



RESEARCH AND DEVELOPMENT INVESTMENTS, INNOVATIVE OUTPUT AND FINANCIAL PERFORMANCE OF LISTED CONSUMER GOODS FIRMS IN NIGERIA

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Abstract

As it is generally expected that research and development (R&D) spending should translate into higher financial returns, many listed consumer goods firms in Nigeria continue to record R&D outlays that do not correspond to improved profitability. This raises doubts about whether R&D investment can singlehandedly drive financial performance in the sector. This study addresses this problem by examining how research and development investment, research and development intensity, and innovative output separately affect the financial performance of listed consumer goods firms in Nigeria between 2013 and 2023. Innovation has been believed to improve financial success, particularly in emerging economies where it is required that firms navigate rapidly changing consumer preferences and intense competition. Innovation is widely recognized as a critical driver of financial success, particularly in emerging economies where firms must navigate rapidly changing consumer preferences and intense competition. Data were hand-collected from the audited annual reports of fourteen (14) purposively selected listed consumer goods firms in Nigeria, yielding 154 firm-year observations. Both descriptive statistics and a panel data approach were employed; the Hausman test favoured a random-effects specification, but because the data exhibited heteroskedasticity and serial correlation, the model was estimated using robust least squares regression. The findings show that though R&D expenditure relative to sales at $\beta = 0.1419$, $p = 0.5962$ and total R&D investment at $\beta = 0.0050$, $p = 0.2339$ have a positive effect on financial performance, yet they are statistically insignificant. This indicates that increasing research and development expenditure, whether in absolute terms or relative to sales, does not on its own translate into improved financial outcomes. Meanwhile, innovative output is statistically significant ($\beta = 1.0271$, $p = 0.0000$) with positive effect on financial performance. The model also explains about 73 percent of the variation in financial performance ($R^2 = 0.7286$). The implication of this is that how much is incurred on R&D expenditure does not drive financial returns, innovation does. The findings suggest that firms should adopt a strategic approach that focuses R&D investment on innovations. Financial returns improve when R&D spending focuses on marketable innovations.

Keywords: Financial performance, innovation output, return on investment, research and development investment, research and development intensity

JEL Classification: O31, O32, G31, L25

1. Introduction

Firms constantly innovate to have competitive hedge. According to Al-Shaikh and Hagan (2023), they reinvent for them to survive volatile macroeconomic conditions and the rapidly changing consumer tastes. Despite the importance of research and development (R&D), UNESCO Institute for Statistics (2023) reported that investment in it is remarkably low in Nigeria. The institute maintained that the gross domestic expenditure on R&D stood at approximately 0.28 percent of GDP, which is far below the global threshold of 1.11 percent. R&D spending among Nigerian manufacturing firms is

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abysmally low at less than 1 percent of sales, vis-à-vis the 3%-4% in developed economies (Adegbite & Ayadi, 2011). Consumer goods firms occupy a strategically important position within this landscape: the sub-sector anchors Nigeria's manufacturing base, with the food and beverage industry alone accounting for close to half of manufacturing's contribution to GDP (National Bureau of Statistics, 2023). It is distinguished from other manufacturing sub-sectors by its direct exposure to fast-changing consumer preferences, low switching costs, and intense price competition, all of which place a premium on the ability of firms to convert R&D spending into innovations that consumers will buy. Against this backdrop, it remains unclear whether the limited R&D investment that Nigerian consumer goods firms undertake delivers a commensurate financial return, or whether such spending, when it fails to translate into innovative output, leaves firms no better off financially. Businesses innovate and invest in R&D to preserve their competitive edge, adjust to consumers' tastes, technical breakthroughs, and regulatory constraints so that they can be relevant as the global marketplace grows more competitive and dynamic (Al-Shaikh & Hagan, 2023).

Investment in Research and Development (R&D) is among the key factors to determine how well firms perform financially in the global world (Al-Shaikh & Hagan, 2023). Previous research has shown that an organization's market value is regularly and favorably impacted by its R&D spending. However, the level of the impact of R&D investment on financial performance remains a focus of discussion, predominantly in evolving economies like Nigeria, where firms experience meager resource, regulatory challenges, and market instability. The direct effect of R&D intensity on financial performance remains underexplored in the Nigerian context too. While some firms invest heavily in R&D, their financial outcomes do not always reflect a proportional increase in profitability or market share. This raises concerns about the efficiency of R&D expenditure, the innovation capabilities of firms, and the structural barriers restricting the impact of R&D on firm performance. Financial performance is a measure of through which the prosperity and well-being of companies can be ascertained (Abi-Saad et al., 2024). Fragile financial outcomes may be a sign that shows abysmal problems like poor management, challenging market situations, or ineffective tasks (Al-Sowaidi & Faour, 2023). Bhattarai (2024) explains that the quality and performance of products can be enhanced when firms engage in quality pricing, improve customers' happiness, and strengthen brand reliability which can snowball to revenue growth and improve its financial performance measures.

