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Abstract

The current economic environment in Kenya presents a number of challenges, such as rising production costs, fluctuating exchange rates, high taxation, a decline in profitability, inflationary pressures, and increased competition both locally and globally, that necessitate sound decision-making for optimal performance by most firms. Companies in the country have undertaken the task of evaluating and reorganizing their investment strategies with the aim of enhancing growth and profitability. Manufacturing is one of the sectors being confronted by this scenario. This sector is important in Kenya as it contributes significantly to the country's social and economic development. Since 2010, Kenya's manufacturing sector has contributed around 15 percent to the GDP in the economy and nearly 300,000 employees, accounting for 13 percent of total national employment. However, there has been noted a decline in the performance of the manufacturing sector. Between the year 2016 and 2024, the sector has experienced an average fall of 0.2 percent in the Return on Assets. The sector has also reported a decline in revenue earnings in relative to their total assets over the same period. However, as this is being observed, the sector has also reported expansions and replacements whose main goal is to improve profitability. Therefore, this study investigated the investment decisions based on expansions and renewals, and profitability of manufacturing and allied firms listed at the NSE. Specific objectives included the effect of expansion, replacement, and renewal decisions, on the profitability of manufacturing and allied firms listed at the Nairobi Stock Exchange. The study was grounded on profit maximization theory, agency and signaling theory to adopt the profit maximization model. Panel secondary data was used in the analysis of the audited financial statements of all the nine listed enterprises covering the period 2016 to 2024 to enhance a comprehensive analysis of the entire population. Data was analyzed using panel regression with model selection guided by the Haussmann test, alongside diagnostic checks to ensure robustness. The study generated empirical evidence on investment decisions and profitability, hence offering insights for managers and policy implications for sectoral growth. The study reveals that replacement and expansion investments negatively and significantly affect profitability, while renewal investments has a positive but insignificant effect. This points to the need of these firms consolidating their productions while developing distribution points to improve on their profitability. In addition, the firms may consider replacing the investments with more advanced technology to save on cost that affects performance negatively.

Keywords: *Performance, Replacement, Renewal, Expansion*

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1. Introduction

Corporate entities are driven by a strong desire to achieve return on investments and increase their profitability (Shabbir & Wisdom, 2020). However, there is a growing concern among stakeholders such as the shareholders regarding the potential impact of policymakers' decisions on investment decisions and profitability (Quddus *et al.,* 2022). They strive to carry out their operations in a manner that ensures the security of their investments, while still prioritizing profit generation.

Companies globally have undertaken the task of evaluating and reorganizing their investment strategies with the aim of enhancing profit growth over time (Mugwang'a *et al.,* 2018). The production industry is essential to any country's plan for economic expansion. It is one of the strongest drivers of growth. It directly affects productivity, job creation, and long-term economic stability. (Matar & Eneizan, 2018). About 70% of manufacturing exports from both developed and developing nations come from the manufacturing sector.

Africa has experienced a diminishing performance in manufacturing firms and especially those in Sub-Saharan Africa. According to the World Bank (2015), these firms are operating below their full capacity. Similarly, the African Development Bank (AFDB, 2024) reported that manufacturing contributes only a small portion to the GDP in African countries, ranging between 3.8 percent and 15 percent compared to 30 percent to 40 percent in industrialized nations. In Kenya manufacturing sector has also shown a downward trend in the performance and are reducing their roles in driving overall GDP growth (KNBS, 2025).

Manufacturing firms in Kenya are currently facing significant challenges that are adversely impacting their profitability. only 35% of total market share exports, compared to 47% in South Africa, 67% in Malaysia, and 73% in Singapore (Karani, 2022). Kenyan manufacturing firms are classified into 12 sectors based on their product relatedness (KAM, 2019). The Government of Kenya identified four key pillars to drive socio-economic growth: manufacturing, economically accessible housing, Guaranteed food supply, and equitable health coverage (GoK, 2018–2022). Manufacturing, one of the four pillars, is thought to be a key force behind economic growth because it can boost GDP by adding value to raw materials, raise foreign exchange profits, and create a significant number of job opportunities. To support this sector, the government has been

investing in infrastructure development and enhancing agricultural production, aiming to create a more conducive environment for manufacturing growth (Wanjiru et al., 2019). In addition, the Government has undertaken a series of reforms, notably prioritizing the manufacturing sector as one of the pillars of its "Big Four Agenda" aimed at revitalizing industrial growth. However, statistical data from the past decade shows that Kenyan manufacturing sectors listed on the NSE have undergone persistent low growth, reduced profitability, and a loss of market share. This highlights the critical need for wise investment decisions to be developed and put into action (Murithi & Muthimi, 2024).

1.1.1 Profitability of manufacturing and allied firms in Kenya

Successful businesses are critical elements of economic, social, and political development in a country (Taouab & Issor, 2019). Manufacturing firms' performance in a competitive business environment is dependent on unique internal firm characteristics. Profitability is shaped by a mixture of internal and external factors, with human decisions within the firm playing a central role in shaping these factors. Managerial choices affect internal aspects such as cost control, operational efficiency, and resource allocation, while also determining how effectively a firm responds to external conditions like market dynamics, economic fluctuations, and regulatory changes. This underscores the significance of strategic decision-making in driving firm performance and sustaining long-term profitability.(Ifeduni & Charles, 2018).

Manufacturing is an important sector in Kenya, contributing significantly to the country's social and economic development (KAM, 2019). Over the last five years Kenya's manufacturing sector contributed 15 percent of GDP in the economy and nearly 300,000 workers, accounting for 13 percent of total national employment (Awino *et al*., 2018). There are 9 firms listed on the Nairobi Stock Exchange (NSE) in the manufacturing and allied firms' category which include; Unga Group Limited East Africa, B.O.C Gases Kenya Plc, BAT Kenya, Carbacid Investment Ltd, Flame Tree Group Holdings Ltd, East African Breweries Ltd, Mumia's Sugar Co. Ltd, Eveready East Africa Ltd, and Kenya Orchards Ltd (NSE, 2023). NSE plays a pivotal role in mobilizing domestic savings and facilitating the transfer of securities between shareholders, and enabling companies to promote local equity participation by providing Kenyans with opportunities to acquire ownership through shareholding (Gok, 2022).

