

## REVENUE STRUCTURE AND OPERATIONAL EFFICIENCY OF COMMERCIAL PARASTATALS IN KENYA

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### ABSTRACT

Commercial parastatals in Kenya play a pivotal role in advancing socioeconomic development by providing essential services such as energy, water, and transportation. Despite this mandate, many parastatals continue to grapple with persistent inefficiencies. The general objective of the study was to assess the effect of revenue structure on the operational efficiency of commercial parastatals in Kenya. The specific objectives were to examine the effect of service fees, and investment revenues on the operational efficiency of commercial parastatals in Kenya. The study was guided by cost recovery and firm theory. The study utilized the longitudinal research design that involved repeated observations of the same variables over an extended period. The population of commercial parastatals in Kenya was 43 as of December 2024, and thus, a census study was conducted. Secondary data for the period between 2020 and 2024 was utilized to collect financial information from KNBS, Kenya National Auditors Reports, and the GOK website. Data were gathered from secondary sources with the aid of a secondary data collection sheet and analyzed using descriptive and inferential statistics. The descriptive statistical tools included frequencies, percentages, means, variances, and standard deviations. Inferential statistical tools included Pearson's product-moment correlation and panel regression analysis. A diagnostic test was conducted to test the assumptions of the regression model and panel regression for inferential analysis. Panel regression results indicated that revenue structure has a significant positive effect on the operational efficiency of commercial parastatals in Kenya. Specifically, service fee reported a positive and significant effect ( $\beta = 0.2318$ ,  $p = 0.0000$ ), investment revenue recorded a positive and significant effect ( $\beta = 0.1893$ ,  $p = 0.0000$ ) on the operational efficiency of commercial parastatals in Kenya. The study recommended policymakers should introduce performance-based funding frameworks to ensure that government financial support encourages operational efficiency and accountability. Furthermore, clear investment governance guidelines should be established to ensure that investment activities contribute to institutional sustainability and operational improvement.

**Key Words:** Revenue Structure, Operational Efficiency, Commercial Parastatals in Kenya, Service Fees, Investment Revenues

## Background of the Study

Operational efficiency is primarily a metric that measures the efficiency of profit earned as a function of operating costs (Hayes, 2024). The greater the operational efficiency, the more profitable a firm or investment is. Translated in a similar way, it relates to how firms make good use of available resources, using the right methods and people to produce goods that meet the standards set in the market and earn a higher value for the organization (Obaje & Abdullahi, 2021). It involves the identification of wasteful resources and processes that affect productivity and the growth of organizational profits. The main concern of operational efficiency is redesigning new work processes that improve productivity and quality (Darrab & Khan, 2010).

Key components of measuring operational efficiency include the Operating Expense Ratio, asset turnover ratio, cost per unit of service delivered, and achievement of performance contract targets. The asset turnover ratio, calculated as total revenue divided by total assets, reflects how effectively a firm manages its assets relative to income generation. Mukui (2022) emphasized that expense containment is a critical dimension of operational efficiency in manufacturing firms listed on the Nairobi Securities Exchange, linking disciplined cost management directly to financial performance. In Kenya, performance contracts are widely used to align public institutions with national development goals. Nduati and Wanyoike (2022) highlighted that role clarity and systematic performance reviews are essential for meeting these targets, which in turn reinforce institutional effectiveness and fiscal accountability.

The revenue structure of an organization encompasses various income streams. Revenue structure influences operational efficiency through several mechanisms. A diversified revenue structure can provide a stable inflow of funds, thereby enhancing operational efficiency (Almagtome et al., 2023). The revenue structure of Kenyan commercial parastatals is characterized by a mix of internally generated income (service fees, , and investment returns). A well-balanced revenue structure can cushion the organization against economic fluctuations and policy changes that might affect specific income sources (Nguyen & Liang, 2021).

Service fees are levied on users for services rendered, and their key aspects include revenue generated from user fees, the cost recovery ratio, and customer payment compliance. These fees, levied on users for services rendered, affect the financial autonomy of parastatals and their ability to reinvest in service improvements. Key performance indicators such as cost recovery ratios and customer payment compliance are essential in evaluating efficiency. In Kenya's water sector, for instance, enhanced billing systems and smart metering have improved fee collection and reduced non-revenue water, contributing to better operational outcomes (Water Services Regulatory Board, 2025). Regulatory oversight and tariff reforms are increasingly geared toward ensuring that service fees support both equity and efficiency.

Investment revenue is an indicator of how effectively a parastatal is utilizing its resources to generate financial gains and improve operational efficiency. Three key components of investment returns include Return on Investment (ROI), Return on Assets (ROA), and Investment Portfolio Performance. In Kenya, parastatals with diversified investment portfolios spanning real estate, equities, and fixed income have demonstrated resilience amid macroeconomic shocks (Kestrel Capital, 2025). Parastatals must navigate liquidity constraints, governance challenges, and market volatility to optimize returns. Strengthening investment governance and aligning portfolios with national development priorities are key to sustaining efficiency.

## Statement of the Problem.

Commercial parastatals in Kenya are tasked with promoting socio-economic growth by supplying essential commodities and services in areas including water, transportation, and electricity (Were, 2020; Kariuki & Muturi, 2022). Many parastatals nevertheless experience ongoing operational inefficiencies as a result of their volatile and undiversified revenue streams

(Auditor-General Reports, 2023). Over the last 5 years, the National Treasury (2024) and Auditor-General Reports (2025) have reported a general downward trend in the asset turnover ratio (ATR), one of the most important metrics for operational efficiency that assesses how well firms utilize their assets to generate revenue. For instance, sectoral data reveal that the average ATR for these firms stood at 0.46% in 2020, before dropping to 0.41% in 2021 and 0.38% in 2022. There was a modest recovery to 0.42% in 2023, and the ratio again fell to 0.37% in 2024 (Auditor-General Reports, 2020 - 2023). These findings indicate that Kenyan parastatals consistently struggle to convert assets into revenue. Recent financial reports highlight these challenges. For instance, Kenya Airways' ATR decreased from 0.57% in 2020 to 0.46% in 2022 (National