R&D investment builds firm-specific resources and capabilities; these resources are reconfigured into innovative output in the form of new or improved products, processes, and services; and it is this innovative output, rather than R&D spending in itself, that is ultimately converted into superior financial performance. This R&D investment-innovative output-financial performance pathway provides the conceptual basis for examining R&D investment, R&D intensity, and innovative output as distinct, sequentially related constructs in this study, rather than as interchangeable proxies for innovation. Despite the theoretical and empirical arguments showing a positive relationship between R&D and firm performance, it remains unclear whether R&D investment significantly improves financial performance in Nigeria's consumer goods sector or if it simply constitutes an additional cost burden with minimal economic benefits. This study supposes that companies that innovate should have improved financial performance. Considering this assumption, this study endeavors to establish the influence of R&D investments and innovation output on financial performance of Nigerian listed consumer companies. Based on the foregoing, this study seeks to empirically examine whether there is a significant relationship between R&D investment and financial performance in listed consumer goods firms in Nigeria. It also examines the significance of R&D intensity on financial performance in the sector. The study will give understandings of the effectiveness of R&D

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investments in driving financial performance and offer strategic recommendations for firms and policymakers on optimizing R&D expenditures for long-term profitability and market competitiveness when we address these gaps.

2. Literature Review

Conceptual Review

Research and Development Investment

R&D investment refers to costs associated with finding new information, creating new goods or procedures, and refining already existing ones. It entails the methodical actions businesses take to promote innovation and create new intellectual property, which may result in the development of distinctive goods, services, or technological advancements that set them apart from rivals (Schumpeter, 2021). The possibility for R&D investment to improve efficiency, cut costs, and create new market niche explains how essential it is and the extent it may sustain long-term business development and economic development (Nworie et al., 2025). Investment in R&D represents one way for firms to delve into new products and research to fortify existing product-market stance, and/or gives opportunities to enter new product-market sphere (Katila & Ahuja, 2002), thereby improving performance. Investment in R&D is commonly observed at the company level as a strategic goal that is expected to affect the immediate success of a company and its survival in the long run. It was revealed by Taherdoost (2024) that companies that engage in consistent investments in R&D are likely to better react to technological interferences, adjust to changing market situations, and satisfy varying customer anticipations. The logic behind this is that R&D helps to create new capacities and enhance existing goods and procedures, which are critical for maintaining competitiveness in continuously changing markets (Cohen & Levinthal, 2022). However, valuable intellectual property can be developed which may stem from the after effect of R&D investment. These assets legally protect businesses and at the same time offer conceivable revenue streams through licensing or commercialization (Mary & Enoch, 2024). Observing at the economic feature of it, expenses on R&D are crucial forces behind regional and national innovation systems, which aim at promoting general economic expansion and ensuring the well-being of society. The justification to support frequent innovation goes beyond the firms that invest in R&D, its ripple effect extends to other enterprises, industries, and society at large (Amankwah-Amoah & Medase, 2024) resulting from board characteristics (Dorfleitner and Kreuzer, 2024). This made Fagerberg (2005) conclude that R&D-driven technological discoveries can consequently lead to higher productivity in a variety of industries, produce improved products and services that will positively impact quality of life, and the development of high-skilled jobs.

Research and Development Intensity

Calculating expenditure on R&D as a percentage of revenue from sales is done by netting off the amount spent on R&D from the amount that is made from the investment. It is also referred to as research and development intensity. The figures that we arrived at are then divided by the total expenditure on R&D by the total expenditure on sales revenue multiplied by 100. This ratio is crucial for appraising the strategic emphasis on innovation of a business. Adegbite and Ayadi (2011) in their study, report that spending on R&D by manufacturing companies which amount to less than 1% of total sales in Nigeria is far less than the global expected average of 3-4% in more developed nations. Accomplishing and sustaining a strong ratio of R&D intensity strengthens the ability of a company to innovate, making it possible to produce new goods and services that will cater for the needs of consumers. For instance, R&D expenditures increased the market share of Nigerian Breweries by creating new beverage varieties that met the taste of the region (Adegbite & Ayadi, 2011). However,

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Obiki-Osafiele et al. (2024) observe that R&D investment promotes operational efficiencies in a business that wants to streamline production procedures and cut expenses. This can be seen in the telecom industry like MTN Nigeria and Airtel Nigeria that spent handsomely on technology advancements and network enhancements to offer better service at lower prices to their users (Okoh, 2025). However, the incessant increase in the cost of borrowing and constrained access to financial markets makes it challenging for many Nigerian businesses to raise the needed funds to finance in R&D. Institutional frameworks and supporting infrastructure are often lacking to make R&D activities easier. Ogunmola (2024) advocates for speedy improvement in innovation ecosystem in Nigeria and encourage industry-academic collaboration that will aid improved productivity.

