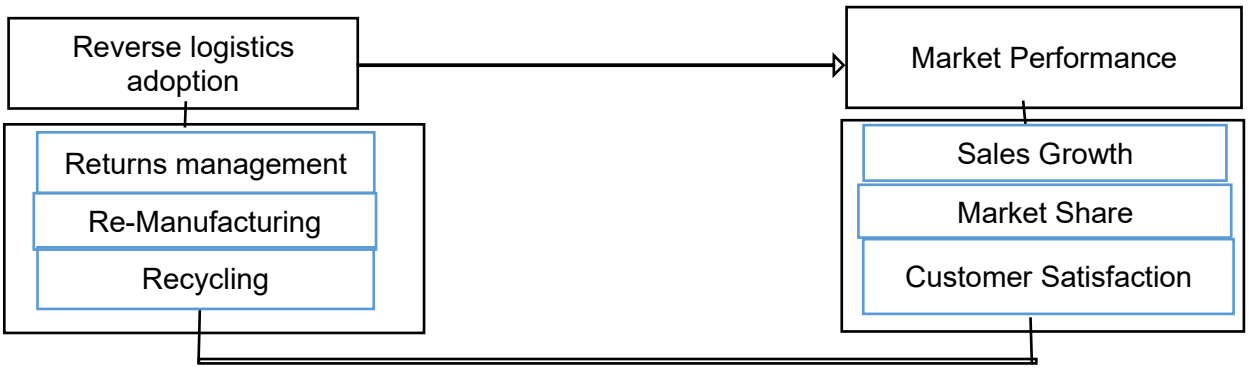
The horizontal line signifies a movement that indicates that Reverse Logistics Adoption is a determinant of Market Performance of Small and Medium Enterprises in Rivers State.

Figure 1: Conceptual Framework of The Relationship Between Reverse Logistics Adoption and Market Performance of Small and Medium Enterprises in Rivers State



Sources: *Author's Conceptualisation*

Aim and Objectives of the Study

The overarching purpose of this research is to establish and empirically test the relationship between the dimensions of Reverse Logistics Adoption (RLA) and the Market Performance (MP) of Small and Medium Enterprises (SMEs) in Rivers State, Nigeria, while accounting for the influence of the Regulatory Environment.

Specifically, the study is designed to:

1. Ascertain the nature and extent of the influence of Returns Management practices on Sales Growth of SMEs in Rivers State.
2. Determine the magnitude of the influence of Remanufacturing practices on the Market Share of SMEs in Rivers State.
3. Examine the relationship between Recycling practices and Customer Satisfaction among SMEs in Rivers State.
4. Investigate the collective and unique predictive power of the three Reverse Logistics Adoption dimensions: Returns Management, Remanufacturing, and Recycling, on the overall Market Performance of SMEs in Rivers State.

Research Questions

The study raised the following research questions to guide the investigation:

1. To what extent do Returns Management practices significantly influence the Sales Growth of SMEs in Rivers State?
2. What is the degree of significant influence of Remanufacturing practices on the Market Share of SMEs in Rivers State?

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3. What is the nature of the relationship between Recycling practices and Customer Satisfaction among SMEs in Rivers State?

4. To what extent do the combined dimensions of Reverse Logistics Adoption jointly influence the overall Market Performance of SMEs in Rivers State?

Research Hypotheses

The following hypotheses are formulated as tentative answers to our research questions:

H_{01}: Returns Management practices have no significant positive influence on the Sales Growth of SMEs in Rivers State.

H_{02}: Returns Management has no significant relationship with Market Share of SMEs in Rivers State.

H_{03}: Returns Management has no significant relationship with customer Satisfaction of SMEs in Rivers State.

H_{04}: Re-manufacturing has no significant relationship with Sale Growth of SMEs in Rivers State.

H_{05}: Re-manufacturing has no significant relationship with Market Share of SMEs in Rivers State.

H_{06}: Re-Manufacturing has no significant relationship with customer satisfaction of SMEs in Rivers State.

H_{07}: Recycling has no significant relationship with Sales Growth of SMEs in Rivers State.

H_{08}: Recycling has no significant relationship with Market Share of SMEs in Rivers State.

H_{09}: Recycling has no significant relationship with customer satisfaction of SMEs in Rivers State.

REVIEW OF RELATED LITERATURE

This study draws primarily from Resource-Based View (RBV) to provide a comprehensive lens for understanding the relationship between Reverse Logistics Adoption (RLA) and Market Performance (MP) in the context of Rivers State SMEs.

The Resource-Based View (RBV) of the Firm

The Resource Based View, prominently championed by Wernerfelt (1984) and refined by Barney (1991), posits that a firm's competitive advantage and superior performance stem from the possession and exploitation of heterogeneous resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN).

In the context of this study, Reverse Logistics Adoption is not merely viewed as a functional activity but as a strategic capability that potentially satisfies the valuable, rare, inimitable, and non-substitutable (VRIN) criteria.

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Structured Reverse Logistics Adoption, e.g., efficient Returns Management and sophisticated Remanufacturing, creates value by reducing costs through less reliance on virgin materials, generating new revenue streams (resale of refurbished goods), and improving customer loyalty (superior returns service). These are fundamental drivers of Market Performance.

While the need for Reverse Logistics is common, the systematic adoption of high-quality, efficient Reverse Logistics systems is rare among Nigerian SMEs, giving firms that master this capability a distinct edge.

