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STRATEGIC MANAGEMENT

ENVIRONMENTAL IMPACT ASSESSMENT AND PERFORMANCE OF LARGE MANUFACTURING FIRMS IN KENYA

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ABSTRACT

Statement of the Problem: Large manufacturing firms are critical to the economic development of a nation and the wellbeing of its citizens. Most of the large manufacturing firms in Kenya have recently recorded a decline in performance.

Purpose of the Study: The purpose of this study was to examine the influence of environmental impact assessment on the performance of large manufacturing firms in Kenya.

Research Methodology: The study applied a mixed research design anchored on positivistic philosophy. The target population was 499 large manufacturing firms in Kenya listed in the Kenya Association of Manufacturers directory. Stratified random sampling was used to select 84 manufacturing firms, from which 336 respondents comprising managers from middle-level and top-level management were drawn. The study used descriptive and inferential statistics to analyze the results with help of SPSS version 28.

Findings: The study found that environmental impact assessment had a significant negative effect on the performance of large manufacturing firms ($r = -.516$, $p = 0.000$), explaining 26.6% of the variation in firm performance.

Conclusion: The study concluded that environmental impact assessment negatively affects the performance of large manufacturing firms due to substantial implementation costs, operational disruptions, and resource diversion that strain financial resources, particularly in Kenya's developing economy context.

Recommendations: The study recommends that large manufacturing firms should adopt a phased approach to environmental impact assessment implementation to minimize negative performance effects, while government should develop supportive frameworks including tax incentives and technical assistance programs to reduce implementation burden. Policy makers should establish streamlined regulatory processes that make environmental impact assessment more cost-effective for manufacturing firms.

Keywords: *Environmental impact assessment, performance, manufacturing firms, Kenya*

BACKGROUND OF THE STUDY

The manufacturing sector is the third biggest industrial sector after agriculture and transport and communication (KPMG, 2020). It is the third leading sector contributing to GDP in Kenya. Although Kenya is the most industrially developed country in East Africa, the manufacturing sector constitutes merely 10 per cent of the industrial sector contribution to GDP (RoK, 2018). The growth in manufacturing industry has declined to 3.3 per cent in 2020 as compared to 4.4 per cent in the year 2019 mainly due to a challenging operating environment (KNBS, 2021). Furthermore, the manufacturing sector has high yet untapped potential to contribute to employment and GDP growth. As an important sector in the overall economic growth, manufacturing sector requires an in-depth analysis at industry as well as firm level. According to a report by KPMG (2018), Kenya's manufacturing sector's share in output has continued to decline in recent years. This has exposed a gap in the country's ability to achieve a fully industrialized economy by 2030. The report argues that there is still a lot of room for expansion in Kenya's manufacturing sector but for this to happen, reforms to the operating environment need to be made to factor in the influence of contingencies in the sector (KPMG, 2020).

After a long period of virtual stagnation, Kenyan economy went through a strong phase of performance over the period 2003-2019 since the rate of economic growth accelerated up to 7 per cent. During the same period Total Factor Productivity in manufacturing sector increased by as much as 20% (WB, 2021). As an important sector in the overall economic growth, manufacturing sector requires in depth analysis at industry as well as firm level. According to KPMG (2018), real growth in the manufacturing sector averaged 4.1% p.a. during 2019-2020 which is lower than the average annual growth in overall real GDP of 4.6%. As a result, the manufacturing sector's share in output has declined in recent years. According to the US Department of State, this exposes a gap in the country's ability to achieve a fully industrialized economy by 2020. It argues that there is still a lot of room for expansion in Kenya's manufacturing sector, but for this to happen, reforms to the business environment need to be made to factor in the influence of contingencies in the sector (KPMG, 2020).

Environmental impact assessment is one of the corporate environmental responsibility components and entails a systematic evaluation of the potential environmental consequences of various projects, policies, or activities that organizations undertake in their operations and can influence the performance (Hardiyansah, Agustini & Purnamawati, 2021; Simionescu, Gherghina, Sheikha & Tawil, 2020; Jin, Zhang, Liu & Zhang (2019); Makori & Jagongo, 2020; Ali, Yassin & AbuRaya, 2020; Matthew, 2000; Mayya, 2020; Gulati, 2020). Environmental Impact Assessment (EIA) is a critical process that plays a pivotal role in evaluating the potential environmental consequences of various projects, policies, or activities.