Manufacturing in Kenya has experienced consistent fall in performance. Figure 1 illustrates a consistent decline in profitability among manufacturing and allied firms listed on the NSE, as determined by Return on Assets (ROA), for the period 2016 to 2024. This downward trend signals a deteriorating of the efficiency with which these firms are utilizing their assets to generate earnings. Even though the industrial sector is strategically important to Kenya's economic growth, particularly under the country's industrialization agenda the observed decline in ROA has not been adequately explained in existing literature.
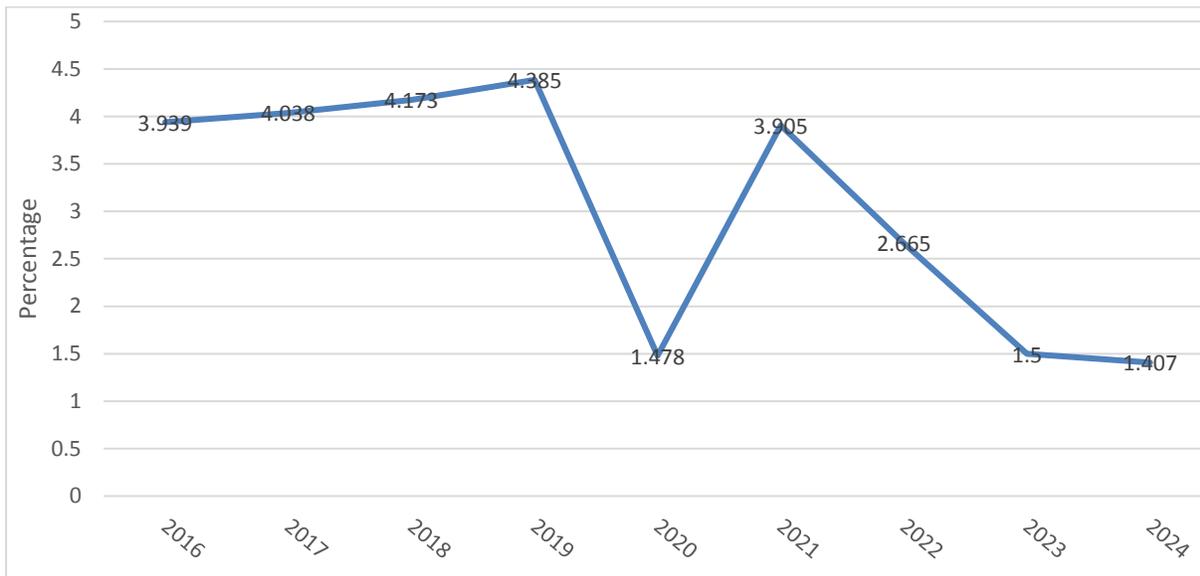
Figure 1: Profitability of manufacturing and allied firms

The figure reveals that profitability among manufacturing and allied firms listed on the NSE has shown notable fluctuations across the nine-year period, with an overall declining trend. This pattern suggests that while certain firms or periods experienced temporary improvements, the sector's capacity to consistently generate returns from its asset base has weakened over time. The persistent decline in Return on Assets (ROA) points to underlying operational inefficiencies, escalating production costs, or suboptimal investment decisions, reinforcing the need for strategic reforms to enhance financial performance and asset utilization within the industry.

1.1.2   Investment Decisions in manufacturing and allied firms in Kenya

Investment decisions refers to process of allocating funds to long-term or significant capital projects in order to enhance revenue collection capacity. The utilization of a particular approach aimed at generating revenue for an organization typically leads to the acquisition of assets and additional resources (Saif *et al.*, 2022). Firms engage in a variety of investment decision processes, such as expansion decisions, renewable decisions and replacement decisions, in order to pursue the fundamental goal of achieving growth (Farooq *et al.,* 2022).

The implementation of long-term investment strategies, particularly in the acquisition of fixed assets, plays a crucial role in fostering sustained growth over an extended period. Investment decisions in the capital market for investors, such as expansion, replacement, and renewal decisions, necessitate a great deal of information about the company in which they intend to invest (Triani and Tarmidi, 2019). Similarly, investment decisions can be classified into three categories: 'expansion decisions, replacement decisions, and renewal decisions.' (Wu & Pea-Assounga, 2022). Correlation can exist between investment decisions metrics on renewable decisions, expansion decisions and profitability (Mbevi and Opuodho, 2022).

Expansion decisions is defined as the strategic decisions undertaken by an enterprise to get additional fixed assets with the aim of enhancing its operational scale and market reach (Ndiritu, 2023). These decisions typically involve the allocation of significant financial resources toward the purchase of new tangible assets such as machinery, buildings, or production lines. Beyond mere asset acquisition, expansion decisions encompass broader strategic initiatives, including the introduction of new products, entry into new lines of business, capacity augmentation, and diversification of operations(Ronoh Benhard, 2024). Such investments are intended to drive long-term growth and competitiveness. If not properly aligned with market demand, operational efficiency, or financial capacity, expansion efforts can strain a firm's resources and adversely impact profitability.

Nine manufacturing and related companies listed on NSE increased their total assets by KSh 19.06 billion between 2016 and 2024. Firms like EABL, BAT Kenya, and Unga Group are leading in capital expenditures aimed at new production facilities, product diversification, and regional

market penetration, demonstrating a strong sector-wide commitment to expansion. But even with these large asset additions, many of these companies' financial performance has not increased proportionately, especially when it comes to profitability and return on assets.(*NSE 2023*). These actions reflect a sector-wide commitment to growth and competitiveness. However, in some cases, the financial gains from such expansions have not matched the scale of investment, highlighting the need to assess how expansion decisions impact profitability and return on assets.

The process of replacement decisions involves corporations determining when and how to replace depreciated fixed assets (Musau, 2016). Globally, organizations prioritize optimizing financial returns while minimizing operational costs. Replacement decisions are typically influenced by several factors, such as depreciation allowances, technological advancements, and the overall efficiency of capital equipment, each of which directly impacts an organization's asset valuation and performance(Kasee & Oluoch, 2025).