Sophisticated Reverse Logistics Adoption involves tacit knowledge, complex cross-functional coordination, and dedicated physical assets, e.g., sorting facilities, skilled technical labour for remanufacturing. These elements are difficult for competitors to copy, ensuring a sustained advantage.

While alternative waste management strategies exist, none fully substitute for the value recovery, customer intelligence, and closed-loop efficiency offered by an integrated Reverse Logistics system.

The Resource Based View provides the theoretical underpinning for Ho1, Ho2, and Ho3, suggesting that investments in the Reverse Logistics Adoption dimensions—Returns Management, Remanufacturing, Recycling—should positively and significantly translate into superior Market Performance outcomes such as Sales Growth, Market Share, and Customer Satisfaction because these capabilities represent a sustained competitive advantage.

The Resource-Based View (RBV) Theory has become a cornerstone in strategic management, offering a framework for understanding how firms achieve and sustain competitive advantage by leveraging their internal resources. The theory was primarily developed by Barney (1991), who argued that a firm's resources, when valuable, rare, inimitable, and non-substitutable (VRIN), could provide the foundation for a sustained competitive advantage (Barney, 1991). This perspective marked a significant shift from traditional theories that focused on external market conditions as the primary determinants of competitive advantage, emphasizing instead the unique internal characteristics of the firm. Barney's articulation of the Resource Based View built on earlier contributions by scholars such as Edith Penrose, who, in her 1959 work, The Theory of the Growth of the Firm argues that the growth and competitive advantage of a firm could be attributed to the productive use of its resources (Penrose, 1959). Penrose's ideas laid the groundwork for the Resource Based View by highlighting the importance of internal resources in shaping firm performance. However, it was Barney who formalized these ideas into a coherent theory, defining the specific attributes that resources must possess to be sources of competitive advantage. Wernerfelt (2021) defined Resource Based View as a collection of productive resources, where the ownership and strategic use of these resources lead to sustained competitive advantage.

Scholars following Barney have expanded and refined the Resource Based View. For instance, Peteraf (1993) contributed to the theory by introducing the concept of "resource heterogeneity" and "resource immobility" which underscore that not all firms possess the same resources, and certain resources cannot be easily transferred or replicated by competitors. According to Peteraf and Barney (2019), Resource Based View emphasizes that the heterogeneity of firms' resources and capabilities is the basis for their competitive advantages, particularly when such resources are difficult to duplicate or transfer across firms. For Makadok (2019), Resource

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Based View is a paradigm underlining the importance of firm-specific resource selection and placement for achieving competitive superiority. This differentiation is critical to sustaining competitive advantage. Grant (2020) defined Resource Based View as a strategic framework that views a firm as a bundle of resources, emphasizing the role of resource quality and strategic fit in driving long-term performance.

Newbert (2018) opined that Resource Based View describes that competitive advantage stems from firm-specific resources that are valuable, rare, and not easily imitated by competitors. Similarly, Wernerfelt (1984) in his work, A Resource-Based View of the Firm, emphasized the importance of resource accumulation and how firms can strategically manage their resource portfolios to achieve long-term success. Barney (2021) The Resource-Based View (RBV) posits that an organization's ability to sustain competitive advantage is determined by its possession of valuable, rare, inimitable, and non-substitutable (VRIN) resources, combined with effective organizational processes to exploit these resources. According to Helfat et al. (2020), Resource Based View highlights the importance of identifying and nurturing firm-specific resources that underpin competitive advantage and resilience in dynamic markets.

Despite its widespread acceptance, the Resource Based View has faced criticism and counterarguments. One of the main critiques, as articulated by Priem and Butler (2001), is that the theory is tautological and lacks predictive power. They argue that the Resource Based Views's criteria for determining valuable resources are often defined ex post facto after a firm has already achieved success making it difficult to apply the theory predictively. For Priem and Butler (2019), Resource Based View provides a framework for explaining how firms utilize strategic resources to create competitive advantages and achieve superior performance. Additionally, some scholars contend that the Resource Based View overemphasizes internal resources at the expense of external factors, such as market dynamics and industry structure, which can also significantly impact a firm's competitive advantage.

Conceptual Review

The conceptual review serves as the foundation for understanding the critical elements of this study, providing clarity on the key constructs and their interrelationships. By exploring the core concepts, this section aims to establish a comprehensive conceptual framework for analyzing how reverse logistics adoption (Returns Management, re-manufacturing and recycling) relate with market performance (market share, sales growth and customer satisfaction). Through this review, the study aligns theoretical insights with practical implications.

Concept of Reverse Logistics Adoption (RLA)

Reverse Logistics (RL) is a term coined by Stock (1992) and formally defined by Rogers and Tibben-Lembke (1998) as the efficient and effective management of the flow of goods and information backward through the supply chain. Reverse Logistics Adoption (RLA) moves beyond the mere presence of these activities to denote the degree of formalisation, integration, and resource commitment a firm dedicates to these reverse flows. It signifies a strategic shift from an *ad hoc* reaction to returns to a proactive, systematic capability.

Reverse Logistics Adoption is conceptually distinct from simple waste management in several key ways:

Reverse Logistics Adoption is primarily driven by the dual goals of value recovery (economic

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benefit) and environmental responsibility, whereas traditional waste management often focuses solely on cost-minimisation through disposal.

Effective Reverse Logistics Adoption requires cross-functional collaboration (marketing, operations, finance) and the integration of information systems to track returned products, material conditions, and final disposition decisions, making it a holistic supply chain practice (Panigrahi et al., 2018).

A firm that adopts Reverse Logistics strategically sees used products as potential inventory, thereby engaging in a closed-loop supply chain model, rather than the linear open-loop model prevalent in non-adopting firms.