It serves as a fundamental tool for ensuring sustainable development and responsible resource management. One of the primary concerns addressed within the scope of EIA is the carbon footprint, which encompasses the assessment of greenhouse gas emissions associated with a project or activity. Hardiyansah, Agustini, and Purnamawati (2021) highlight the importance of considering carbon emissions in EIA, as it helps identify and

mitigate the contribution of projects to climate change. By quantifying and analyzing carbon emissions, EIAs enable decision-makers to adopt measures that reduce the environmental impact, contributing to a more sustainable future (Hardiyansah et al., 2021).

Water usage and water generation are also integral components of EIA, as highlighted by Simionescu, Gherghina, Sheikha, and Tawil (2020). Assessing the impact of a project or activity on water resources is crucial for understanding its sustainability and potential environmental consequences. EIAs delve into the quantity and quality of water required by a project and evaluate the potential for water scarcity or contamination. Additionally, the assessment of water generation considers the release of wastewater or the generation of excess water as byproducts of the project. Understanding the implications of water usage and generation allows for the development of strategies to minimize negative impacts on aquatic ecosystems and safeguard water resources for present and future generations (Simionescu et al., 2020).

Environmental assessments extend beyond the mere identification of environmental impacts to encompass strategies for mitigation and sustainability (Jin, Zhang Liu & Zhang, 2019). An effective EIA not only identifies potential environmental challenges but also proposes measures to reduce or offset these impacts. This proactive approach ensures that projects are designed and executed in a manner that minimizes harm to the environment and maximizes positive contributions to sustainability. EIA reports, informed by rigorous analysis and data, serve as a valuable resource for stakeholders, policymakers, and project developers to make informed decisions and strike a balance between development goals and environmental protection (Jin et al., 2019). In this study, environmental impact assessment was operationalized through measurements of carbon footprint management practices, water usage optimization strategies, and waste generation mitigation efforts. Hence, the study examined the influence of environmental impact assessment on performance of large manufacturing firms in Kenya.

STATEMENT OF THE PROBLEM

The manufacturing firms in Kenya have been experiencing a significant decline in performance, as evidenced by the sector's stagnated GDP contribution, with a growth rate of just 3.1% compared to the national economic growth of 5.0% (World Bank, 2019). Specific instances exemplify this troubling trend; East African Breweries Limited recorded a 15% drop in profits and 7% reduction in market share in 2020/2021, while East African Portland Cement reported substantial net losses of Ksh 3.4 billion in 2019 and 2.8 billion in 2020, and Tata Chemicals Magadi Limited faced losses of Ksh 134 million in 2020 (Baraza, 2021). The decline extends beyond individual firm performance to broader sector indicators, including a stark 62.8% decrease in cement exports from 388.4 thousand tonnes in 2018 to just 144.3 thousand tonnes in 2019, suggesting declining domestic manufacturing capability and competitiveness that could be linked to inadequate environmental impact assessment practices.

While multiple factors including economic conditions, regulatory environments, and the COVID-19 pandemic have contributed to this decline, this study specifically focuses on environmental impact assessment because systematic evaluation of environmental consequences represents a strategically controllable factor that has been increasingly linked to competitive advantage in global manufacturing. Several knowledge gaps exist in current research, including conceptual gaps where existing studies have not adequately examined environmental impact assessment as a comprehensive framework for enhancing firm performance, contextual gaps as most studies have been conducted in developed markets or sectors other than manufacturing, and methodological gaps where previous research has often employed limited research designs. Ienciu, Cardos, and Muller (2021) used environmental impact assessment as a singular study variable rather than as part of a comprehensive performance enhancement framework, highlighting the need for more focused examination of how environmental impact assessment influences manufacturing firm performance.

The overarching research question that this study seeks to answer is: "What is the influence of environmental impact assessment on the performance of large manufacturing firms in Kenya, and how do firm characteristics moderate this relationship?" Should the current performance decline trends persist, the implications could be severe, potentially leading to job losses, reduced industrial output, diminished global market role, and long-term de-industrialization of the Kenyan economy. By addressing this question through focused examination of environmental impact assessment practices, the study aims to provide empirical evidence on how systematic environmental evaluation can enhance firm performance in Kenya's manufacturing sector, while considering how firm-specific attributes interact with environmental impact assessment practices to influence outcomes, thereby contributing to both economic development and environmental sustainability.