NSE-listed manufacturing and related companies, such as Flame Tree Group and EAB Carbacid Investments, showed distinct trends in asset replacement between 2016 and 2024 with an objective of increasing production capacity and enhancing operational effectiveness. For example, EABL overhauled its machinery at its Kisumu and Ruaraka plants and replaced a lot of its old infrastructure with green energy upgrades, such as solar installations and biomass boilers. These expenditures, which totaled more than KSh 20 billion, were meant to improve reliability and lower long-term expenses in addition to increasing capacity. Similarly, in order to support steady output, Carbacid upgraded outdated production equipment and substituted a solar plant for grid-based systems. Significant increases in depreciation and capital expenditure show that Flame Tree Group, on its part, invested in new machinery across its plastics and cosmetics divisions. Current literature lacks a clear linkage between delayed or suboptimal capital replacement strategies and the declining ROA observed among manufacturing and related enterprises listed on the NSE.

Renewal decisions refers to the strategic decisions undertaken by a firm to improve the quality, efficiency, and functionality of its existing fixed assets (Rotich & Matanda, 2022). These decisions are particularly significant in capital-intensive industries, such as manufacturing, where asset performance directly influences output and operational continuity. Proper maintenance and timely

renewal of fixed assets are critical in ensuring the smooth and uninterrupted progression of the production process (Nzewi et al., 2016).

1.2 Research Problem

Manufacturing and related enterprises in Kenya have exhibited a comparatively reduced growth rate in the country (Rotich et al., 2022). The Economic Survey results over the past five years consistently validate the persistent growth challenges encountered by enterprises operating in the industry (Khatib & Nour, 2021). Manufacturing industries listed with NSE in Kenya have experienced slowing ROA over the last 5 years. There was reported an average fall of 0.2 percent in the Return on Assets between the years 2016 and 2024 for these firms. This indicates a decline in the profitability of the enterprises in respect to their total assets. Furthermore, the sector's profits fell from 191 billion to 133 billion from the year 2018 to 2024 (KNBS, 2025).

In this study, investment decisions were assessed by utilizing renewable decisions and expansion decisions as metrics. The study incorporated resource-based theory and modern portfolio theory as foundational frameworks. The observations utilized in this study spanned from 2015 to 2019, and the study consisted of nine companies that were listed on the NSE. Additionally, the current study employed cause- and effect research design and conducted longitudinal panel data, thereby addressing the cross-sectional element and bridging the methodological gap.

1.3 Research Objectives

The study sought to:

(a) Examine the effect of expansion decisions on profitability of manufacturing and Allied Firms listed at the NSE, Kenya.

(b) Assess the effect of replacement decisions on profitability of manufacturing and Allied Firms listed at the NSE, Kenya.

(c) Determine the effect of renewal decisions on profitability of manufacturing and Allied Firms listed at the NSE, Kenya.

2. Literature Review

2.1 Theoretical Framework

This study is grounded in Agency Theory, Signaling Theory, and Profit Maximization Theory, which together provide a comprehensive framework for examining the relationship between investment decisions and profitability of manufacturing and allied firms listed on the Nairobi Securities Exchange (NSE). These theories collectively explain managerial decision-making behavior, information asymmetry between firms and investors, and the overarching objective of firm performance, thereby justifying the study's focus on expansion, replacement, and renewal investment decisions.

Agency Theory, developed by Jensen and Meckling (1976), explains the potential conflict arising from the separation of ownership and control in modern firms. Shareholders, as principals, seek to maximize returns, while managers, as agents, may pursue investment decisions that enhance managerial control or personal benefits rather than shareholder wealth Rotich & Matanda, (2022). Such decisions, including expansion and asset replacement, may involve financing choices that affect firm risk and profitability Leepsa & Panda, (2017). In this study, agency theory provides insight into how managerial investment behavior can influence profitability outcomes.

Signaling Theory addresses information asymmetry between management and external stakeholders by explaining how firms communicate their future prospects through observable actions (Connelly et al., 2011). Investment decisions such as asset growth, renewal, and modernization serve as signals of operational efficiency and future profitability, thereby shaping investor perceptions and market valuation Dionne & Ouederni, (2011)Effective signaling through strategic investments can attract capital, enhance investor confidence, and positively influence firm performance (Parveen et al., 2020).

Profit Maximization Theory, rooted in classical economic thought posits that firms aim to optimize profits through efficient allocation of resources. Profitability reflects a firm's ability to balance costs and revenues while achieving competitive advantage (Hussain, (2012). For manufacturing and allied firms listed on the NSE, investment decisions are critical mechanisms for enhancing productive capacity and long-term returns Young & Makhija, (2014). Consequently, this theory

anchors the profitability variable by explaining how strategic investments ultimately drive firm performance.

2.2 Empirical Review

This section reviews empirical studies that examine the relationship between investment decisions and firm profitability. It synthesizes evidence from both developed and developing economies, highlighting how expansion, replacement, and renewal decisions influence financial performance across different sectors. By evaluating prior findings, methodologies, and contextual settings, the review identifies inconsistencies and research gaps that justify the use of longitudinal panel data in the present study focusing on manufacturing and allied firms listed on the Nairobi Securities Exchange (NSE).

2.2.1 Expansion Decisions and Profitability

Empirical studies on expansion decisions present mixed findings regarding their impact on profitability. Cordis and Kirby (2017), using cross-sectional data from non-financial firms listed on NASDAQ between 1963 and 2012, found a negative relationship between expansion decisions and financial performance, attributing this outcome to poor managerial investment choices. However, the study's reliance on cross-sectional analysis limited its ability to capture firm-specific and time effects. Similarly, Ariemba et al. (2016), focusing on SACCOs in Kenya, reported no statistically significant relationship between expansion decisions and financial performance, largely due to methodological limitations such as reliance on correlation analysis and a narrow sectorial focus.

Conversely, other studies report positive effects of expansion decisions on profitability. Ringera and Muturi (2019) established a positive and significant relationship between expansion decisions and the performance of microfinance institutions in Kenya, while Muchele and Kombo (2019) found similar results among Kenyan manufacturing firms. However, these studies relied on correlation and multiple regression techniques and, in some cases, primary data, which may be subject to bias. The present study addresses these gaps by employing panel data regression on manufacturing and allied firms listed on the NSE, allowing for more robust, time-sensitive, and firm-specific analysis.