Treasury, 2023). Similarly, KPLC ATR declined from 0.42% in 2022 to 0.38% in 2024, reflecting challenges from rising debt, governance issues, and technical losses (Auditor-General, 2022). The Kenya Railways SGR operations recorded a notably low ATR of 0.03% in 2023 despite generating KES 15 billion in revenue from assets exceeding KES 500 billion (Omondi & Githinji, 2023). These ratios, all below 1.0, demonstrate systemic underperformance in revenue generation across state-owned enterprises. Extensive research has identified gaps that remain; conceptually, studies focus on profitability over operational efficiency metrics (Peng et al., 2016; Muriu & Kihara, 2023). Regionally, research centers on Asian and South African SOEs (Nugroho, 2019; Gumede, 2021), with limited Kenyan evidence despite political, procurement, and bailout challenges (Otieno & Wanjala, 2024). Kenyan studies (Wachira, 2018; Mugenda, 2021) examine financial performance but do not link revenue structures to operational efficiency, while methodological limitations include reliance on ratio analysis and descriptive designs over econometric approaches (Mungai, 2021; Wainaina & Muriuki, 2023). This warranted a study that empirically investigates how revenue structures influence operational efficiency in Kenyan commercial parastatals, addressing both the conceptual and methodological gaps.

### **Objectives of the Study**

The general objective of the study was to establish the effect of revenue structure on the operational efficiency of commercial parastatals in Kenya.

#### **Specific Objectives**

- i. To determine the effect of service fees on the operational efficiency of commercial parastatals in Kenya.
- ii. To examine the effect of investment revenue on the operational efficiency of commercial parastatals in Kenya.

### **Hypotheses of the Study**

**H<sub>01</sub>** Service fees do not significantly affect the operational efficiency of commercial parastatals in Kenya

**H<sub>02</sub>**: Investment revenue does not significantly affect the operational efficiency of commercial parastatals in Kenya

## **LITERATURE REVIEW**

### **Theoretical Review**

#### **Cost Recovery Theory**

Cost Recovery Theory was developed by Mohring and Harwitz in 1962. The theory argues that companies should attempt to recoup all or a portion of the expenses associated with providing services through fees or charges to users. Furthermore, Cost Recovery Theory suggests that when revenues are directly tied to organizational performance, institutions have stronger incentives to improve service efficiency, minimize operational wastage, and respond more

effectively to consumer needs (Whittington, 1992; Mikesell, 2017). In addition to being a source of income, service fees also act as a tool for accountability, encouraging organizations to provide value. They relieve economic strain on governments and encourage operational discipline, efficiency, and sustainability by tying revenue to performance (Mikesell, 2017).

Cost recovery theory anchors the service fees within the broader inquiry into revenue structure and operational efficiency of commercial parastatals. Entities such as Kenya Power and the National Water Conservation and Pipeline Corporation have adopted fee-based models to finance operations and expand service coverage. Njoroge and Waweru (2023) observe that service fees in these organizations are instrumental in covering recurrent costs, reducing fiscal deficits, and improving service delivery standards. The theory supports the view that when service fees are well-calibrated and transparently managed, they can lead to better financial planning, enhanced customer satisfaction, and more efficient use of resources. Thus, service fees become both a revenue stream and a performance lever, aligning financial inputs with operational outputs.

Nonetheless, the theory is not without critique. While it emphasizes financial sustainability, it may overlook socio-economic disparities that affect users' ability to pay, particularly in essential sectors like water and energy. Omondi and Githinji (2024) caution that rigid cost recovery models can lead to service exclusion for low-income populations, undermining equity and access. Moreover, the assumption that service quality will automatically improve with fee-based funding is not always empirically supported. Kariuki and Mutua (2021) advocate for hybrid approaches that combine cost recovery with targeted subsidies and performance-based funding to balance efficiency with equity. Therefore, cost recovery theory offers a compelling rationale for integrating service fees into the revenue structures of Kenyan parastatals.

## **Firm Theory**

Firm Theory was developed by Coase in 1937. The theory posits that firms exist to minimize transaction and production costs while maximizing returns through strategic resource allocation. It conceptualizes the firm as a rational economic agent whose decisions are guided by profit maximization and operational efficiency. In the context of commercial parastatals, firm theory provides a compelling lens to understand how investment returns serve as a critical driver of financial performance. It suggests that parastatals, despite their public ownership, must adopt private-sector efficiency principles to remain financially viable. Investment returns, therefore, are not merely outcomes but strategic imperatives that shape the revenue structure and determine the capacity of these entities to deliver services effectively.

The theory assumes that firms in general operate under conditions of bounded rationality, where decision-makers aim to optimize returns within resource and institutional constraints. It presumes that efficient investment decisions are contingent upon accurate forecasting, cost-benefit analysis, and risk management. In the Kenyan context, these assumptions manifest in parastatals such as KenGen, which have adopted capital-intensive investment strategies in renewable energy. Firm Theory also assumes that the reinvestment of returns into operational systems can yield compounding efficiency gains. However, these assumptions rely heavily on the presence of managerial autonomy, financial discipline, and performance-based accountability, which are not uniformly present across all Kenyan parastatals.

However, the practical application of firm theory in the Kenyan context warrants critical examination. Muriu and Kihara (2023) argue that the theory's inherent focus on profit maximization may conflict with the broader public service mandate of parastatals, which are expected to deliver socially necessary services that may not always be financially lucrative. Additionally, Otieno and Wanjala (2024) highlight that the assumption of rational, profit-driven decision-making is often challenged by contextual realities such as political interference, bureaucratic inefficiencies, and weak institutional oversight. These factors can distort investment priorities, introduce operational inefficiencies, and reduce the ability of

parastatals to fully realize the benefits of their investment revenue. Therefore, while Firm Theory provides a valuable conceptual framework for linking investment returns to operational efficiency, its explanatory power in the Kenyan setting must be tempered by recognition of institutional, political, and socio-economic constraints.

## **Empirical Literature**

### **Service Fees and Operational Efficiency**

Shukrani, Ifire, Yeya, and Banafa (2022) examined the effect of service fees on the operational efficiency of investment firms listed at the NSE, Kenya. The period of study was 2015 to 2020, focusing on investment companies listed at the Nairobi Securities Exchange (NSE). Secondary data was used in this research. The study adopted a descriptive research design in analyzing the effects of the study variables. Several diagnostic and correlation tests were conducted before ultimately running the multiple linear regression model used in modeling the results of this study. The results indicated that the service fee had no significant effect on the operational efficiency of investment firms listed at the NSE, Kenya. The study focused only on NSE-listed investment firms. This limits both the depth of analysis and the generalizability of the findings.

