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Influence of Technical Attributes on Organizational Performance in Kenya's Energy Parastatals

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Abstract

The purpose of this study is to determine the influence of technical attributes on organizational performance of Kenya's energy parastatals. Positivism research philosophy and descriptive research design were adopted by the study. A total of 16996 employees in the ten organizations that are in the energy sector were targeted. Stratified random sampling technique was used to select a sample size of 384 respondents. A structured questionnaire was used as an instrument for primary data collection. Descriptive statistics were used in the analysis of quantitative data presented in the form of percentages, frequencies, means, and standard deviations while inferential statistics included correlation and regression analysis using Statistical Package for Social Sciences (SPSS) version 28. Correlation analysis results indicated that technical attributes had a strong and positive relationship with organizational performance ($r = .746$, $p < .05$). Regression analysis yielded $R^2 = .556$, $F(1,302) = 378.637$, $p < .05$, and a beta coefficient of $\beta = 0.748$, $t = 19.459$, $p < .05$, indicating that the technical attributes significantly influenced organizational performance of Kenya's energy parastatals. The study concludes that technical attributes significantly influence organizational performance in Kenya's energy parastatals. The study recommends that management of Kenya's energy parastatals should strengthen technical leadership attributes by enhancing evidence-based decision-making, ensuring clear role definition, and aligning organizational goals across all levels. Leaders should prioritize structured decision processes, clarify responsibilities, and communicate performance expectations to improve operational efficiency as well as regulatory compliance. For future research, studies should examine the influence of technical attributes on organizational performance in other sectors and institutional contexts, particularly those characterized by different regulatory and operational complexities. Further research should also explore potential moderating and mediating variables, such as organizational culture, technological capability, and employee competence, to provide a deeper understanding of how technical leadership attributes shape organizational performance.

Keywords: Technical attributes, organizational performance, energy parastatals, Kenya.

Introduction

Leadership is a critical organizational resource that shapes how institutions plan, coordinate, and execute their mandates. In complex and highly regulated environments, effective leadership is not only defined by ethical intent but also by the leader's technical capacity to make sound decisions, clarify roles, and align organizational goals. Scholars argue that leadership effectiveness is strongly influenced by the extent to which leaders possess the technical attributes necessary to translate strategy into action and ensure operational coherence (Modise, 2023). In public sector organizations, particularly parastatals, technical leadership competence is essential for efficiency, accountability, and sustained organizational performance.

Technical attributes of leadership refer to the leader's ability to apply knowledge, skills, and structured processes to guide organizational operations. These attributes include decision-making capability, role clarification, and goal clarity, which collectively enable leaders to coordinate resources, reduce ambiguity, and enhance performance outcomes. According to Twesigye (2024), ethical leadership is incomplete without technical competence, as leaders must not only act ethically but also possess the skills required to make informed decisions and implement policies effectively. In this regard, technical attributes serve as the operational foundation upon which ethical leadership is actualized.

Decision-making is a core technical attribute that significantly influences organizational effectiveness. Leaders are frequently required to make complex decisions involving competing interests, limited resources, and regulatory constraints. Ethical leaders who demonstrate sound decision-making skills are better positioned to balance these demands while maintaining organizational integrity (Bush et al., 2020). Effective decision-making enhances consistency, reduces operational inefficiencies, and strengthens compliance with institutional frameworks. Chen et al. (2020) emphasize that leadership decision-making is particularly critical in environments characterized by ethical dilemmas and high accountability demands, such as public sector institutions.

Role clarity is another essential technical attribute that supports organizational performance. Clearly defined roles enable employees to understand their responsibilities, performance expectations, and reporting relationships. When leaders provide clear role definitions, they reduce role conflict and ambiguity, which are common sources of inefficiency and workplace dissatisfaction (Hancock et al., 2020). Research suggests that role clarification enhances coordination, accountability, and task execution, thereby contributing to improved organizational outcomes (Raziq et al., 2024). In the context of ethical leadership, role clarity ensures that ethical standards and operational responsibilities are consistently upheld across all levels of the organization.

Goal clarity further strengthens the effectiveness of technical leadership attributes. Leaders who articulate clear organizational goals provide direction and alignment, enabling employees to focus their efforts on shared objectives. Goal clarity facilitates strategic alignment and performance monitoring, which are essential for achieving efficiency and regulatory compliance (Zhang et al., 2022). Clear goals also reinforce ethical leadership by ensuring transparency in expectations and reducing discretionary behavior that may lead to unethical practices.