In the Nigerian SME context, Reverse Logistics Adoption often starts with basic Returns Management but must evolve toward more complex activities like remanufacturing and robust recycling to capture full value, especially given the high cost of imported virgin materials (Olorunniyi, 2020).

Dimensions of Reverse Logistics Adoption

For this research, Reverse Logistics Adoption is dimensionally disaggregated to allow for granular empirical testing of specific activities that contribute to Market Performance. The dimensions of Reverse Logistics Adoption considered in this study are Returns Management, re-manufacturing and recycling.

Returns Management (RM)

Returns Management is the initial and often most visible component of Reverse Logistics Adoption, particularly in consumer-facing SMEs. It involves the entire process from the customer's decision to return a product to its entry into the reverse flow system.

Key Processes of Returns Management includes Return authorisation (RMA), transport coordination, product inspection and quality screening, and rapid processing of refunds or exchanges.

Strategic Importance of Returns Management is a direct determinant of Customer Satisfaction. Efficient Returns Management minimizes customer friction, increases the probability of repeat business, and ensures that returned products are quickly channelled to the highest-value recovery option, e.g., immediate resale, repair, or remanufacturing, thus preserving the product's embedded value (Govindan & Bouzon, 2018). Poor Returns Management leads to 'returns in limbo,' inventory obsolescence, and negative customer word-of-mouth.

Returns management (RM) is a foundational and critical subset of reverse logistics (RL), constituting the initial set of activities focused specifically on the processes related to products returned from the point of consumption back to the point of origin or repair/disposition centers (Rogers & Tibben-Lembke, 2001). While reverse logistics encompasses the entire flow of materials for the purpose of recapturing value or ensuring proper disposal, returns management is primarily concerned with the highly visible, customer-facing, and transaction-intensive events that occur immediately after the product leaves the consumer's hands (Stock, 2001).

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Returns management is often considered the "front-end" of the reverse supply chain. Its primary objective is to manage the flow of returned products efficiently to minimize costs and maximize value recovery, all while maintaining high levels of customer satisfaction.

Academically, Returns Management distinguishes itself from general Reverse Logistics through its focus on four core functions:

Gatekeeping: This is the process of controlling the entry of products into the reverse flow. Effective gatekeeping uses defined policies to verify the legitimacy of a return, ensuring the customer is eligible and the return reason is valid, e.g., within warranty or return window. Successful gatekeeping prevents illegitimate returns from draining organizational resources (Tibben-Lembke, 2002).

Reverse Flow Authorization: This includes issuing Return Merchandise Authorization (RMA) numbers. The Returns Merchandise Authorization process ties the returned unit to specific documentation, such as customer records and reasons for return, which are crucial for tracking, reporting, and final disposition.

Collection and Transportation: This involves the physical collection of the item from the customer and its transport to a designated centralized return center or facility, often utilizing specific packaging and tracking protocols that differ from forward logistics.

Inspection, Sorting, and Triage: Upon arrival, the item is meticulously inspected and sorted. This crucial step determines the item’s disposition, that is, its next pathway. Potential dispositions include Direct Resell and Repair/Refurbish.

The scholarly literature emphasizes that optimized returns management is not merely a cost center but a strategic differentiator that directly impacts a firm's profitability and competitive positioning (Gauden, 2011).

Poor returns management leads to inventory distortion, increased handling costs, and lost sales opportunities. Conversely, highly efficient Returns Management, particularly rapid triage, dramatically speeds up the value recovery cycle, often allowing high-value items to be quickly returned to the primary inventory for resale.

For many retailers and e-commerce platforms, the ease and speed of the returns process significantly influence customer lifetime value and loyalty. A cumbersome returns process often leads to customer churn, making Returns Management a vital part of the customer service experience (DeKoster & De Vries, 2010).

In summary, returns management is the specialized, high-touch, and often time-sensitive activity that initiates the entire reverse logistics process. It is the bridge connecting the customer experience with the complex internal operations of value recovery.

Remanufacturing

The adoption of robust Reverse Logistics (RL) practices marks a necessary organizational shift from a linear, "take-make-dispose" economic model toward a Circular Economy (CE) framework (Govindan & Bouzon, 2018). Among the various disposition options available in Reverse Logistics, e.g., direct resale, refurbishment, recycling, remanufacturing stands out as the highest-value recovery activity for most complex products (Thierry et al., 1995).

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Remanufacturing is defined as the process of bringing a used product (often called a 'core') back to a 'like-new' or 'better-than-new' condition, complete with a warranty that is equivalent to or better than that of the original new product (Steinhilper, 1998; Charter & Gray, 2008). It requires the complete or partial disassembly of a core, the thorough cleaning and inspection of all parts, the replacement of worn or failed components, and the final reassembly and testing to meet original equipment manufacturer (OEM) specifications (Lund, 1984). Consequently, the successful adoption of remanufacturing capability is indicative of a mature and strategically committed Reverse Logistics system.

Scholarly discourse necessitates a precise distinction between remanufacturing and two other related product recovery processes: refurbishment and recycling.

Table 1: Distinction between remanufacturing and two other related product recovery processes: refurbishment and recycling

Process	Primary Intervention	Outcome Quality	Value Position in RL
Recycling	Material breakdown and component destruction.	Raw material (secondary input).	Lowest value recovery (focused on material stream).
Refurbishment	Repair, cleaning, and cosmetic restoration.	Used, functional, and warranted product.	Mid-level value recovery (focuses on product usability).
Remanufacturing	Complete disassembly, part replacement, and rebuilding.	"Like-new" product with original warranty.	Highest value recovery (focuses on functional equivalence).

