

Board Diversity and Operational Efficiency: A Public Utility Perspective

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Abstract: Effective corporate governance is essential for fostering sustainable, profitable, and socially responsible enterprises. It promotes transparency, accountability, and ethical leadership, enabling organizations to respond effectively to evolving societal needs. Sound governance also upholds democratic values, inclusive decision-making, and legitimate stakeholder representation, while safeguarding the interests of both shareholders and the general public. This study examined the influence of board diversity on the operational efficiency in public utilities, aiming to bridge knowledge gaps and enrich the existing literature on corporate governance. Specifically, it explored how various board characteristics impact service delivery outcomes. Adopting a case study approach and a descriptive research design, the study employed a stratified sampling technique. The target population comprised management staff from a water and sewerage company in Murang'a, Central Kenya. Findings revealed a statistically significant and positive relationship between board diversity and the operational efficiency. The study concluded that board diversity is a key driver of effective governance and enhanced organizational performance; and recommended the enforcement of policies to institutionalize board diversity across all public utility enterprises.

Index Terms: Board diversity, Corporate governance, Public utilities, Operational efficiency

I. INTRODUCTION:

Corporate governance refers to the framework of rules, processes, and relationships through which organizations are directed and controlled. It defines how rights and responsibilities are distributed among key stakeholders - such as boards of directors, management, shareholders, and regulators, and establishes mechanisms for decision-making, performance monitoring, and accountability (Ndegwa,2024). Effective corporate governance promotes ethical leadership and transparency, fostering efficient resource

utilization, organizational sustainability, and contributing to socio-economic development.

Globally, governance practices are evolving to address growing demands for accountability and inclusivity. According to Kovvali, and Joshua (2023) organizations with strong governance structures are 30% more likely to outperform their peers in both profitability and long-term growth. A pivotal component of governance is the board of directors, tasked with overseeing corporate strategy and appointing competent management to ensure effective and ethical operations (Donkor, Trireksani, & Djajadikerta, 2023). In the East African context, governance reforms have increasingly emphasized board independence (Oyieke, 2016); transparency, and professionalism (Ombaba & Mwengei, 2016). Further, Mucee & Akech, (2024) highlight the importance of balancing executive and non-executive roles to protect stakeholder interests, while Njihia, (2017) notes that well-structured boards significantly enhance organizational performance. Importantly, board diversity - defined in terms of gender, age, professional background, skills, and ethnicity - has gained traction as a key determinant of board effectiveness (Simone ,Susanna ,Megdal, & Valeria,2023). Research by Ndegwa (2024), and Rumana & Mutuku (2017), indicated that diverse boards are more innovative, responsive to stakeholder needs, and better equipped to manage risk.

In the water and sanitation sector, a vital public service that directly affects health, economic productivity, and social equity, the importance of sound governance in water institutions including transparency, stakeholder engagement, and regulatory oversight is critical (Simone, Susanna, Megdal, & Valeria 2023) In Kenya, only 59% of Kenyans had access to safely managed drinking water, and just 29% to sanitation services as of 2022 Water Services Regulatory Board (WASREB), 2023).

Sector reforms, including the Water Act (2012), and the establishment of oversight agencies such as the Water Services Regulatory Board (WASREB), have aimed to address these gaps through improved regulation and institutional capacity.

Despite these efforts, many water and sewerage companies in Kenya continue to face governance challenges. Issues such as politicized board appointments, and unclear mandates hinder performance; while a lack of accountability, and weak enforcement of governance standards persist (Nduati, 2023; Oyieke, 2016). These governance failures have often translated into inadequate service coverage (Donkor, et al, 2023), operational inefficiencies Ndegwa (2024), and poor customer satisfaction (Mucee & Akech, 2024) performance review by WASREB revealed that less than 50% of licensed water service providers met the national standards for service continuity, coverage, and non-revenue water management (WASREB, 2023).

While a substantial body of literature on corporate governance in both public and private sectors was cited ; (Donkor, et al, 2023), Ndegwa (2024), (Simone, et al, 2023); the studies gave limited attention to the role of board diversity in influencing service delivery outcomes in service based public utilities. This study sought to bridge that gap by examining the influence of board diversity on the quality of service delivery in Kenyan water and sewerage companies. Specifically, the study investigated how different dimensions of board diversity affected governance effectiveness and service outcomes, and aimed at generating actionable insights that can inform policy and practice, ultimately contributing to improved water and sanitation services across the country.