Statement of the Problem

Among Kenya's energy parastatals, technical leadership attributes are particularly important due to the sector's strategic significance and regulatory complexity. Inefficiencies, governance challenges, and performance gaps within public institutions have often been linked to weaknesses in leadership decision-making, unclear roles, and misaligned objectives (Hancock et al., 2020). Despite the growing recognition of ethical leadership, limited empirical studies have isolated technical attributes as a distinct dimension influencing organizational performance in the Kenyan public sector.

Although ethical leadership has been widely studied, existing empirical literature has largely focused on empowerment and moral attributes, with limited attention given to technical leadership attributes such as decision-making competence, role clarity, and goal clarity. Studies by Twesigye (2024) and Umar et al. (2020) established a positive relationship between ethical leadership and organizational performance but emphasized empowerment practices, creating a conceptual gap regarding technical attributes. Their findings are similar to Kontogeorga and Papapanagiotou (2023), and Zulueta (2021) who however relied on secondary data or small sample sizes, limiting insights into operational leadership attributes that directly influence performance.

Kenyan-based studies have also predominantly examined participatory, moral, or ethical leadership dimensions without isolating technical attributes as independent predictors of organizational performance (Kithinji & Gatobu, 2025; Otiende & Makokha, 2020; Owino et al., 2024). As a result, there is limited empirical evidence on how leadership decision-making, role clarity, and goal clarity influence organizational performance within Kenya's energy parastatals. This study therefore sought to address this gap by examining the influence of technical leadership attributes on organizational performance among Kenya's energy sector parastatals, thereby contributing context-specific empirical evidence to ethical leadership literature and informing leadership practice in the public energy sector.

Literature Review

Theoretical review

This study's theoretical framework borrowed from a combination of earlier works by Ahmad et al. (2021) and Zahrani (2022), which described ethical leadership constructs that collectively outline four pivotal dimensions of ethical leadership. These are hereby identified as the character dimension, technical attributes, empowerment attributes and moral dimension.

The Ethical Leadership Theory delineates the moral traits inherent in an ethical leader and the ethical conduct expected from such a leader. This theory suggests that employees and key external stakeholders perceive a leader both as a moral individual and as a moral manager, which contributes to the leader's reputation as an ethical leader and is essential for executive ethical leadership (Truitt, 2020). Brown et al. (2005) characterized ethical leadership as demonstrating behaviors perceived as normatively appropriate, expressed through individual actions and interactive relationships, and communicated to followers through bilateral communication, emphasis, and decision-making.

Several scholars have further refined the Ethical Leadership Theory by developing associated models. For instance, Zahrani (2022) focused on a two-dimensional model tailored to human resource context, focusing on technical attributes and moral/ethical attributes of leadership. Meanwhile, Ahmad et al. (2021) focused on a two-dimensional model concentrating on character dimension and empowerment attributes of ethical leadership. Consistent with the frameworks proposed by Ahmad et al. (2021) and Zahrani (2022), this study assessed the influence of ethical leadership on organizational performance.

Conceptual Framework

In this study, the conceptual framework consisted of the independent variable as technical attributes style measured by decision making, role clarification and goal clarity as the study constructs. Organizational performance as the dependent variable was measured by efficiency and regulatory compliance. Figure 1 shows the relationship between the independent variable (technical attributes) and the dependent variable (organizational performance)

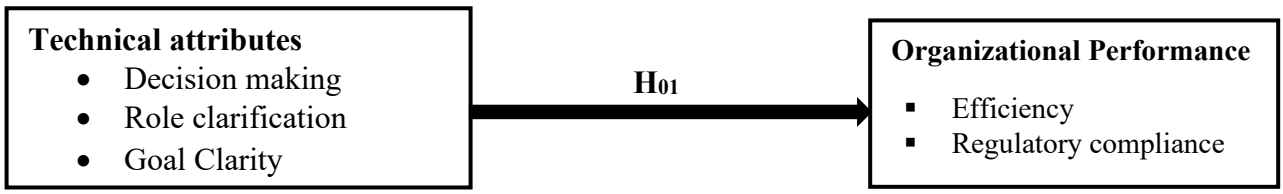

Figure 1
Conceptual Framework

Empirical Review

Decision-making is a critical technical attribute of leadership that directly influences organizational performance. Chen et al. (2020) examined leadership decision-making in ethically complex organizational environments and found that leaders who apply structured and principled decision-making processes enhance operational consistency and organizational outcomes. Their study demonstrated that effective decision-making reduces ambiguity and strengthens accountability, particularly in public sector institutions where regulatory compliance is paramount. These findings suggest that leadership decision-making capability is a key determinant of organizational performance.

