African Journal of Emerging Issues
Peer reviewed | Double blind | Interdisciplinary

African Journal of Emerging Issues (AJOEI)
Online ISSN: 2663 - 9335
Available at: https://ajoeijournals.org

STRATEGIC MANAGEMENT

MODERATING INFLUENCE OF FIRM CHARACTERISTICS ON THE RELATIONSHIP BETWEEN CORPORATE ENVIRONMENTAL RESPONSIBILITY AND PERFORMANCE OF LARGE MANUFACTURING FIRMS IN KENYA

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Publication Date: August 2025

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 determine the moderating influence of firm characteristics on the relationship between corporate environmental responsibility and performance of large manufacturing firms in Kenya.

Research Methodology: The target population was 499 large manufacturing firms in Kenya. Proportionate and stratified random sampling was used to select 84 manufacturing firms, from which 336 respondents were drawn. The study used descriptive and inferential statistics to analyze the results with help of SPSS version 28.

Findings: The results revealed that firm characteristics moderated the relationship between corporate environmental responsibility and the performance of large manufacturing firms,

theoretically extending our understanding of how organizational attributes influence the environmental responsibility-performance relationship in developing economies.

Recommendations: The study recommends that large manufacturing firms in Kenya should adopt differentiated corporate environmental responsibility strategies based on their specific firm characteristics, as the research demonstrates that organizational attributes such as size, age, employee numbers, liquidity levels, and asset base fundamentally moderate the relationship between environmental practices and performance outcomes. Firms should conduct comprehensive assessments of their internal capabilities and resources before implementing environmental responsibility initiatives, recognizing that larger and older firms may have different implementation advantages and challenges compared to smaller or newer organizations in areas such as energy efficiency investments, environmental impact assessments, and regulatory compliance systems.

Keywords: *Firm characteristics, corporate environmental responsibility, performance, manufacturing firms, Kenya*

BACKGROUND OF THE STUDY

The performance of a company is a measure of how a firm can use assets from its core business to generate revenues (Selvam, 2021). The performance can be measured using both financial and non-financial indicators. The financial indicators comprise the market share, return on assets (ROA), return on equity (ROE), return on investments (ROI), net profit margin, while non-financial indicators include market share, customer base, growth, customer satisfaction, production efficiency, customer service, among others (Ntiamoah, Egyiri & Kwamega, 2020). Non-financial performance measures, though subjective, serve as complements to the financial measures (Muloli, 2020). The study measured the performance using both financial and non-financial indicators. Combining these two measures helps managers gain a broader perspective on measuring and comparing performance hence the extent of effectiveness and efficiency in utilization of resources, competitiveness, and readiness to face the growing external pressures, including globalization.

Corporate environmental responsibility (CER) is a corporate social responsibility (CSR) component that refers to the commitment and practice of firms to adopt responsible actions to

protect and improve the natural environment (Nederhand & Klijn, 2019). CER plays a crucial role in improving environmental quality through corporate design for the environment, waste minimization, demand-side management, product stewardship and full-cost accounting (Lee, Kim & Kook, 2021; Gichohi, 2020; Tasneem, Muhammad & Basit, 2021). Thus, the study determined the moderating influence of firm characteristics on the relationship between corporate environmental responsibility and performance of large manufacturing firms in Kenya. Firm characteristics refer to the demographics and managerial variables that form an organization's internal environment (Essel, Adams & Amankwah, 2019).

The firm characteristics can consist of the firm's size, age, number of employees, sales revenue and customer base (Efuntade & Akinola, 2020). The firm size determines how large an organization is and can be measured based on the total assets (Ali, Yassin & AbuRaya, 2020). The organizations with more assets can be considered large, while those with fewer assets can be categorized as small in size. Large companies are significantly diversified due to their cash flows stability and they do not experience high failure rates. Empirical studies provide strong support for the moderating approach to firm characteristics in environmental responsibility research.

Mboi, Muturi, and Wanjare (2018) established a significant positive moderating effect of enterprise characteristics on the relationship between capital structures and financial performance of medium-sized and large enterprises in Kenya. Similarly, Kivaya, Kemboi, and Odunga (2020) found that firm size moderates the relationship between corporate governance and financial performance of microfinance banks in Kenya, confirming that firm size is a significant moderator on board composition and performance relationships. Moderating variables can also change the direction of the relationship between the independent and dependent variables. Firm characteristics may influence the relationship between corporate environmental responsibility and the performance of large manufacturing firms in Kenya. The firm size, firm age and sales growth were used to measure the firm characteristics in the study. The study examined whether the firm size, firm age and sales growth can moderate the relationship between corporate environmental responsibility and the performance of large manufacturing firms in Kenya.

STATEMENT OF THE PROBLEM

The manufacturing sector in Kenya faces significant performance challenges that are differentially experienced across firms with varying characteristics, yet the role of firm-specific attributes in moderating these performance outcomes remains poorly understood. While the sector's overall GDP contribution has stagnated at a growth rate of just 3.1% compared to the national economic growth of 5.0% (World Bank, 2019), the performance decline is not uniform across all manufacturing firms. Large established firms such as East African Breweries Limited (EABL) recorded a 15% drop in profits and 7% reduction in market share, 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 134,000,000 in 2020 (Baraza, 2021). These varying performance outcomes among firms of different sizes, ages, and growth trajectories demonstrate that firm characteristics may play a crucial moderating role in how external challenges and internal strategies translate into performance results, as suggested by resource-based theory perspectives (Barney, Ketchen & Wright, 2011).