2.2.2 Replacement Decisions and Profitability

Studies on replacement decisions generally suggest a positive link with firm performance, though methodological differences exist. Teodoro-Filho et al. (2018), using a probabilistic model on non-current assets in Brazil, demonstrated that replacement decisions are highly sensitive to cost considerations and financial constraints. While informative, the model did not fully capture dynamic firm environments, limiting its applicability to long-term profitability analysis. Similarly, Farah and Altinkaya (2018) found that replacement decisions significantly influenced profitability in a Ugandan manufacturing firm, though the study's focus on a single firm constrained generalizability.

Evidence from developed markets further supports the profitability-enhancing role of replacement decisions. Fu et al. (2016), examining firms listed on the NYSE, reported a statistically significant positive relationship between replacement decisions and profitability. However, the study was conducted in a context distinct from emerging economies and relied on simplified proxies for firm value. This study builds on prior research by analyzing multiple manufacturing and allied firms listed on the NSE using panel data, thereby offering broader and more contextually relevant insights.

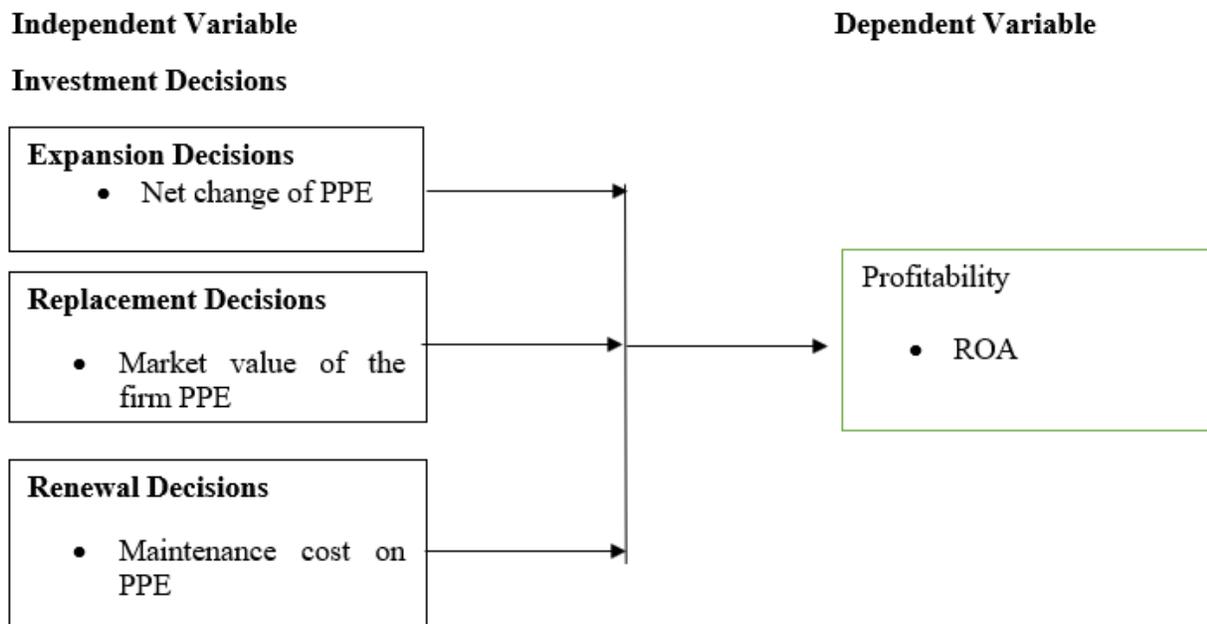## 2.2.3 Renewal Decisions and Profitability

Empirical literature consistently indicates that renewal decisions positively affect profitability. Rotich et al. (2022) examined manufacturing firms listed on the NSE and found that asset renewal decisions had a statistically significant positive effect on financial performance. Similarly, Purba and Bimantara (2020) reported a positive association between renewal decisions and profitability among transportation firms listed on the Indonesian Stock Exchange. However, these studies were limited by small sample sizes and sector-specific focus, restricting the generalizability of their findings.

Comparable results were observed by Nzewi et al. (2018) among aluminum manufacturing firms in Nigeria, where renewal decisions significantly enhanced firm returns. Nonetheless, much of the existing literature relies on questionnaire-based data and correlation analysis. This study addresses these limitations by utilizing longitudinal panel data derived from audited financial statements of

manufacturing and allied firms listed on the NSE, enabling a more objective, time-based, and firm-specific assessment of the relationship between renewal decisions and profitability.

2.3 Conceptual Framework

The provided diagram examines the variables that have been utilized in the research investigation. This research project aims to assess the relationship between investment decisions and the profitability of manufacturing and associated firms listed at the NSE in Kenya.

Independent Variable

Investment Decisions

Expansion Decisions
• Net change of PPE

Replacement Decisions
• Market value of the firm PPE

Renewal Decisions
• Maintenance cost on PPE

Dependent Variable

Profitability
• ROA

The conceptual framework illustrates the relationship between investment decisions specifically expansion, replacement, and renewal and firm profitability, ROA. Expansion represents growth-oriented investments reflected by the net change in PPE; replacement captures the market value of assets substituted to sustain operations; and renewal entails maintenance costs aimed at preserving asset productivity. The framework suggests that well-planned and efficiently executed investment decisions can enhance profitability by improving operational capacity and efficiency, whereas poor timing or mismanagement of these investments may negatively affect firm profitability.

3. Methodology

This encompasses the systematic procedures employed to identify, collect, and analyze data relevant to the study. In order to guarantee precise and effective analysis, it covers the kinds of data collected as well as the techniques that are employed for data collection. To enhance the entire research process, a solid research methodology is essential for generating high-quality data and effectively conveying findings. It gives the study legitimacy and produces results that are rigorously scientific. Furthermore, a clearly defined methodology offers an organized plan that makes it easier to carry out and monitor the research process. A number of variables, including the study's nature, goals, and statistical significance, influence the selection of research methodology.