Refurbishment involves less intensive intervention, usually limited to repairing minor defects, cleaning, and perhaps replacing cosmetic parts. The final product retains a "used" status. In contrast, remanufacturing necessitates the complete restoration of the product to its original performance standards, often mandated by external regulations or internal quality assurances (Kerr & Ryan, 2001).

Recycling represents the lowest-value strategy, as it involves the destruction of the product form to recover basic materials, e.g., metals, plastics (Guide Jr. & Van Wassenhove, 2009).

The adoption of a formal remanufacturing capability serves multiple strategic and economic imperatives, often explained through fundamental management theories.

From the perspective of the Resource-Based View (RBV), effective remanufacturing represents a valuable, rare, and inimitable (VRI) firm capability (Barney, 1991).

Remanufacturing reduces reliance on costly virgin materials and manufacturing capacity, offering a cost advantage over firms reliant solely on forward production. It also allows firms to tap into price-sensitive market segments with warranted products, thus expanding market share (Guide Jr. & Van Wassenhove, 2003).

Successful remanufacturing requires unique, non-codified expertise, specialized reverse manufacturing facilities, proprietary inspection knowledge, and sophisticated component

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disposition planning. This combination creates a sustained competitive advantage that is difficult for competitors to replicate (Hazen et al., 2017).

Remanufacturing is a cornerstone of the Circular Economy paradigm. By extending the useful life of a product, it directly reduces the volume of waste sent to landfills and the energy consumption associated with extracting and processing new raw materials (Bocken et al., 2016). For organizations, this demonstrates commitment to environmental sustainability, which enhances corporate reputation and can improve customer satisfaction among environmentally conscious consumers (Ogbechie & Nwankwo, 2018).

The strategic adoption of remanufacturing mitigates risks associated with the forward supply chain. It provides an alternative, internal source for key components and finished goods, offering insulation against volatility in raw material prices, geopolitical supply chain disruptions, and unexpected spikes in demand (Stevels, 2002). This internal control over the secondary raw material stream enhances supply chain resilience.

While strategically rewarding, the adoption of remanufacturing capability presents complex operational challenges that require significant Reverse Logistics Adoption maturity:

Unlike forward manufacturing, remanufacturing depends on the unpredictable supply and quality of 'cores' returned from the market. A successful remanufacturing operation requires a dedicated returns management system to efficiently acquire, inspect, and grade these used products (Srivastava, 2007).

The disassembly process must often be flexible, non-destructive, and integrated with complex testing procedures to determine which components can be reused, repaired, or replaced (Thierry et al., 1995). This demands distinct engineering expertise and dedicated capital investment not typically found in traditional forward-only operations.

Effective adoption requires specialized information technology (IT) systems that track core status, disposition history, and component inventory separately from new product inventory. The absence of such integrated systems is often cited as a major barrier to Reverse Logistics Adoption for Small and Medium Enterprises (SMEs) (Olorunniyi, 2020).

Remanufacturing is recognized as the most strategically rewarding form of product recovery within the reverse logistics domain. Its adoption reflects an organization’s commitment to advanced Reverse Logistics capabilities and closed-loop operation. By yielding products equivalent to new ones while significantly reducing material and energy costs, remanufacturing fundamentally alters the firm's cost structure and offers a sustainable competitive advantage rooted in the principles of the Resource Based View and the Circular Economy. For any organization aiming for full Reverse Logistics Adoption, the mastery and formal implementation of scalable remanufacturing processes represent the apex of strategic maturity.

Recycling

The transition from linear supply chains to Closed-Loop Supply Chains (CLSCs) is a defining feature of the modern industrial landscape, driven by legislative pressures, material scarcity, and the pursuit of a Circular Economy (CE) (Guide Jr. & Van Wassenhove, 2009). Within this paradigm shift, Reverse Logistics Adoption (RLA) refers to the organizational commitment and implementation of systems designed to efficiently manage the flow of used products, parts,

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and materials back from the point of consumption. Among the various disposition options, including reuse, repair, and remanufacturing, recycling serves as the most foundational and highest-volume material recovery dimension of Reverse Logistics Adoption.

This study rigorously defines recycling within the Closed-Loop Supply Chains context, differentiates its value proposition, and examines the strategic and operational requirements necessary for firms to successfully adopt robust recycling capabilities as part of their reverse logistics mandate.

Recycling is the process by which a product is recovered at the end-of-life (EOL) stage, disassembled, and broken down into its fundamental constituent materials, which are then processed back into secondary raw materials for use in new product manufacturing (Srivastava, 2007).

It is essential to distinguish recycling from higher-value recovery options like remanufacturing and refurbishment. These higher-order processes aim to preserve the product's functional form, the embodied labor, and the intellectual value. Recycling, conversely, destroys the product form to recover the material value.

This hierarchy dictates recycling's position in the recovery strategy: it is the disposition option of last resort, generally applied only when the product or its components cannot be economically or technically reused, repaired, or remanufactured. Despite being the lowest-value option, recycling is critical because it handles the bulk of material waste that cannot be reinserted into the value chain through higher-order methods. Therefore, successful Reverse Logistics Adoption cannot be achieved without a structured, high-capacity recycling capability (Thierry et al., 1995).