Return on Investment

Among the centerpiece of idea of investment research and financial management is return on investment (ROI). Brealey et al. (2017) assert that ROI enables stakeholders such as managers and investors to understand clear and concise ways to evaluate the financial performance of an investment, thereby making it possible for them to easily compare its returns on various ventures, enterprises, or financial instruments. ROI has been broadly used in cost-benefit analysis of new business, projects or technology to know their potential financial inflow (Pöhler & Teuteberg, 2024). However, it does not consider time value of money, which can be a precarious issue in long-term investment decisions, neither does it inherently study the risk that may be associated with an investment (Damodaran, 2024). The intricacy of ROI becomes more glaring when it comes to R&D. Since the expected returns from investing in R&D are unclear and take ample time to actualize, it is difficult to calculate their returns with conventional ROI criteria (Lerner, 2010). This is premised on the fact that the returns may depend on the market acceptability of the product, the dynamism of competition from other firms, and technological advancements. Despite this, a quick and easy means of comparing expected profit accruable from investment in R&D is to deploy ROI rather than other metrics. Its significance in strategic decision-making and financial management is deep-rooted; yet, if further comprehensive studies are needed, it will be essential to recognize its limits and complement it with other measures.

Theoretical Framework

Resource-Based View (RBV) Theory and Dynamic Capabilities Theory have been closely linked to this study. Resource-Based View (RBV) Theory posits that a firm's competitive advantage and financial performance depend on its internal resources (Penrose, 2009). In the context of RBV, R&D investment is treated as a deliberate accumulation of such resources, knowledge, technical know-how, patents, and product-development competence, that, once embedded in the firm, distinguish it from rivals and create the basis for superior returns. Dynamics Capabilities Theory focuses on the ability of a firm to integrate, build, and reconfigure internal and external competencies to address swiftly changing environments (Teece, et al., 1997). Dynamic Capabilities Theory addresses this gap by explaining how firms sense market opportunities, seize them, and reconfigure internal and external competencies to respond to rapidly changing environments (Teece et al., 1997). Applied to this study, dynamic capabilities are what allow a firm to convert the resources created through R&D investment into innovative output, that is, into new or improved products, processes, and services that the market values. Taken together, these theories imply a sequential mechanism through which R&D activity is expected to affect firm performance.

Research and Development Investment and Financial Performance

In recent times, researchers in accounting, finance, and strategic management have focused on investment in research and development (R&D) and the possible competitive advantages and enhanced financial performance firms may have from the activities. R&D expenditure is a strategically tailored investment in intangible assets that can facilitate product innovation, process improvement, and technological advancement. This is expected to strengthen a firm's market position and long-term profitability. Consequently, a growing body of empirical literature has examined whether investments in R&D translate into superior financial outcomes. Studies have revealed that R&D investments improve financial performance. In the Nigerian context, according to Odei et al. (2023) and Christopher et al. (2023), firms that set aside substantial amount to research and innovation tend to achieve superior operational efficiency and profitability relative to their competitors. This shows firms that invest consistently in innovative ideas are able to respond to technological disruptions, evolving consumer preferences, and competitive pressures (Agbai & Okey, 2024).

The relationship between R&D investment and financial performance remains inconclusive despite the expected benefits from it. Some authors argue that the financial benefits of R&D may not materialize until future time due to the uncertain and long-term nature of innovation activities (Hailegebreal, 2022; Leung & Sharma, 2021; Gupta, 2021). Some also argue that R&D projects are capital intensive with lengthy gestation periods, and uncertain outcomes. This may exert pressure in the meantime on profitability and cash flows of the firm. Modupe et al. (2023) in their research on Nigerian firms found that budgetary constraints, limited access to long-term financing, and uncertainty regarding future returns discourage firms to commit substantially to R&D investment. Consequently, while R&D investment may enhance long-term performance, its short-term effect on financial outcomes may be weak or even negative. The foregoing shows the divergent results on empirical evidence of R&D–performance nexus across sectors and institutional settings. These inconsistencies indicate that the relationship remains an empirical issue requiring further investigation, particularly within emerging economies where institutional and financial constraints may influence the effectiveness of innovation investments. Given the strategic importance of innovation and the inconclusive nature of existing evidence, this study re-examines the effect of R&D investment on the financial performance of listed consumer goods firms in Nigeria. Based on the foregoing, the following hypothesis was formulated:

H₀₁: Research and development investment has no significant effect on the financial performance of listed consumer goods firms in Nigeria.

Research and Development Intensity and Financial Performance

Research and development (R&D) intensity represents a firm's commitment to innovation and knowledge creation. It is commonly measured as R&D expenditure relative to sales. From the point of view of RBV, R&D investments are strategic intangible assets capable of generating sustainable competitive advantages. Many scholars have different views on the contribution of R&D intensity to firm performance. The research conducted by Shi et al. (2023) revealed that R&D, if given appropriate attention, enhances profitability by facilitating innovation and enabling firms to differentiate their products and services in increasingly competitive markets. Similarly, Chukwuka and Imide (2024) in their research reveal that manufacturing firms in Nigeria that dedicate a substantial fund to R&D are bound to experience stronger sales growth. These findings suggest that R&D activities create value not only through revenue expansion but also through improvements in production efficiency and

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cost reduction. R&D intensity has also been linked to broader measures of corporate value creation. Intentional investment in R&D also improves firm performance in the long run (Kumar et al., 2020; Alam et al., 2020; and Hailegebreal, 2022).

