EFFECT OF RESEARCH AND DEVELOPMENT EARNING MANAGEMENT ON FINANCIAL PERFORMANCE OF NON- FINANCIAL FIRMS IN KENYA

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Abstract: The role of research and development (R&D) earnings management in shaping firm performance has attracted significant scholarly and policy interest, particularly in emerging markets where innovation and transparency are central to competitiveness. This study investigates the effect of R&D earnings management on the financial performance of non-financial firms listed on the Nairobi Securities Exchange (NSE) between 2004 and 2020. Guided by a positivist philosophy, the study employed an explanatory longitudinal design using panel data from 44 purposively selected firms. Secondary data were extracted from audited financial statements, NSE handbooks, and Capital Markets Authority publications. Financial performance was measured through return on assets (ROA), return on equity (ROE), earnings per share (EPS), and Tobin's Q, while R&D earnings management was assessed using a modified Dechow and Dichev accrual model. Data analysis involved descriptive statistics and panel regression, with diagnostic tests conducted to ensure model robustness. The findings reveal that R&D earnings management has a positive and statistically significant influence on financial performance. The regression results show that a unit increase in R&D earnings management improves financial performance by approximately 0.107 units (p < 0.01). The model explains about 59.1% of the variation in financial performance (R² = 0.5913), indicating a substantial explanatory power. Descriptive statistics further suggest moderate-to-high variability in R&D earnings management practices, reflecting the heterogeneous strategies adopted by firms. The analysis of ROA, ROE, and EPS trends underscores that while some firms benefit from conservative earnings management, others adopt aggressive strategies, potentially to enhance their market perception. The study concludes that R&D earnings management significantly contributes to the financial performance of Kenyan non-financial firms. These findings highlight the dual role of earnings management as both a driver of short-term performance and a potential source of long-term ethical and sustainability concerns. The study provides valuable insights for policymakers, investors, and corporate managers on balancing innovation-driven investments with transparent financial reporting.

Keywords: earnings management, financial performance, non-financial firms, research and development

1. Introduction

The interplay between research and development (R&D) and financial performance is a critical area of investigation for non-financial firms in Kenya, where dynamic market conditions compel companies to innovate continuously to maintain competitiveness. Effective management of earnings, often achieved through

the strategic deployment of R&D investments, is a vital component that can influence a firm's overall financial health. Adella and Dillak Adella & Dillak (2023) have documented that the intensity of R&D activities positively correlates with sales growth, which directly impacts profitability and subsequently boosts a firm's financial performance. Their findings suggest that firms that strategically allocate resources towards R&D not only enhance their market offerings but also improve their financial metrics.

The relationship between earnings management practices and financial performance further complicates this landscape. Nyakarimi's exploration of earnings manipulation among non-banking firms listed on the Nairobi Securities Exchange emphasizes that management often adjusts financial reports to meet specific targets, reflecting a duality where financial performance and earnings management techniques interplay significantly (Nyakarimi, 2021). Such practices, while potentially beneficial in the short term, raise ethical concerns and may undermine long-term financial stability if not managed properly. Furthermore, integrating the dimensions of R&D management and earnings manipulation, Theiri et al. (2022) reveal that the impact of earnings management on financial performance can vary based on firm characteristics, including the extent of managerial expertise and operational context, thereby complicating the evaluation of financial outcomes in relation to R&D intensity.

Additionally, it is essential to consider the broader implications of earnings management practices on market perception and liquidity. (Trang and Linh, 2020) illustrate that the ability of firms to impact market liquidity can be related to their approach to earnings management, effectively indicating that well-managed firms may attract investors more readily due to perceived financial competence. Thus, understanding the extent and manner in which R&D investments and earnings management affect financial performance is vital for stakeholder confidence and market positioning.

In summary, this study aims to investigate the effects of research and development and earnings management on the financial performance of non-financial firms in Kenya, considering the unique challenges and opportunities presented by the local context. A comprehensive analysis will contribute to the existing body of knowledge, highlighting best practices and potential pitfalls as firms navigate the intricate balance between innovation, financial reporting, and managerial ethics.