Molu and Luketero (2025) conducted a study on the effect of service fees on the performance of community water projects in Marsabit County, Kenya. The study was conducted for a period of 5 years between 2017 and 2021. The study employed a descriptive research design and stratified sampling of 215 respondents. The study employed questionnaires and multiple regression analysis to examine the effects of meter reliability, efficiency, billing accuracy, and flexibility. Findings showed survival fees had the strongest impact on project performance. However, the study's localized scope may limit broader applicability, and it recommends increased investment and regulatory oversight to enhance equity and consumer protection.

Ozordi (2022) explored the influence of service fees on the financial efficiency of service firms in Nigeria. The study empirically sampled 40 financial service firms from the 50 firms registered on the stock market. The study adopted an ex-post-facto research design. Data was collected using secondary sources from the firms' annual reports to determine the influence the governance cost has on Nigeria's financial service efficiency for nine years (2012–2020). Also, the study utilized the Panel Tobit regression to test the hypothesis. The Principal Component Analysis (PCA) was used to ascertain the aggregate service fees. The findings from the study show a significant and positive influence of service fees on the efficiency of financial service firms in Nigeria. The study only covers Nigeria, making the findings less generalizable across different economic or regulatory environments.

Scott's (2019) research analyzed how the service fee charged on public expenditure affects service delivery in the public sector district assemblies of Ghana. Using a mixed-method approach to research, questionnaires, interviews, focus groups, and document analysis were used to collect both qualitative and quantitative data. The participants in the focus group talks, key interview informants, and questionnaire responses were selected using multistage sampling. A sample of 34 of the 170 district assemblies that were in existence as of 2008 was taken. 612 District Assembly (DA) officials, 1020 civilians, 28 national/regional authorities, and 20 focus group participants were among the study's participants. While qualitative data were explored thematically, quantitative data measured using scaled items were analyzed using regression and descriptive statistics. According to the study, service fees on government expenditures significantly improved service delivery.

Xiang (2017) investigated the effect of service fee on the performance of over 2,000 small and medium-sized enterprises (SMEs) in Australia using longitudinal panel data spanning 2010–2014. The study employed a panel regression model and Pearson's correlation analysis to account for cross-sectional heterogeneity and provide robust inferential results. Findings indicated that service fee support does not influence SME performance. However, the study

was conducted within a developed economy context, where SMEs benefit from stable institutional, regulatory, and financial frameworks. This limitation reduces the applicability of the findings to developing economies, where structural constraints, institutional weaknesses, and funding challenges may alter the effectiveness of government financial assistance.

### **Investment Revenue and Operational Efficiency**

Chache et al., (2021) conducted a study to determine the effect of investment revenue on risk adjustment returns of insurance companies in Kenya. The study used a longitudinal research design on a population of 63 insurance companies licensed by the Insurance Regulatory Authority in Kenya, both life and general insurance companies. A census approach was undertaken since the study included all 63 insurance companies in Kenya. Data were secondary, drawn from annual returns submitted to the regulator, covering five years (2014-2018). The study applied linear regression and the OLS regression model to examine the relationship between investment revenue and risk adjustment returns. The findings showed that investment revenue significantly affects the risk-based returns of insurance companies in Kenya. The study was conducted on insurance firms in Kenya and therefore cannot be generalized to the commercial parastatals in Kenya.

Shukrani, Ifire, Yeya, and Banafa (2022) examined the effect of investment revenue on the operational efficiency of investment firms listed at the NSE, Kenya. The period of study was 2015 to 2020, focusing on investment companies listed at the Nairobi Securities Exchange (NSE). Secondary data was used in this research. The study adopted a descriptive research design in analyzing the effects of the study variables. Several diagnostic and correlation tests were conducted before ultimately running the multiple linear regression model used in modeling the results of this study. The results indicated a strong positive relationship between investment in revenue and operational efficiency of investment firms listed at the NSE, Kenya. The study focused only on NSE-listed investment firms. This limits both the depth of analysis and the generalizability of the findings.

Osorio (2016) examined the impact of investment revenue on the performance of private schools in Uganda over the period 2007 to 2014. A mixed-methods research design was adopted, combining survey data from school administrators and teachers with secondary data from Ministry of Education reports. Regression analysis was used to assess the effect of PPP arrangements on performance indicators such as student enrollment, access to education, and academic achievement. The findings revealed that investment revenue significantly improved the performance of private schools in Uganda. The study was limited to the education sector and did not consider other critical sectors such as infrastructure, health, or commercial parastatals, where investment revenue may play an equally significant role.

Olaniyan (2020) examined the effect of investment and its impact on revenue generation in Nigeria. The study was conducted for a period of 11 years from 2010-2020. The study adopted a descriptive research design in analyzing the effects of the study variables. Utilizing the augmented Dickey-Fuller and Philip Perron unit, the estimated equation and diagnostic tests of stationarity were conducted utilizing the time-series property of the data series. To determine whether there is no association between the variables, a root test was performed. The ordinary least squares regression technique was employed to establish the relationship between the variables. The empirical evidence shows that investment had a positive impact on revenue generation in Nigeria. The study was limited to macroeconomic, country-level data and did not examine sector-specific or firm-level impacts like parastatals.

Krishnamoorthi and Murigesan (2018) analyzed the effect of investment revenue and risk-adjusted return of selected mutual fund schemes in India. Data on 13 sample mutual funds were gathered and collected from the official websites of a few chosen Indian mutual fund companies between 2014 and 2017. Each of the six businesses had its BETA value determined. Eviews software, an econometric application, was utilized to analyze the data using correlation and the

random effect regression technique. Descriptive statistics were also used to show and analyze the sampled data, determining the standard deviation, mean, maximum, and minimum. The study revealed no significant effect on investment revenue on the risk-adjusted return of selected mutual fund schemes in India. The study was, however, done on Indian mutual funds and cannot be generalized to Kenyan parastatals.