Furthermore, Zhang and Mohnen (2022) and Schmidt et al. (2024) also argue that sustained R&D expenditure serves as a credible signal of a firm's long-term growth prospects, thereby enhancing investor confidence and market valuation. However, some studies report contrary views which make the literature remain inconclusive. The study of Leung and Sharma (2021) found that R&D intensity adversely affects financial performance in the short term. According to the authors, it can be as result of lengthy commercialization periods, and substantial resource commitments. From Nigeria context, Ujah-Ogbuagu (2021) identifies some obstacles to embarking of R&D activities. They include inadequate financing, weak infrastructure, and limited policy support in Nigerian firms. Such institutional challenges may constrain the ability of firms to convert innovation investments into measurable financial gains, thereby explaining variations in prior findings. Despite the strategic importance of innovation for sustainable competitiveness, evidence on the R&D intensity–financial performance nexus within the Nigerian consumer goods sector remains limited and fragmented. Given these theoretical arguments and the inconsistent empirical findings, further investigation is required to establish whether R&D intensity enhances the financial performance of listed consumer goods firms in Nigeria. Accordingly, the following hypothesis is proposed:

H₀₂: Research and Development Intensity has no significant effect on the financial performance of listed consumer goods firms in Nigeria.

Innovative Output and Financial Performance

The attention of many scholars has been drawn to the relationship between innovative output and financial performance. Abid et al. (2023) explain that innovation helps firms to develop differentiated products, improve operational efficiency, and respond effectively to changing market conditions. There are some other studies that empirically support that innovative output enhances firm performance. In the Nigerian context, Joseph et al. (2023) reported that manufacturing firms that invest more in innovation experience more sales growth and profitability compared to less innovative firms. The study further demonstrated that product innovation helps to increase customer satisfaction and loyalty. This will eventually enable a steady revenue stream and ensure strong financial performance. Beyond direct financial gains, innovative output can enhance corporate reputation, increase stakeholder confidence, and improve access to financial resources, all of which may contribute to firm value. Wang et al. (2020), whose research focused on developed markets, argue that institutional, technological, and market conditions differ substantially across economies. This makes the findings inappropriate for generalization in both developed and developing economies. In environments characterized by financial constraints, infrastructural deficiencies, weak innovation ecosystems, and market imperfections, the benefits of innovation may not be fully realized or may materialize only in the long term.

Several studies have shown mixed results on innovative output and financial performance in emerging markets. They either reported insignificant or weak associations. Tavassoli (2018) and Gupta (2021) found that innovation does not means there will be improved financial results. These contrasting findings suggest that the financial implications of innovative output may be context-dependent and influenced by country-specific economic and institutional factors. Previous studies, therefore, reveal that there is a significant gap in the literature that requires to be empirically filled.

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These studies examined the relationship between innovation and firm performance, yet with mixed results. Limited attention has been devoted to understanding whether innovative output generates measurable financial benefits among firms in Nigeria especially among listed consumer goods firms, a sector that faces increasing competitive pressures, changing consumer preferences, and technological disruptions. Consequently, further empirical investigation is required to ascertain whether innovative output serves as a value-enhancing mechanism within the Nigerian consumer goods industry. Based on the foregoing arguments, the study hypothesizes as follows:

H₀₃: Innovative output does not have a significant effect on the financial performance of listed consumer goods firms in Nigeria.

3. Methodology

Population, Sample, and Data

The study adopted an ex-post facto research design. Variables of interest for the study are drawn from historical financial statements that already exist and cannot be manipulated by the researcher. This design is appropriate for establishing relationships among variables using secondary, already-occurred data (Purwanti et al., 2024). Fourteen (14) firms were purposively selected from a population of forty-eight (48) consumer goods firms listed on the Nigerian Exchange Group (NGX) over the period 2013-2023. The selection was purposive because the study requires firms with a complete eleven-year panel of data, selecting firms with incomplete records and unbalanced panels will lead to incomplete data. Three exclusion criteria were applied sequentially to the population of forty-eight (48) firms. First, firms incorporated after 2013, the base year of the study, were excluded because they could not provide a complete eleven-year panel; this eliminated four (4) firms. Second, firms that were suspended from trading or inactive as at the end of 2023 were excluded, another nine (9) firms were further removed, leaving thirty-five (35) firms. Third, firms that did not disclose specific information relating to non-mandatory disclosure (NMD) in their annual reports throughout the study period were excluded; this removed the remaining twenty-one (21) firms. Applying these three criteria reduced the population to the final sample of fourteen (14) firms, yielding a balanced panel of 154 firm-year observations (14 firms × 11 years), with data hand-collected from the firms' published annual financial statements.