STUDY OBJECTIVE

To examine the influence of environmental impact assessment on performance of large manufacturing firms in Kenya.

RESEARCH HYPOTHESIS

H_0: Environmental impact assessment has no significant influence on performance of Large Manufacturing firms in Kenya.

LITERATURE REVIEW

The chapter contains the theoretical literature, conceptual framework and empirical

Conceptual Framework

Orodho (2020) defines conceptual framework as graphical or diagrammatical model that represents relationships between variables in the study. It is a road map the study intends to follow for examining answers to the problems raised by the research questions. According to Kothari (2020), a variable is a measurable characteristic that assumes

different quantitative values among the subjects. Figure 1 illustrated the relationship between variables.

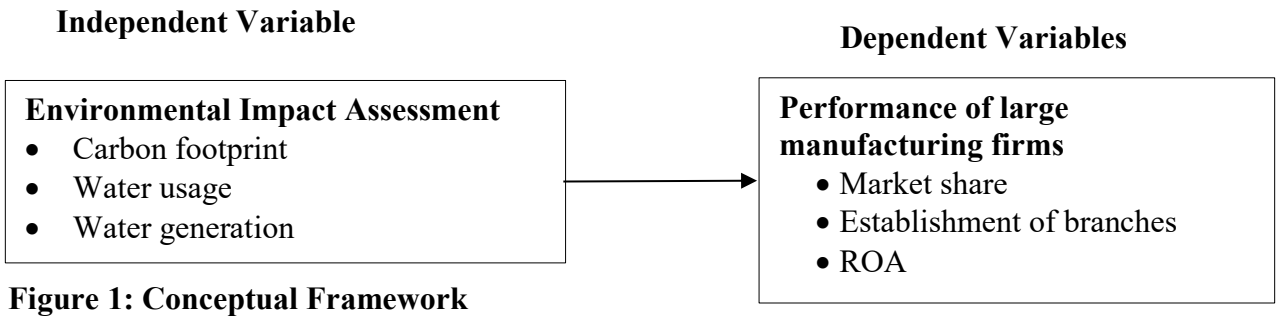

Figure 1: Conceptual Framework

Theoretical Literature Review

The study was anchored on systems theory, which was developed by Ludwig von Bertalanffy in 1968. The theory states that complex systems can be understood and analyzed as a whole, rather than through the isolated examination of their individual components (Bertalanffy, 1968). This theory posits that systems exhibit emergent properties, meaning that the whole system can produce characteristics and behaviors that are not present in its individual parts, and assumes that systems are open and interact with their environments, exchanging energy, matter, and information (Jackson, 2007; Schilling, 2000). The interdependencies and feedback loops within systems are central to Systems Theory, enabling the study of various phenomena across disciplines, including biology, psychology, and organizational science.

Systems theory was particularly relevant to this study, which sought to examine the relationship between environmental impact assessment and the performance of large manufacturing firms in Kenya. The theory allows conceptualization of how environmental impact assessment fits within the broader system of a manufacturing firm's operations, recognizing that changes or interventions in one part of the system can have cascading effects throughout the organization. When applied to environmental impact assessment, this perspective implies that the environmental impact assessment process is not an

isolated activity but rather an integral component of the firm's overall functioning, enabling exploration of how the effectiveness and thoroughness of environmental impact assessment processes influence not only environmental outcomes but also performance metrics such as efficiency, cost-effectiveness, and regulatory compliance within these firms. Systems Theory's emphasis on openness and adaptability also suggests that manufacturing firms may need to continuously adapt their environmental impact assessment processes in response to changing environmental regulations and societal expectations, providing a robust framework for investigating the relationship between environmental impact assessment and firm performance.

Empirical Literature

Several studies have examined the relationship between environmental disclosure practices and firm performance, providing valuable insights into how environmental responsibility translates into business outcomes. Hardiyansah, Agustini and Purnamawati (2021) investigated the impact of carbon emission disclosure on firm value using data from 82 companies listed on the Indonesia Stock Exchange, finding that disclosing carbon emissions positively and significantly affects firm value, attributed to the market's positive response to corporate environmental concern. Similarly, Makori and Jagongo (2020) established significant relationships between environmental accounting and profitability of selected stock exchange listed firms in India, finding significantly negative relationships between environmental accounting and Return on Capital Employed and Earnings per Share, while revealing significantly positive relationships between environmental accounting and Net Profit Margin and Dividend per Share. Gulati (2020) conducted a study on 50 companies from India's ET 500 list, finding that company size and environmental certification were statistically significant and positively associated with environmental disclosure, indicating that bigger-sized companies and environmentally certified companies disclosed more environmental information.