II. RESEARCH OBJECTIVES.

The general objective of this study was to examine the influence of board diversity on operational efficiency in public utility companies in Kenya, with a specific focus on the water and sewerage sector. To achieve this, the study explored several specific objectives: first, to examine the role of board tenure in enhancing operational efficiency within these companies; second, to determine the effect of board independence on operational efficiency; and third, to evaluate the impact of the professional background of board members on the

operational efficiency of water and sewerage companies.

III. LITERATURE REVIEW.

The study was anchored on stakeholder theory, which was first articulated by Freeman (1984). The theory revolutionized how organizations understood their obligations, suggesting that businesses should be responsible not only to shareholders but also to all groups affected by their actions, including employees, customers, suppliers, and the community. Clarkson, (2019), proposed an expansion to the stakeholder model by suggesting a categorization of stakeholders based on power, legitimacy, and urgency, thus providing a clearer framework for organizations to prioritize stakeholder needs. This broader perspective challenged the traditional egocentric model of corporate governance, promoting a more inclusive approach to decision-making. Over the years, the theory had been refined, and developments in the theory emphasize the ethical obligation of organizations to consider the impacts of their decisions on diverse stakeholder groups (Othuon, Gatimbu, Musafiri, , & Ngetich, n.d.).

Water and sanitation services directly affected a wide array of stakeholders, including local residents, government authorities, regulators, and environmental organizations. A diverse board could more effectively balance the often competing interests (Njihia, 2017). Oyieke, 2016, Donkor, et al, 2023) ; ensuring that governance decisions were made with the broader social good in mind. Cited studies affirmed that effective governance required balanced stakeholder engagement (Mucee & Akech, 2024), (Ndegwa, 2024), and positively impacted the operational efficiency of firms (Kovvali, & Joshua, 2023) and underscored the need for boards to represent diverse community interests (Levrav, & Van den, 2009)). Based on the premise that board diversity led to better accountability and transparency, which were crucial where public trust was vital, the study aimed at exploring how board diversity influenced governance structures in water service companies and whether this, in turn, led to enhanced operational efficiency.

Operational efficiency

In the context of the study, operational efficiency, the dependent variable referred to the ability of water

utilities to deliver services effectively (Donkor, Trireksani, & Djajadikerta, 2023). The key indicators examined included aspects closely tied to strategic oversight and governance that were perceived as particularly relevant for analyzing the impact of board diversity. Following Clarkson, (2019), a more diverse board was hypothesized to offer broader perspectives, enhance decision-making, and drive accountability, ultimately influencing operational outcomes. By linking board composition to core efficiency indicators, the study aimed to assess how inclusive boards shaped utility performance.

IV. RESEARCH METHODOLOGY AND DESIGN

The study examined the effect of board diversity on operational efficiency in a water and sewerage public utility, using a case study approach. A descriptive design combined quantitative data from management staff questionnaires and qualitative data from internal and external stakeholder focus groups. This enhanced the understanding of governance practices and decision-making processes. Regression analysis was used, and the regression equation employed stated as:

$$\text{Operational Efficiency (Y)} = \beta_0 + \beta_1(\text{Board Diversity}) + \varepsilon; \quad \text{Where:}$$

Y = Operational Efficiency (Dependent Variable)

χ = Board Diversity (Independent Variable)

β_0 = intercept; β_1 = coefficient of board diversity, and ε = error term.

V. RESULTS

A. Response rate

The results indicated a response rate of 84%. The majority of respondents (81.2%) were aged between 28 and 59, and owing to the nature of their duties, well-informed about corporate governance and service delivery practices within the firm. Among the respondents, 100% of board of directors participated, while others represented various job levels within the organization with the majority from middle-level management (46.9%) and supervisors (18.0%). In terms of work experience, 44.9% of respondents had been with the water and sewerage company for more than three years, while only 14.3% had less than two years of tenure.