The decision by organizations to adopt formal recycling programs, moving beyond mere regulatory compliance, is anchored in several established management theories:

Institutional Theory and Legitimacy: Institutional Theory posits that organizational behavior is influenced not only by market forces but also by social norms, regulations, and stakeholder expectations (DiMaggio & Powell, 1983). The widespread public concern over environmental impact and the prevalence of Extended Producer Responsibility (EPR) legislation force firms to adopt recycling capabilities to attain legitimacy and maintain a positive corporate image (Hazen et al., 2017).

Coercive Isomorphism: This is driven by government mandates, e.g., European Union's WEEE Directive or various state-level EPR laws, which legally require producers to finance or execute the recycling of their products.

Mimetic Isomorphism: Firms often adopt recycling practices to emulate industry leaders or competitors who are perceived as more sustainable, thereby reducing uncertainty and gaining social acceptance.

The economic justification for recycling is often framed by comparing the cost of collecting, processing, and selling secondary materials against the cost of acquiring and processing virgin raw materials, alongside the avoided cost of landfill disposal (Kopicki et al., 1195). For materials with high intrinsic value, e.g., precious metals in electronics, recycling can transition from a compliance cost to a profit-generating activity, strengthening the overall business case

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for Reverse Logistics Adoption. Furthermore, the environmental benefits, such as reduction in energy consumption, greenhouse gas emissions, and habitat disruption, provide a strategic lever for enhanced Corporate Social Responsibility (CSR).

The integration of high-volume recycling into Reverse Logistics Adoption requires overcoming significant operational hurdles that distinguish it from the forward supply chain.

Unlike the predictable forward flow, the reverse flow for recycling is inherently uncertain regarding quantity, timing, and quality (degree of contamination, wear, and damage) of the returned cores (Fleischmann et al., 1997). This uncertainty complicates operational planning, facility sizing, and labor scheduling, demanding flexible and highly adaptive logistics networks.

The core challenge in recycling is the efficient sorting and separation of commingled materials. Products, particularly electronics (WEEE), are composed of complex, multi-material structures, e.g., plastics, metals and glass—rare earth elements that are often difficult to separate without highly specialized, capital-intensive equipment. The lack of standardized disassembly or labeling protocols across industries further exacerbates this challenge, requiring substantial R&D investment in automated sorting technologies for effective Reverse Logistics Adoption (Wagner & Nes, 2003).

The economic viability of recycling is tightly coupled with the market prices of the resultant secondary materials. Low commodity prices can render collection and processing unprofitable, creating a cyclical dependence where recycling capacity shrinks when it is least economically attractive. Sustained recycling adoption requires firms to either absorb this volatility or achieve sufficient economies of scale to buffer against short-term price fluctuations, often through mandatory EPR schemes that ensure a steady material flow (Sarkis et al., 2011)

Recycling is indisputably a vital, non-negotiable component of comprehensive Reverse Logistics Adoption. While it sits at the base of the product recovery hierarchy in terms of value preservation, its role in managing high-volume waste streams, mitigating resource dependency, and satisfying institutional demands for environmental responsibility is paramount. Successful Reverse Logistics Adoption requires organizations to move beyond passive compliance and invest strategically in flexible, technology-driven reverse logistics infrastructures capable of managing the unique uncertainties of the recycling supply chain, thereby ensuring both environmental sustainability and long-term economic resilience.

Recycling is the necessary final stage of Reverse Logistics Adoption, focusing on resource recovery and regulatory compliance.

Recycling is critical for environmental compliance and corporate social responsibility (CSR), which influences Customer Satisfaction (Ogbechie & Nwankwo, 2018). Furthermore, high-quality recycling practices can reduce an SME's procurement costs for secondary raw materials, indirectly boosting Sales Growth by improving profit margins. In Rivers State, compliance with regulations on electronic and hazardous waste is especially important, making recycling a major factor in reducing regulatory risk (NDDC, 2021).

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Concept of Market Performance (MP)

Market Performance (MP) conceptually refers to the effectiveness and efficiency with which an enterprise competes within its industry, capturing customer value and achieving market goals (Lado & Wilson, 1994). It is a broader concept than mere financial performance, integrating a firm's market standing, customer relationships, and competitive position. Given the limitations of accessing audited financial statements in the SME context of Nigeria, MP is often measured using a mix of objective financial indicators (growth) and subjective, perception-based competitive measures (share, satisfaction), benchmarked against key competitors.

Measures of Market Performance

Following the established practice in SME performance studies (Simpson et al., 2012), this research adopts a hybrid, multi-dimensional approach to measuring MP. The measures of Market Performance adopted for this study are Sales Growth, Market Share and Customer Satisfaction.

Sales Growth (SG)

Sales Growth is a primary indicator of a firm's financial vitality and market acceptance. It captures the increase in the volume or value of goods and services sold over a period. In the context of RLA, efficient RL contributes to SG through:

Reduced Lost Sales: Rapid RM ensures customers are quickly served with replacements, preventing them from switching to competitors.

Revenue from Recovered Products: Resale of high-quality refurbished/remanufactured goods creates an entirely new revenue stream, directly contributing to SG.

Cost Efficiency: RL cost reductions (from recycling/reuse) can allow for more competitive pricing, thereby stimulating sales volume.

Market Share (MS)

Market Share reflects the competitive success of an SME in capturing a proportion of the total market demand. It is an indicator of the firm's competitive strength and market acceptance. RLA influences MS by the following:

Product Differentiation: The availability of certified remanufactured or refurbished products differentiates the SME from competitors who only offer new goods, allowing it to capture larger segments of the market.