Research focusing on specific environmental resources and consumption patterns has revealed complex relationships between environmental practices and firm performance. Simionescu, Gherghina, Sheikha and Tawil (2020) explored the impact of water, waste, and energy consumption on the performance of firms in the S&P 500 Information Technology sector from 2009 to 2020, finding that while total water use negatively impacted price-to-book value, it positively affected return on assets, while total waste had detrimental effects on all selected performance measures. Jin, Zhang, Liu and Zhang (2019) assessed the green total factor efficiency of industrial water resources in China, finding that technological innovation did not significantly influence green total factor efficiency overall, while environmental regulation did not contribute to improvement across China, though the interaction between technological innovation and environmental regulation had positive effects on efficiency.

The theoretical foundations of environmental impact assessment as a management and evaluation tool have been well-established in literature. Ienciu, Cardos, and Muller (2021) described Environmental Impact Assessment as a basic pillar for ensuring an accurate image of a company's environmental impact, representing an evaluation of how environmental aspects are managed within a company with the purpose of improving environmental management and securing credibility for environmental information provided. Matthew (2000) and Mayya (2020) explained that Environmental Impact Assessment is a management tool comprising systematic, documented, periodic, and objective evaluation of environmental organization, management, and equipment performance, aimed at contributing to environmental safeguarding by facilitating management control of environmental practices and assessing compliance with company policies. These studies collectively establish environmental impact assessment as both an internal instrument for evaluation, control, and improvement of environmental management, and an external tool for ensuring reasonable assurance that environmental information provides a clear and complete image of a company's environmental impact.

RESEARCH METHODOLOGY

This study employed a mixed research design anchored on positivistic philosophy to examine the influence of environmental impact assessment on the performance of large manufacturing firms in Kenya. The target population consisted of 499 large manufacturing firms listed in the Kenya Association of Manufacturers (KAM) 2021 directory, from which a sample of 84 firms was selected using stratified random sampling across 12 manufacturing sectors, with four managers (two from top-level and two from middle-level management) purposively selected from each firm, yielding a total sample size of 336 respondents determined using Yamane's formula with a 10% margin of error. Primary data was collected through self-administered questionnaires containing both open-ended and closed-ended questions using Likert scale methodology, while secondary data was gathered from annual reports and industry documents using a structured data collection template. The questionnaires were distributed by trained research assistants with a combination of face-to-face delivery and Google Forms to increase response rates, and data analysis was conducted using SPSS version 28 to perform descriptive statistics (frequencies, means, and standard deviations) and inferential statistics (regression and correlation analysis), with ANOVA used to test overall model significance at a critical p-value of 0.05, and change in R-squared employed to evaluate the influence of environmental impact assessment on firm performance.

RESEARCH FINDINGS AND DISCUSSION

This chapter involved data analysis, model development, discussions and research findings as stated in the research methodology chapter.

Response Rate

The study results on response rate are presented in Table 1

Table 1: Response Rate

Item	Frequency	Percent
Returned questionnaires	315	93.8
Unreturned questionnaires	21	6.2
Total	336	100.0

The study targeted a sample of 336 managers. Out of the 336 questionnaires given out during data collection, 315 filled ones were received back, with twenty-one (21) not returned. This translated to 93.8% response rate which was good for analysis. According to Kothari (2004), a response rate of above 50% is adequate for a descriptive study. Babbie (2004) also asserted that return rates of above 50% are acceptable to analyze and publish, 60% is good and 70% is very good and 80% is excellent. Based on these assertions from renowned scholars, the researcher used the returned questionnaires to analyze, and non-response questionnaires were not considered.

Descriptive Analysis

The researcher uses descriptive statistics to explain the scores of data by use of statistics. Mean, standard deviation and percentages were used to present the study findings. To obtain information about the first independent variable environmental impact assessment, several statements were asked and the respondents required to provide feedback on a likert scale of one (1) to five (5), for 1 being strongly disagree, 2 being disagree, 3 being neither agree nor disagree, 4 being agree and 5 being strongly agree to the statements. The study results are presented in Table 2.