Tipu (2024) examined the relationship between critical success factors of investment revenue and the sustainable performance of construction firms in Malaysia. The study covered seven years (2014–2020). Using a survey design and convenience sampling, data were collected from 394 respondents in construction firms contracted by the public sector. The study employed descriptive statistics, bivariate correlation, hierarchical multiple regressions, and factor analysis for data validation. Findings indicated that investment revenue significantly influences the sustainable performance of construction firms. However, the study was limited to construction firms with public sector contracts, thereby excluding other sectors within parastatals where PPPs could also influence performance.

### Conceptual Framework

A conceptual framework is a diagrammatic representation of the association between study variables (Afshar et al., 2022). The conceptual framework shows the influence of revenue structure on the operational efficiency of commercial parastatals in Kenya. The independent variables were service fees, and investment returns. The dependent variable is the operational efficiency of parastatals.

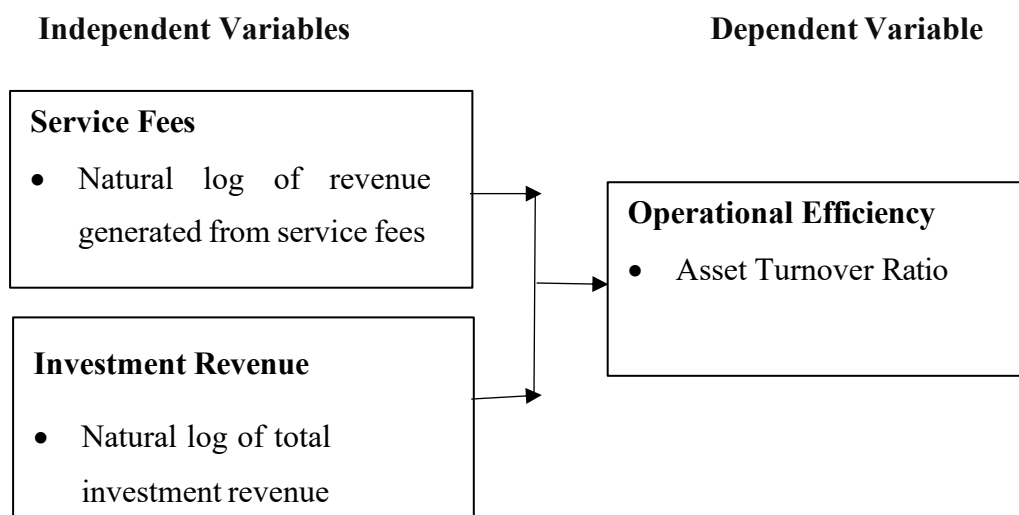


Figure 2.1 Conceptual Framework

#### Service Fees

Service fees constitute a pivotal revenue stream for state-owned enterprises (SOEs) and commercial parastatals, especially within essential service sectors such as utilities, healthcare, and transportation. These fees, charged directly to users, significantly contribute to financial sustainability by offsetting operational costs and reducing dependence on government funding. As highlighted by Mungai and Waweru (2021), the capacity of parastatals to appropriately structure and collect user fees directly influences their financial stability and service delivery efficiency. Parastatals that generate substantial income from service fees tend to exhibit greater financial autonomy and enhanced operational performance. Thus, well-designed and equitably implemented service fee mechanisms are integral to ensuring both fiscal resilience and high-quality public service provision.

#### Investment Revenue

Investment revenue serve as a vital measure of how efficiently parastatals deploy resources to

generate financial gains and enhance operational performance. Investment revenue provides an assessment of profitability and investment effectiveness. As Kibet and Ngetich (2022) underscore, investment revenue is particularly valuable in capital-intensive sectors such as energy and infrastructure, where it helps determine whether investment projects yield meaningful financial outcomes. A high revenue reflects prudent investment management, contributing to financial stability, operational efficiency, and improved public service delivery. By maximizing returns, parastatals can reduce reliance on external funding and reinforce their capacity to deliver essential services sustainably.

### **Operational Efficiency**

Operational efficiency refers to an organization's ability to effectively utilize resources to generate outputs, minimize costs, and deliver services optimally (Waring & Glendon, 2021). In commercial parastatals, it encompasses financial performance as well as effective deployment of physical, human, and technological resources to achieve service delivery objectives, commonly measured by indicators such as the asset turnover ratio (ATR) and return on assets (Mukui, 2022; Omondi & Githinji, 2023). High operational efficiency enables parastatals to maximize outputs from limited inputs, reduce dependency on government subsidies, and improve service delivery (Were, 2020; Kariuki & Muturi, 2022), whereas inefficiencies lead to persistent deficits and fiscal strain (Auditor-General Reports, 2023; National Treasury, 2024). Understanding operational efficiency is therefore critical to examining how revenue structures influence the performance of commercial parastatals.

## **RESEARCH METHODOLOGY**

A research design serves as the structural blueprint for a study, outlining the strategic approach used to investigate specific, testable research questions (Bhatt, 2022). In this study, a longitudinal research design was employed, relying on secondary quantitative data. As defined by Miksza and Elpus (2018), a longitudinal study involves repeated observations of the same variables over an extended period, often spanning several years. This research design is preferred because it facilitates the identification of patterns and shifts in key variables, reinforcing the relevance and validity of the chosen design (Caruana 2015).

The population of this study comprised the forty-three commercial parastatals operating in Kenya between 2020 and 2024. By examining all forty-three entities, the study ensures comprehensive coverage, enhances the generalizability of findings, and aligns with the longitudinal design's emphasis on institutional performance over time. In this study, a census was conducted to include all forty-three commercial parastatals operating in Kenya for the 5 years between 2020 and 2024. According to Mugenda Mugenda (2003), all objects in the population affect the contribution in one way or another towards achieving a good conclusion.

Data was collected using a secondary data collection sheet, designed to extract relevant quantitative information from official publications. Specifically, the data was sourced from the annual reports of the National Treasury and the KNBS, covering the period from 2020 to 2024. The study gathered secondary data by compiling information from reports published by the reports using a data collection sheet. The data were imported into STATA 18 software for analysis. The software was used to generate tables, graphs, regression, statistical analysis, and other statistical parameters, and the data was entered on the data collection sheets.