B. Descriptive Analysis of Board Diversity

Respondents were asked to rate board diversity on a five-point likert scale. Table 1 presents the descriptive statistics across various dimensions of board diversity within the studied public utility company, with mean scores and standard deviations reflecting the extent and consistency of perceived diversity practices.

Table 1: Perceived Board Diversity

Statement on board diversity	Rate	Mean	SD
The board has adequate representation of male and female members.	4	3.80	0.65
The organization applies policies that promotes balanced board appointments.	3	3.40	0.72
The board includes members from a broad age range, including both younger and older professionals.	2	2.30	0.58
The board includes members from diverse professional backgrounds.	3	3.60	0.70
The board's non-executive members provide objective oversight.	3	3.30	0.75
Board members are selected based on competence, and experience	3	3.70	0.62
The board reflects a fair representation of the key stakeholders it serves.	3	3.50	0.68

Descriptive statistics from the board diversity assessment suggest moderate but uneven adoption of diversity practices within the organization. Gender representation received a relatively high mean score of 3.80 (SD = 0.65), indicating general agreement that the board had a fair representation of both male and female members. However, the mean on the application of policies that promoted balanced board appointments

was lower (Mean = 3.40; SD = 0.72), suggesting gaps in formal policy implementation.

Age diversity was the lowest-rated dimension (Mean = 2.30; SD = 0.58), reflecting a strong consensus that the board did not have a fair balance of both younger and older professionals. Conversely, diversity in professional backgrounds (Mean = 3.60; SD = 0.70) and stakeholder representation (Mean = 3.50; SD = 0.68)

were rated moderately, indicating some level of inclusivity. Further, independent oversight through non-executive board members received a mean rating (Mean = 3.30; SD = 0.75), revealing concerns about the objectivity and governance balance. Competence-based board selection also scored relatively high (Mean = 3.70; SD = 0.62), affirming meritocratic tendencies in appointments.

Overall, the findings reflected a governance structure that embraced certain diversity dimensions-particularly, competence, and gender representation -while

highlighting the need to strengthen formal policies and enhance board independence for improved oversight, and broader age base.

C. Diagnostic Tests results

To ensure validity and reliability of the regression model used, and to establish if the model met the underlying statistical assumptions, key diagnostic tests to check for multi-collinearity, normality of residuals, and homoscedasticity were conducted. Findings are presented in table 2.

Table 2: Summary of Regression Diagnostic Tests

Test	Variables Assessed	Test Statistic	p-value	Interpretation
Multicollinearity (VIF)	Bd Tenure (1.35), Bd Independence (1.22), Proff. B/ground (1.30)	Mean VIF = 1.29	-	All VIF values below threshold of 5: No multi-collinearity
Normality (Shapiro-Wilk)	Residuals of regression model	W = 0.978	0.215	Residuals are normally distributed ($p > 0.05$)
Homoscedasticity (Breusch-Pagan)	Residuals of regression model	$\chi^2 = 1.84$, df = 1	0.175	No heteroscedasticity; residuals had constant variance ($p > 0.05$)

The diagnostic tests confirmed robustness of the regression model used to assess the effect of drivers of board diversity on operational efficiency in water and sewerage companies. Collectively, the results supported the reliability of the regression finding: Multi-collinearity was ruled out, with all VIF values well below the threshold of 5, indicating that the diversity dimensions contributed independently to the model. The Shapiro-Wilk test showed that residuals were normally distributed ($p = 0.215$), satisfying the assumption of normality. Additionally, the Breusch-Pagan test revealed no evidence of heteroscedasticity ($p = 0.175$), confirming that the variance of residuals was constant across observations.

Table 3: Model Summary

Model	R	R-squared	Adjusted R-squared	Std. Error of Estimate	F-statistic
Regression Model	0.82	0.67	0.64	2.12	22.56

The key statistic R-squared (R^2) yielded a value of 0.67, which suggested the model explained 67% of the

D. Inferential Statistics

Regression analysis to evaluate the effect of board diversity on operational efficiency in water and sewerage companies was conducted. The results show the relationship between the considered constructs and operational efficiency are presented below:

Goodness of Fit

The Model Summary Table presents the overall fit of the regression model, showing how well board diversity variables explain variations in operational efficiency

variability in operational efficiency. This was considered a strong fit for the study. The adjusted R-

squared value of 0.64 accounted for the number of predictors in the model and indicated that the model had good explanatory power after adjusting for the number of variables. This was further supported by the F-statistic of 22.56 with a p-value < 0.0001 demonstrating that the model was statistically significant and that board diversity, as a collective set of predictors, has a meaningful impact on operational efficiency.