The Kenya Association of Manufacturers (KAM, 2021) revealed that some firms were considering relocating operations to countries like Egypt due to diminishing profits, while others remained committed to local operations, suggesting that firm-specific characteristics may determine strategic responses to performance pressures. The decline in cement exports from 388.4 thousand tonnes in 2018 to 144.3 thousand tonnes in 2019, coupled with increased imports from 14.7 thousand tonnes in 2017 to 23.0 thousand tonnes in 2018 (KNBS, 2019), indicates that firms with different resource bases and operational scales may be experiencing varying degrees of competitive pressure and response capabilities.

Despite the documented differential impact of performance challenges across firms with varying characteristics, there is limited empirical understanding of how firm attributes moderate the relationship between strategic initiatives and performance outcomes in Kenya's manufacturing context. While corporate environmental responsibility has been identified as a strategically controllable factor that can enhance competitive advantage (Kibogy, 2021; Muloli, 2020), the effectiveness of such initiatives may be contingent upon firm-specific characteristics such as size,

age, and growth patterns (Mboi, Muturi & Wanjare, 2018). The absence of comprehensive research examining how firm characteristics influence the relationship between environmental responsibility practices and performance formed the motive of the current study.

STUDY OBJECTIVE

To determine the moderating influence of firm characteristics on the relationship between corporate environmental responsibility and performance of large manufacturing firms in Kenya.

RESEARCH HYPOTHESIS

H_0: Firm characteristics do not moderate the relationship between corporate environmental responsibility and performance of large manufacturing firms in Kenya.

LITERATURE REVIEW

The chapter presents literature relevant to corporate environmental responsibility, firm characteristics and performance.

Conceptual Framework

Figure 1 illustrated the relationship between variables.

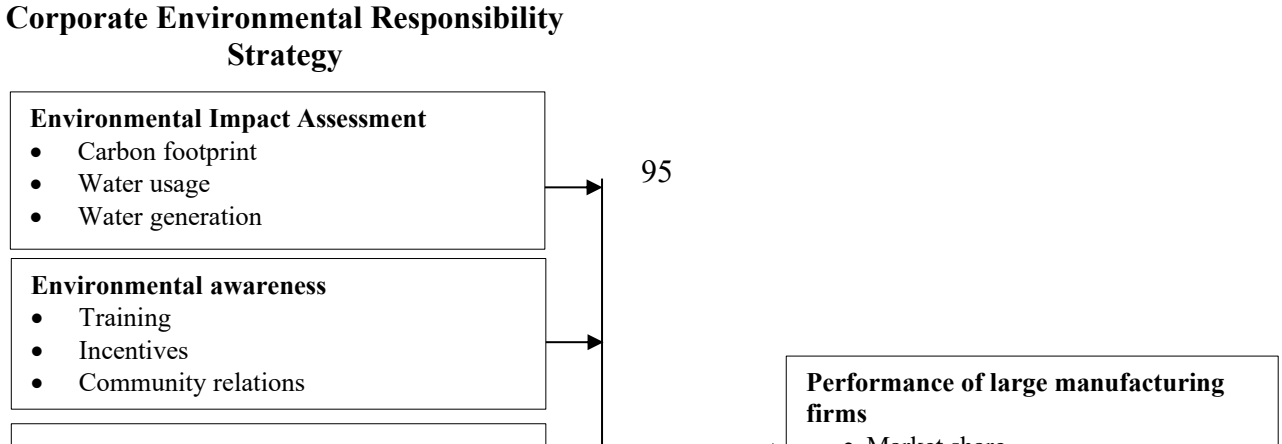

Figure 1: Conceptual Framework

Theoretical Literature Review

The study was founded on resource-based view theory. The resource-based view theory, developed by Edith Tilton Penrose in 1959, establishes that organizational resources are valuable when they contribute meaningfully to production processes. Barney, Ketchen and Wright (2011) demonstrated that organizations possess both tangible and intangible resources that require optimal utilization for competitive advantage. Tangible resources include physical assets such as computers, buildings, and financial capital, while intangible resources comprise intellectual capital and knowledge management practices (Barney & Arikan, 2005). Das and Teng (2000) argued that

production assets are exclusively categorized as either tangible or intangible, with efficiency in resource utilization determining their strategic significance.

The resource-based theory provides a comprehensive framework for understanding how firm characteristics moderate corporate environmental responsibility-performance relationships. Larger firms typically possess greater access to tangible resources such as financial capital and physical assets, enabling more substantial investments in sustainable practices, environmental technologies, and compliance measures (Ali, Yassin & AbuRaya, 2020). Firm age represents another critical characteristic, as older firms accumulate valuable intangible resources including industry-specific knowledge, relationships, and reputation that can be leveraged for environmental initiatives. Sales growth creates dynamic resource allocation challenges, where rapidly growing firms must balance operational scaling demands with environmental investment priorities. The theory suggests that these firm characteristics - size, age, and sales growth - fundamentally influence a firm's ability to implement corporate environmental responsibility practices effectively, thereby moderating the relationship between environmental initiatives and performance outcomes in manufacturing contexts (Mboi, Muturi & Wanjare, 2018).

Empirical Literature

A moderating variable can influence the relationship between the independent and dependent variables. Studies have demonstrated the significant moderating role of firm characteristics on various organizational relationships. Mboi, Muturi and Wanjare (2018) examined 90 enterprises listed on the Nairobi Securities Exchange between 2020 and 2021, finding that firm characteristics (size and age) had a significant positive moderating effect on the relationship between capital structure and financial performance, reducing explanatory power for ROE while increasing it for ROA. Kivaya, Kemboi and Odunga (2020) studied all 13 registered microfinance banks in Kenya using causal research design and concluded that firm size significantly moderates the relationship between corporate governance and financial performance, particularly affecting board duality and composition. However, Mutende, Mwangi, Njihia and Ochieng (2021) found contrasting results when examining firms listed on the NSE from 2019 to 2020, reporting that firm characteristics had

a negative significant moderating effect on the relationship between free cash flows and financial performance.