The study used descriptive and inferential statistics for data analysis. The descriptive statistics included mean, minimum, maximum, standard deviation, skewness, and kurtosis. Inferential statistical tools included Pearson's correlation analysis and the panel regression analysis. The panel regression model is a combination of cross-section and time series data, Zulfikar (2018), in which the data, including time series and cross-sectional data, is pooled into a panel data set and estimated using a panel data regression. The research performed hypothesis testing through t-tests alongside F-tests to establish the statistical significance of the findings and achieve

robust conclusions.

## RESEARCH FINDINGS AND DISCUSSIONS

### Descriptive Statistics Results

This section presents descriptive statistics for the study variables based on annual mean values computed from the raw ratio data. The descriptive statistics include the number of observations, minimum, maximum, mean, standard deviation, skewness, and kurtosis, which together provide insights into the central tendency, dispersion, and distributional properties of the study variables. Table 4.1 presents the descriptive results.

**Table 1: Descriptive Statistics Results**

Statistics	Obs	Min	Max	Mean	SD	Skewness	Kurtosis
Operational Efficiency	2150	0.5211	0.9869	0.7352	0.2198	0.5034	-3.0757
Service Fees	2157	7.1273	7.3174	7.2159	0.0743	0.3759	-0.8306
Investment Revenue	2150	0.1153	0.4647	0.2822	0.1454	0.1319	-1.9510

Regarding Asset Turnover Ratio (ATR), Table 1 shows that asset utilization efficiency ranged from a minimum of 0.5211 to a maximum of 0.9869, indicating variation from low to near-optimal asset use during the study period. The mean ATR of 0.7352 suggests that commercial parastatals achieved moderate asset utilization efficiency on average, while the standard deviation of 0.2198 indicates noticeable year-to-year variation in operational performance. The skewness value of 0.5034, which lies within the acceptable  $\pm 1$  threshold, indicates mild asymmetry and approximate normality, consistent with the normality guidelines proposed by Hair et al., (2019). Similarly, the kurtosis value of -3.0757, being below the benchmark of 3, reflects a platykurtic distribution with no extreme values, implying stable asset utilization patterns. Comparable findings of moderate asset turnover ratios have been reported by Wanyama (2017), Mugenda (2018), and Aivazian, Ge, and Qiu (2017), who attribute such outcomes in capital-intensive sectors to adjustment costs, investment rigidities, and the long-term nature of asset productivity.

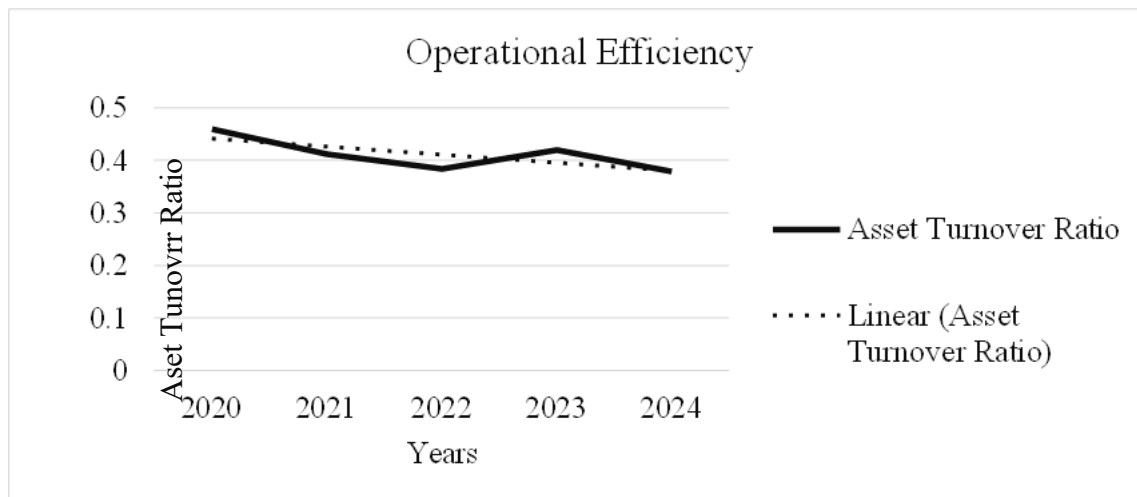
Table 1 indicates that revenue generated from service fees ranged from a minimum of 7.1273 to a maximum of 7.3174, reflecting limited variation in internally generated revenue over the study period. The mean value of 7.2159 shows that service fee revenue remained relatively stable, a finding further supported by the low standard deviation of 0.0743, which indicates minimal year-to-year fluctuations. The skewness value of 0.3759, which lies within the acceptable  $\pm 1$  threshold, suggests mild right skewness and an overall balanced distribution. Similarly, the kurtosis value of -0.8306, being below the benchmark of 3, indicates a platykurtic distribution with no extreme revenue values, consistent with the assertion by Hair et al. (2019) that kurtosis values below 3 imply limited outliers and distributional stability. These results suggest that internally generated revenue from service fees was steady and predictable. Comparable findings have been reported by Mugenda (2018), Ochieng (2019), and Schiavo-Campo (2017), who observed that internally generated revenues in public institutions tend to be more stable and less volatile than external funding sources.

With respect to investment revenue, Table 4.1 shows that returns ranged from a minimum of 0.1153 to a maximum of 0.4647, indicating variation from low to relatively strong performance during the study period. The mean revenue of 0.2822 suggests that investments generated moderate but positive returns on average, while the standard deviation of 0.1454 reflects some year-to-year variation due to changing operational and economic conditions. The skewness value of 0.1319, which lies within the acceptable  $\pm 1$  threshold, indicates a fairly symmetric distribution of returns. Similarly, the kurtosis value of -1.951, being below the benchmark of

3, indicates a platykurtic distribution with limited extreme values, suggesting the absence of sharp gains or losses. Overall, these results imply stable and sustainable investment performance with manageable risk exposure. Comparable findings have been reported by Ngugi (2018), Aivazian et al. (2020), and Ouma (2019), who observed that firms operating in capital-intensive environments tend to record moderate and stable returns due to gradual asset productivity adjustments.

### Trend Analysis for Operational Efficiency

This section analyzes the trend in operational efficiency, proxied by the Asset Turnover Ratio (ATR), for commercial parastatals in Kenya over the period 2020–2024. Figure 1 illustrates both the actual ATR values and the fitted linear trend line over the five years.