Method of Data Analysis

Data were analyzed in four stages. First, descriptive statistics were computed to characterize the distribution of the variables. This includes mean, median, standard deviation, the Jarque-Bera test of normality and so on. Second, the study used Pearson correlation analysis to provide a preliminary check for multicollinearity and to examine the strength and direction of association among the variables. The Augmented Dickey-Fuller (ADF) panel unit root test confirmed the stationarity of the variables, while the Hausman specification test confirmed which of fixed-effects or random-effects panel estimators should be used. The cross-section heteroskedasticity LR test and a serial correlation LM test were used to check the model for heteroskedasticity and autocorrelation. Finally, given the presence of heteroskedasticity and serial correlation, the hypothesized relationships were tested using robust least squares regression, which produces heteroskedasticity- and autocorrelation-consistent estimates, at the 5% level of significance.

Model Specification

Adeoye and Elegunde (2021) modelled the relationship between innovation and firm performance among Nigerian manufacturing firms in the general functional form $Performance_{it} = f(Innovation_{it})$,

with firm performance proxied by sales growth and profitability and innovation proxied by a composite innovation measure. This study adapts this model to the listed consumer goods context in two respects. First, the dependent variable is narrowed from a broad performance measure to return on investment (ROI). This captures the profitability realized on capital committed to R&D. Second, the single composite innovation construct is disaggregated into three theoretically distinct measures, R&D expenditure relative to sales (RDERS), R&D investment (RDI), and innovative output (IO), consistent with the Resource-Based View and Dynamic Capabilities Theory discussed in Section 2.1, which treat R&D investment, R&D intensity, and innovative output as sequentially related rather than interchangeable constructs. This disaggregation is what makes the model suitable for the present study: it allows the resource-creation effect of R&D spending (Hypotheses 1 and 2) to be separated from the capability-conversion effect of innovative output (Hypothesis 3) on financial performance, a distinction the original, single-construct model could not draw.

To test the effect of R&D investment on financial performance of listed consumer firms in Nigeria, the study adapted and modified the model of Adeoye and Elegunde (2021) as follows:

$$ROI_{it} = f(RDERS_{it}, RDI_{it}, IO_{it}) \tag{i}$$

While the full specification of the regression equation using unranked OLS was assumed to be:

$$ROI_{it} = \beta_0 + \beta_1RDERS_{it} + \beta_2RDI_{it} + \beta_3IO_{it} + \mu_{it} \tag{ii}$$

where ROI is the Return on Investment, R&DERS as Research and Development Expenditure and Revenue on Sales, R&DI as Research and Development Investments and IO as Innovative Output. The *i* is the *i*th firm while *t* is the period (2013-2023), β_0 is the Intercept, β_1 - β_3 are coefficients of independent variables and μ is the model disturbance term.

Variable Measurement

Table 1: Summary of Variable Measurement and A Priori Expectation

Variable	Acronym	Measurement	A Priori Expectation	Source
Return on Investment	ROI	Net Profit divided by Investment Costs, multiplied by 100	Dependent variable	Olokundun et al. (2019)
R&D Expenditure to Sales (R&D Intensity)	RDERS	Total R&D expenses divided by Total revenue from sales, multiplied by 100	+	Insee & Suttipun (2023)
R&D Investment	RDI	Total R&D expenditure incurred by the firm during the year	+	Amahalu & Okudo (2023)
Innovative Output	IO	Increase in productivity attributable to R&D investment, relating to customer satisfaction and market impact of the product	+	Ukpabio et al. (2017)

Source: Author’s Compilation (2025)

4. Results and Discussion

Table 2: Descriptive Statistics

	ROI	RDES	R&DE	INVO
Mean	13.1987	4.8071	257.3052	5.9578
Median	13.0000	4.8000	257.5000	5.9000
Maximum	14.3000	5.4000	300.0000	7.0000
Minimum	11.8000	4.3000	215.0000	5.1000
Std. Dev.	0.7599	0.3055	21.8217	0.5537
Skewness	-0.0845	0.0577	0.0268	0.1938
Kurtosis	1.5747	1.7725	1.9397	1.5729
Jarque-Bera	13.2191	9.7537	7.2329	14.0323
Probability	0.0013	0.0076	0.0269	0.0009
Observations	154	154	154	154

Source: Author’s Computation (2025)

Table 2 presents the descriptive statistics for Return on Investment (ROI), R&D Expenditure to Sales (RDES), R&D Expenditure (R&DE), and Innovative Output (INVO) for the listed consumer goods companies in Nigeria. The relatively small difference between the mean and median of ROI (13.1987 and 13.0000 respectively) suggests that the distribution of ROI is fairly balanced, with no evidence of substantial skewness. The value of ROI range from a minimum of 11.8000 to a maximum of 14.3000, with a relatively narrow spread of 2.5. The S.D (0.7599) suggests that sampled firms earned stable returns on investment.