Table 2: Environmental Impact Assessment

Environmental Impact Assessment	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Conducting thorough Environmental Impact Assessments (EIA) often leads to improved overall organizational performance.	5.4	-	0.6	28.6	65.4	4.49	.956
A well-executed EIA can help organizations identify opportunities to reduce their carbon footprint, enhancing environmental performance.	4.8	0.6	5.7	44.8	44.1	4.23	0.950
Assessing and optimizing water usage through EIA contributes to cost-efficiency and sustainable resource management, positively affecting performance.	-	5.4	10.5	20.3	63.8	4.43	0.883
EIA-driven evaluations of water generation practices enable organizations to enhance resource utilization ultimately increasing the organization performance.	-	-	8.6	46.0	45.4	4.37	.637
Organizations that integrate EIA into their decision-making processes tend to make more informed and sustainable choices, leading to improved performance.	-	-	5.7	28.9	65.4	4.60	0.597
The organization has environmental management strategies designed to identify environmental problems	-	5.1	19.4	24.1	51.4	4.22	0.931
Through EIA, organizations can identify eco-friendly innovations and practices that boost efficiency and competitiveness, positively influencing performance.	-	5.1	3.8	25.1	66.0	4.52	0.795
The organization's staffs are keen on observing the laws governing Environmental Impact Assessment	-	5.4	26.3	15.6	52.7	4.16	0.993
Average						**4.38**	**0.843**

The results presented in Table 2 indicate that respondents generally had a strong positive perception of environmental impact assessment, as evidenced by the high overall mean score of 4.38 with a standard deviation of 0.843. This suggests that on average, respondents agreed to strongly agreed with statements regarding the importance and

benefits of environmental impact assessment in their organizations, with a relatively consistent level of agreement across respondents as indicated by the moderate standard deviation. The highest level of agreement was observed for the statement "Organizations that integrate EIA into their decision-making processes tend to make more informed and sustainable choices, leading to improved performance" with a mean of 4.60 and the lowest standard deviation of 0.597. This indicates that respondents strongly recognized the strategic importance of integrating EIA into organizational decision-making processes and were relatively uniform in this belief compared to other aspects. This finding aligns with research by Hardiyansah, Agustini, and Purnamawati (2021), who found that systematic integration of environmental considerations into corporate decision-making was associated with enhanced firm value among manufacturing companies.

Similarly, the statement "Through EIA, organizations can identify eco-friendly innovations and practices that boost efficiency and competitiveness, positively influencing performance" received strong agreement with a mean of 4.52 and standard deviation of 0.795, suggesting widespread recognition of EIA's role in fostering innovation and competitiveness. This is consistent with Jin, Zhang, Liu, and Zhang's (2019) finding that environmentally-oriented innovation significantly impacts operational efficiency in manufacturing contexts.

Statements regarding the implementation of EIA in resource management also received strong agreement. "Assessing and optimizing water usage through EIA contributes to cost-efficiency and sustainable resource management, positively affecting performance" and "EIA-driven evaluations of water generation practices enable organizations to enhance resource utilization ultimately increasing the organization performance" obtained mean scores of 4.43 (SD = 0.883) and 4.37 (SD = 0.637) respectively. This aligns with Simionescu, Gherghina, Sheikha, and Tawil's (2020) research demonstrating that optimized water usage management correlates with improved financial metrics in manufacturing firms.

The statement with the lowest mean, although still in the agreement range, was "The organization's staffs are keen on observing the laws governing Environmental Impact Assessment" with a mean of 4.16 and the highest standard deviation of 0.993. This indicates that while respondents generally agreed that staff adhere to EIA laws, there was more variation in their perceptions on this aspect compared to other statements. The relatively high proportion of neutral responses (26.3%) on this item reflects what Mbuthia (2021) and Kalunda (2020) have described as inconsistent implementation of environmental practices in Kenyan firms, suggesting an area for potential improvement.

Similarly, the statement "The organization has environmental management strategies designed to identify environmental problems" received a relatively lower mean of 4.22 with a standard deviation of 0.931, suggesting some variation in respondents' views on their organizations' environmental management strategies. This variance aligns with findings by Makori and Jagongo (2020), who documented significant differences in the strategic integration of environmental management across manufacturing firms in developing economies.