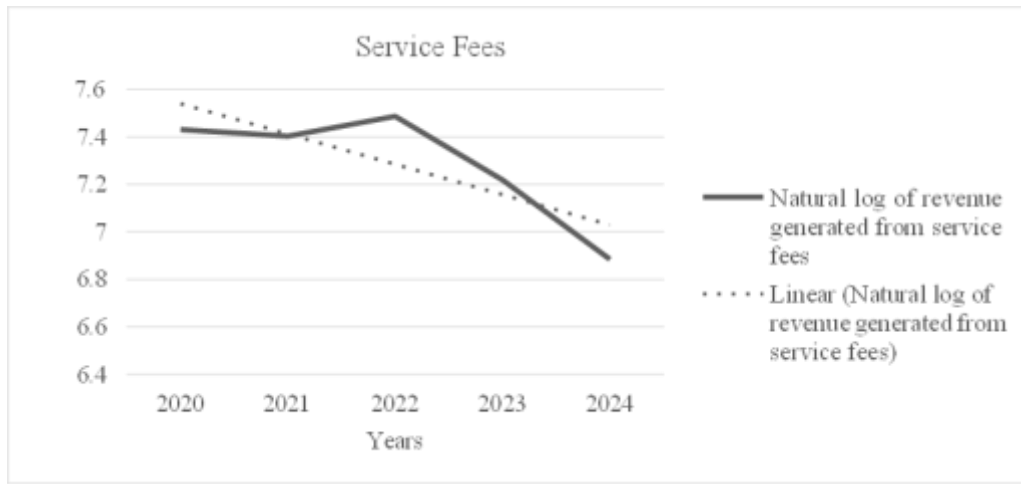


**Figure 1. Trend Analysis for Operational Efficiency**

The trend analysis in Figure 4.1 shows that the Asset Turnover Ratio (ATR) declined from about 0.46 in 2020 to 0.42 in 2021, and further to approximately 0.39 in 2022, indicating a continuous deterioration in operational efficiency as asset growth was not matched by revenue expansion. A modest recovery was observed in 2023, with ATR improving to around 0.42, before declining again to approximately 0.38 in 2024, the lowest level over the period. Overall, the trend reflects a fluctuating but generally declining pattern in asset utilization efficiency among Kenyan commercial parastatals. This downward trend suggests increasing difficulty in converting expanding asset bases into revenue, raising concerns about financial sustainability. Low asset turnover implies higher operating costs, reduced financial flexibility, and growing reliance on government subsidies and bailouts. These results are consistent with studies by Wachira (2018) and Mungai (2021), who documented declining efficiency among Kenyan state-owned enterprises due to weak revenue diversification and governance challenges. Similar regional evidence is provided by Nugroho (2019), who found that state-owned enterprises in developing economies often experience declining asset turnover ratios because capital-intensive investments do not immediately translate into revenue growth.

### Trend Analysis for Service Fees

This section examines the trend in service fees, measured as the natural logarithm of revenue generated from service fees, for commercial parastatals in Kenya over the period 2020–2024. Figure 2 presents both the observed service fee values and the fitted linear trend line over the study period.

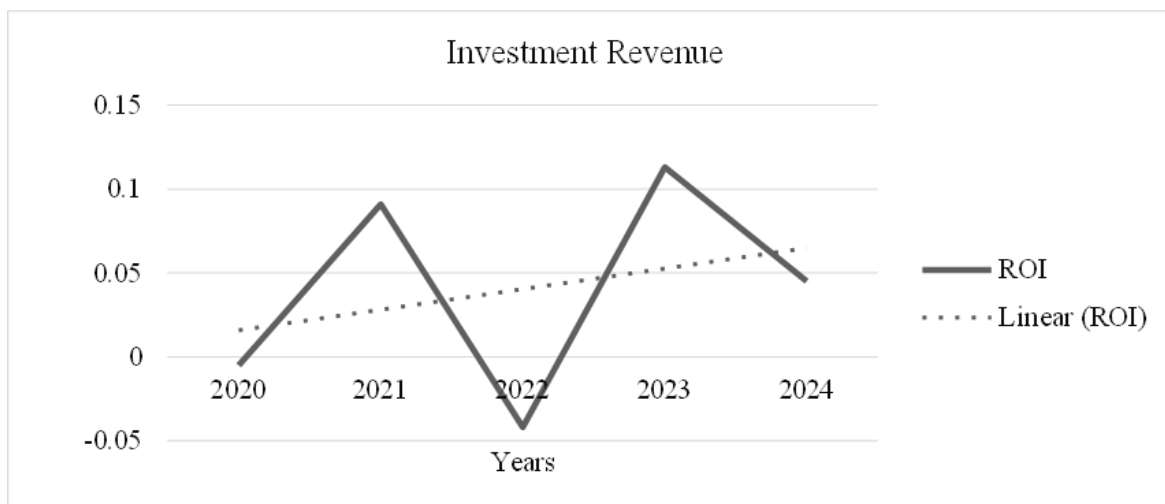


**Figure 2. Trend Analysis for Service Fees**

The results in Figure 2 show that the natural log of service fee revenue was approximately 7.4 in 2020, indicating relatively strong internally generated revenue at the start of the period. Service fee revenue declined slightly in 2021, before rising sharply to about 7.5 in 2022, the highest level observed. Thereafter, the ratio declined to approximately 7.2 in 2023 and 6.9 in 2024, reflecting a weakening of internally generated income. The linear trend line indicates an overall declining trend in service fee revenue over the period, suggesting that service fees have become a less reliable revenue source over time. This decline may be attributed to affordability constraints, regulatory price controls, rising operational inefficiencies, and increased non-payment by consumers. These findings are consistent with those of Shukrani et al. (2022), who reported volatility and limited contribution of service fees to operational efficiency among NSE-listed investment firms in Kenya due to regulatory and market constraints. Similarly, Scott (2019) found that while service fees can support service delivery, their effectiveness in the public sector is often constrained by affordability and weak enforcement. At the regional level, Ozordi (2022) observed that service fee revenue in Nigerian service firms tends to decline when governance and billing inefficiencies persist.

**Trend Analysis for Investment Revenue**

This section examines the trend in investment revenue, measured by investment revenue, for commercial parastatals in Kenya over the period 2020–2024. Investment revenue reflects the effectiveness of investment decisions and indicates how well parastatals convert invested capital into financial returns. Figure 3 presents the annual investment revenue values alongside a fitted linear trend line.