International studies have consistently supported the moderating influence of firm characteristics across different economic contexts and sectors. Badara (2021) analyzed Nigerian deposit money banks from 2019 to 2020 using Stata SE 12 software and established that firm size has a significant moderating effect on the relationship between board structure and financial performance. In Germany, Dalci, Tanova, Ozyapici and Bein (2019) examined 285 non-financial firms listed on the Frankfurt Stock Exchange and found that smaller firm size correlates with decreased returns on assets, concluding that firm size is a significant factor in investment decisions. Kumar and Shan (2021) conducted research in India measuring firm size using natural logarithm of total assets and confirmed that firm size has a significant moderating effect on the relationship between capital structure and financial performance of non-financial corporations.

The empirical evidence consistently demonstrates that firm characteristics function as significant moderating variables across diverse organizational contexts, though the direction and magnitude of effects vary depending on the specific relationships examined. Meshack, Winnie, Okiro and Ochieng (2022) reinforced these findings by showing that firm size positively moderates the relationship between capital structure and financial performance of firms listed on the Nairobi Securities Exchange, recommending that managers focus on growing firm size in terms of total assets. The studies collectively indicate that firm size, measured through various metrics including total assets and employee numbers, consistently influences how independent variables relate to performance outcomes. These findings establish a strong empirical foundation for investigating firm characteristics as moderating variables in the relationship between corporate environmental responsibility and firm performance in manufacturing contexts.

RESEARCH METHODOLOGY

This study adopted a mixed research design combining qualitative and quantitative approaches within a positivistic philosophy framework to examine the moderating role of firm characteristics on corporate environmental responsibility and performance relationships. The target population comprised 499 large manufacturing firms listed in the Kenya Association of Manufacturers

(KAM) 2021 directory, stratified across 12 manufacturing sectors. Using Yamane's (1967) formula with a 10% margin of error, a sample of 84 firms was selected through stratified random sampling, with four managers (two top-level and two middle-level) purposively selected from each firm, yielding 336 respondents from Finance, Procurement, Operations, Human Resources, and Production departments. Primary data was collected using self-administered questionnaires containing both open-ended and closed-ended questions, supplemented by secondary data from annual reports and industry publications. Data analysis was conducted using SPSS, employing descriptive statistics, correlation analysis, and regression analysis, with the Baron and Kenny (1986) three-step moderation technique used to test moderating effect of firm characteristics.

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.

Environmental Impact Assessment

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 study findings revealed that large manufacturing firms in Kenya demonstrated strong positive perceptions of environmental impact assessment, with an overall mean score of 4.38 and standard deviation of 0.843, indicating consistent agreement across respondents regarding the importance and benefits of EIA in organizational contexts. The highest level of agreement was observed for the integration of EIA into organizational decision-making processes (mean = 4.60, SD = 0.597), suggesting widespread recognition of EIA's strategic importance in enhancing informed and sustainable business choices (Hardiyansah, Agustini & Purnamawati, 2021). Respondents also strongly agreed that EIA facilitates the identification of eco-friendly innovations and practices that boost efficiency and competitiveness (mean = 4.52, SD = 0.795), which aligns with Jin, Zhang, Liu and Zhang's (2019) findings on environmentally-oriented innovation impacts. Additionally, statements regarding EIA implementation in resource management, particularly water usage optimization and resource utilization enhancement, received strong agreement with means of 4.43 and 4.37 respectively, supporting Simionescu, Gherghina, Sheikha and Tawil's (2020) research on the correlation between optimized resource management and improved financial performance.

However, the study identified areas requiring improvement in EIA implementation, particularly regarding staff adherence to environmental laws and organizational environmental management strategies. The statement concerning staff compliance with EIA laws received the lowest mean score of 4.16 with the highest standard deviation of 0.993, indicating considerable variation in perceptions and a substantial proportion of neutral responses (26.3%). This finding reflects the inconsistent implementation of environmental practices documented by Mbuthia (2021) and Kalunda (2020) in Kenyan manufacturing firms. Similarly, organizational environmental management strategies designed to identify environmental problems showed relatively lower agreement (mean = 4.22, SD = 0.931), suggesting variation in strategic integration approaches across different firms. These findings align with Makori and Jagongo's (2020) documentation of significant differences in environmental management integration across manufacturing firms in developing economies, indicating that while firms recognize EIA's theoretical importance, practical implementation remains at an "embryonic stage" as described by Wang'ombe (2020).

Environmental awareness

The study results are presented in Table 3

Table 3: Environmental awareness

Environmental awareness	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Regular environmental training programs boost overall performance.	-	21.3	22.5	41.9	14.3	3.49	.982
Incentives for eco-friendly practices motivate and improve employee performance.	-	4.1	9.2	53.0	37.0	4.16	0.754
Strong community relations focused on environmental education enhance organizational performance.	-	-	21.3	43.5	35.2	4.16	0.740
Encouraging employee participation in eco-awareness campaigns positively influences dedication and performance.	5.7	4.1	34.9	50.5	4.8	3.44	0.877
Well-informed employees about environmental policies align with sustainability goals, improving performance.	5.7	21.3	25.1	35.9	12.1	3.27	1.101
Onboarding with environmental awareness fosters sustainability, impacting performance positively.	5.7	13.7	29.5	49.2	1.9	3.28	0.926
Periodic assessments improve employee efficiency and innovation, contributing to performance.	-	-	9.2	51.1	39.7	4.30	0.630
Carbon information disclosure accelerates the market diffusion of energy-saving products.	-	21.3	-	34.6	44.1	4.02	1.138
Collaboration with local schools for environmental education strengthens community ties, benefiting performance.	5.7	25.4	25.7	33.0	10.2	3.17	1.093
Employee feedback on environmental awareness efforts leads to informed changes, improving organizational performance.	13.3	16.5	7.9	48.6	13.7	3.33	1.276
Average						**3.66**	**0.952**

