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Effect of Problem-Solving Strategy on Organization Performance of The Electricity Energy Sub-Sector in Kenya

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Abstract

The electricity energy sub-sector in Kenya plays a pivotal role in driving the country's economic growth, industrialization and social transformation. The government has invested heavily in the sector, channelling billions of shillings into generation, transmission, and distribution infrastructure. Despite these milestones, the performance of the electricity energy sub-sector remains below optimal levels. Persistent challenges such as frequent power outages, high system losses, aging infrastructure and high costs of electricity undermine the sector's ability to deliver reliable and affordable energy therefore the study sought to assess the effect of problem-solving strategies on organization performance of the electricity energy Sub-Sector in Kenya. The study was anchored on dynamic capabilities theory. The study adopted a pragmatist philosophy and employed a mixed-method convergence design, collecting primary data through questionnaires and interviews from 199 respondents comprising top, middle, and lower-level management across all six companies in Kenya's electricity energy sub-sector. Quantitative data were analyzed using descriptive and inferential statistics while qualitative data were analyzed thematically using NVivo, with reliability assessed through Cronbach's Alpha at 0.7 threshold and validity tested through a pilot study involving 18 respondents from Rabai Power Ltd Kenya. The study found that problem-solving strategy, characterized by effective monitoring systems for early problem identification, structured evaluation techniques using root cause analysis, and strategically aligned solutions implemented within agreed timelines, significantly enhances organizational performance in Kenya's electricity energy sub-sector, though gaps exist in documentation practices and employee participation in brainstorming sessions. The study concludes that problem-solving strategy has a strong and statistically significant positive effect on organizational performance in the electricity energy sub-sector in Kenya, as embedded problem-solving capabilities not only mitigate disruptions but also catalyze innovation and adaptability. The study recommends that energy institutions should invest in comprehensive internal capacity-building programs that focus on root-cause analysis, strategic thinking, and scenario planning to enhance problem-solving skills and strengthen organizational resilience. Organizations should establish robust documentation systems for problem evaluation results to institutionalize organizational learning and prevent recurrence of similar challenges. Management should create more inclusive and participatory problem-solving cultures by actively involving employees at all levels in brainstorming sessions, as frontline staff possess valuable practical insights that can lead to more innovative and effective solutions.

Keywords: *Government Policies, Knowledge Management Strategies, Organization Performance, Electricity Energy Sub-Sector*

1.1 Background of the Study

Problem-solving strategy refers to a systematic process of identifying, analyzing, and resolving challenges to achieve desired outcomes effectively and efficiently (Nonaka & Takeuchi, 2021). It involves the use of logical, innovative, and evidence-based approaches to address obstacles that hinder performance, while fostering adaptability and continuous improvement. In the context of the electricity energy sub-sector, problem-solving strategy refers to structured approaches that organizations employ to tackle operational inefficiencies, system failures, regulatory demands, and customer-related challenges. These strategies include root-cause analysis, innovation-driven solutions, predictive maintenance, scenario planning, and the integration of digital technologies to optimize service delivery and ensure sustainable operations (Teece, 2023).

The significance of problem-solving strategy in the electricity energy sub-sector lies in its ability to address the unique complexities of the industry. The sector is capital-intensive, technology-driven, and subject to rapid changes in demand, environmental concerns, and policy interventions. By adopting effective problem-solving approaches, electricity organizations can reduce power losses, enhance grid reliability, optimize resource utilization, minimize downtime, and ensure compliance with environmental and regulatory standards. More importantly, problem-solving strategies help organizations meet consumer expectations for affordable, reliable, and sustainable electricity supply, thereby contributing to national economic growth and social well-being (Yu & Liu, 2021).

Globally, countries have adopted different problem-solving strategies to strengthen the performance of their electricity sectors. In the United States, the application of Lean Six Sigma and advanced digital monitoring systems has been instrumental in reducing transmission losses, enhancing outage management, and ensuring efficient grid operations (Henderson, 2021). In Malaysia, recent studies have highlighted the adoption of artificial intelligence (AI)-based electricity consumption prediction models and multi-scenario planning frameworks to optimize energy demand forecasting and improve grid reliability (Rahman & Lee, 2020; Sustainable Energy Management Study, 2024; Optimising Power Mix Study, 2024). Additionally, technical problem-solving approaches such as voltage uprating in transmission lines have been employed to handle rising demand and sustain efficiency (Voltage Uprating Study, 2021).