Bush et al. (2020) explored the role of leadership decision orientation in shaping organizational behavior and performance. The study distinguished between prevention-focused and promotion-focused leadership decision-making and found that leaders who adopt proactive, well-informed decision approaches are more effective in guiding organizations toward improved performance outcomes. The findings indicated that sound leadership decisions contribute to efficiency, risk management, and alignment with organizational goals. This aligns with evidence from public sector organizations showing that leadership decision-making competence significantly enhances institutional effectiveness.

Role clarity has also been identified as a significant technical attribute influencing organizational performance. Hancock et al. (2020) examined the effects of organizational structures and

leadership practices on performance and established that clearly defined roles and responsibilities reduce role conflict and improve coordination within organizations. Their findings revealed that leaders who provide clear role expectations enhance employee accountability and task execution, leading to improved organizational efficiency. Similarly, Raziq et al. (2024) emphasized that role clarification by leaders strengthens ethical compliance and performance by minimizing ambiguity in responsibilities and decision authority.

Goal clarity is another essential technical attribute that supports effective leadership and performance. Zhang et al. (2022) investigated ethical leadership practices in multinational organizations and found that clearly articulated goals improve strategic alignment and performance outcomes. The study demonstrated that leaders who communicate clear and measurable goals foster transparency and shared understanding, which enhances organizational focus and regulatory compliance. Goal clarity was shown to be particularly important in complex and regulated environments, where misalignment can lead to inefficiencies and ethical lapses.

Empirical evidence further suggests that technical leadership attributes collectively enhance organizational performance by improving coordination, accountability, and decision quality. Twesigye (2024) argued that ethical leadership must be supported by technical competence to be effective, noting that leaders who lack technical attributes may struggle to translate ethical intentions into tangible performance outcomes. In public sector contexts, technical attributes such as decision-making capability, role clarity, and goal alignment are essential for achieving efficiency and sustaining organizational performance.

Methodology

The study followed a positivist philosophy emphasizing objectivity and measurable facts. The descriptive correlational research design was chosen to explore how technical attributes of leaders affect performance (Modise, 2023; Shuwen et al., 2024). The target population comprised of 16,996 employees from ten parastatals which are Energy and Petroleum Regulatory Authority (EPRA), Kenya Pipeline Company (KPC), Kenya Electricity Generating Company (KenGen), Kenya Power and Lighting Company, Kenya Electricity Transmission Company (KETRACO), Rural Electrification Authority (REA), Geothermal Development Company (GDC), Nuclear Power and Energy Agency (NUPEA), National Oil Corporation of Kenya (NOCK) and Kenya Petroleum Refineries Limited as indicated in Table 1.

Table 1

Population Distribution

No	Company	Employees	Percentage
1	Energy and Petroleum Regulatory Authority (EPRA)	218	1.28
2	Kenya Pipeline Company (KPC)	1522	8.96
3	Kenya Electricity Generating Company (KenGen)	2650	15.59
4	Kenya Power and Lighting Company	9663	56.85
5	Kenya Electricity Transmission Company	540	3.18
6	Rural Electrification Authority (REA)	308	1.81
7	Geothermal Development Company (GDC)	443	2.61

8	Nuclear Power and Energy Agency (NUPEA)	188	1.11
9	National Oil Corporation of Kenya (NOCK)	987	5.81
10	Kenya Petroleum Refineries Limited	477	2.81
	Total	**16996**	**100.0**

Stratified random sampling technique was used to select a sample of 384 respondents based on the percentage of each stratum. The organizations from different categories were grouped into 10 homogenous strata before sampling. Yamane (1967) formula was used to define the sample for each strata. A five-point Likert scale measured respondents' agreement levels (Zahrani, 2022). Data were analyzed using SPSS version 28. Descriptive statistics summarized demographic data, while correlation and regression analyses tested the relationships between ethical leadership dimensions and organizational performance.