The study findings revealed that large manufacturing firms in Kenya demonstrated moderately positive perceptions of environmental awareness, with an overall mean score of 3.66 and standard deviation of 0.952, indicating moderate variation in responses across respondents. The highest level of agreement was observed for periodic assessments improving employee efficiency and innovation (mean = 4.30, SD = 0.630), suggesting strong consensus about the importance of systematic evaluation in enhancing environmental performance, which aligns with Khan, Yu and

Umar's (2021) identification of systematic assessment as a key driver of environmental performance improvement. Additionally, respondents showed consistent recognition of incentive structures and community relations, with "Incentives for eco-friendly practices motivate and improve employee performance" and "Strong community relations focused on environmental education enhance organizational performance" receiving means of 4.16 with relatively low standard deviations (0.754 and 0.740 respectively). These findings support Kibogy's (2021) research demonstrating that tangible incentive structures and community engagement significantly influence environmental initiative effectiveness in Kenyan manufacturing firms.

However, the study identified significant implementation challenges in environmental awareness practices, particularly regarding educational partnerships and employee knowledge translation. The lowest agreement was recorded for collaboration with local schools for environmental education (mean = 3.17, SD = 1.093), indicating considerable variation in responses and neutral positions on educational partnerships, which corresponds with Ntiamoah, Egyiri and Kwamega's (2020) finding that educational partnerships remain among the least developed aspects of environmental awareness programs. Similarly, employee knowledge about environmental policies received relatively lower agreement (mean = 3.27, SD = 1.101), reflecting what Pham et al. (2020) described as considerable variation in environmental knowledge translation into actionable sustainability practices across organizations. The higher standard deviations for employee feedback mechanisms (SD = 1.276) and carbon information disclosure (SD = 1.138) suggest varying implementation effectiveness across different manufacturing firms, consistent with Mwangi and Oyenje's (2020) documentation of implementation disparities in the Kenyan manufacturing sector and Somjai, Fongtanakit and Laosillapacharoen's (2020) identification of the "awareness-implementation gap" in developing economies.

Environmental regulations compliance

The study results are summarized in Table 4

Table 4: Environmental regulations compliance

Environmental regulations compliance	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Strict compliance with environmental laws enhances a manufacturing firm's overall performance	21.3	4.1	14.9	47.0	12.7	3.26	1.345
Meeting reporting requirements aids transparency and operational improvements, contributing to better performance.	14.0	8.9	7.0	64.8	5.4	3.39	1.169
Timely acquisition of permits ensures uninterrupted operations, positively influencing performance	-	-	34.6	65.4	-	3.65	0.476
Compliance fosters responsibility and efficiency, improving resource management and overall performance	-	-	48.6	47.9	3.5	3.55	0.564
Meeting emissions and pollution standards mitigates legal and financial risks, safeguarding performance	-	-	35.2	45.4	19.4	3.84	0.723
Compliance opens doors to markets with stringent standards, expanding the customer base and boosting performance.	5.7	-	23.2	34.0	37.1	3.97	1.058
Employees and other stakeholders at the forefront in creating awareness about environment conservation	21.3	-	15.6	41.6	21.6	3.42	1.399
Compliance minimizes regulatory issues and disruptions, allowing the organization to focus on core activities and enhance competitiveness and performance	19.7	8.9	16.2	45.2	10.2	3.17	1.307
Average						**3.53**	**1.005**

Large manufacturing firms in Kenya demonstrated moderately positive perceptions of environmental regulations compliance (mean = 3.53, SD = 1.005), with highest agreement on market access benefits (mean = 3.97) and risk mitigation through emissions standards compliance (mean = 3.84), supporting Wang, Xu and Liang's (2021) findings on market competitiveness and Emuebie, Olaoye and Ogundajo's (2021) research on risk mitigation benefits. Operational compliance aspects showed moderate agreement with lower variation, particularly regarding permit acquisition timeliness (mean = 3.65, SD = 0.476), consistent with Nawawi et al.'s (2022) findings on operational continuity importance. The recognition of market access benefits suggests that firms understand compliance as a strategic tool for accessing premium markets that demand environmental standards. The relatively consistent agreement on operational aspects indicates that

firms have developed practical understanding of compliance requirements for day-to-day operations.

However, significant concerns emerged regarding strict compliance and core business performance relationships, with the lowest agreement for compliance minimizing regulatory disruptions (mean = 3.17, SD = 1.307) and strict compliance enhancing overall performance (mean = 3.26, SD = 1.345), where 21.3% strongly disagreed. These findings align with Yoo and Heshmati's (2019) documentation of compliance as potentially constraining short-term performance and reflect Wang and Yan's (2022) "compliance ambivalence" concept, where theoretical benefits are acknowledged but practical implementation experiences vary considerably across different firm characteristics and management approaches (Menike, 2020). The substantial disagreement on strict compliance benefits suggests that firms may perceive regulatory requirements as burdensome rather than value-creating in certain contexts. These mixed perceptions highlight the need for policy frameworks that better align regulatory requirements with business performance objectives in developing economy contexts.