**Figure 3 Trend Analysis for Investment Revenue**

The trend analysis shows that investment revenue was slightly negative at about  $-0.01$  in 2020, indicating weak investment performance, before improving sharply to approximately  $0.09$  in 2021, reflecting a strong rebound. The revenue then declined to around  $-0.04$  in 2022, the lowest level during the period, before recovering significantly to about  $0.11$  in 2023, the highest value recorded, suggesting improved investment management and favorable returns. In 2024, investment revenue moderated to approximately  $0.05$ , indicating reduced performance compared to 2023, though returns remained positive. Despite notable year-to-year volatility, the linear trend line indicates an overall upward trend in investment revenue over the five years. These findings are consistent with Chache et al. (2021) and Shukrani et al. (2022), who documented volatile investment returns among Kenyan firms due to market sensitivity, and with Krishnamoorthi and Murigesan (2018), who reported similar investment revenue variability among Indian mutual funds. Collectively, these studies underscore that while investment revenue can enhance operational efficiency, its effectiveness depends on stability, sound governance, and prudent investment decision-making.

### Correlation Analysis Results

Before regression analysis, Pearson correlation was conducted to assess the degree of association between the study variables and to provide preliminary evidence of relationships. The Pearson correlation coefficients ( $r$ ) were computed at a 5% significance level to establish whether the relationships were statistically significant. The results are presented in Table 2.

**Table 2 Correlations Matrix Results**

Correlation	ATR	Service Fees	Investment Revenue
ATR	1.0000		
Service Fees	0.3802	1.0000	
Investment Revenue	0.3190	0.1267	1.0000
N	215	215	215

The correlation between Service Fees and ATR ( $r = 0.3802$ ) is positive. The results imply that internally generated revenue plays a more direct role in enhancing operational efficiency. When parastatals generate income through user fees, they are likely to utilize assets more effectively to sustain revenue flows. This finding supports Ozordi (2022), who found that service fees significantly improved financial efficiency among Nigerian service firms. It also aligns with Scott (2019), who observed that service-based revenue strengthened service delivery performance in Ghanaian district assemblies. However, Shukrani et al. (2022) reported an insignificant effect of service fees on operational efficiency among NSE-listed firms, indicating that sectoral differences may influence outcomes.

The correlation between investment revenue and ATR ( $r = 0.3190$ ) is positive, indicating that higher investment returns are associated with improved operational efficiency. This suggests that parastatals that generate higher returns from investments are likely managing their asset base more effectively. The result aligns with Chache et al. (2021), who found that investment revenue significantly influenced risk-adjusted returns among insurance firms in Kenya. It is also consistent with Olaniyan (2020), who reported a positive relationship between investment and revenue generation in Nigeria. However, Krishnamoorthi and Murigesan (2018) found no significant effect of investment revenue on mutual fund performance in India, suggesting contextual variations.

### Model Summary

The model summary presents the overall explanatory power of the regression model, examining the effect of revenue structure on operational efficiency. The coefficient of determination ( $R^2$ ) and adjusted  $R^2$  were used to assess model fitness. Table 4.10 presents the

model summary.

**Table 3: Model Summary**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F-statistic	Sig
1	0.6928	0.4800	0.4685	43.5173	0.0000

Table 3 shows the regression model summary, indicating a multiple correlation coefficient (R) of 0.6928, suggesting a strong positive relationship between the combined revenue structure variables and operational efficiency among commercial parastatals in Kenya. The coefficient of determination (R<sup>2</sup>) is 0.4800, implying that approximately 48% of the variation in Asset Turnover Ratio (ATR) is explained by Service Fees, and investment revenue. This indicates that nearly half of the differences in operational efficiency across commercial parastatals can be attributed to variations in their revenue structures. The Adjusted R<sup>2</sup> of 0.4685 shows that after adjusting for the number of predictors in the model, approximately 46.85% of the variation in operational efficiency remains explained. The small difference between R<sup>2</sup> and Adjusted R<sup>2</sup> suggests that the model is stable and does not suffer from overfitting.

The F-statistic of 43.5173 with a significance level of 0.0000 indicates that the overall model is statistically significant at the 1% level. This means that the independent variables, when considered jointly, significantly explain changes in operational efficiency. These findings are consistent with Ozordi (2022), who reported that revenue-related variables significantly explained firm efficiency in Nigeria. Similarly, Mutiso and Mwangangi (2021) found that financial structure components significantly influenced project performance in Kenyan state corporations. However, Aivazian et al. (2020) reported weaker explanatory power of government support on SOE performance in Indonesia, highlighting contextual differences across economies. Overall, the model summary confirms that revenue structure is a substantial determinant of operational efficiency in Kenyan commercial parastatals, thereby justifying further examination of the individual regression coefficients.

### Analysis of Variance (ANOVA)

The Analysis of Variance (ANOVA) test was conducted to assess whether the overall regression model was statistically significant in explaining variations in the revenue structure of commercial parastatals in Kenya. The ANOVA test examines the joint effect of all independent variables on the dependent variable. Table 4 presents the results

**Table 4: ANOVA Result**

Model		df		
Regression	7.8421	2	1.960545.5173	0.0000
Residual	9.4548	212	0.0450	
Total	17.2969	214		

The F-statistic of 43.5173 with a significance level of 0.0000 indicates that the regression model is statistically significant at the 1% level. This means that the independent variables, when considered jointly, significantly explain variations in operational efficiency among commercial parastatals in Kenya. The regression sum of squares (7.8421) represents the variation in Asset Turnover Ratio explained by the revenue structure components, while the residual sum of squares (9.4548) reflects unexplained variation due to other institutional, managerial, and macroeconomic factors. The statistical significance of the overall model is consistent with a growing body of literature emphasizing the importance of revenue structure in shaping institutional performance.

Globally, Peng et al. (2016) demonstrated that financial structure variables jointly determine performance outcomes in state-linked enterprises in emerging markets. Regionally, Gumede (2021) reported that financial restructuring and diversified revenue streams significantly influenced the performance of South African SOEs. Likewise, Asumadu (2024) reported that PPP initiatives significantly contributed to macroeconomic growth, reinforcing the role of diversified financing mechanisms. Within the Kenyan context, Mutiso and Mwangangi (2021) found that financial and partnership structures significantly influenced project performance in state corporations. Chache et al. (2021) also reported that investment revenue significantly explained variations in risk-adjusted returns among insurance firms in Kenya.