Results

A total of 384 questionnaires were distributed, of which 304 were fully filled and returned, 4 were incomplete, while 76 were not returned. This represented a response rate of 79.17%.

Descriptive Statistics

To examine the demographic information of the respondents and their institution of work, descriptive statistics were used. The results showed that 59.3% were male and 40.7% were female, indicating a moderate gender imbalance favoring men. In terms of age, the largest group of respondents (42.1%) fell between 31–40 years, followed by 28.5% aged 41–50 years, 18.2% aged 21–30 years, and 11.2% above 50 years. Regarding education level, 49.7% held bachelor's degrees, 28.3% had postgraduate qualifications, 17.8% possessed diplomas, and 4.2% held PhDs, reflecting a well-educated workforce. In terms of work experience, 37.4% had served for 6–10 years, 29.8% for 1–5 years, 21.5% for 11–15 years, and 11.3% for over 15 years, showing strong institutional familiarity. The distribution across organizations was also diverse: KenGen (22%), KPLC (18%), EPRA (12%), KETRACO (11%), KPC (10%), GDC (9%), NOCK (7%), REA (5%), NUPEA (4%), and KPRL (2%). Overall, the demographic results indicated that most respondents were mature, experienced, and highly educated professionals, providing credible insights into technical attributes and performance in Kenya's energy parastatals.

The data in Table 2 showed that most employees in the study felt either neutral or positive about key aspects of the organization's decision-making processes, role clarity, and goal clarity. For instance, when employees were asked whether their opinions were valued in decision-making processes, 57.6% of respondents remained neutral, 29.6% agreed, and a small proportion (1.6%) strongly agreed. This pattern of responses was observed across the statements concerning decision-making transparency, communication from management, and employee confidence in leadership decisions. A similar trend was evident for role clarity, where the majority indicated that job responsibilities and expectations were clearly communicated, though again with a larger proportion of neutral responses. Further, the findings showed that the mean scores for most of the statements fell between 3.46 and 3.53, suggesting a generally positive yet tempered perception of the technical attributes of the organization. Specifically, a mean score of 3.53 for the statement about employees feeling that their opinions were valued indicates that, on average, employees felt that their input was considered in organizational decision-making, though the data also suggested

some room for improvement. The relatively narrow standard deviations, ranging from 0.628 to 0.669, indicate that while the employees' views were somewhat aligned, there were still varying opinions, as reflected by these moderate levels of variability.

Table 2

Descriptive Statistics for Technical Attributes

Technical Attributes Statement		Percentage (%)						
		SD	**D**	**N**	**A**	**SA**	**Mean**	**SD**
TADM1	I feel that my opinions are valued in decision-making processes	0.0	11.2	57.6	29.6	1.6	3.53	.639
TADM2	The decision-making process is transparent and inclusive of all team members	0.0	9.5	58.2	31.6	0.7	3.46	.628
TADM3	Decisions made by management are communicated clearly to all employees	0.0	7.9	60.2	29.6	2.3	3.51	.640
TADM4	Management considers employee feedback before making major decisions	0.0	10.9	56.6	30.6	2.0	3.51	.660
TADM5	I feel confident in the decisions made by our leadership team	0.0	11.2	56.3	31.3	1.3	3.46	.669
		0.3	8.6	61.5	28.9	0.7	3.47	.659
TARC6	There are mechanisms to address role ambiguities in our organization							
TARC7	New roles are conveyed to me clearly	0.0	10.2	59.2	29.3	1.3	3.46	.638
TARC8	I have a clear understanding of my job responsibilities	0.0	11.8	56.9	30.3	1.0	3.50	.603
TARC9	The expectations for my role are communicated effectively by my supervisor.	0.0	9.9	60.2	28.9	1.0	3.50	.650
TARC10	I receive adequate feedback regarding my performance in relation to my role	0.0	12.8	57.9	28.0	1.3	3.46	.628
TAGC11	I am aware how my roles contribute to the overall strategic goals	0.0	10.9	57.2	30.3	1.6	3.48	.644
TAGC12	I have a clear understanding of the goals set for my role	0.0	9.5	61.8	27.6	1.0	3.49	.645
TAGC13	I receive regular updates on the progress of our team and organizational goals	0.0	9.5	55.9	33.6	1.0	3.50	.624
TAGC14	The organization's goals are communicated effectively to all employees.	0.3	8.6	60.2	29.6	1.3	3.46	.617
TAGC15	The goals set for me are realistic and achievable	0.0	10.5	59.2	28.9	1.3	3.47	.654

Inferential Statistics

The inferential statistics included factor analysis, correlation analysis, chi-square test, linearity test, multicollinearity test, homoscedasticity test and linear regression analysis.