Brand Reputation: Commitment to environmental responsibility through robust recycling and disposal practices enhances the firm's brand reputation and attracts environmentally conscious customers, leading to increased customer base and Market Share expansion (Ogbechie & Nwankwo, 2018).

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Customer Satisfaction (CS)

Customer Satisfaction is a non-financial, yet critically important, measure of performance, as it is a precursor to customer loyalty, repeat business, and positive word-of-mouth (Heskett et al., 1994). RLA primarily influences CS through these:

Seamless Returns: The efficiency and fairness of the Returns Management process are highly correlated with post-purchase satisfaction and loyalty.

Environmental Trust: Assurance that the SME is responsibly managing the product lifecycle, particularly through safe Recycling and Disposal, builds customer trust and reduces the cognitive dissonance associated with consumption (Panigrahi et al., 2018).

Empirical Review of the Relationship Between Reverse Logistics Adoption and Market Performance

Empirical literature globally has widely investigated the relationship between various elements of sustainable supply chain management (SSCM) and firm performance, providing a robust, albeit context-specific, foundation for this study.

Govindan and Bouzon (Global Review, 2018), on Systematic Review on Reverse Logistics, sustainable supply chain management, and firm performance, confirm a positive link between RL practices (especially remanufacturing and efficient returns) and competitive, environmental, and economic performance, which provides the core theoretical direction, but the findings lack contextual validation for SMEs in Nigeria's unique institutional environment.

Olorunniyi (Nigeria, 2020), on Qualitative Study on GSCM Barriers in Nigerian SMEs, identified financial constraints, lack of technical expertise, and weak regulatory pressure as primary barriers to Reverse Logistics implementation, confirms the operational challenges faced by Nigerian SMEs but does not provide quantitative evidence linking specific Reverse Logistics Adoption dimensions to specific Market Performance metrics.

Simpson et al. (UK/US, 2012), on Survey on SME Performance Measurement, advocate for the use of a hybrid approach for SMEs, combining financial (Sales Growth) and non-financial (Customer Satisfaction, Market Share) measures for reliable performance assessment, and justify the dependent variable measurement strategy but is geographically irrelevant for testing the Reverse Logistics Adoption-Market Performance causal link in a developing economy.

Chukwu and Okoro (South-East Nigeria, 2021), on Survey on the Impact of Green Logistics on Operational Performance of Manufacturing Firms, find a significant positive relationship between green logistics (including Reverse Logistics components) and operational performance (e.g., cost reduction), and focus on *operational* performance (internal efficiency) and not *market* performance (external competitiveness); the finding is confined to manufacturing firms and a different geopolitical zone.

Panigrahi et al. (Asia, 2018), on Tested Success Factors for Reverse Logistics Implementation, confirm that top management commitment and strategic partnerships are key to successful Reverse Logistics implementation and resulting business success, and highlight internal factors (RBV), but do not account for the strong moderating role of the external Regulatory Environment characteristic of emerging markets like Rivers State.

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Ogbara (Port Harcourt, Nigeria, 2019), on Case Study Linking Waste Management to Sustainability in Port Harcourt, finds that effective industrial waste management, a component of recycling, significantly contributes to the firm's perceived contribution to environmental sustainability, and provides contextual proof of Reverse Logistics performance linkage in Rivers State but is limited to a single case study, one Reverse Logistics dimension (waste management), and perceived environmental outcomes, not direct Market Performance.

Empirical studies overwhelmingly support a positive and significant link, demonstrating that Reverse Logistics Adoption impacts Market Performance through both direct differentiation and indirect cost efficiency.

Strategic Reverse Logistics Adoption fosters market differentiation by improving customer relationships and product perception. Quantitative analyses show that a strong commitment to end-of-life product management enhances brand trust and perception. This translates directly into higher customer retention and an increased Willingness To Pay for products from environmentally proactive firms, thus strengthening market share and price control (Prakash & Gupta, 2008).

The ability to execute effective reverse processes, especially in sectors that involve remanufacturing (e.g., automotive components), signals high confidence in product durability. This differentiation allows firms to offer stronger warranties or superior maintenance services, providing a competitive edge in the marketplace (Govindan et al., 2015).

Reverse Logistics Adoption benefits often manifest as internal efficiencies that enable external market success. Large-scale quantitative studies have confirmed a strong negative correlation between robust Reverse Logistics Adoption investment and raw material procurement costs (Srivastava, 2007). By reintroducing secondary materials into the forward loop, firms stabilize profit margins and secure the financial resources needed to aggressively pursue market share and R&D investment, thus funding long-term market growth.

Proactive Reverse Logistics Adoption reduces exposure to environmental litigation, regulatory fines, and negative media coverage. The avoidance of these non-trivial negative financial shocks contributes to the stable, superior financial performance necessary for maintaining a strong position in the market (Wu & Dunn, 1995).

The strength of the Reverse Logistics Adoption-Market Performance relationship is not universal and is subject to several moderating variables. Empirical studies have shown that the benefits are strongest when Reverse Logistics Adoption achieves economies of scale, suggesting that larger firms often realize greater Market Performance gains due to their ability to efficiently process larger volumes of returned products (Thierry et al., 1995). Furthermore, the impact is highly contingent on the industry context (stronger in high-value material sectors like electronics) and the degree of integration, where strategically embedding Revers Logistics data into new product design yields the highest Market Performance returns.