In South Africa, structural reforms and problem-solving strategies such as restructuring state-owned utilities, integrating independent power producers, and implementing regulatory reforms have been central in addressing persistent load-shedding and diversifying energy supply (Mokoena & Sithole, 2020; OECD, 2025). Similarly, in Uganda, studies show that problem-solving strategies such as rural electrification programs, privatization of distribution services, and adoption of digital platforms for billing have improved customer engagement and sustainability. More recently, Uganda's electricity supply industry demonstrated resilience strategies during the COVID-19 pandemic by adjusting operations, reallocating demand, and addressing revenue challenges, while rural electrification initiatives continue to address access dilemmas (Tumwine, 2021; Comparative Analysis of Impacts & Resilience Study, 2022; Rural Electrification Study, 2023). These international experiences highlight the critical role of problem-solving strategies in overcoming sectoral challenges and driving performance improvements.

In the Kenyan context, the adoption of effective problem-solving strategies is essential for addressing challenges such as unreliable supply, high system losses, aging infrastructure, climate-related disruptions, and affordability concerns (EPRA, 2020). The ability of electricity

organizations to navigate these challenges directly influences their operational efficiency, customer satisfaction, and long-term sustainability. This underscores the link between problem-solving strategies and organizational performance. Organizational performance in the electricity energy sub-sector refers to the effectiveness with which energy companies achieve their objectives of reliable supply, operational efficiency, financial sustainability, and customer satisfaction (Kianto, Sáenz, & Aramburu, 2020). It can be measured through indicators such as efficiency in energy generation and distribution, system reliability, revenue growth, customer service quality, renewable energy adoption, regulatory compliance, and environmental sustainability (Yu & Liu, 2021).

1.2 Statement of the Problem

The electricity energy sub-sector in Kenya plays a pivotal role in driving the country's economic growth, industrialization, and social transformation. It underpins the realization of Vision 2030, and the Sustainable Development Goals by ensuring affordable, reliable, and sustainable energy supply. The government has invested heavily in the sector, channeling billions of shillings into generation, transmission, and distribution infrastructure to expand access, stabilize supply, and integrate renewable energy sources. For instance, the Kenya National Bureau of Statistics (2023) reports that electricity generation capacity rose to 3,321 MW in 2022, while electricity access reached 75% of the population. Despite these milestones, the performance of the electricity energy sub-sector remains below optimal levels due to recurring operational inefficiencies, supply instability, and consumer dissatisfaction.

Persistent challenges such as frequent power outages, high system losses, aging infrastructure, and high costs of electricity undermine the sector's ability to deliver reliable and affordable energy. The Energy and Petroleum Regulatory Authority (EPRA, 2023) has reported that system losses averaged 22% in 2022, significantly above the global best practice benchmark of 10%. Similarly, frequent disruptions and erratic supply have affected manufacturing competitiveness, slowed digital transformation, and reduced customer confidence in the electricity utility providers. These challenges reflect weaknesses in the adoption of structured problem-solving strategies that could enhance efficiency, adaptability, and resilience in the sub-sector therefore the study sough to assess the effect of problem-solving strategy on organization performance of the electricity energy Sub-Sector in Kenya.

2.1 Theoretical Framework

The study was anchored on the Dynamic Capabilities Theory (DCT), which was introduced by Teece, Pisano, and Shuen (1997). The theory emphasizes an organization's ability to integrate, build, and reconfigure internal and external competencies in response to rapidly changing environments. Unlike static views of organizational resources, DCT focuses on how firms continuously adapt and innovate by sensing opportunities, seizing them, and transforming their operations to maintain competitiveness. The theory is particularly relevant in explaining the effect of problem-solving strategy on organizational performance in the electricity energy sub-sector in Kenya. The sub-sector operates in a volatile environment characterized by technological shifts, policy reforms, climate-related disruptions, and increasing consumer demands for reliable and affordable electricity. To remain competitive and resilient, organizations must go beyond possessing technical and financial resources they need dynamic capabilities that enable them to identify operational inefficiencies, innovate solutions, and reconfigure processes in line with emerging challenges. Problem-solving strategies, such as predictive maintenance, scenario

planning, digital innovation, and collaborative stakeholder engagement, represent these adaptive capabilities that allow organizations to manage complexity and sustain performance.

In this context, DCT provides a valuable lens by linking problem-solving strategies to organizational performance outcomes in the electricity sub-sector. Inefficiencies such as frequent power outages, high system losses, and customer dissatisfaction can often be traced back to weak dynamic capabilities, including inadequate innovation, poor coordination, and limited adaptability to policy and market shifts. By strengthening problem-solving strategies, electricity organizations enhance their ability to reconfigure resources, anticipate disruptions, and respond effectively to regulatory and environmental pressures. This, in turn, leads to improved reliability, operational efficiency, customer satisfaction, and long-term sustainability of the sub-sector.