Factor Analysis Results

In Table 3, the Kaiser-Meyer-Olkin (KMO) statistic was 0.973, which was considerably higher than the crucial threshold of significance of the test, which was set at 0.5 (Shrestha, 2021). In addition to the KMO test, the Bartlett's Test of Sphericity χ^2 (105, N = 304) = 3017.578, $p<0.05$ was extremely significant. These findings give a strong rationale for further statistical analysis.

Table 3

KMO and Bartlett's Test

KMO.		.973
Bartlett's Test of Sphericity	Approx. Chi-Square	3017.578
	Df	105
	Sig.	.000

There were 15 variables that were measured to evaluate the influence of technical attributes on the organizational performance of Kenya's energy parastatals. To determine the number of components to be retained, the Kaiser criterion of retention was employed. In this criterion, the Eigen value for the retained components is greater than 1. After extraction, one component was selected. Cumulatively, these components accounted for 59.948% of the total variation as indicated in Table 4.

Table 4

Total Variance Explained for Results of Technical Attributes

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.992	59.948	59.948	8.992	59.948	59.948
2	.652	4.349	64.297			
3	.628	4.185	68.482			
4	.544	3.630	72.112			
5	.494	3.294	75.405			
6	.478	3.189	78.595			
7	.446	2.973	81.567			
8	.424	2.827	84.394			
9	.410	2.734	87.128			
10	.375	2.501	89.629			
11	.358	2.387	92.016			
12	.341	2.273	94.289			
13	.305	2.033	96.322			
14	.293	1.950	98.272			
15	.259	1.728	100.000			

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

Extraction Method: Principal Component Analysis.

Correlation Analysis

As indicated in Table 5, there was a positive correlation between technical attributes and Organizational performance, which was statistically significant, r (304) = 0.746, p=0.000. This indicates that technical attributes had a significant influence on organizational performance in Kenya's energy sector parastatals.

Table 5

Correlation Analysis

		Organizational performance
Technical attributes	Pearson Correlation	.746**
	Sig. (2-tailed)	.000
	N	304

*. Correlation is significant at the 0.05 level (2-tailed).

Chi-Square Test

Analysis was carried out to assess the significance of the relationship between technical attributes on organizational performance of Kenya's energy parastatals. Findings indicated that the two variables were significantly associated χ^2 (756, N = 304) = 1096.981, p < .05. Table 6 summarizes the results.

Table 6

Chi-square Test Statistics on Technical Attributes

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1096.981[a]	756	.000
Likelihood Ratio	650.848	756	0.998
Linear-by-Linear Association	168.558	1	.000
N of Valid Cases	304		

a. 814 cells (100.0%) have expected count less than 5. The minimum expected count is .00.
**. Correlation is significant at the 0.05 level (2-tailed).

Linearity Tests

The study performed a linearity test to assess whether the relationship between technical attributes and organizational performance was linear. As indicated in Table 7, the significance value for deviation from linearity was 0.849, which exceeds the 0.05 threshold. This suggests that the relationship between technical attributes and organizational performance is linear.

Table 7

Linearity Test

			Sum of Squares	Df	Mean Square	F	Sig.
Organizational Performance * Technical attributes	Between Groups	(Combined)	47.736	36	1.326	10.938	.000
		Linearity	44.562	1	44.562	367.585	.000
		Deviation from Linearity	3.174	35	.091	.748	.849
	Within Groups		32.368	267	.121		
	Total		80.104	303			

Multicollinearity Test

The study used Variance Inflation Factors (VIF) for each variable to check for multicollinearity. If VIF values fall between 1 and 10, it is assumed that there is no multicollinearity. Since all the values were between 1 and 10, the study findings indicated no multicollinearity problem in the relationship between technical attributes and organizational performance. The results are presented in Table 8.