Energy Efficiency

The study results are presented in Table 5

Table 5: Energy Efficiency

Environmental awareness	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean	Std. Dev.
Investing in renewable energy reduces energy costs and enhances performance	-	-	14.9	69.8	15.2	4.00	0.550
Implementing energy-efficient measures lowers operational expenses and boosts organizational performance	-	-	5.1	74.3	20.6	4.16	0.483
Regular energy audits identify areas for improvement, optimizing performance.	-	5.4	5.1	62.9	26.7	4.11	0.723
Energy-efficient practices reduce environmental impact, enhancing the organization's image and market competitiveness.	-	5.4	25.4	45.4	23.8	3.88	0.834
Lower energy consumption improves cost-effectiveness and overall financial performance.	-	5.4	18.4	34.9	41.3	4.12	0.895
Energy-efficient processes lead to reduced downtime and increased productivity, positively impacting performance.	-	-	-	32.4	67.6	4.68	0.469
Utilizing renewable energy sources aligns with sustainability goals and attracts eco-conscious customers, benefiting performance.	-	-	-	53.7	46.3	4.46	0.499
Efficient energy use minimizes resource waste, contributing to improved resource management and performance	-	5.4	-	65.1	29.5	4.19	0.691
Lower energy bills free up capital for investments that can further enhance performance	-	-	44.8	32.7	22.5	3.78	0.791
Energy-efficient technologies enhance reliability and resilience, minimizing disruptions and maintaining performance..	-	5.4	36.2	39.4	19.0	3.72	0.832
Energy savings contribute to increased profitability, positively influencing organizational performance.	-	5.4	25.4	48.3	21.0	3.85	0.811
A commitment to energy efficiency fosters a culture of sustainability, attracting talent and partners, ultimately enhancing overall performance.	-	26.7	9.8	36.2	27.3	3.64	1.146
Average						**4.05**	**0.727**

Large manufacturing firms in Kenya demonstrated strong positive perceptions of energy efficiency, with an overall mean score of 4.05 and standard deviation of 0.727, indicating consistent agreement across respondents regarding energy efficiency benefits. The highest agreement was observed for operational benefits, with "Energy-efficient processes lead to reduced downtime and increased productivity" receiving a mean of 4.68 (SD = 0.469), supporting Berner, Lange and Silbersdorff's (2022) documentation of positive correlations between energy-efficient processes and operational reliability. Additionally, renewable energy adoption showed strong

support (mean = 4.46, SD = 0.499), consistent with Di Foggia's (2021) identification of customer preference benefits, while implementation measures received means of 4.16 and 4.19 respectively, supporting Jiang, Zhou and He's (2021) documentation of cost-saving benefits from energy efficiency initiatives. The consistently strong agreement on operational and financial benefits suggests that energy efficiency represents a well-understood strategic priority among manufacturing firms. These findings indicate that energy efficiency initiatives align closely with immediate business objectives, making them more readily acceptable compared to other environmental responsibility practices.

However, the study identified variation in perceptions regarding cultural and reliability aspects of energy efficiency, with lower agreement on secondary benefits compared to direct operational advantages. The lowest agreement was recorded for cultural sustainability benefits (mean = 3.64, SD = 1.146) and technology reliability enhancement (mean = 3.72, SD = 0.832), consistent with Trianni, Cagno, Dolšak and Hrovatin's (2021) findings on variable cultural impacts and Herce et al.'s (2021) research showing more variable perceptions of reliability benefits compared to cost-saving advantages. Higher proportions of neutral responses on capital investment benefits (44.8%) and technology resilience (36.2%) suggest ambivalent experiences in these areas, aligning with Kalantzis and Revoltella's (2019) documentation of variation in secondary energy efficiency benefits among manufacturing firms. These mixed perceptions on secondary benefits suggest that while firms recognize direct operational advantages, the broader strategic implications of energy efficiency may require more time and experience to materialize. The variation in cultural and reliability perceptions indicates that organizational context and implementation approach significantly influence how energy efficiency benefits are realized beyond immediate cost savings.

Firm characteristics

The descriptive results are presented in Table 6

Table 6: Firm characteristics

Firm characteristics	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean	Std. Dev.
The firm size in terms of total assets influences the company's performance	13.0	25.4	9.8	48.3	3.5	3.04	1.183
The sales growth determines the strategy to be adopted.	-	4.1	46.0	46.3	3.5	3.49	0.635
The age of the company is critical in influencing the company's performance.	-	-	4.1	38.7	20.3	3.79	0.756
The number of employees influences the performance level of the company.	-	-	4.1	5.81	37.8	4.34	0.554
The sales turnover has a significant effect on the performance of the company.	-	-	35.2	47.3	17.5	3.82	0.705
The company considers the extent of its assets before any decision-making.	-	-	31.7	47.3	21.0	3.89	0.719
The liquidity level influences the performance level of the company.	-	-	20.6	58.1	21.3	4.01	0.648
Older companies are more efficient in production.	-	21.3	4.1	41.6	33.0	3.86	1.099
Average						**3.78**	**0.787**