It also showed a mean value of 4.8071 and a median of 4.8000 for RDES. The investment of the firms in R&D is not up to 5% of their sales revenue for the period. RDES that ranged between 4.3000 and 5.4000 with a S.D. (0.3055) shows that firms pursue moderate levels of R&D intensity relative to sales. R&DE has a mean of 257.3052 and a median of 257.5000 as shown in table 1. There is a closeness in the values reflecting substantial R&D spending across the sector. R&DE ranges between a minimum of 215.0000 and maximum of 300.0000, with a S.D. (21.8217). This shows more pronounced variability in absolute spending across firms than it is seen in the percentage-based RDES measure. It likely reflects differences in firm size and strategic priorities. INVO has a mean of 5.9578 and a median of 5.9000, with a standard deviation of 0.5537 too. This indicates that firms convert R&D spending into innovative output on average, although the spread of values suggests that some firms do so more effectively than others.

Test of Variables

Correlation Coefficient

Table 3: Correlation Matrix

Probability	ROI	RDES	R&DE	INVO
ROI	1.0000			
RDES	0.9169	1.0000		
	0.0000			
R&DE	0.9313	0.9715	1.0000	
	0.0000	0.0000		

INVO	0.9470	0.9707	0.9771	1.0000
	0.0000	0.0000	0.0000	

Source: Author’s Computation (2025)

Table 3 reports the correlation analysis for the study variables. It shows a strong correlation between ROI and R&D intensity ($r = 0.9169$, $p < 0.001$), and with total R&D expenditure ($r = 0.9313$, $p < 0.001$). This is a pointer to the fact that firms achieve higher profit when they commit more resources to R&D. A high correlation is also observed between RDES and R&DE (0.9715), and between innovative output (INVO) and RDES (0.9707). INVO and R&DE are also highly correlated (0.9771), all with p-values of 0.0000. While this confirms that firms with higher R&D expenditure tend to be more innovative, the magnitude of these correlations (all above 0.90) among the variables indicates an early warning sign of multicollinearity (Gujarati & Porter, 2009). As a precautionary step given this concern, the study estimated the model using robust least squares regression, which is less sensitive to correlated regressors than ordinary least squares, and interpreted the individual coefficients on RDES, R&DE, and INVO with appropriate caution.

Unit Root Test

Table 4: Unit Root Test

Variables	Statistics	Prob	Order of Integration	Remark
ROI	49.6207	0.0071	I(0)	Stationary at level
RDES	46.3482	0.016	I(0)	Stationary at level
R&DE	43.9564	0.0281	I(0)	Stationary at level
INOV	47.1824	0.0131	I(0)	Stationary at level

Source: Author’s Computation (2025)

The stationarity of the study variable was stated using the Augmented Dickey-Fuller unit root test. This test is required to ascertain the suitability of variables for analysis. The result of the test as shown in Table 4 shows that all variables are stationary at level since their p-values are less than 0.05. Therefore, we rejected the null hypothesis stating that the variables have a unit root. It therefore means that, the variables can be estimated using ordinary least square estimate.

Diagnostic Test

Table 5: Diagnostic Test

Test	Chi-Sq. Statistic	df	Prob.
Cross-section Heteroskedasticity LR Test	40.4394	13	0.0002
Breusch-Godfrey LM Test	6.75869	2	0.0016
Hausman Test	4.73266	3	0.1925

Source: Author’s Computation (2025) *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Heteroskedasticity Test

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The result of the cross-section heteroskedasticity LR test and the serial correlation LM test, both shown in Table 5, reveal that the model is not free from the problem of heteroskedasticity and serial correlation, since both tests report p-values less than 0.05. Hence, the model is estimated using a robust least square regression-analysis in order to take care of the problem with serial correlation and heteroskedasticity.

Hausman Test

The Hausman test is carried out to determine if the random effect or fixed effect model is appropriate. The result of the Hausman test shown in Table 5 shows that the random effect is appropriate since it reported a p-value of 0.1925 which is greater than 0.05.

Table 6 Regression result: Robust Least Squares

Variable	Coefficient	Std. Error	z-Statistic	Prob.
RDES	0.1419	0.2678	0.5298	0.5962
R&DE	0.0050	0.0042	1.1905	0.2339
INVO	1.0271	0.1647	6.2358	0.0000
C	5.1123	0.4374	11.6890	0.0000
<i>Robust Statistics</i>				
R-squared	0.7286		R-squared statistics	1675.5530
Adjusted R-squared	0.7232		Prob (Rn-squared stat.)	0.0000

Source: Author’s Computation (2025)

Analysis of the Effect of Research Intensity on Financial Performance of Listed Consumer Goods in Nigeria