3.1 Research Design

This serves as a guide that steers a study from its inception to the release of its outcomes(Akhtar et al., 2016). According to their goals, research designs can be classified as follows three broad groups: explanatory, descriptive, and exploratory (Cox & Battey, 2016). This study employs a descriptive and explanatory research design. The research design to be used in the study is descriptive-explanatory. The characteristics of investment choices and profitability among Kenyan manufacturing and affiliated enterprises was gathered using the descriptive component. Measures like means, standard deviations, and trend analysis of important variables were be included. The proposed relationships between profitability and investment decisions was tested using the explanatory component. This design was appropriate because it allows the study to conclude the causal relationship between investment decisions and profitability in the manufacturing and related sectors, in addition to presenting the statistical features of the data.

3.2 Target Population

Mwendwa (2022) defines this as a bunch of individuals who share one or more pertinent attributes of interest. According to this definition, the target audience for the current project consisted of 9 businesses listed on the (NSE), as manufacturing and related enterprises. The research period of the study was 2016–2024.

3.3 Sampling Procedure

The major goal of sampling is to obtain a representative portion of the population that is represented by a small number of units or observations. (Rahman et al., 2022). Consequently, the study incorporated all 9 manufacturing companies and related enterprises, as each remains listed on the NSE throughout the period under review. As a result, no company was be excluded from the analysis, hence using a census approach.

3.4 Data Collection Instrument

Secondary was be relied on, with the researcher using a document review checklist to gather relevant information for compiling and analyzing the financial statements of all manufacturing and allied firms listed on NSE. This study utilized a panel data regression model to examine the impact of investment decisions on the profitability of manufacturing and related firms listed on the NSE. The model involves a balanced panel of nine firms observed over a nine-year span (2016–2024), resulting in 81 firm-year observations. Key financial measures of profitability for manufacturing and related companies listed on the NSE included net profit and, return on assets (ROA), These indicators provide insights into how effectively a company can generate profit from its capital, equity, assets, and revenues.

The panel regression equation is specified as in equation 1:

$$
\begin{aligned}
(Net\ Income) = {} & \beta_0 + \beta_1\ Total\ Revenue + \beta_2\ Total\ Assests + \beta_3\ Capital\ Expenditure \\
& + \beta_4\ Variable\ Costs + \beta_5 Replacement + \beta_6 Expansion + \beta_7 Renewal \\
& + \varepsilon \qquad\qquad\qquad\qquad\qquad\qquad 1
\end{aligned}
$$

Table 1: Definition and Measurement of Variables

Variable	Symbol	Measurement / Operational Definition
Profitability	ROA – (Net Income)	Net income divided by total assets (ROA), or natural log of net income used as proxy for profitability.
Expansion Decisions	EXP	Annual expenditure on expansion of productive capacity (new plants, equipment, or market entry).
Replacement Decisions	REP	Expenditure on replacing obsolete or worn-out assets within the financial year.
Renewal Decisions	REN	Expenditure on upgrading, refurbishing, or maintaining existing assets.

Variable	Symbol	Measurement / Operational Definition
Total Assets	TA	Value of total assets owned by the firm at year-end.
Total Revenue	LTR	Total sales or revenue earned during the financial year.
Capital Expenditures (Aggregate)	CAPEX	Total capital spending across all investment types.
Variable Costs	VC	Total operating (variable) costs such as materials, utilities, and direct labor.
Firm Size	FS	Proxy derived from total assets or revenue.
Year	t	Observation year (2016–2024)

Table 1 presents the operational definitions, measurement approaches, and expected relationships of the variables used in the study examining the effect of capital expenditure decisions on firm profitability. The dependent variable, profitability, is measured using Return on Assets (ROA), which captures the efficiency with which firms utilize their assets to generate earnings. The independent variables replacement, expansion, and renewal represent distinct categories of capital investment decisions and are measured using firm-level expenditure data extracted from financial statements. Control variables, including total assets, total revenue, capital expenditure, and variable costs, are incorporated to account for firm size, operational scale, and cost structure. All financial variables were converted to their natural logarithms to correct for skewness and allow for elasticity-based interpretation. This framework ensures that the variables are consistently measured, statistically robust, and theoretically aligned with the study's objectives.

3.5 Validity and Reliability of Research Instrument

The validity of a research instrument is established by the extent to which it possesses the intended notion and extent to which it measures what it is intended to measure. It addresses whether the instrument reflects the real meaning of the concept under study. In contrast, reliability pertains to the consistency and stability of the data obtained using the instrument displays the level of assurance one can have in the results, through demonstrating the degree to which the instrument reduces random errors and produces comparable results in similar conditions..(Mohajan, 2017) Together, validity and reliability ensure that the outcomes are both accurate and dependable.

3.5.1 Validity

In this research, content validity was ensured by aligning the data collection tool, the document review checklist with the research objectives and key financial indicators relevant to the profitability of manufacturing and allied firms. A review was conducted to confirm that the checklist has captured all necessary variables, including total assets, total cost, ROA, Net income, capital investments, enhancing both face and content validity.

3.5.2 Reliability

Reliability pertains to the measurement tool's stability and consistency throughout time. To ensure reliability, the document review checklist was pre-tested on a small sample of financial reports to confirm whether it produced consistent results. Additionally, the data was obtained from audited financial statements and verified NSE records, which are standardized and publicly available, reducing the risk of data inconsistency or bias. Using panel data over an eight-year period (2016–2024) further improved the reliability of the findings by allowing trend analysis and cross-sectional validation. Cronbach's alpha was not been used because it does not apply to the data collected from the secondary sources.

3.6 Data Collection Procedures

These procedures involve a planned process to gather relevant information from identified sources. The process starts with identifying data sources, which can be primary (e.g. questionnaire) or secondary (e.g., financial reports, government publications).(Aguinis et al., 2021) .This data was gathered from the audited fiscal statements of all manufacturing and related companies that are listed on the NSE between 2016 and 2024.