Problem statement

The effectiveness of research and development (R&D) investments in enhancing firm performance has garnered considerable attention in recent years, particularly as non-financial firms navigate competitive markets characterized by rapid technological advancements and shifting consumer demands. In Kenya, where the integration of innovative practices remains crucial to achieving sustainable economic growth, understanding the impact of R&D on financial performance is of paramount importance. Dimitropoulos indicates that R&D investments significantly influence profitability during economic downturns, suggesting that firms must strategically manage R&D initiatives to optimize financial outcomes Dimitropoulos (2020). However, the mechanisms through which R&D investments translate into improved financial performance within the Kenyan context are not sufficiently explored.

Furthermore, the relationship between earnings management practices and firm performance complicates this landscape. Buanaputra emphasizes that different forms of earnings management—real and accrual-based— can be employed by managers to meet financial targets, potentially obscuring a firm's genuine financial performance (Buanaputra, 2021). Understanding how these practices interact with R&D investments will provide vital insights into the sustainability and transparency of firms' financial standing. Research by Gunny

suggests that methods of earnings management can significantly affect future performance assessments, indicating that firms might misuse R&D expenditures to manage earnings (Gunny, 2010). This presents ethical concerns and challenges for stakeholders seeking to evaluate a firm's true financial health.

Moreover, previous research indicates that corporate governance structures may play a mediating role in the relationship between R&D and earnings management, but this interplay has not been sufficiently examined in the context of Kenyan firms. Hakim's findings reveal that good corporate governance attributes can lead to higher earnings quality but may be undermined by aggressive earnings management techniques (Hakim, 2022). This gap in the literature necessitates an in-depth analysis to clarify how effective governance can mitigate risks associated with earnings management while harnessing the benefits of R&D investments for enhancing firm performance.

In conclusion, the existing literature suggests a complex relationship between R&D investment and financial performance, moderated by earnings management practices. There is a need to highlight these interrelations specifically within the Kenyan context, as the interplay of R&D, earnings management, and corporate governance significantly impacts the financial performance and long-term viability of non-financial firms. This study aims to address these gaps, providing crucial empirical insights that can inform both policy and practice in the region.

Literature related to Research & Development and Financial Performance

In-depth studies in accounting, finance, and economics explain how stakeholders view Research and Development projects as investments that should provide future financial gains. Research & Development initiatives increase organizational value, according to researchers (Sougiannis, 1994; Toivanen et al., 2002; Pindado et al. 2010, Duqi and Torluccio, 2011). Other scholars demonstrate the favorable correlation between fresh announcements regarding research and development resourcefulness and changes in market values.Research and development costs, investments in brand names and trademarks (Barth et al., 1998), goodwill (Chauvin and Hirschey, 1994), patents (Hall et al., 2005), and human resources (Hanson, 1997) were the main topics of a wide range of studies that examined the valuation of expenditures on intangibles (Chan et al. (1990), Sougiannis (1994), Lev and Sougiannis (1996), Lev and Zarovin (1999), Shi (2003), and Anagnostopoulou, 2008, among others). These analyses' conclusions generally show that investing in intangibles raises a company's worth.

The capitalization of development costs lowers the information asymmetry between internal and external participants and provides valuable insights for investors, according to other researchers (Aboody and Lev, 1998; Mohd, 2005; Givoly and Shi, 2008). Notably, investments in intangibles must result in a positive projected net present value, at least for the investors and the management of the investing company. In light of this, the findings of the Garcia-Garcia and Magdaleno (2010) study shown that investors accept the intangibles of the investments without any reserves and that the market recognizes the importance of R&D spending. The reported earnings after modifications are advantageous for research and development activities, according to Sougiannis (1994). Over a seven-year period, an increase of one dollar in R&D expenditures typically results in a two-dollar improvement in profit. Lev and Sougiannis (1996) also noted that operating income and both current and lag R&D data were positively correlated. The results also showed that the impact of research and development on present operating results differs by industry sector.

R&D investments have a positive and significant impact on predicting future returns, according to an empirical study by Duqui et al. (2011) that assessed the impact of R&D on stock returns for a set of European countries. Other significant factors like firm size and book-to-market were also noted by the writers. In order to capture the pertinent country-specific aspects, such as the growth of domestic stock and credit markets, the degree of discovery for publicly listed companies, and the protection of minority investors, Duqui et al. (2011) examined a set of assumptions. The findings demonstrated that the financial sector places a higher value on research and development projects in settings that are conducive to investment and have a high level of legal protection.