Large manufacturing firms in Kenya demonstrated moderately positive perceptions of firm characteristics' influence on performance, with an overall mean score of 3.78 and standard deviation of 0.787, indicating relatively consistent agreement across respondents. The highest agreement was observed for human resource factors, with "The number of employees influences the performance level of the company" receiving a mean of 4.34 (SD = 0.554), supporting Essel, Adams and Amankwah's (2019) identification of workforce size as a significant determinant of operational capacity and performance in manufacturing contexts. Similarly, liquidity management showed strong recognition (mean = 4.01, SD = 0.648), consistent with Nyabaga and Wepukhulu's (2020) documentation of strong associations between liquidity management and financial performance among Kenyan manufacturing firms. However, significant variation emerged regarding firm size and sales growth influences, with the lowest agreement recorded for asset-based firm size effects (mean = 3.04, SD = 1.183), where 25.4% disagreed, consistent with Mboi, Muturi and Wanjare's (2018) findings that asset size effects on performance varied significantly depending on contextual factors. Sales growth strategy determination showed moderate agreement (mean = 3.49, SD = 0.635) with high neutral responses (46.0%), reflecting considerable

ambivalence aligned with Meshack, Winnie, Okiro and Ochieng's (2022) documentation of varying strategic approaches to sales growth across manufacturing firms. The high proportion of neutral responses across multiple items reflects what Ali, Yassin and AbuRaya (2020) described as "contextual contingency" in firm characteristics' influence, where significance depends heavily on other organizational and environmental factors. These mixed perceptions suggest that while certain firm characteristics like human resources and liquidity show universal importance, others like size and growth effects are more context-dependent and vary significantly across different organizational situations.

Performance of Large Manufacturing Firms

The descriptive statistics of performance are summarized in Table 7.

Table 7: 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**

Large manufacturing firms in Kenya demonstrated moderately positive perceptions of organizational performance, with an overall mean score of 3.61 and standard deviation of 1.042, indicating considerable variation in performance experiences across organizations. The highest agreement was observed for asset growth (mean = 3.79, SD = 1.163), though with substantial variation suggesting uneven asset growth across different manufacturing firms, consistent with

Ivanov and Mayorova's (2020) documentation of significant disparities in asset growth rates across manufacturing subsectors in emerging economies. Customer retention showed moderate agreement (mean = 3.67, SD = 1.012), aligning with Lam, DeCarlo and Sharma's (2019) findings that retention outcomes varied considerably depending on product differentiation and market positioning strategies, while expansion activities (mean = 3.66, SD = 0.827) showed more consistent experiences compared to target achievement (mean = 3.63, SD = 1.058), supporting Cohen and Li's (2020) research on uniform physical expansion implementation. However, significant challenges emerged regarding market share performance, with the lowest agreement recorded for market share growth over five years (mean = 3.41, SD = 1.010), where 25.4% disagreed, and consistent market share increases (mean = 3.49, SD = 1.166) with 30.8% disagreement, consistent with Ogutu, Obonyo and Sagwa's (2020) documentation of market share pressures from increased competition and World Bank (2020) reports on market share challenges in domestic and regional markets. The consistently high standard deviations across all performance indicators suggest significant variation in performance experiences, consistent with KIPPRA's (2020) analysis of Kenyan manufacturing sector performance disparities attributed to differences in firm characteristics, industry subsectors, and corporate environmental responsibility practices effectiveness. 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

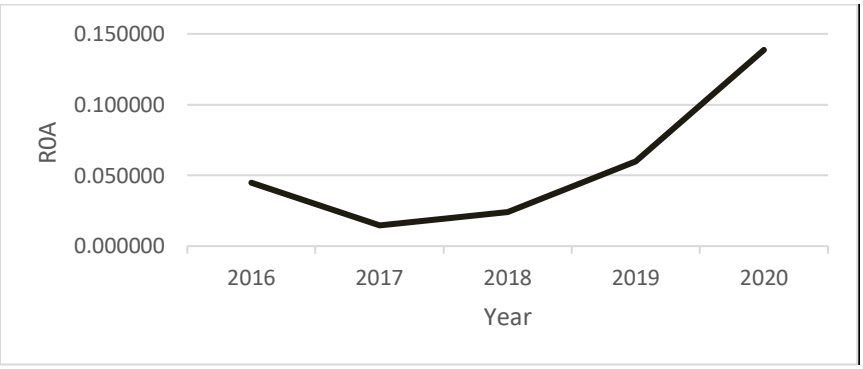

Figure 2: Trend Analysis of ROA

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

Table 8 provides summary of the correlation coefficients of all variables and their p-values.

Table 8: Correlation matrix for all variables

		Performance	Environmental impact assessment	Environmental awareness	Environmental regulations compliance	Energy efficiency	Firm characteristics
Performance	Pearson Correlation	1.000					
	Sig. (2-tailed)						
Environmental impact assessment	Pearson Correlation	-.516**	1.000				
	Sig. (2-tailed)	0.000					
Environmental awareness	Pearson Correlation	.702**	.454**	1.000			
	Sig. (2-tailed)	0.000	0.000				
Environmental regulations compliance	Pearson Correlation	.637**	.489**	.636**	1.000		
	Sig. (2-tailed)	0.000	0.000	0.000			
Energy efficiency	Pearson Correlation	.568**	.329**	.431**	.466**	1.000	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
Firm characteristics	Pearson Correlation	.607**	.528**	.518**	.465**	.411**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	

The results show that performance has a significant negative correlation with environmental impact assessment ($r = -.516$, $p = 0.000$), suggesting that comprehensive environmental assessments may initially create financial burdens that negatively affect performance. This finding aligns with research by Makori and Jagongo (2020), who found negative relationships between environmental accounting practices and certain performance metrics in manufacturing firms. In contrast, performance demonstrates a strong positive correlation with environmental awareness ($r = .702$, $p = 0.000$), indicating that heightened environmental consciousness contributes substantially to enhanced organizational outcomes. This supports findings by Khan, Yu, and Umar (2021), who established that environmental awareness leads to improved efficiency and innovation, ultimately enhancing firm performance.