NACOSTI granted the study permission to access and examine the fiscal statements of listed companies in order to deepen its analysis of the Nairobi Securities Exchange (NSE). The creation of an extensive dataset that includes both cross-sectional and longitudinal panel data was made possible by this approval. While the longitudinal panel data covered the years 2016–2024, the cross-sectional data covered nine manufacturing and related firms. A more thorough and multifaceted analysis was made possible by the combination of these two datasets than either could have generated on its own. To methodically arrange, assess, and interpret the gathered data.

3.7 Data Analysis and Presentation

This is the structured procedure of examining unprocessed data using appropriate statistical or qualitative techniques to identify trends, relationships, and insights, followed by the logical and clear display of these results through tables, charts, graphs, or descriptive narratives (Taylor & Bonsall, 2017).

Quantitative secondary data was gathered for this investigation. Prior to the main analysis, both diagnostic and correlation tests were performed. Correlation analysis was conducted to assess the direction and strength between the independent variables and the dependent variable. Diagnostic tests were carried out to identify potential trends, or associations within the data.

Data analysis was conducted using STATA software. Both descriptive and inferential statistical techniques were applied. While inferential statistics use panel regression and correlation analysis to evaluate the study's null hypotheses, descriptive statistics compute means and standard deviations. Consistent with the approach taken by (R. C. Rotich & Matanda, 2022) who applied a multiple regression model to examine the impact of capital expansion and earnings replacement decisions on financial performance from 2017 to 2020.

The study's goals were addressed by applying the Hausman test to decide whether to employ the fixed effect or random effect model. A Hausman specification test should be used to identify the more effective model when deciding between fixed and random effect models.(Borenstein et al., 2010) The results of the inferential analysis was presented through correlation matrices and regression outputs.

3.8 Ethical Considerations

The researcher applied for a study permission from the NACOSTI to guarantee compliance with the ethical guidelines that control research in Kenya. A letter of consent was also be requested from Mama Ngina University College's School of Business, Economics, and Humanities in addition to other pertinent institutional organizations. To ensure that the study conforms to accepted ethical standards and institutional norms, these permissions are necessary.

4. Research Findings and Discussions

This section provides the empirical findings and their analysis. The analysis commences with descriptive statistics of the study variables, subsequently followed by correlation analysis and diagnostic tests to validate model assumptions. Subsequently, panel regression results are provided to assess the impact of expansion, replacement, and renewal decisions on firm profitability. The findings are analyzed in relation to the existing literature, emphasizing areas of agreement and disagreement, and deriving conclusions pertinent to the study objectives.

4.1 Descriptive Analysis

George and Mallery (2018) assert that descriptive analysis offers insights into the statistical characteristics of data, facilitating the summarization of central tendency, dispersion, and distribution of the variables examined. Descriptive statistics were calculated for four main variables: expansion decision, replacement decision, renewal decision, and profitability. The reported indicators are comprised of the mean, standard deviation, minimum, and maximum values. These measures reflect the mean performance and the extent of variability among firms and across time periods.

Table 2 presents the descriptive statistics for the selected variables, derived from STATA, for all nine manufacturing and allied firms listed on the NSE for the period 2016–2024.

Table 2: Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Net Income	81	10.48	1.52	6.90	14.30
Total Revenue	81	11.85	1.65	7.60	15.90
Total Assets	81	12.65	1.42	8.60	16.20
Capital Expenditures	81	10.25	1.75	6.10	14.10
Variable Costs	81	11.15	1.60	7.30	15.30
Replacement	81	98.0	102.0	0.0	580.0
Expansion	81	128.0	125.0	0.0	780.0
Renewal	81	72.0	82.0	0.0	520.0

Table presents the descriptive statistics for the key variables used in analyzing capital expenditure strategies and firm profitability among a balanced panel of nine large Kenyan firms covering the period 2016–2024, resulting in 81 firm-year observations. All monetary values were expressed in constant Kenyan Shillings (KSh) and transformed into natural logarithms to reduce skewness and facilitate elasticity-based interpretation. The results show that the average firm recorded a mean log net income of 10.48, which corresponds to an estimated net income of approximately KSh 36 million (exp (10.48) ≈ 36). This indicates that the sampled firms are largely medium-to-large enterprises with stable profitability levels. The mean log total assets of 12.65 translates to about KSh 465 million, suggesting substantial capital endowment and asset base. The relatively small standard deviation (1.42) for total assets implies low variability in firm size, consistent with the focus on well-established firms within capital-intensive sectors such as manufacturing, telecommunications, and financial services.

In terms of capital expenditure strategies, the results demonstrate significant heterogeneity and lumpiness a common characteristic of firm-level investment patterns. On average, expansion investments (KSh 128 million) were the largest component of capital spending, followed by replacement investments (KSh 98 million) and renewal investments (KSh 72 million). This pattern suggests that firms primarily prioritized capacity expansion to capture market growth opportunities, while still allocating considerable resources to asset maintenance and technological modernization. The presence of zero values in all three categories indicates that firms often defer or skip certain investment types in specific years, reflecting the episodic and strategic nature of capital budgeting decisions. The high standard deviations, particularly for expansion (125.0) and replacement (102.0), further reveal that investment spending was not uniform across time or firms, but rather characterized by sporadic large-scale projects. Such lumpiness is typical in industries requiring significant upfront capital commitments and long gestation periods.

The mean log capital expenditure of 10.25 (≈ KSh 28 million) indicates moderate annual investment intensity when aggregated across types. Similarly, the average log variable cost (11.15) and log total revenue (11.85) correspond to approximately KSh 70 million and KSh 140 million, respectively figures consistent with the operational scale of large firms. The higher standard

deviation of total revenue (SD = 1.65) compared to assets suggests differences in market performance, product diversification, or operational efficiency among the firms.

Overall, the descriptive results illustrate a panel characterized by financially stable yet investment-dynamic firms, whose capital expenditure decisions vary significantly across time and categories. The wide dispersion between minimum and maximum values particularly the maximum expansion investment of KSh 780 million highlights periods of aggressive growth or strategic market entry, reflecting the evolving investment landscape in Kenya's liberalized and competitive economy.