3.1 Research Methodology

The study was guided by a pragmatism research philosophy, which emphasizes the use of multiple approaches to understand complex phenomena by integrating both quantitative and qualitative methods. In line with this philosophical orientation, the study adopted a convergent mixed research design to investigate the effect of problem-solving strategy on organizational performance in the Electricity Energy Sub-Sector in Kenya. This design was considered appropriate as it allowed for the simultaneous collection and analysis of both quantitative and qualitative data, thereby providing a comprehensive understanding of the study problem. The target population comprised all six companies operating within the Electricity Energy Sub-Sector in Kenya. The study focused specifically on managers at different organizational levels, who were considered knowledgeable and directly involved in strategic decision-making and performance management within their institutions.

The unit of observation included 199 respondents. Since the population was manageable, the study adopted a census approach to include all targeted respondents. Prior to the main study, a pilot test was conducted among 18 respondents from Rabai Power Ltd in Kenya to examine the reliability and validity of the research instruments. Face and content validity were established through expert review, while reliability of the questionnaire was assessed using Cronbach's Alpha, with a threshold of 0.7 considered acceptable. The study relied primarily on primary data collected through structured questionnaires and interview schedules. For data analysis, quantitative data was analyzed using both descriptive statistics (such as frequencies, percentages, means, and standard deviations) and inferential statistics, which included regression analysis to test hypothesized relationships. Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS). On the other hand, qualitative data was analyzed thematically with the aid of NVivo software, which facilitated the identification of emerging patterns and themes.

4.0 Results

The results were presented in sections.

4.1 Descriptive Findings for Problem-Solving Strategy on Organization Performance

The study sought to assess the aspects of Problem-Solving Strategy on Organization Performance of the Electricity Energy Sub-Sector in Kenya. The responses were rated from 1-5 where 1 is the lowest meanwhile and 5 indicated the highest mean. Key SA=Strongly Agree, A=Agree, U=Undecided, D=Disagree, SD=Strongly Disagree. The study findings were as indicated in table 1.

Table 1: Problem-Solving Strategy on Organization Performance

	Mean	Std.
Our company identifies problems early due to effective monitoring systems.	3.871	0.917
Our company encourages employees to report potential issues proactively.	3.571	1.217
Our company categorizes problems to identify their priority levels.	3.785	0.887
In our company problems are thoroughly evaluated before solutions are implemented.	3.607	0.959
Problem evaluation results are documented for future reference.	3.417	1.2901
Employees participate in brainstorming sessions to evaluate problems.	3.288	1.364
Solutions are clearly defined and communicated to all stakeholders.	3.969	1.039
Defined solutions are implemented within agreed timelines.	3.877	0.980
Solutions are aligned with the organization's strategic goals.	3.969	1.039
Aggregate	**3.706**	**1.077**

Source: Survey Data (2025)

From the analysis, respondents generally agreed that their organizations apply structured problem-solving approaches. The highest-rated practices were ensuring that solutions are aligned with organizational strategic goals (M = 3.969, SD = 1.039) and communicating solutions clearly to stakeholders (M = 3.969, SD = 1.039). This suggests that companies in the electricity energy sub-sector recognize the importance of aligning problem resolution with broader strategic objectives and ensuring transparency during solution implementation. The findings also revealed strong agreement that solutions are implemented within agreed timelines (M = 3.877, SD = 0.980) and that early identification of problems is facilitated by monitoring systems (M = 3.871, SD = 0.917). These results indicate that timeliness and monitoring are integral aspects of organizational problem-solving, contributing to improved performance and efficiency.

Moderate ratings were observed in areas such as thorough evaluation of problems before implementation (M = 3.607, SD = 0.959) and employee participation in brainstorming sessions (M = 3.288, SD = 1.364). This implies that while evaluation mechanisms exist, more emphasis may be needed on inclusive and participatory approaches to strengthen collective decision-making and innovation. Documentation of problem evaluation results received the lowest mean score (M = 3.417, SD = 1.290), suggesting a gap in institutionalizing learning from past experiences. Overall, the aggregate mean score of 3.706 (SD = 1.077) reflects moderate agreement on the effectiveness of problem-solving strategies in the electricity energy sub-sector. The results highlight that while companies have established practices in monitoring, solution alignment, and timely implementation, there is room to improve on systematic documentation, knowledge sharing, and employee involvement in problem-solving processes. Strengthening these areas could enhance organizational adaptability, resilience, and long-term performance.