Similarly, performance shows a significant positive correlation with environmental regulations compliance (r = .637, p = 0.000), suggesting that adherence to environmental regulations contributes to better organizational outcomes. This corroborates research by Li, Cao, Zhang, Chen, Ren, and Zhao (2021), who found that regulatory compliance significantly positively influences financial performance in energy-intensive companies. Performance also exhibits a positive correlation with energy efficiency (r = .568, p = 0.000), indicating that energy-efficient practices contribute to improved performance outcomes. This finding is consistent with Osazefua (2019), who demonstrated that energy efficiency has a significant impact on the financial sustainability of manufacturing companies. Finally, performance shows a substantial positive correlation with firm characteristics (r = .607, p = 0.000), suggesting that organizational attributes such as size, age, and growth significantly influence performance outcomes. This supports research by Mboi, Muturi, and Wanjare (2018), who established that firm characteristics have significant effects on financial performance metrics. These correlation patterns highlight the differential effects of various environmental responsibility dimensions on firm performance, providing empirical support for the conceptual framework guiding this study and corroborating previous research findings in different contexts.

Test of Moderating Variable

The moderation decision criteria were examined under step three. Under step three, if firm characteristics are significant under the interaction term, they moderate the relationship; otherwise not. The coefficient of determination (R squared) for the three steps is presented below in Table 9.

Table 9: Model Fitness of Corporate Environmental Responsibility, Firm Characteristics and Performance

Model	R Square
1	0.628
2	0.653
3	0.742

a Predictors: Environmental impact assessment, environmental awareness, environmental regulations compliance, energy efficiency, firm characteristics, environmental impact assessment*firm characteristics, environmental awareness*firm characteristics, environmental regulations compliance*firm characteristics, energy efficiency*firm characteristics

The model fitness results presented in Table 9 show the effect of firm characteristics on the relationship between corporate environmental responsibility and firm performance. Model 1, which contains only the corporate environmental responsibility dimensions (environmental impact assessment, environmental awareness, environmental regulations compliance, energy efficiency) as independent variables, has an R Square value of 0.628, showing that these factors explain 62.8% of changes in firm performance. This demonstrates a substantial ability of the model to explain performance even before considering moderating effects. Model 2, which adds firm characteristics as an independent variable, shows an R Square value increase to 0.653. This 2.5% increase suggests that firm characteristics directly affect performance beyond environmental responsibility practices. Model 3, incorporating interaction terms between corporate environmental responsibility dimensions and firm characteristics, shows a further R Square increase to 0.742. This 8.9% increase from Model 2 confirms that firm characteristics significantly moderate the relationship between corporate environmental responsibility and firm performance. This improved explanatory power demonstrates the importance of considering organizational attributes when studying environmental responsibility practices and performance. The study's analysis of variance results are presented in Table 10

Table 10: ANOVA of Corporate Environmental Responsibility, Firm Characteristics and Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.734	4	7.683	130.829	.000b
	Residual	18.206	310	0.059		
	Total	48.94	314			
2	Regression	31.975	5	6.395	116.486	.000b
	Residual	16.964	309	0.055		
	Total	48.94	314			
3	Regression	36.328	9	4.036	97.614	.000b
	Residual	12.612	305	0.041		
	Total	48.94	314			

a Dependent Variable: Performance

b Predictors: Environmental impact assessment, environmental awareness, environmental regulations compliance, energy efficiency, firm characteristics, environmental impact assessment*firm characteristics, environmental awareness*firm characteristics, environmental regulations compliance*firm characteristics, energy efficiency*firm characteristics

The ANOVA results presented in Table 10 confirm the statistical significance of all three regression models examining the moderating effect of firm characteristics. Model 1, containing only the corporate environmental responsibility dimensions, shows an F-statistic of 130.829 with a p-value of 0.000, confirming these factors collectively have a significant effect on firm performance. Model 2, which adds firm characteristics as an independent variable, has an F-statistic of 116.486 with a p-value of 0.000, confirming the statistical significance of this expanded model. Model 3, with interaction terms between corporate environmental responsibility dimensions and firm characteristics, shows an F-statistic of 97.614 with a p-value of 0.000. The consistently low p-values (0.000) across all models indicate the results are extremely unlikely to be due to chance, supporting the validity of the moderation analysis. These ANOVA results, combined with the R Square increases in the model fitness analysis, provide strong statistical support for examining the regression coefficients to determine how firm characteristics moderate the relationship between corporate environmental responsibility and firm performance. The regression of the moderating effect of firm characteristics is presented in Table 11.

Table 11: Regression Coefficients of Corporate Environmental Responsibility, Firm Characteristics and Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	0.382	0.203		1.885	0.060
1	Environmental impact assessment	-0.166	0.043	0.158	3.874	0.000
	Environmental awareness	-0.431	0.05	0.403	8.636	0.000
	Environmental regulations compliance	0.219	0.057	0.184	3.812	0.000
	Energy efficiency	0.278	0.043	0.257	6.415	0.000
2	(Constant)	-0.382	0.203		-1.885	0.060
	Environmental impact assessment	-0.166	0.043	0.158	3.874	0.000
	Environmental awareness	-0.431	0.050	0.403	8.636	0.000
	Environmental regulations compliance	0.219	0.057	0.184	3.812	0.000
	Energy efficiency	0.278	0.043	0.257	6.415	0.000
	Firm characteristics	-0.382	0.203		-1.885	0.060
3	(Constant)	-0.347	0.175		-1.977	0.049
	Environmental impact assessment	-0.162	0.039	0.154	4.116	0.000
	Environmental awareness	-0.182	0.048	0.170	3.816	0.000
	Environmental regulations compliance	0.154	0.050	0.130	3.074	0.002
	Energy efficiency	0.170	0.039	0.158	4.380	0.000
	Firm characteristics	0.174	0.036	0.195	4.775	0.000
	Environmental impact assessment*Firm characteristics	-0.161	0.016	-0.654	-9.784	0.000
	Environmental awareness*Firm characteristics	-0.061	0.013	0.229	4.691	0.000
	Environmental regulations compliance*Firm characteristics	0.021	0.010	0.085	2.146	0.033
	Energy efficiency*Firm characteristics	0.120	0.017	0.493	7.269	0.000

a Dependent Variable: Performance

The regression coefficients presented in Table 11 show how firm characteristics moderate the relationship between corporate environmental responsibility dimensions and firm performance. Based on these results, the regression models for each step are:

Model 1: (Direct effects without moderator):

$Y = 0.382 - 0.166X_1 - 0.431X_2 + 0.219X_3 + 0.278X_4$

Model 2: (Adding firm characteristics as independent variable):

$Y = -0.382 - 0.166X_1 - 0.431X_2 + 0.219X_3 + 0.278X_4 - 0.382Z$

Model 3: (Including interaction terms):

$Y = -0.347 - 0.162X_1 - 0.182X_2 + 0.154X_3 + 0.170X_4 + 0.174Z - 0.161X_1Z - 0.061X_2Z + 0.021X_3Z + 0.120X_4Z$

Where: Y = Performance X_1 = Environmental impact assessment X_2 = Environmental awareness X_3 = Environmental regulations compliance X_4 = Energy efficiency Z = Firm characteristics

In Model 1, environmental impact assessment ($\beta = -0.166$, $p = 0.000$), environmental awareness ($\beta = -0.431$, $p = 0.000$), environmental regulations compliance ($\beta = 0.219$, $p = 0.000$), and energy efficiency ($\beta = 0.278$, $p = 0.000$) all have significant effects on firm performance, with different directions of influence. In Model 2, with firm characteristics added as an independent variable, its direct effect on performance is not statistically significant ($\beta = -0.382$, $p = 0.060$). However, in Model 3, which includes interaction terms, firm characteristics show a significant positive direct effect ($\beta = 0.174$, $p = 0.000$), indicating a relationship that becomes apparent only when considering interactions. All four interaction terms in Model 3 are statistically significant, confirming that firm characteristics moderate the relationship between each corporate environmental responsibility dimension and firm performance. Environmental impact assessment interaction ($\beta = -0.161$, $p = 0.000$) and environmental awareness interaction ($\beta = -0.061$, $p = 0.000$) have negative coefficients, meaning stronger firm characteristics amplify the negative or reduce the positive relationship between these practices and performance.

In contrast, environmental regulations compliance interaction ($\beta = 0.021$, $p = 0.033$) and energy efficiency interaction ($\beta = 0.120$, $p = 0.000$) have positive coefficients, showing that stronger firm characteristics enhance the positive relationship between these practices and performance. The strongest moderation effect is for environmental impact assessment, followed by energy efficiency, environmental awareness, and environmental regulations compliance. The study rejects the null hypothesis since all interaction term p-values are less than 0.05. Therefore, firm

characteristics have a statistically significant moderating effect on the relationship between corporate environmental responsibility and performance of large manufacturing firms in Kenya.

These findings align with several previous studies. Mboi, Muturi and Wanjare (2018) established a significant positive moderating effect of enterprise characteristics on the relationship between capital structures and financial performance in medium-sized and large enterprises in Kenya. Kivaya, Kemboi and Odunga (2020) found that firm size significantly moderates the relationship between corporate governance and financial performance of microfinance banks in Kenya. Mutende, Mwangi, Njihia and Ochieng (2021) determined that firm characteristics have a negative significant moderating effect on the relationship between free cash flows and financial performance of firms listed on the Nairobi Securities Exchange. Badara (2021) showed that firm size has a significant moderating effect on the relationship between board structure and financial performance of deposit money banks. Additionally, Meshack, Winnie, Okiro and Ochieng (2022) confirmed that firm size has a positive moderating effect on the relationship between capital structure and financial performance of firms listed on the Nairobi Securities Exchange.

CONCLUSION

The study concludes that firm characteristics has a moderating relationship between corporate environmental responsibility and performance of large manufacturing firms in Kenya. This means that for large manufacturing firms to realize good performance while still observing the corporate environmental responsibility, then they must ensure that they look at the firm characteristics such as firm size, firm age and sales growth. The moderating effect varied across different dimensions of environmental responsibility, enhancing some relationships while tempering others. This indicates that environmental responsibility strategies should not be applied uniformly across organizations but rather tailored to the specific characteristics of each firm. For instance, larger firms may benefit more from certain types of environmental initiatives than smaller ones, while firms with higher growth rates might experience different outcomes from environmental investments compared to those with stable or declining growth patterns.

RECOMMENDATIONS

The study recommends that large manufacturing firms in Kenya should adopt differentiated corporate environmental responsibility strategies based on their specific firm characteristics, as the research demonstrates that organizational attributes such as size, age, employee numbers, liquidity levels, and asset base fundamentally moderate the relationship between environmental practices and performance outcomes. Firms should conduct comprehensive assessments of their internal capabilities and resources before implementing environmental responsibility initiatives, recognizing that larger and older firms may have different implementation advantages and challenges compared to smaller or newer organizations in areas such as energy efficiency investments, environmental impact assessments, and regulatory compliance systems. Management should prioritize energy efficiency initiatives regardless of firm characteristics given their consistently positive performance impact, while tailoring environmental awareness programs and regulatory compliance approaches to align with their specific organizational context, resource availability, and strategic positioning.

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