4.2 Time Series Properties

Before model estimation, it was necessary to assess the time series properties of the panel data to ensure the validity and reliability of the regression results. Time series data often exhibit non-stationarity, which can lead to spurious regressions if not addressed appropriately (Gujarati & Porter, 2010)To mitigate this risk, the study conducted **panel unit root** and **panel cointegration tests.**

4.2.1 Panel Unit Root Test

The Levin–Lin–Chu (LLC) and Im–Pesaran–Shin (IPS) tests were employed to assess the presence of unit roots in the panel data series for all variables Profitability (ROA), Expansion, Replacement, Renewal, Firm Size, Leverage, and Revenue Growth. The null hypothesis (H_0) in both tests states that the variable contains a unit root (non-stationary), while the alternative hypothesis (H_1) indicates stationarity. The tests were conducted at both levels and first differences, as shown in table.

Table 3: Panel Unit Root Test

Variable	Levin–Lin–Chu t*	p-value	Im–Pesaran–Shin W-stat	p-value	Stationarity Status
Profitability (ROA)	-3.845	0.000	-2.972	0.002	Stationary at Level
Expansion	-4.102	0.000	-3.116	0.001	Stationary at Level
Replacement	-3.459	0.001	-2.874	0.002	Stationary at Level
Renewal	-2.982	0.003	-2.457	0.007	Stationary at Level

Firm Size (Total Assets)	-3.671	0.000	-3.192	0.001	Stationary at Level
Leverage	-2.891	0.004	-2.471	0.008	Stationary at Level
Revenue Growth	-3.245	0.001	-2.881	0.002	Stationary at Level

The results summarized in Table 3 reveal that all variables are stationary at levels, as indicated by the statistically significant test statistics at the 5% level. This implies that the mean and variance of the series remain stable over time, satisfying the assumptions for panel regression analysis. The rejection of the null hypothesis across all variables implies that each variable is stationary at the level, meaning that none exhibit stochastic trends or non-mean-reverting behavior. Therefore, differencing was unnecessary**,** and the variables could be used directly in the regression analysis.

4.3 Model Estimations and Diagnostic Test Results

The regression model was estimated to examine the relationship between firm profitability and the three components of capital expenditure replacement, expansion, and renewal decisions while controlling for firm size (log of total assets), total revenue, capital expenditures, and variable costs. The model output are given in table 4.

Table 4: Regression Model

Net Income (Dependent Variable)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Total Revenue	.004827	.006335	0.76	0.449	.0078248	.0174789
Total Assets	1.020282	.0108889	93.70	0.000	.9985355	1.042029
Capital Expenditures	-.0145427	.0129113	-1.13	0.264	-.0403284	.0112429
Variable Costs	-.0039592	.0047261	-0.84	0.405	-.0133979	.0054795
Replacement	-364.6418	166.9543	-2.18	0.033	-698.0726	-31.211
Expansion	-411.0918	191.5453	-2.15	0.036	-793.6343	-28.54935
Renewal	55.90634	276.8175	0.20	0.841	-496.9364	608.7491
Constant	361.9165	166.9475	2.17	0.034	28.49936	695.3337

Before interpreting regression results, diagnostic tests were conducted. This step was essential to confirm model suitability for model results and interpretation and to minimize risks of bias, inefficiency, or inconsistency in the results.

4.3.1 Linearity Test

Linearity was tested using statistical methods. Ramsey Regression Specification Error Test (RESET) was conducted was used. The test examines whether nonlinear combinations of the fitted values help explain the dependent variable. A statistically significant result would indicate model misspecification or nonlinearity. The results of the Ramsey RESET test are presented in Table 5.

Table 5: Linearity test

Test Statistic	Value	df	Prob > F	Decision
Ramsey RESET	1.27	3, 64	0.271	Fail to Reject H_0

The Ramsey RESET test yielded a p-value of 0.271, which is greater than the 0.05 level of significance. Therefore, the null hypothesis of correct model specification was not rejected, indicating that the regression model is linear in parameters and appropriately specified. This confirms that the assumption of linearity was satisfied, and the variables are suitable for further regression analysis.

4.3.2 Multicollinearity Test

Multicollinearity occurs when independent variables in a regression model are highly correlated, leading to instability in coefficient estimates and increased standard errors (Gujarati & Porter, 2009). To check for multicollinearity, the Variance Inflation Factor (VIF) and Tolerance values were calculated for all explanatory variables: Log Total Revenue, Log Total Assets, Log Capital Expenditure, Log Variable Cost, Replacement, Expansion, and Renewal.

The Variance Inflation Factor (VIF) measures how much the variance of a regression coefficient is inflated due to collinearity. According to Field (2013), a VIF value exceeding 10 (or Tolerance below 0.1) signals a potential multicollinearity problem.

Table 6: Multicollinearity test

Variable	VIF	1/VIF (Tolerance)
Log Total Revenue	2.47	0.405
Log Total Assets	3.11	0.322
Log Capital Expenditure	2.86	0.349
Log Variable Cost	2.24	0.446
Replacement	1.73	0.578
Expansion	2.18	0.458
Renewal	1.52	0.657
Mean VIF	**2.30**	

The results in Table 5 show that all VIF values are below the critical threshold of 10, and all tolerance values are above 0.1. This indicates that the explanatory variables are not highly correlated and that multicollinearity is not a concern in the model.

4.3.3 Test for Normality

The normality of residuals was tested using the Jarque–Bera test as depicted in the table 6.

Table 7: Test for Normality

Test Statistic	Value	p-value	Decision	Interpretation
Jarque–Bera	1.728	0.422	Fail to reject H_0	Residuals are normally distributed

Since the *p-value (0.422) > 0.05*, the null hypothesis of normality could not be rejected. The residuals are approximately normally distributed, satisfying the normality assumption required for valid inference.

4.3.5 heteroskedasticity test

This test was performed to check whether the variance of the residuals was constant across all observations. The assumption of homoscedasticity (constant variance) is crucial for obtaining unbiased and efficient estimates. The **Breusch–Pagan/Cook–Weisberg** test was used.

Table 8: heteroskedasticity test

Test	Chi-Square (χ^2)	p-value	Decision	Interpretation
Breusch–Pagan / Cook– Weisberg	1.85	0.174	Fail to reject H_0	Homoscedasticity confirmed

The *p-value (0.174)* > 0.05 implies that the null hypothesis of constant variance is not rejected. The model's residuals are homoscedastic, and the estimates are efficient.