In addition, the researcher interviewed top level managers on the methods used to identify problems before they escalate. The respondents stated, "We have automated monitoring tools that flag irregularities in real-time, especially in areas like grid performance and fuel usage." The respondent also mentioned, "We rely on daily operations reports and feedback from line managers, which helps us detect unusual trends or delays early." These responses indicate that both technological and human monitoring systems are in place to enable early detection of problems, which is essential in minimizing disruptions and maintaining service continuity in the electricity energy sub-sector. When asked to state the process used to evaluate the causes of identified problems, the respondents explained, "We conduct root cause analysis sessions using tools like fishbone diagrams and the 5 Whys technique to get to the bottom of persistent issues." They also shared, "A multi-disciplinary team is formed to assess incidents, review data logs, and gather insights from affected units." These findings suggest that energy organizations apply structured diagnostic approaches and inclusive evaluation frameworks, which help in accurately identifying the root causes of problems and formulating targeted interventions.

4.2 Inferential Statistics

The regression analysis findings are indicated below

Table 2: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.418	.055		7.601	.000
	Problem-Solving Strategy	.532	.044	.613	12.142	.000

a. Dependent Variable: Organization Performance

From the results in the coefficient table, the regression model can be summarized as follows: **Organization Performance = 0.418 + 0.532PSS**

The findings indicated that a unit increase in problem solving strategy would cause the organization performance to increase by 0.532. This implies that strengthening problem-solving strategies within the electricity energy sub-sector directly enhances organizational performance by improving efficiency, reducing operational inefficiencies, increasing customer satisfaction, and enabling organizations to adapt more effectively to technological, regulatory, and environmental changes.

5.1 Conclusion

The study concludes that problem-solving strategy has a strong and statistically significant positive effect on organizational performance in the electricity energy sub-sector in Kenya. When problem-solving capabilities such as monitoring systems to identify problems, effective techniques for problem evaluation, and clear steps to define solutions are embedded within an organization, they not only mitigate disruptions but also catalyze innovation and adaptability. Organizations that employ structured diagnostic approaches such as root cause analysis, fishbone diagrams, and the 5 Whys technique, combined with multi-disciplinary evaluation teams, demonstrate greater capacity to accurately identify underlying causes of persistent challenges and formulate targeted interventions. Strategic alignment of solutions with organizational objectives, coupled with clear

communication to stakeholders and timely implementation, are critical determinants of successful problem resolution and improved performance outcomes. However, gaps in documentation of problem evaluation results and limited employee participation in brainstorming sessions indicate missed opportunities for institutionalizing organizational learning and fostering inclusive innovation. Strengthening problem-solving strategies within the electricity energy sub-sector directly enhances organizational performance by improving efficiency, reducing operational inefficiencies, increasing customer satisfaction, and enabling organizations to adapt more effectively to technological, regulatory, and environmental changes that characterize Kenya's dynamic energy landscape.

6.1 Recommendations

The study recommends that energy institutions in the electricity energy sub-sector should invest in comprehensive internal capacity-building programs that focus on root-cause analysis, strategic thinking, and scenario planning to enhance problem-solving skills and strengthen organizational resilience. Organizations should prioritize the establishment of robust documentation systems for problem evaluation results to institutionalize organizational learning and prevent the recurrence of similar challenges in the future. Management should create more inclusive and participatory problem-solving cultures by actively involving employees at all levels in brainstorming sessions and decision-making processes, as frontline staff often possess valuable practical insights into operational challenges that can lead to more innovative and effective solutions. Energy companies should maintain and continuously upgrade their automated monitoring tools and real-time flagging systems while ensuring seamless integration between technological platforms and human reporting mechanisms to enable early detection of problems before they escalate.

Organizations should strengthen the use of structured diagnostic frameworks such as fishbone diagrams, the 5 Whys technique, and multi-disciplinary team approaches to ensure thorough evaluation of problems and accurate identification of root causes. The sub-sector should ensure that all problem-solving initiatives remain strategically aligned with broader organizational objectives such as reducing system losses, improving grid reliability, enhancing customer satisfaction, and achieving financial sustainability. Management should establish clear timelines and accountability mechanisms for solution implementation to maintain momentum and ensure that defined solutions translate into tangible performance improvements. Finally, policymakers and regulatory bodies should support the development of industry-wide problem-solving competency frameworks and facilitate knowledge-sharing platforms where electricity organizations can learn from each other's experiences and adopt best practices in addressing common sectoral challenges.

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