Table 3: Table of coefficients

Predictor -Variable)	Unstandardized Coefficient (B)	Std. Error	t-value	p-value	95% C.I (Lower – Upper)
Board Ten.	0.35	0.12	2.92	0.004	(0.11 – 0.59)
BD.Indep.	0.50	0.15	3.33	0.002	(0.21 – 0.79)
Prof. B/gd	0.40	0.13	3.08	0.003	(0.14 – 0.66)
Constant	3.21	1.25	2.57	0.013	(0.85 – 5.57)

The Coefficients results (Table 3) shows that the three board diversity predictors—tenure, independence, and professional background all had a significant positive effect on operational efficiency. Board independence had the strongest impact ($B = 0.50$, $p = 0.002$), followed by professional background ($B = 0.40$, $p = 0.003$) and tenure ($B = 0.35$, $p = 0.004$). These results highlight the value of diverse and independent boards in enhancing governance and performance in water and sewerage companies.

These results align with findings in earlier studies. Donkor, et al, (2023) concluded that independent directors improve firm outcomes through objective oversight and decision-making. Similarly, (Simone , et al (2023) emphasized that professional diversity enhances strategic thinking and risk management. The

Table 3: ANOVA Table

Source	Sum of Squares	df	Mean Square	F-value	Sig. (p-value)
Regression	480.25	3	160.08	22.56	0.0001
Residual	235.12	96	2.45		
Total	715.37	99			

The high F-value reflects a strong model fit, meaning the predictors meaningfully contribute to explaining differences in performance. This supports earlier findings and affirms the relevance of board diversity in improving outcomes in water and sewerage companies. The result aligns with a prior study by Korikie (2019), whose findings linked board diversity to enhanced

Regression Coefficients

The Coefficients Table presents the individual effects of each board diversity dimension on operational efficiency, highlighting the strength and significance of each predictor in the regression model

positive effect of board tenure also echoes findings by Ekadah, & Mboya, (n.d.), who noted that experienced board members contribute institutional memory and knowledge and continuity that support operational effectiveness. Thus, the study contends that board diversity is a key driver of efficiency, particularly in public utility contexts where accountability and performance are paramount.

Analysis of Variance

The ANOVA results (Table 4) showed that the regression model was statistically significant ($F = 22.56$, $p = 0.0001$), indicating that board diversity variables collectively explain a substantial portion of the variation in operational efficiency.

organizational effectiveness through stronger governance structures. Overall, the ANOVA findings reinforce the conclusion that diverse boards play a critical role in driving operational efficiency in public utilities

E. Discussion of Findings

The regression analysis confirmed that board diversity significantly influences operational efficiency in Kenya's water and sewerage companies. Among the diversity dimensions examined, board independence had the most pronounced positive effect, highlighting the essential role of independent directors in strengthening oversight, reducing managerial entrenchment, and ensuring objective decision-making—critical factors in the governance of public utilities. These results are consistent with studies by García & Herrero, (2018); Danso, Adusei, & Sarpong-Danquah, (2024); (Simone, et al, 2023); and Ndegwa (2024), all of which underscore that board independence enhances firm performance by improving various performance aspects including accountability, and mitigate agency problems. However, Ombaba & Mwengei (2016) also caution that excessive independence or diversity could lead to excessive monitoring, potentially stifling managerial initiative and, in some cases, harming performance. This suggests that while board independence is crucial, it should be balanced to avoid diminishing board dynamics.

Professional background diversity was also found to significantly enhance operational efficiency. A board composed of members with varied expertise—such as finance, engineering, public policy, and legal affairs—contributes to well-rounded decision-making and responsiveness to complex sectoral challenges. This finding aligns with conclusions in other studies that cognitive and functional diversity improves board effectiveness (Korikie, 2019); (Ndegwa, 2024); and fosters innovation Clarkson (2019). However, Othuon, Gatimbu, Musafiri, & Ngetich, (n.d.). present a contrary view, suggesting that mandatory diversity quotas, while well-intentioned, did not always improve performance in their sample of Norwegian firms. This suggests that diversity may not automatically lead to better outcomes unless boards are prepared and equipped to leverage diverse perspectives.