However, some contrary evidence exists. Nugroho (2019) found that government support did not significantly improve the financial performance of Indonesian SOEs when institutional inefficiencies were present. Similarly, Krishnamoorthi and Murigesan (2018) reported weak explanatory power of investment revenue on mutual fund performance in India, suggesting that context and governance quality may moderate financial structure effects. Overall, the ANOVA results confirm that revenue structure variables, when analyzed collectively, significantly influence operational efficiency in Kenyan commercial parastatals.

### Regression Coefficient Results

The study employed a Random Effects panel regression model to examine the effect of service fees, and investment revenue on operational efficiency. The choice of the Random Effects model was informed by the Hausman specification test, which indicated that the random effects estimator was consistent and efficient ( $p > 0.05$ ). The coefficient results are shown in Table 5

**Table 5: Regression Coefficients Result**

	Unstandardized Coefficient(B)	Std. Error	t-value	Sig.	[95% Conf. Interval
(Constant)	0.2147	0.0735	2.9218	0.0039	0.0706 0.3588
Service Fees	0.2318	0.0521	4.4491	0.0000	0.1297 .3339
Investment Revenue	0.1893	0.0445	4.2549	0.0000	0.1021 0.2765

The panel regression equation based on the regression coefficients is presented as;

$$Y = 0.2147 + 0.2318X_{1it} + 0.1893X_{2it}$$

Where  $Y$  is the operational efficiency of commercial parastatals

$X_1$  represent service fees

$X_2$  represents investment revenue

$it$  represents indices for individual firms at time  $t$

### Hypotheses Test Results

#### **H<sub>1</sub>: Service Fees have no Significant Effect on the Operational Efficiency of Commercial Parastatals in Kenya**

In line with the first hypothesis, service fees showed a positive and significant effect on operational efficiency ( $B = 0.2318$ ,  $p = 0.0000$ ). Therefore, the null hypothesis ( $H_{02}$ ) was rejected, and the study concluded that service fees significantly enhance operational efficiency, and among the predictors, this variable exhibits the strongest coefficient. This finding strongly supports cost recovery theory (World Bank, 1994; Mikesell, 2017), which posits that linking revenue directly to service delivery promotes operational discipline and accountability. The result is consistent with Ozordi (2022), Munga and Kithinji (2025), Scott (2019), and Keya (2021), among other studies, who reported a significant positive influence of service fees on operational efficiency in different regions. However, Shukrani et al., (2022), Dulacha (2025),

and Phiri (2025) reported an insignificant relationship between service fees and operational efficiency, suggesting that sectoral and institutional differences may influence outcomes.

## **H<sub>02</sub>: Investment Revenue has no Significant Effect on the operational efficiency of Commercial Parastatals in Kenya.**

Lastly, investment revenue revealed a positive and statistically significant beta value of  $B = 0.1893$  and  $p = 0.0000$ . This implies that, holding other factors constant and investment revenue is controlled, a unit increase of investment revenue will increase the operational efficiency of commercial parastatals in Kenya. Accordingly, the null hypothesis ( $H_{04}$ ) is rejected, and the conclusion is made that investment revenue significantly influence operational efficiency of commercial parastatals in Kenya. This finding aligns with firm theory (Coase, 1937), which emphasizes efficient resource allocation as a determinant of performance. Similar findings were reported by Chache et al. (2021), who found that investment revenue significantly influenced performance among Kenyan insurance firms. Olaniyan (2020) similarly reported a positive relationship between investment and revenue generation in Nigeria. Conversely, Krishnamoorthi and Murigesan (2018) and Klijn (2025) found no significant relationship, suggesting that investment efficiency depends on institutional structure and governance quality. Shukri and Ogilo (2025) conclude that investment revenue often has negative effects on Kenyan parastatals due to operational inefficiencies, high debt, and misaligned incentives. The study suggests that, rather than fostering growth, these investments are often hindered by poor management, leading to low returns on assets, while heavy government borrowing to fund these entities creates a crowding-out effect

## **Conclusions of the Study**

The study concludes that service fees are a critical driver of operational efficiency among commercial parastatals. Revenue generated directly from service delivery strengthens institutional financial autonomy and encourages efficient utilization of resources. The findings imply that when institutions rely on internally generated income, they tend to adopt more disciplined operational practices aimed at maintaining revenue flows and improving service quality. Consequently, service fees represent a sustainable revenue mechanism that enhances operational accountability while reducing excessive reliance on government funding.

The study concludes that investment returns play an important role in strengthening the financial sustainability of commercial parastatals. Income generated from strategic investments enables institutions to diversify their revenue streams and support operational activities beyond their core service functions. The findings imply that parastatals that effectively manage investment portfolios are better positioned to reinvest resources into infrastructure improvement, technological upgrades, and service expansion. As a result, investment revenue enhances the ability of these institutions to optimize asset utilization and improve operational efficiency over time.

## **Recommendations of the Study**

### **Service Fees and Operational Efficiency**

Given the finding that service fees significantly enhance operational efficiency by strengthening internal revenue generation, commercial parastatals should implement a service-value alignment framework. Instead of treating service fees purely as revenue instruments, institutions should periodically evaluate whether their pricing structures reflect the actual operational value created by their services. This can be achieved through periodic service audits that assess operational costs, service quality, and customer demand patterns. By aligning service charges with measurable service outcomes, parastatals can strengthen financial sustainability while ensuring that revenue generation remains closely linked to operational performance improvements.

## Investment Performance and Operational Efficiency

In response to the finding that investment returns contribute to improved operational efficiency, commercial parastatals should adopt a strategic reinvestment policy where a defined portion of investment income is automatically reinvested into operational improvement programs. These programs may include asset maintenance, operational automation, staff capacity development, or modernization of service delivery systems. Additionally, parastatals should develop institutional investment roadmaps that identify investment opportunities aligned with their operational mandates rather than pursuing purely financial investments. This would ensure that investment activities directly reinforce the operational objectives of the institution while strengthening long-term financial sustainability.

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