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METHODOLOGY

This study adopted cross-sectional survey research design, where all the variables of study were investigated as a one-time observation. A specific, up-to-date list of all small- and medium-sized enterprises (SMEs) in Rivers State is not publicly available, as this data changes frequently. However, a representative sample of top 10 small and medium scale businesses in Rivers State, as seen in Nigeria Business Directory - BusinessList.com.ng (2025), was selected for the study. However, examples of SMEs in various sectors include companies involved in logistics, furniture, engineering, and hospitality. The researcher conveniently administered three (3) copies of the questionnaire to management staff of each of the top 10 SMEs in Rivers State, bringing our respondents to 30. This number formed our data base for analysis. The research employed the use of Pearson moment Correlation Coefficient to test the relationship between the variables under study.

RESULTS AND DISCUSSION

The data collected on Reverse Logistics Adoption dimensions (Returns Management, re-manufacturing and recycling) were correlated with data obtained on the measures of Market Performance (sales growth, market share and customer satisfaction) of Small and Medium Enterprises in Rivers State, using SPSS Version 25 and the results are presented in the tables below:

Table 2: Description of the Degree of Association Between Variables

Range of r values	Description
±0.800 to 1.00	Very strong
±0.600 to .790	Strong
±0.400 to .590	Moderate
±0 .200 to .390	Weak
± 0.00 to .190	Very weak

Source: *SPSS correlated output*

The Pearson Product moment coefficient correlation is calculated using the SPSS 25.0 version to establish the relationship among the empirical referents of the dimensions of the predictor variable and the criterion variable. Correlation coefficient can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while the value of +1.00 represents a perfect positive correlation. A value of 0.00 represents a lack of correlation: all the coefficient values that indicate levels of significance (* or **), as calculated using SPSS, were accepted. Our confidence interval was set at the 0.05 (two tailed) level of significance to test the statistical significance of the data in this study.

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Questionnaire Analysis

The table below outlines the number of questionnaires distributed, collected and analyzed.

Table 3: Analysis of questionnaire distribution

Numbers	Questionnaire	Percentage (%)
No. Sent out	30	100%
No. Returned	26	87%
No. Not Returned	4	13%

Source: *Field Survey Data (2025)*

The table above shows that a total of 30 copies of questionnaire were distributed, out of which 26 (87%) were retrieved while 4 (13%) were not retrieved. However, 26 (87%) of the retrieved questionnaire were useful. The 26 (87%) of the returned and useful questionnaires were deemed sufficient to conduct the study.

Table 4: Correlations for the relationship between Returns Management (RM) and Sales Growth

		Returns Management	Sales Growth
Returns Management	Correlation coefficient	1	.968
	Sig. (2-tailed)		.000
	N	26	26
Sales Growth	Correlation coefficient	.968	1
	Sig. (2-tailed)	.000	
	N	26	26

Correlation is significant at the 0.01 level (2-tailed).
Source: *Research Data 2025 (SPSS output version 25.0)*

From the result in the table above, the correlation coefficient shows that there is a positive relationship between Returns Management and Sales Growth. The correlation coefficient of .968 confirms the magnitude and strength of this relationship and it is statistically significant at $p = 0.000 < 0.05$. The correlation coefficient represents a very high correlation between the variables. Therefore, based on empirical findings, we infer that Returns Management significantly influences Sales Growth of SMEs in Rivers State.

Table 5: Correlations for the relationship between Re-manufacturing and Market Share

		Re-manufacturing	Market Share
Re-manufacturing	Correlation coefficient	1	.934
	Sig. (2-tailed)		.000
	N	26	26
Market Share	Correlation coefficient	.934	1
	Sig. (2-tailed)	.000	
	N	26	26

Correlation is significant at the 0.01 level (2-tailed). **Source:** *Research Data 2025*

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From the result in the table above, the correlation coefficient shows that there is a positive relationship between Re-manufacturing and Market Share. The correlation coefficient of .934 confirms the magnitude and strength of this relationship and it is statistically significant at p = 0.000 < 0.05. The correlation coefficient represents a high correlation between the variables. Therefore, based on empirical findings, we infer that Re-manufacturing significantly influences Market Share of SMEs in Rivers State.

Table 6: Correlations for the relationship between Recycling and Customer Satisfaction

		Recycling	Customer Satisfaction
Recycling	Correlation coefficient	1	.979
	Sig. (2-tailed)		.000
	N	26	26
Customer Satisfaction	Correlation coefficient	.979	1
	Sig. (2-tailed)	.000	
	N	26	26

Correlation is significant at the 0.01 level (2-tailed).
Source: *Research Data 2025 (SPSS output version 25.0)*

From the result in the table above, the correlation coefficient shows that there is a positive relationship between recycling and Customer Satisfaction. The correlation coefficient .979 confirms the magnitude and strength of this relationship and it is statistically significant at p = 0.000 < 0.05. The correlation coefficient represents a very high correlation between the variables. Therefore, based on empirical findings, we infer that Recycling significantly influences Customer Satisfaction of SMEs in rivers state.

DISCUSSION OF FINDINGS

Based on the theoretical grounding in the Resource-Based View (RBV) and the existing global empirical literature, this study expects to find a statistically significant and predominantly positive relationship between the dimensions of Reverse Logistics Adoption (RLA) and Market Performance (MP) among SMEs in Rivers State.

This section discussed the findings obtained in the study regarding the relationships between the variables and compared them with extant literature so as to see if they are in agreement or not. From the analysis of the relationship between returns management and market performance, the correlation coefficient shows that there is a positive relationship between returns management and market performance. The correlation coefficient of .968 confirms the magnitude and strength of this relationship and it is statistically significant at p = 0.000 < 0.05. The study expects to find a significant positive influence of Returns Management (RM) on Sales Growth (SG). This finding will be discussed by linking efficient RM to reduced lost sales opportunities and the creation of re-sale revenue streams from quickly processed returns. This would be interpreted as evidence that even basic Revers Logistics activities, by minimizing friction in the customer transaction process, directly support the financial performance metrics (SG), corroborating findings from the service quality literature (Heskett et al., 1994).