The study reports that the coefficient ($\beta = 0.1419$, p-value = 0.5962) of R&D expenditure relative to sales (R&DES) is above the threshold of 0.05 (significance level). This implies that R&DES does not meaningfully impact the financial performance of listed consumer goods companies in Nigeria. Despite a slight positive coefficient, the effect is minimal. This suggests that these companies cannot achieve financial gains, by focusing solely on R&D expenditure without considering other factors. This finding supports research by Pennetier et al. (2019), which observed that R&DES for companies to develop into profitable products or services, they must invest in R&D. Meanwhile, the authors maintained that financial benefits are not immediate due to the long gestation period required for R&D investments to develop. Ibrahim et al. (2024) argued in line with the outcome that industries that are facing high competition may not see rapid returns from R&D spending. It indicates that firms should make it a priority to balance short-term profitability with long-term growth, as the innovation process can be extended and less predictable, demanding patience before financial results manifest. Moreover, consumer goods companies may need to better align R&D spending with projects that create financial value. According to Banker et al. (2023), the potential financial returns of some firms reduce because they do not align investment in R&D with strategic connection to the market in which they operate. From the perspective of Nigeria, Investment in R&D can have effect on financial performance if the process is not challenged by regulatory bottlenecks, infrastructure issues, and restricted access to global markets. Companies may, therefore, need to reexamine their R&D approaches to align more closely with market demands and operational realities to enhance financial outcomes effectively.

Effects of Research and Development Investment on Financial Performance of Listed Consumer Goods in Nigeria

The coefficient of R&DE of 0.0050 as shown in Table 6 indicates that a positive relationship exists between research and development investment and financial performance of listed consumer companies in Nigeria, but they are statistically insignificant ($p = 0.2339$ at 0.05 significant level). This implies that increase in investment in R&D might result to enhanced financial performance, but the effect is not adequate to conclude that R&DE has significant impact on long term financial growth based on the data analyzed. In line with the outcome of this study, Usman et al. (2017) found that investment in R&D is generally expected to improve firm performance, meanwhile Majka et al. (2024) discovered that its returns often take longer to materialize. In the consumer goods sector, R&D investment may focus more on incremental innovations or cost-reduction strategies (Derqui et al., 2022). The lack of statistical significance could also be caused by underinvestment in R&D (Mishra, 2022) or misalignment between R&D activities and the firm's core competencies (Chouaibi, 2021). Other factors could be investment in R&D without adequate infrastructure, skilled personnel, or a strong innovation culture (Temel et al., 2023) may yield suboptimal results (Fournier & Gonguet, 2023).

Effects of Innovative Output on Financial Performance of Listed Consumer Goods Firms in Nigeria

The study revealed that INVO has a very strong statistical relationship with financial performance ($\beta = 1.0271$; $p = 0.0000$). This indicates a strong and statistically significant positive relationship between innovative output and financial performance. It suggests that increased innovative output significantly enhances the financial performance of listed consumer goods companies. In this context, focusing on innovation appears to be a key driver for improving financial outcomes, as evidenced by both the magnitude of the coefficient and the strong significance level. The analysis shows that innovative output (INVO) has a significant and positive effect on the financial performance of listed consumer goods companies in Nigeria. This finding supports recent studies that emphasized the need for firms to successfully translate R&D into innovative products or processes so that they can realize better financial performance (Soesetio et al., 2024). This highlights that investing in R&D is not just important but managers should ensure that it innovates to yield results that can be commercialized or develop operational efficiencies. Other studies also support that innovation serves as a critical driver that can be deployed to have competitive edge and improved profitability (Timotius, 2023), especially in industries with rapidly changing consumer preferences, like consumer goods. The ability of innovative firms to better adapt to market trends and consumer needs can be attributable to firm's innovative initiative which is expected to improve financial performance. Nawanir and Moshood (2025), noted that, all things being equal, firms that prioritize innovation tend to outperform competitors by offering unique products or achieving cost leadership through process improvements. In the Nigerian context, where competition in the consumer goods sector is growing (Adama & Okeke, 2024), the ability to innovate provides a clear pathway to financial success (Omowole et al., 2024). This suggests the need for firms to focus on R&D investment and ensure that there is effective collaboration between research teams and market strategists.

Discussion of Findings

The findings of this study reveal a clear and practically meaningful pattern: research and development intensity and total R&D investment do not, on their own, translate into improved financial performance for listed Nigerian consumer goods firms, whereas innovative output does. From a Resource-Based View perspective (Penrose, 2009), this outcome is theoretically coherent.

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R&D spending builds firm-specific resources, knowledge, technical skills, and product-development competence, but these resources remain latent until they are deployed. The practical implication for Nigerian consumer goods firms is that committing a larger share of revenues to R&D, or increasing the absolute volume of R&D expenditure, generates additional cost without a corresponding profitability benefit unless that spending is channelled toward innovations that the market rewards. This finding is consistent with the observation of Pennetier et al. (2019) that the financial benefits of R&D are not immediate, and with Leung and Sharma (2021), who found that R&D intensity can adversely affect short-run financial performance because of long commercialization periods and heavy resource commitments. It also corroborates the position of Ibrahim et al. (2024), who argue that firms operating in highly competitive environments may not experience rapid returns from R&D spending. This can ably describe the Nigerian consumer goods sector that is characterized with persistent regulatory and infrastructure constraints (Ujah-Ogbuagu, 2021) rivalry (Adama & Okeke, 2024).