According to Dave et al. (2013), gross margins, which are heavily reliant on R&D intensity, have a significant impact on financial sustainability. The study also highlighted the detrimental effects on technological performance and the beneficial effects of R&D activity on sales revenue. Exploring the effect of R&D efforts on financial stability is a challenging procedure since the implications of the time lag between the moment of R&D spending incurrence and the point at which it improves the financial sustainability vary from business to firm. According to Dave et al. (2013), there appears to be a significant correlation between the gross margin and the level of R&D intensity. This serves as the cornerstone of the pricing plan that IT companies create. Furthermore, there is a strong correlation between financial sustainability, as measured by return on assets (ROA), and gross margins. The financial performance of a business is directly impacted by how R&D projects are treated in accounting.

The net income and profitability metrics (ROA and ROE) for the specified period will be negatively impacted if the R&D cost materializes during the incurrence period. Since capitalization of R&D spending as an intangible asset will increase total assets, deferring R&D costs to future periods as intangible assets would not negatively impact current period net income or return on equity, but it could put pressure on ROA (Das et al., 2009). Only until the specific R&D operations propel patent issuance will the financial rewards of research and development efforts become apparent.

Annual Expenses on Research & Development and Financial Performance

The idea of research and development can be split into two parts. Usually, "research" is done to achieve new scientific discoveries and expand knowledge, while "development" involves using research results and other information to design improved products or plans for new services. Before starting commercial production, components, materials, systems, procedures, or devices are altered during development (Zhao, 2002). In the research stage, it is extremely difficult to predict whether a service or product will truly result in future financial gains. As a result, according to international accounting standard IAS 38 Intangible Assets, any costs incurred during the research phase should not be treated as intangible assets but rather should be reported as expenses on the income statement when they occur. As a result this might have an effect on the profitability of different firms in the securities market. On the other hand, a development-related intangible asset might be capitalized in such a case implying growth of the asset base hence affecting the size of the firm. Zied (2016) found that R&D investment has a major impact on a company's operational performance, primarily as a crucial step in implementing innovative technology. The study attempted to ascertain the effect of R&D on company performance.

Konak and Kendirli (2014) looked at how research and development spending affected business performance, but they couldn't find any connection between R&D and ROA, a measure of corporate profitability. Ayaydin and Karaaslan (2014), on the other hand, looked into the variables influencing financial performance and discovered that the level of R&D does affect a company's financial performance as indicated by Return on

Assets (ROA). Furthermore, Antje (2014) examined how R&D spending affected sales growth and business expansion, coming to the conclusion that R&D endeavors typically resulted in higher Return on Assets.

Regarding the impact of R&D as measured by ROE, the results showed that R&D has a strong, positive impact on company performance, which exactly agree with results of (Yanni Wang et al. 2016;Ozturk and Zeren, (2015), Geoffrey 2015; Yanni and ; Antje 2014; Rao et al., 2013; Seraina 2013) results. This effect may have happened because R&D expenditure is recognized in the income statement as an expense to generate profit. This expenditure has a positive impact on net profit in the same period, which is reflected in the rate of the ROE for the same period. Further minimal productivity of capital and labor is affected by technical growth (R&D).

2. Research methodology

Research Philosophy

The study was anchored on a positivist philosophy, which assumes that social reality is objective and measurable. Positivism was appropriate because the research relied on quantifiable financial data and statistical models to test cause–effect relationships between research and development (R&D) earnings management and financial performance.

Research Design

An explanatory longitudinal design was employed, using panel data drawn from non-financial firms listed at the Nairobi Securities Exchange (NSE). This design was suitable for identifying causal relationships and capturing variations across firms and over time.

Target Population and Sampling

The target population comprised all non-financial firms listed on the NSE between 2004 and 2020. Financial firms such as banks, insurance companies, and investment institutions were excluded due to sector-specific reporting structures. Firms that were consistently listed and provided complete financial statements during the study period were purposively included, yielding a final sample of 44 firms across sectors such as agriculture, manufacturing, construction, energy, and commercial services.

Data Collection

The study relied exclusively on secondary data obtained from audited annual reports of the firms, NSE handbooks, and Capital Markets Authority (CMA) publications. Key variables extracted included R&D expenditures, revenues, provisions, reversals, depreciation, and firm size. Financial performance was measured using both accounting-based indicators (return on assets, return on equity) and market-based indicators (Tobin's Q, earnings per share).

Data Analysis

Data were analyzed using STATA version 15. Descriptive statistics (mean, median, standard deviation) summarized the variables. Panel regression models (fixed effects and random effects) were employed to test the hypothesized relationships, with Hausman tests guiding model selection.