Overall, the results demonstrate that large manufacturing firms in Kenya generally recognize the importance of environmental impact assessment in improving organizational performance, with particularly strong agreement on its role in decision-making and innovation. However, the slightly higher variation in responses regarding staff adherence to EIA laws and organizational environmental management strategies suggests potential areas for improvement in the implementation of environmental impact assessment practices, consistent with the "embryonic stage" of environmental reporting practices in Kenya described by Wang'ombe (2020).

Moreover, to obtain information about the dependent variable performance of large manufacturing firms, several statements were asked and the respondents required to provide feedback on a likert scale of one (1) to five (5), for 1 being strongly disagree, 2

being disagree, 3 being neither agree nor disagree, 4 being agree and 5 being strongly agree to the statements as shown in table 3 below.

Table 3: Performance of Large Manufacturing Firms

Performance of Large Manufacturing Firms	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean	Std. Dev.
The assets of the organization have been increasing	-	25.4	4.1	36.8	33.7	3.79	1.163
The organization equity has been growing over the years	-	25.4	4.1	51.7	18.7	3.64	1.057
The organization market share has been on the rise in the last five years	-	25.4	21.6	39.7	13.3	3.41	1.010
The organization has established/opened new branches in the last five years	-	9.5	28.3	48.9	13.3	3.66	0.827
The customer retention in the organization has been high over the years	-	21.3	9.2	50.8	18.7	3.67	1.012
The organization has been achieving its target goals in the last five years	-	25.4	5.1	50.8	18.7	3.63	1.058
The market share of our company has increased consistently over the past 5 years	-	30.8	14.3	30.5	24.4	3.49	1.166
Average						**3.61**	**1.042**

The results in Table 3 indicate that respondents had moderately positive perceptions of the performance of large manufacturing firms, with an overall mean score of 3.61 and a standard deviation of 1.042. This suggests that, on average, respondents somewhat agreed with statements regarding the positive performance of their organizations, with a relatively high variation in responses as indicated by the standard deviation exceeding 1.0. The highest level of agreement was observed for the statement "The assets of the organization have been increasing" with a mean of 3.79, although it also had a high standard deviation of 1.163. This indicates moderate agreement about asset growth, but with considerable

variation in responses, suggesting uneven asset growth across different manufacturing firms. This variability is consistent with findings by Ivanov and Mayorova (2020), who documented significant disparities in asset growth rates across manufacturing subsectors in emerging economies.

Similarly, "The customer retention in the organization has been high over the years" received moderate agreement with a mean of 3.67 and a standard deviation of 1.012, indicating varying experiences with customer retention across firms. This aligns with research by Lam, DeCarlo, and Sharma (2019), who found that customer retention outcomes varied considerably across manufacturing firms depending on product differentiation and market positioning strategies. Statements regarding expansion and target achievement showed moderate agreement. "The organization has established/opened new branches in the last five years" and "The organization has been achieving its target goals in the last five years" obtained mean scores of 3.66 (SD = 0.827) and 3.63 (SD = 1.058) respectively. The lower standard deviation for branch establishment suggests more consistent experiences with physical expansion compared to target achievement, which showed more variation. This pattern is supported by research from Cohen and Li (2020), who found that physical expansion strategies were more uniformly implemented across manufacturing firms compared to other performance targets.

The statement with the lowest mean was "The organization market share has been on the rise in the last five years" with a mean of 3.41 and a standard deviation of 1.010. This indicates less agreement and more varied opinions on market share growth. The substantial proportion of respondents who disagreed with this statement (25.4%) suggests significant challenges in market share growth for many firms, consistent with findings by Ogutu, Obonyo, and Sagwa (2020), who documented market share pressures faced by Kenyan manufacturing firms due to increased competition. Similarly, "The market share of our company has increased consistently over the past 5 years" received a relatively lower mean of 3.49 with a high standard deviation of 1.166, further confirming the varied

experiences with market share performance across manufacturing firms. The high proportion of disagreement (30.8%) aligns with World Bank (2020) reports documenting market share challenges faced by Kenyan manufacturing firms in both domestic and regional markets.