Table 8

Multicollinearity Test for Technical Attributes

Variable	**Collinearity Statistics**	
	Tolerance	**VIF**
(Constant)		
Technical attributes	.412	2.425
Technical attributes	.413	2.424
Technical attributes	.464	2.157
Character Dimension	.319	3.132
Organizational Culture	.451	2.215

Homoscedasticity Test

This test was carried out to determine if the data was equally scattered from the center, thus implying that the variances of the data from the mean were equal. Results in Table 9 shows that the probability associated with the Levene Statistic, F (31, 267) = 1.362, p = 0.123 exceeded the study's level of significance testing, $p \leq .05$ at 5% significance level. Thus, the variance was homogeneous.

Table 9

Test of Homogeneity of Variances

Levene Statistic	**df1**	**df2**	**Sig.**
1.326	31	267	.123

Regression Model Summary

As indicated in Table 10, the linear regression model is $Y=\beta_0+ \beta_1X_{1+}e$, where X represents technical attributes and e denotes the error term. The coefficient of determination (R^2) and correlation coefficient (r) show the degree of association between technical attributes and organizational performance. The values of R and R^2 are 0.746 and 55.6%, respectively. The R value of 0.556 indicates the correlation between technical attributes and organizational performance. This means that 55.6% of the variation in organizational performance can be explained by technical attributes.

Table 10

Model Summary

Model	R	R square	Adjusted R square	Std. Error	Sig
1	0. 746[a]	.556	.555	.3431	0.000

a. Predictors: (Constant) (technical attributes)
b. Dependent Variable: Organizational performance

Analysis of Variance ANOVA

The Analysis of Variation (ANOVA) was applied to see whether variations in technical attributes could explain organizational performance differences. The model is a good fit, F (1,302) = 378.637, $p < 0.05$, based on the results in Table 11. As a consequence, technical attributes illustrate variations in Organizational performance.

Table 11

Technical attributes ANOVA Results

	Model	SS	Df	MSS	F	Sig
1	Regression	44.562	1	44.562	378.637	.000[b]
	Residual	35.542	302	.118		
	Total	80.104	303			

a. Dependent Variable: Organizational performance
b. Predictors: (Constant), Technical attributes

Regression Coefficient

There was a positive and significant relationship between technical attributes and organizational performance, $\beta = 0.778$, $t(302) = 19.459$, $p < 0.05$. This means that a unit increase in technical attributes led to an increase in organizational performance by 0.778. Thus, additional technical attributes had a positive influence on organizational performance of Kenya's energy parastatals. The results are presented in Table 12.

Table 12

Technical attributes Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	1.737	.130		13.332	.000
	Technical attributes	.778	.040	.746	19.459	.000

a. Dependent Variable: Organizational Performance

Discussion of Results

Technical Attributes and Organizational Performance

The study found a strong positive correlation between technical attributes and organizational performance, with a Pearson correlation coefficient of $r = 0.746$, $p = 0.000$. This indicates that technical attributes, which include clarity of decision-making, role understanding, and effective communication of goals, are significantly linked to better performance outcomes within Kenya's energy parastatals. These findings resonate with Yuan et al. (2023) who found a similar positive correlation ($r = 0.75$) between well-defined decision-making processes and organizational performance in the technology sector. When technical aspects of leadership of knowledge, skills, and the ability to make informed decisions are clearly communicated and implemented, they provide a sense of direction and purpose for employees, contributing directly to enhanced performance. Elbanna et al. (2021), in their study of strategic management in organizations, further confirmed that technical decision-making, when combined with clarity and purpose, improves organizational efficiency and success. Similarly, Deb Biswas and Sengupta (2025) emphasized the role of shared decision-making in top management teams (TMT), noting that organizations with clear, structured technical attributes in leadership experience significantly better performance outcomes due to improved coordination and alignment of efforts across teams. The consistent finding across studies shows that the presence of effective technical attributes in leadership is vital for driving organizational success in both public and private sector entities.