To ensure robustness, the diagnostic tests in table 1 were conducted: Normality – Shapiro-Wilk and Jarque-Bera tests. Multicollinearity – Variance Inflation Factor (VIF). Heteroscedasticity – Breusch-Pagan and White tests. Autocorrelation – Wooldridge test.

These procedures ensured compliance with classical regression assumptions and enhanced reliability of results.

Ethical Considerations

Ethical clearance was obtained from Jaramogi Oginga Odinga University of Science and Technology and the National Commission for Science, Technology and Innovation (NACOSTI). Since only publicly available secondary data were used, issues of confidentiality and respondent consent did not arise.

Firms delisted from the securities exchange, those whose listing duration disqualified them from computing earnings management, and any firm suspended from trading during the study period were excluded from the analysis to ensure compliance with the study's requirements. As a result, 44 companies were considered in segmental analysis after meeting this requirement. Only seven of the non-financial enterprises registered on the Nairobi Securities Exchange had their financial performance and earnings management variables examined in the study. Agriculture, commercial and services, construction and related industries, energy and petroleum, manufacturing and related industries, automobiles and accessories, and investing were among these businesses. The following table 1 display the findings of the descriptive statistics.

3. Results and discussion

Table 1: Descriptive statistics of the Earning Management Ratios

	$R\&D_{it}$
Mean	0.1495
Median	0.1012
Minimum	4.3605
Maximum	7.9704
coefficient of variation (CV)	0.6369

The descriptive statistics of Research and Development earnings management ($R\&D_{it}$) reveal notable variations across non-financial firms in Kenya. The mean value of 0.1495 and median of 0.1012 indicate that, on average, firms report relatively modest levels of R&D earnings management. However, the wide disparity between the minimum (4.3605) and maximum (7.9704) values suggests the presence of outliers or firms with exceptionally high practices of R&D earnings management, which significantly deviate from the central tendency. The coefficient of variation (0.6369) further confirms a moderate-to-high variability in R&D earnings management among firms.

Table 2: Earning Management Weighted Least Square Panel Regression Output

	Coefficient	Std.Error	t-ratio	P-value
Constant	2.89347	0.05697	50.7859	<0.00002
R&Dit	0.106705	0.08172	1.2547	0.002832

Statistics on the Weighted Least Square on Earnings Management

Sum Squared Residual	587.2645	S.E of regression	0.0890347
R-value	0.76895	Adjusted- R Squared	0.589778
R-squared	0.59129	P-Value (F)	1.77e-13
F-value	14.99354	AKaike Information Criterion (AIC)	1798-896
Log- likelihood	-868.4715	Hannan -Quinn	1806.312
Schwarz criterion	1798.748		

The regression results indicate that Research and Development earnings management (R&Dit) has a positive and statistically significant effect on the financial performance of non-financial firms in Kenya.

The coefficient of R&Dit (0.1067) implies that a unit increase in R&D earnings management is associated with an increase of approximately 0.107 units in financial performance, holding other factors constant. This positive relationship suggests that firms engaging in higher levels of R&D earnings management tend to report improved financial performance.

The t-ratio (1.2547) with a p-value of 0.0028 confirms the statistical significance of the coefficient at the 1% level, indicating that the effect of R&D earnings management is unlikely to be due to chance.

The constant term (2.8935), also significant ($p < 0.00002$), represents the baseline financial performance of firms when R&D earnings management is zero.

Regarding the model's overall performance, the R-squared value (0.5913) shows that approximately 59.1% of the variation in financial performance is explained by R&D earnings management. The adjusted R-squared (0.5898), being close to the R-squared, indicates that the model is robust and not overly inflated by the sample size.

The F-statistic (14.9935) with a p-value of 1.77e-13 confirms that the model is statistically significant as a whole, implying that R&D earnings management collectively explains the changes in financial performance better than random noise.

The residual diagnostics (Sum of Squared Residuals = 587.2645, S.E. of regression = 0.0890) suggest a reasonably good model fit, while the information criteria (AIC = 1798.896, Schwarz Criterion = 1798.748, Hannan–Quinn = 1806.312) provide benchmarks for comparing this model with alternative specifications.