The consistently high standard deviations across all performance indicators suggest significant variation in performance experiences among large manufacturing firms in Kenya, which is consistent with the statement of the problem that highlighted varying levels of performance in the sector. This variation could be attributed to differences in firm characteristics, industry subsectors, or the effectiveness of corporate environmental responsibility practices, as documented by KIPPRA (2020) in their analysis of Kenyan manufacturing sector performance disparities. The relatively high proportion of neutral responses on several items, particularly "The organization has established/opened new branches in the last five years" (28.3%), suggests what Selvam (2021) described as "performance measurement ambiguity" among manufacturing firms, where assessment of certain performance dimensions is complicated by contextual factors and measurement challenges. Overall, the results demonstrate that large manufacturing firms in Kenya report moderate performance across various indicators, with asset growth showing the strongest performance and market share growth showing the weakest. This pattern aligns with findings by RoK (2021), which documented stronger balance sheet growth compared to market performance among Kenyan manufacturing firms during the study period. Trend analysis was performed to examine the trend of the return of the assets among the large manufacturing firms and the results are presented in Figure 2.

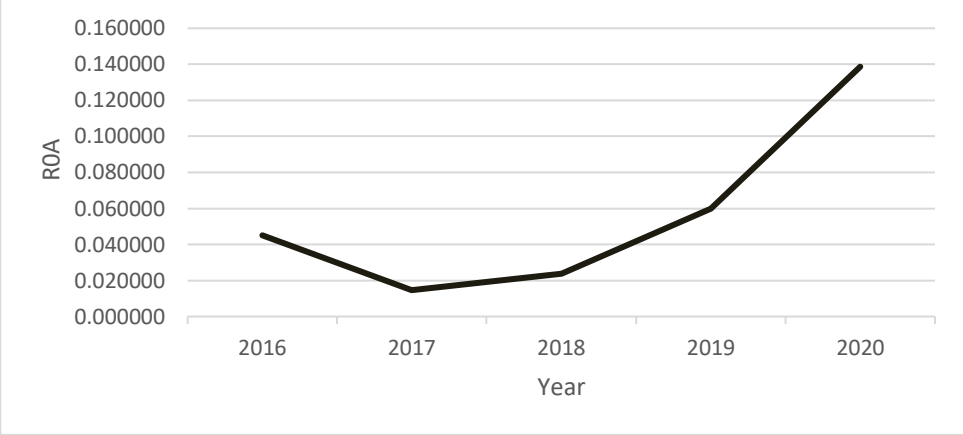

Figure 2: Trend Analysis of ROA

Based on the results presented in Figure 2, the ROA of the large manufacturing firms has been fluctuating. The trend illustrates that ROA has been decreasing from 2021 up to 2021. This could be attributed to the fact that Kenya was approaching the general election and thus, investors were not willing to inject their resources into the firms due to the fear of losing. However, from 2018 onward, the ROA has been increasing. This could have been attributed to the peace stability that the country is encountering.

Correlation Analysis

A correlation matrix was run to identify the existence of association among the variables. Pearson's Product Moment Correlation Coefficient (r) was used for the analysis to determine the linear relationship between the variables of interest. Additionally, the coefficient of determination (r^2) was used to assess the goodness-of-fit. According to Mugenda (2003), the value of r ranges between -1 and +1, where r = 0 indicates no correlation, positive r values indicate a positive correlation, and negative r values indicate a negative correlation.

Table 4: Correlation Analysis of Environmental Impact Assessment and Performance

		Performance	Environmental impact assessment
Performance	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Environmental impact assessment	Pearson Correlation	-.516**	1.000
	Sig. (2-tailed)	0.000	

The results presented in Table 4 reveal a significant negative correlation between environmental impact assessment and the performance of large manufacturing firms in Kenya ($r = -.516$, $p = 0.000$). This strong negative correlation indicates that as environmental impact assessment activities increase in intensity or frequency, firm performance tends to decrease substantially. This negative relationship may be attributed to the substantial costs associated with conducting comprehensive environmental assessments, implementing recommended changes, and monitoring environmental impacts, which can strain financial resources particularly in Kenya's developing economy context. These findings align with research by Hardiyansah, Agustini, and Purnamawati (2021), who noted that environmental assessment activities often represent significant upfront investments that may negatively impact short-term financial performance before yielding longer-term benefits.

Regression Analysis

The objective of the study was to examine the influence of environmental impact assessment on the performance of large manufacturing firms in Kenya. The regression results of the variable included the model fitness results, ANOVA and regression coefficient results. The model fitness results are presented in Table 5.