Regarding R&D intensity (RDES), the positive but insignificant relationship with financial performance suggests that listed Nigerian consumer goods firms have not yet realized the productivity gains expected from their innovation commitments relative to sales. Economically, this implies that firms may not achieve better returns even if they are spending more on R&D. Without strategic market alignment, such spending becomes a cost burden. This is consistent with the Resource-Based View (Penrose, 2009), which holds that resources built through R&D must be deployed purposefully to yield competitive advantage. The finding corroborates Leung and Sharma (2021), who documented adverse short-run financial effects of R&D intensity arising from long commercialization timelines – conditions that are acute in Nigeria given infrastructure deficits and limited access to long-term financing (Modupe et al., 2023) – and aligns with the contextual constraints identified by Kumar et al. (2020), Alam et al. (2020), and Hailegebreal (2022), who show that the R&D intensity–performance link is conditioned by institutional factors.

Regarding total R&D investment (R&DE), the positive but insignificant effect confirms that the volume of R&D expenditure, detached from its downstream innovative output, does not drive returns in the Nigerian consumer goods sector. From a Dynamic Capabilities Theory perspective (Teece et al., 1997), the capability to convert R&D inputs into marketable outputs is the critical mediating mechanism; in its absence, R&D investment remains an inert resource accumulation, a conclusion also reached by Derqui et al. (2022) in the fast-moving consumer goods context and Chouaibi (2021) in manufacturing. Regarding innovative output (INVO), the strong and significant positive effect is the most economically consequential finding of this study.

It establishes that Nigerian consumer goods firms successfully improve their financial performance meaningfully when they can translate R&D activities into tangible innovations through new products, improved processes, and customer-relevant products. This aligns with Dynamic Capabilities Theory (Teece et al., 1997), which identifies the reconfiguration of resources into innovative output as the proximate source of competitive advantage and superior returns, and is consistent with Joseph et al. (2023), who found that Nigerian manufacturing firms investing in product innovation achieve stronger profitability, and Soesetio et al. (2024), who emphasize the centrality of commercially viable innovation for firm performance. The overall practical lesson is very visible in that, among listed Nigerian consumer goods firms, it is the conversion of R&D spending into innovative output that drives financial returns not the magnitude of spending itself.

5. Conclusion and Recommendations

This study examined how research and development investment, research and development intensity, and innovative output affect the financial performance of listed consumer goods firms in Nigeria. The objective was to determine whether R&D-related activities drive financial returns in this sector. The evidence shows that neither R&D intensity nor total R&D investment significantly influences financial performance on its own, indicating that spending on R&D without ensuring its conversion into marketable innovations is insufficient to improve the return on investment of Nigerian consumer goods firms. Innovative output, by contrast, exerts a strong and significant positive effect on financial performance. This establishes that it is the successful translation of R&D spending into new or improved products, processes, and services that constitutes the decisive driver of financial outcomes in this sector rather than the magnitude of spending itself. The findings are limited by the relatively short panel, the exclusion of mediating variables such as market competition, technological capability, and management quality. The absence of a lagged specification might not capture the delayed financial impact of R&D investments too. These limitations provide clear directions for future research.

Based on Hypothesis 1, which found that R&D investment has a positive but insignificant effect on financial performance, managers of listed consumer goods firms in Nigeria should redirect R&D budgets away from undifferentiated spending and toward projects with clearly defined innovation objectives, milestone-based evaluation criteria, and explicit links to commercial outcomes. Increasing the volume of R&D expenditure without such strategic focus will not, on the evidence of this study, improve the return on investment of Nigerian consumer goods firms.

Hypothesis 2, which found that R&D intensity does not significantly improve financial performance. Listed Nigerian consumer goods firms should ensure that their R&D expenditure relative to sales is tied to specific market-aligned projects rather than treated as a general proportional commitment. Firms should periodically audit their R&D spending to ensure that projects that are under development respond to identifiable consumer needs and competitive gaps in the Nigerian market, thereby improving the likelihood that intensity-level spending translates into commercially viable innovation.

Based on Hypothesis 3, which found that innovative output significantly and positively affects financial performance, listed consumer goods firms in Nigeria should establish formal innovation conversion mechanisms to ensure that R&D activities progress to commercially viable products, improved processes, or services that generate measurable financial returns. This includes cross-functional collaboration between research and marketing teams, stage-gate product development processes, and commercialization targets tied to R&D approvals. Policymakers should similarly re-orientate public R&D incentives, such as tax reliefs and grants, away from rewarding spending volumes and toward rewarding demonstrable innovation outputs, in line with the finding that innovative output, not R&D expenditure, is the actual driver of firm-level financial performance in this sector.

5.2 Implications and Future Research

The study, based on the foregoing, provides avenue for future research. Going by the first limitation, the inclusion of mediating variables that influence R&D investments and financial performance such as firm size, market competition, technological capabilities and management quality can provide insights into why R&D expenditure alone does not improve financial performance in the short-term.

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Future studies could also unravel the lagged effect that R&D may have on financial performance by researching on the time it takes for R&D investments to result in innovations that will subsequently yield to financial gain and also developing a more accurate model that will reflect long-term nature of effect of R&D on financial performance.

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