In addition, the Chi-Square test revealed a significant association between technical attributes and organizational performance, with χ^2 (756, N = 304) = 1096.981, $p < 0.05$. This further supports the argument that organizations with structured and well-defined technical processes and decision-making frameworks are more likely to experience improved performance. Yuan et al. (2023) found a similar pattern, where Chinese firms that implemented structured decision-making processes showed a significant relationship between these technical attributes and superior organizational performance. Marčetić and Vidlička (2020), in their study of Croatian companies, reinforced this by reporting that organizations with clear technical leadership frameworks in decision-making experienced enhanced financial and operational outcomes. These findings indicate that technical attributes, such as transparency, clarity in roles, and effective communication, significantly contribute to an organization's performance by reducing confusion and ensuring a clear path toward goal attainment. Additionally, Deb Biswas and Sengupta (2025) highlight the role of clear communication and decision-making in top management teams, emphasizing that technical competence in leadership structures plays a crucial role in reducing inefficiencies, aligning stakeholders, and improving overall organizational cohesion.

The regression analysis confirmed that technical attributes significantly predicted organizational performance, explaining 55.6% of the variance in performance outcomes ($R^2 = 0.556$), with $F(1,302) = 378.637$, $p < 0.05$. The standardized beta coefficient of $\beta = 0.778$ and $p < 0.05$ further indicated that technical attributes have a substantial influence on performance. These findings are consistent with Otiende and Makokha (2020), who reported an R^2 of 0.527 and $\beta = 0.763$ in their study on leadership competencies in Kenyan public universities. Their research revealed that clarity in roles and effective communication, integral parts of technical leadership, were key factors in improving organizational performance. Furthermore, Kimpah and Ibrahim (2020) found $R^2 = 0.544$ and $\beta = 0.769$ in their study of Malaysian manufacturing firms, reinforcing the importance of technical competencies in leadership for driving organizational success. The substantial impact of technical attributes on performance aligns with the Ethical Leadership Theory, which emphasizes that ethical decision-making, transparency, and clarity in communication by leaders enhance trust and accountability within organizations. Brown and Treviño (2006) argued that ethical leadership, when combined with technical competence, creates a foundation for high-performance outcomes, as employees are more likely to feel confident in their roles, leading to better decision-making and improved overall performance. This synergy between ethical and technical leadership attributes encourages organizations to function more effectively by providing clear goals and roles, ensuring that every individual understands their contribution to the larger organizational strategy.

In the energy sector, particularly in organizations like Kenya Electricity Generating Company (KenGen) and Kenya Power, which are integral to national infrastructure, the emphasis on technical competence is critical for operational success. As such, leaders in these organizations must not only possess strong technical expertise but also be adept at communicating technical objectives and ensuring that the team has the tools and knowledge required to achieve those goals. Based on the triangulated findings from the correlation, Chi-Square, and regression analyses, the study concluded that technical attributes significantly influence organizational performance. The study therefore rejected the null hypothesis that technical attributes do not significantly influence organizational performance of Kenya's energy parastatals and concluded that technical attributes significantly influence organizational performance.

Conclusions and Recommendations

The study established that technical attributes significantly influence organizational performance in Kenya's energy parastatals. Specifically, leadership decision-making capability, role clarity, and goal clarity were found to be critical determinants of organizational efficiency and performance outcomes. These findings demonstrate that effective leadership in the energy sector extends beyond ethical intent and empowerment practices to include the technical competence required to guide operations, align resources, and ensure accountability.

Based on these findings, it is recommended that leaders in Kenya's energy parastatals strengthen technical leadership practices by enhancing structured and evidence-based decision-making processes. Management should ensure that roles and responsibilities are clearly defined and communicated across all levels of the organization to minimize ambiguity and improve coordination. In addition, leaders should prioritize the articulation and communication of clear organizational goals to promote alignment, performance monitoring, and regulatory compliance. Establishing formal mechanisms for strategic planning, performance evaluation, and operational review is essential for reinforcing technical leadership effectiveness.

While this study provides important insights into the role of technical attributes in influencing organizational performance, further research is necessary to expand understanding in this area. Future studies could examine the influence of technical attributes on organizational performance in sectors outside the energy industry, particularly in contexts characterized by different regulatory frameworks and operational complexities. Additionally, future research may explore moderating and mediating variables such as organizational culture, technological capacity, and employee competence to provide a more comprehensive understanding of how technical leadership attributes contribute to sustained organizational performance.

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