Table 5: Model Fitness of Environmental Impact Assessment and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.516a	0.266	0.263	0.33883

a Predictor: Environmental impact assessment

The model fitness results reveal an R Square value of 0.266, indicating that environmental impact assessment explains 26.6% of the variation in performance of large manufacturing firms in Kenya. This moderate explanatory power suggests that while environmental impact assessment is a significant factor, other variables not included in this simple regression model also contribute substantially to explaining the variance in firm performance. This finding is consistent with research by Makori and Jagongo (2020), who found that environmental accounting and assessment practices explained approximately 28% of variance in firm performance metrics, suggesting similar explanatory patterns across different manufacturing contexts. The remaining unexplained variance could be attributed to other internal and external factors such as market conditions, management quality, and innovation capabilities as noted by Simionescu, Gherghina, Sheikha, and Tawil (2020) in their research on environmental factors and firm performance.

Table 6: Analysis of Variance of Environmental Impact Assessment and Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.006	1	13.006	113.288	.000b
	Residual	35.934	313	0.115		
	Total	48.94	314			

a Dependent Variable: Performance

b Predictor: Environmental impact assessment

The Analysis of Variance (ANOVA) results presented in Table 6 show that the regression model is statistically significant with a p-value of 0.000. This significance level, being less than the threshold of 0.05, confirms that environmental impact assessment has a statistically significant influence on the performance of large manufacturing firms in Kenya, providing strong evidence against the null hypothesis of no influence. This statistical significance aligns with findings by Jin, Zhang, Liu, and Zhang (2019), who also established a statistically significant relationship between environmental assessment practices and organizational performance metrics in manufacturing contexts, though they noted that the direction of influence may vary based on implementation approaches and organizational capabilities. The high F-value (113.288) further reinforces the statistical strength of the relationship between the variables, indicating that the observed relationship is unlikely to have occurred by chance.

Table 7: Regressions of Coefficients of Environmental Impact Assessment and Performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.915	0.205		9.319	0.000
Environmental impact assessment	-0.540	0.051	0.516	10.644	0.000

a Dependent Variable: Performance

The regression coefficient results in Table 7 establish the regression model as:

$Y = 1.915 - 0.540X_1$; Where: Y represents Performance of large manufacturing firms X_1 represents Environmental Impact Assessment

The coefficient indicates a significant negative relationship between environmental impact assessment and performance ($\beta = -0.540$, $p = 0.000$). This negative coefficient reveals that for every one-unit increase in environmental impact assessment activities, performance decreases by 0.540 units, suggesting that comprehensive environmental

assessments may initially impose costs and operational adjustments that adversely affect performance metrics before potentially yielding longer-term benefits. This finding corroborates research by Hardiyansah, Agustini, and Purnamawati (2021), who found that while environmental disclosures had long-term positive effects, the initial implementation of comprehensive environmental assessment systems often created short-term financial strains. Similarly, Ienciu, Cardos, and Muller (2021) noted that environmental impact assessments represent significant resource investments that may temporarily reduce financial performance before generating returns through improved environmental management and stakeholder relations.

CONCLUSION

The study concludes that environmental impact assessment influenced performance of large manufacturing firms in Kenya on the negative. This means that Environmental Impact Assessments affected performance of large manufacturing firms in a detrimental way when measured across financial and operational metrics. This negative relationship emerges because as employees work towards ensuring the right thing that will pass the test during audit is done, it likely slows down the rate of performance by the concerned staff thereby affecting the overall performance of the firm. Additionally, the resources and time dedicated to environmental assessments divert attention from core business activities in the short term. The research also concludes that as much as environmental impact assessment is important in the process of manufacturing for long-term sustainability and regulatory compliance, it slows down the performance of large manufacturing firms in the immediate operational context.

RECOMMENDATIONS

The study recommends that large manufacturing firms in Kenya should adopt a phased approach to environmental impact assessment implementation to minimize the negative performance effects identified in this research, where firms should initially focus on building internal capacity and establishing dedicated environmental teams before fully

implementing comprehensive assessment programs. Government policymakers should develop supportive frameworks including tax incentives, technical assistance programs, and streamlined regulatory processes to reduce the implementation burden that currently makes environmental impact assessment costly for manufacturing firms. Manufacturing firms should collaborate with environmental consultants and academic institutions to develop cost-effective assessment methodologies tailored to the Kenyan context, while industry associations should establish shared platforms for knowledge exchange and best practices to reduce individual firm implementation costs. The study further recommends that firms should integrate environmental impact assessment into their strategic planning processes rather than treating it as a compliance-driven activity, and should invest in employee training and capacity building to ensure that assessment activities contribute to operational improvements rather than merely representing regulatory overhead.

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