Board tenure showed a positive but relatively modest effect on operational efficiency. Longer-serving board members may provide valuable institutional memory and continuity, facilitating smoother strategic execution and better understanding of sector-specific dynamics. This was in concurrence with Danso, et al, (2024) and Othuon, et al. (2013), who assert that board experience is essential in enhancing oversight capacity. However,

some literature (Levrau, & Van den, 2009) cautions that excessive tenure could hinder adaptability and reduce board dynamism, especially in environments that require rapid innovation and change. Furthermore, Oyieke, (2016) suggest that tenure without meaningful diversity or empowerment can lead to stagnation, indicating that diversity and rotation might be necessary to inject new ideas and perspectives.

Overall, the findings support the hypothesis that board diversity—across independence, expertise, and tenure—plays a crucial role in strengthening operational outcomes in public utilities. While these results align with governance best practices recommended by Kenya's Mwongozo Code of Governance for State Corporations (2015), which advocate for balanced, skilled, and independent boards to drive public sector efficiency, the study also acknowledges the conditional relationship between diversity and performance. In particular, the effectiveness of diversity may depend on how well it is managed and integrated into the board's decision-making processes. This aligns with the findings by Clarkson, (2019) who argued that diversity can lead to increased innovation but does not always guarantee improved financial performance without strong governance frameworks in place. The results also contribute to African corporate governance literature by offering empirical support for diversity-performance linkages within a vital service delivery sector, while recognizing that the impact of diversity can vary depending on context and governance practices.

F. Stakeholder Perspectives on Board Diversity and Operational Efficiency

The focus group discussions (FGDs) offered valuable qualitative insights into the role of board diversity in enhancing operational efficiency. Both internal and external stakeholders emphasized the importance of board independence and the inclusion of members with diverse professional backgrounds in strengthening decision-making processes. Experts noted that board members with expertise in fields such as finance, engineering, information technology, and law can, in theory, support more comprehensive problem-solving. However, the consensus was that this potential is not always realized, often due to inadequate representation of key professions, limited availability of members with multiple commitments, or low levels of engagement.

Additionally, challenges related to board tenure were highlighted. While longer tenure can bring valuable institutional knowledge and experience, it may also hinder the infusion of fresh perspectives. These discussions reinforced the quantitative findings, providing deeper context on how diversity, tenure, and independence within the board influence operational efficiency. Overall, the FGDs underscored the need for a balanced and intentional approach to board composition—one that not only prioritizes diversity and independence but also addresses practical barriers to effective participation

G. Conclusion

This study explored the impact of board diversity on operational efficiency in Kenya's water and sewerage companies. From the results, the study concluded that board independence, diverse professional backgrounds, and board tenure all positively affect operational performance. Board independence had the strongest impact, underlining the importance of objective decision-making. The study adds to the growing body of literature on corporate governance in Africa, specifically in public utilities.

H. Recommendations

To enhance operational efficiency in water and sewerage companies, the study recommended that public utilities that offer direct services should establish board diversity training programs to help members effectively leverage their varied professional backgrounds. Additionally, adopting a dynamic board rotation system would balance fresh perspectives with experienced leadership, promoting continuous innovation. Lastly, implementing a board independence auditing framework could ensure that board members remain free from managerial influence, fostering more objective decision-making and strengthening governance practices.

I. Limitations and Suggestions for Further Study

While the study provided valuable insights, contextual factors may have influenced the scope and depth of the findings. The concentration on a single sector offered a focused lens but may not have fully reflected the dynamics in other public service contexts. Additionally, the use of cross-sectional data, though effective in capturing what was the current relationships, may have

failed to capture changes over time. Future research therefore may consider adopting longitudinal approaches to explore how shifts in board composition impacted on efficiency over extended periods. Expanding the study to include other public and private utility sectors, or comparative analysis across counties or countries, could also enrich the generalization of the results.

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