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Also, the correlation coefficient shows a positive relationship between re-manufacturing and market performance. The correlation coefficient of .934 confirms the magnitude and strength of this relationship and it is statistically significant at $p = 0.000 < 0.05$. It is expected that Remanufacturing will exert a significant positive influence on Market Share (MS). The discussion will centre on the competitive differentiation enabled by the Remanufacturing capability, which, consistent with the Resource Based View, allows the SME to tap into new, price-sensitive market segments with warranted "like-new" products. This creates a superior competitive positioning and enhances brand image, directly contributing to Market Share gains, supporting claims by Govindan and Bouzon (2018) regarding the strategic value of advanced Reverse Logistics.

Again, the correlation coefficient shows a positive relationship between recycling and Customer Satisfaction. The correlation coefficient of .979 confirms the magnitude and strength of this relationship and it is statistically significant at $p = 0.000 < 0.05$. The correlation coefficient represents a very high correlation between the variables. The analysis is expected to reveal a positive relationship between formal Recycling and Customer Satisfaction (CS). The discussion will interpret this finding through the lens of Stakeholder Theory, arguing that transparent, compliant Recycling practices enhance the firm's organizational legitimacy and CSR profile. Customers reward this perceived environmental stewardship with higher loyalty and satisfaction, providing empirical support for the link between green practices and non-financial market outcomes (Ogbechie & Nwankwo, 2018).

The findings confirm that Reverse Logistics Adoption dimensions have a significant positive influence on Market performance outcomes, with returns management being the most influential dimension. The study contributes to the understanding of how reverse logistics adoption can enhance reverse logistics practices and provides practical insights for logistics and supply chain managers.

CONCLUSION

This study is designed to empirically confirm the thesis that Reverse Logistics Adoption (RLA) is a significant predictor of Market Performance (MP) among Small and Medium Enterprises (SMEs) in Rivers State. The theoretical framework, anchored in the Resource-Based View and Institutional Theory, suggests that RLA operates as a strategic, inimitable capability that simultaneously reduces costs (via resource recovery) and enhances market differentiation (via customer service and brand legitimacy).

The expected findings will lead to the overall conclusion that RLA is a viable and necessary strategic imperative for competitive advantage in the region. Furthermore, the anticipated positive moderation by the Regulatory Environment will lead to the conclusion that the efficacy of SME sustainability strategies is fundamentally dependent on the rigour and consistency of governmental enforcement, providing crucial context-specific validation of Institutional Theory in the Niger Delta context.

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RECOMMENDATIONS

Based on the expected results, the following academic and practical recommendations will be advanced to ensure the findings lead to actionable strategic and policy outcomes:

Recommendations for Management (SMEs)

Strategic Resource Allocation to Returns Management: SME managers must treat Returns Management as a core strategic function, not as a mere logistics task. Investment in dedicated personnel, IT systems, and streamlined Gatekeeping processes is recommended to optimize customer experience and maximize the preservation of product value upon return, which is the fastest route to improving Customer Satisfaction and Sales Growth.

Establish Collective Remanufacturing Hubs: Given the high capital cost of specialized equipment, SMEs are advised to form Inter-Firm Logistics Consortia or partnerships. This collaborative model, supported by shared infrastructure, would allow multiple SMEs to achieve the necessary economies of scale for cost-effective Remanufacturing and Refurbishment, transforming the highest-value recovery dimension from a financial burden into a sustainable competitive capability.

Proactive Environmental Certification: Management should pursue voluntary environmental certifications (e.g., ISO 14001 or equivalent local standards) related to Recycling and Disposal. This proactive approach, beyond mere compliance, serves as a powerful market signal of responsibility, further enhancing brand legitimacy and Competitive Positioning (Market Share).

Recommendations for Government and Policymakers (Rivers State/Federal Agencies)

Enforce Regulatory Consistency: Regulatory bodies, including NESREA and the state Ministry of Environment, must prioritize the consistency and transparency of enforcement of environmental laws. The study posits that consistent coercive pressure is necessary to amplify the competitive advantage derived from Reverse Logistics Adoption, thereby making sustainability an economic necessity rather than an optional cost.

Incentivize Advanced Reverse Logistics Adoption: The government should introduce Financial and Fiscal Incentives specifically targeting high-value RL activities. This should include tax credits for firms investing in Remanufacturing equipment, subsidized loans for establishing internal recycling capacity, and preferential procurement for SMEs that demonstrate verified closed-loop operations. This shifts the policy instrument from punitive compliance to facilitative economic reward.

Suggestions for Further Research

Qualitative Exploration of Institutional Voids: A subsequent qualitative study (e.g., case studies or interviews) is suggested to explore in depth how SMEs strategically navigate institutional voids, e.g., unreliable power, poor roads and the complex relationship with the informal waste sector in Rivers State, and how these factors functionally constrain or enable Reverse Logistics Adoption.

Longitudinal Study of Reverse Logistics Adoption-Marker Performance Link: To conclusively establish causality (which is limited by the current cross-sectional design), a longitudinal panel

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study is required. This would track RLA investments and subsequent MP changes over a 3–5 year period among a fixed sample of Rivers State SMEs.

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