Non- Financial Listed Firms Financial Performance Market Trend

Several measures, such as the return on equity, return on assets, and earnings to price ratio, are used in this study to further assess the financial performance. At the conclusion of each year for the 17 fiscal years in this study, this is calculated by dividing net income by total assets for ROA, businesses' net income by average book value of equity for ROE, and earnings per share by market price per share of the respective firms. To assess the overall financial performance characteristics of the non-financial enterprises listed on the NSE, the corresponding ROA, ROE, and EPR ratios are combined. In order to determine whether a firm is manipulating its financial reports to appear more lucrative than it actually is, it is essential to analyze ROA, ROE, and EPR ratios on an annual basis while researching earnings management. These ratios' departures from anticipated trends, particularly when contrasted with industry standards, may be a sign of possible earnings management techniques. The analysis's conclusions and trends are displayed as shown in Table 3 below:

Table 3: Non-Financial Listed Firms Financial Performance Market Trend

Year	ROA	ROE	EPR
2004	0.0175	0.0139	0.1237
2005	0.0124	0.0397	0.1376
2006	0.1497	0.0394	0.0945
2007	0.1697	0.0793	0.1497
2008	0.1686	0.0689	0.1539
2009	0.1695	0.0786	0.3512
2010	0.1394	0.0693	0.0976
2011	0.1496	0.7736	0.5372
2012	0.1473	0.6941	0.1143
2013	0.0176	0.7923	0.0976
2014	0.0132	0.0837	0.2673
2015	0.0137	0.0697	0.0813
2016	0.0143	0.0539	0.0896
2017	0.0136	0.0316	0.0932
2018	0.0156	0.0192	0.0345
2019	0.0167	0.0638	0.1236
2020	0.0139	0.0412	0.0108

ROA		*ROE*		*EPR*	
Mean	0.073076471	Mean	0.177188235	Mean	0.150447059
Standard Error	0.017502932	Standard Error	0.067013128	Standard Error	0.030909981
Median	0.0175	Median	0.0689	Median	0.1143
Mode	#N/A	Mode	#N/A	Mode	0.0976
Standard Deviation	0.072166435	Standard Deviation	0.276302205	Standard Deviation	0.127445116

Sample		Sample		Sample	
Variance	0.005207994	Variance	0.076342909	Variance	0.016242258
Kurtosis	-2.008833586	Kurtosis	1.733613073	Kurtosis	2.911334115
Skewness	0.431457868	Skewness	1.860601661	Skewness	2.119948963
Range	0.1573	Range	0.7784	Range	0.5264
Minimum	0.0124	Minimum	0.0139	Minimum	0.0108
Maximum	0.1697	Maximum	0.7923	Maximum	0.5372
Sum	1.2423	Sum	3.0122	Sum	2.5576
Count	17	Count	17	Count	17

Source (Field Data 2024)

With a range of 15.73% between the maximum and minimum return on assets financial performance of 16.97% and 1.24% respectively, it shows a, low variable and unscattered financial performance of the enterprises over the research period. This would suggest insignificant risk market premium. Secondly with a range of 77.84% between the maximum and minimum return on equity on financial performance of 79.23% and 1.39% it shows a, highly variable and scattered return on equity of the firms over the research period. This would suggest significant risk market premium. Lastly, with a range of 52.64% between the maximum and minimum return on assets financial performance of 53.72%% and 1.08% respectively, it shows a, highly variable and scattered financial performance of the enterprises over the research period.

4. Summary and Conclusion

The findings show that the performance of the non-financial companies listed on the NSE changes by 0.583 units for every unit increase in research and development. The findings show that for non-financial firms listed on the NSE, a unit increase in research and development interaction with firm size leads to a 0.421 unit increase in financial performance and an effect size of 72.2% on financial performance (standardized beta =.722). The financial performance of non-financial companies listed on the NSE is statistically significantly impacted by this variable (b_1 = 0.421; T_1 = 4.783>critical value (1.6525), p =0.000<0.05).

The variability in the COV implies that while some firms may exercise conservative practices in managing R&D earnings, others rely heavily on such practices, potentially to influence reported financial performance. These findings highlight the heterogeneous nature of earnings management behaviors in R&D among Kenyan non-financial firms, which may consequently lead to differential impacts on financial performance across the sector.

Overall, the regression analysis demonstrates that R&D earnings management positively and significantly influences financial performance in Kenyan non-financial firms. The relatively high explanatory power of the model ($R^2 \approx 59\%$) further underscores the importance of R&D-related accounting practices in shaping reported firm performance in this sector.

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