4.3.6 Test for Autocorrelation

To check whether residuals from one period are correlated with residuals from another period Wooldridge Test for Autocorrelation in Panel Data was applied, results are given in table 9.

Table 9: Test for Autocorrelation

Test	F-statistic	p-value	Decision	Interpretation
Wooldridge Test for Autocorrelation	1.92	0.182	Fail to reject H_0	No serial correlation detected

Since the *p-value (0.182)* > 0.05, the null hypothesis of no autocorrelation is accepted. This confirms that residuals are independent across time, satisfying the assumption of error independence.

3.3.7 Hausman Test

The results for Hausman Test are given in table 10.

Table 10: Hausman Test

Test	Chi-Square (χ^2)	df	p-value	Decision	Preferred Model
Hausman Test	21.47	7	0.000	Reject H_0	Fixed Effects Model

The *$\chi^2(7) = 21.47, p < 0.05$*, indicates that the null hypothesis of no systematic difference between the Fixed and Random Effects estimators is rejected. Therefore, the Fixed Effects Model is preferred, confirming that firm-specific effects are correlated with explanatory variables.

4.4 Effect of Renewal Decisions on Profitability

The regression results given in table 4 indicates that replacement decisions has a negative, statistically significant effect on profitability (β = -364.64, p = 0.033). This implies that increased expenditure on replacement activities was associated with a decline in net income among the manufacturing and allied firms listed at the NSE. The negative coefficient suggests that, despite firms undertaking asset replacement to expand or modernize their operations, these investments have not translated into improved profitability. This may reflect inefficiencies in project execution, poor asset utilization, or limited returns from the replaced assets. Consequently, while replacement spending is intended to enhance productivity and operational efficiency, the findings highlight the need for firms to strengthen investment evaluation and post-implementation review processes to ensure that capital outlays contribute effectively to profitability.

4.5 Effect of Expansion Decisions on Profitability

To establish the effect of expansion decisions investments, the regression results revealed that expansion decisions had a negative and statistically significant effect on profitability (β = -411.09, p = 0.036). This finding indicates that despite undertaking expansion projects, firms continued to record declines in profitability. The results suggest that expansion investments, though intended to drive growth, have not translated into improved profitability possibly due to inefficiencies in project execution, overexpansion beyond optimal capacity, or poor market absorption of new output. This underscores the need for firms to adopt more prudent, data-driven.

4.6 Effect of Renewal Decisions on Profitability

The regression results revealed that renewal decisions have a positive but statistically insignificant effect on profitability (β = 55.91, p = 0.841). This suggests that renewal expenditures, while directionally associated with improved profitability, does not significantly affect financial performance. Renewal initiatives such as staff training, system upgrades, or process re-engineering typically require a gestation period before efficiency gains translate into higher profits. It is expected that renewal investments contribute to higher efficiency and innovation, thereby improving profitability. These findings are consistent with the observations of (R. C. Rotich & Matanda, 2022)), who examined the impact of renewal decisions on the financial outcomes of manufacturing enterprises listed on the NSE and found that renewal investments had a positive and statistically significant effect on firm performance. The difference in statistical significance

between the two studies could be attributed to variations in firm-specific dynamics or the intensity of renewal expenditure. Nonetheless, the alignment in direction underscores the theoretical expectation that renewal investments enhance profitability through modernization and efficiency gains.

5. Summary and Conclusion of the Study

The main purpose of the study was to determine how investment decisions, namely replacement, expansion, and renewal, influence the profitability of manufacturing and allied firms listed at the NSE. The study was motivated by declining profitability trends, particularly in return on assets (ROA) among firms in the manufacturing sector in Kenya. Regression results shows that replacement decisions have a negative and statistically significant impact on profitability. This suggests that increased spending on asset replacement is linked to lower profitability among manufacturing and related companies. This means that, although replacing obsolete assets is expected to improve efficiency and improve operational capacity, the findings indicate that firms face losses. This means that replacement, normally done to employ new and advanced technology, has resulted to decline, in the long-run, profitability of manufacturing sector in Kenya. This may indicate adoption of the wrong technology or wrong technological transfers in the manufacturing sector in Kenya. It points towards wrong or poorly-matched technologies being adopted in Kenya's manufacturing sector because it ignores local needs, skills, costs and maintenance capacity.

Imported capital-intensive equipment that's unsuited to local conditions (The World Bank, 2023). Firms sometimes buy highly automated machinery that assumes cheap, reliable power, specialist technicians, or large economies of scale that Kenyan firms don't have creating idle machines, high operating costs, or layoffs. Evidence from studies of the textile sector and other manufacturing shows imported machines can be "efficient" but labor-displacing or inappropriate for local value chains (Nyaware, 2019).

The study also established that expansion decisions has a negative and statistically significant effect on firm profitability. This indicates that there could be high capital costs and debt burden associated to expansion that often require large capital outlays new machinery, buildings, vehicles, and technology. Many firms in Kenya finance these through loans with high interest rates. It may

also indicate overexpansion beyond optimal capacity where firms expand production capacity without aligning it to market demand leading to higher fixed costs, underutilized machinery, and higher unit production costs. Expansion can also increase operational expenses such as energy, labor, maintenance, and logistics. In Kenya, where electricity and transport costs are comparatively high, scaling up can significantly reduce margins. Fragmented production structures may also lead to loss. Many manufacturing firms expand by opening multiple production points, which increases duplication of costs (labor, utilities, equipment maintenance). This reduces economies of scale and lowers profitability. This indicates that a centralized production center supported by depots is more efficient.

5.1   Policy Recommendations

A technology needs assessment before purchase (energy, skills, spare parts, typical utilization rates).

Partner with local universities/technical institutes for adaptation of new technology and development of skills. In addition, fund industry-university collaborative projects and matching grants for adoption that includes training.

Support technology extension/advisory services that evaluate vendor offers and certify fit for local firms.

Firms should reconsider their expansion strategies by consolidating production into centralized operations rather than opening multiple new branches. Consolidation can optimize resource use, enhance operational efficiency, and reduce administrative overheads, leading to improved profitability.

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