

INFLUENCE OF ENERGY REFORMS ON KENYA'S ELECTRICITY SECTOR PERFORMANCE

Beldine Wakajummah.

Masters Student, Jomo Kenyatta University of Agriculture and Technology, Kenya.

Dr. Patrick Kimaku (PhD).

Department of Business Administration, Jomo Kenyatta University of Agriculture and Technology, Kenya.

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ABSTRACT

The main aim of this study was to establish the influence of energy reforms on the performance of Kenya's electricity sector. The study aimed to determine the influence of industry regulation, restructuring of utilities, private sector participation, and customer service on the performance of the electricity sector in Kenya. Four theories guided this study: compliance theory, agency theory, resource-based theory or view (RBV) and dynamic capability theory. The target population for this study was 14,768 employees from the electricity sector state organizations, i.e., Kenya Electricity Generating Company Plc, Energy and Petroleum Regulatory Authority, Kenya Electricity Transmission Company, Kenya Power and Lighting Company Plc, Rural Electrification and Renewable Energy Corporation, and Geothermal Development Company. A stratified sampling technique was used to sample the respondents through proportional allocation to ensure equal representation of each stratum. This was followed by simple random sampling to arrive at a sample population of 390. The study preferred a descriptive research design with a semi-structured questionnaire as the main data collection tool. A pilot study was conducted on 39 respondents to detect weaknesses in design and instrumentation. Descriptive and inferential statistics were used to analyze the collected data. The study revealed that industry regulation, customer service, utilities' restructuring, and private sector participation all have a moderate to great influence on the performance of the electricity sector. ANOVA, t-test, p-values

and coefficient of determination were used in the data analysis from which data were presented using tables. From the model summary, the R-Square value of 0.723 implied that the independent variables (energy reforms) would contribute 72.3% of the dependent variables (performance) when the external factors are not eliminated from the model. From the ANOVA test, the computed F was higher than the F critical (at 4, 301; F critical = 2.841), indicating the model's overall importance. From the regression analysis, the model indicated that holding the predictor variables constant, Kenya's electricity sector performance would be 5.970. Regression analysis findings indicated that industry regulation, utilities' reorganization, private sector participation, and customer service had respective beta coefficients of 0.612, 0.898, 0.755, and 0.734. The study concluded that industry regulations and private sector participation are crucial to the performance of the electricity sector by providing the structure, framework, and alternative options for guaranteeing investments for sector development. The study recommends creating a more conducive environment where the private sector can continue participating, developing regulations to align the sector to the continually changing environment, investing in robust customer service, and establishing policies to enhance the performance of the restructured utilities.

Key Words: Industry regulation, power utilities' restructuring, private sector participation, customer service, energy reforms and performance.

INTRODUCTION

Many countries have made strides to improve the governance of their electricity sector through a series of energy reforms. These reforms have been enabled by the broader paradigm shift from ownership by the state and centralized organization of infrastructure industries to private ownership, public regulation, and market-oriented structures (OECD, 2000). Various incentives have propelled the implementation of energy reforms. In developed countries, where the systems are comparatively proficient, the primary objective of the reforms has been to enhance operational efficiency. Whereas in developing countries, reforms have been driven by problems of subsidization of prices, low quality of service, low collection rates, high network losses, and poor service coverage (Newbery, 2002). In addition, international development agencies have encouraged and ensured that energy reforms have been implemented in developing countries.

Kenya has instituted several market-oriented energy reforms over the years to increase transparency and efficiency within the electricity sector and improve the sector's performance. The initial reforms began in 1996, driven by the government and its development partner, i.e., the World Bank, as part of the requirements for funding and to increase investment from the private sector. This resulted in establishing an independent regulator, the Electricity Regulatory Board (ERB), through the Electric Power Act of 1997. The next reforms began in 2002 with the enactment of the Energy Act 2006, passed in response to the implementation of Sessional Paper No. 4 of 2004 on Energy. The Rural Electrification Authority (REA) and the Energy Regulatory Commission (ERC) were established in 2007, and Geothermal Development Company (GDC) and Kenya Electricity Transmission Company (KETRACO) in 2008. KenGen partially privatized during this period, with the government selling 30% of its stake. The Energy Act 2019, which created the Energy & Petroleum Regulatory Authority (EPRA) as ERC's successor, marked the latest energy reforms. This Act defined the authorities and duties of the various energy sector bodies, provided for national and local government energy functions, and consolidated all legislation pertaining to the energy sector.

Statement of the Problem

Kenya's energy sector is one of the most critical sectors in the country, with its performance directly impacting the general economy. The energy sector has been identified as an enabler of socio-economic transformation as envisaged in the Kenya Vision 2030, the country's development plan covering the period 2008 to 2030. Public sector reforms have fundamentally changed Kenya's electricity sector's structure, organization, and performance. The initial reforms, which began in 1996, were primarily donor-driven and were motivated by the need to access financial support and attract investment into the energy sector. The subsequent reforms, which began in 2002, strengthened the regulator's independence, partially privatized the generation company (KenGen),

and established complementary energy entities. The most recent changes in 2019 provided for national and local government roles and responsibilities relating to energy and consolidated all legislation pertaining to the energy sector. Significant achievements have been made in Kenya's electricity sector. According to EPRA, 2022, Kenya has achieved an electricity access rate of 76.49%, with the total number of connected customers reaching 8.2 million as of May 2021. The Economic Survey 2022 reports that the total electricity generation rose 7% to 12,414.7 GWh in 2021, with 89.6% of electricity generated from renewable sources. The domestic demand also increased from 8,796.4 GWh in 2020 to 9,565.4 GWh in 2021. As the country's energy sector continues to display performance improvement, it is unclear whether these achievements have been influenced by the energy reforms that have been instituted. This study, therefore, sought to analyze the performance of Kenya's electricity sector and determine how the energy reforms have influenced this performance.

Objectives of the study

The general objective of the study was to determine the influence of energy reforms on the performance of the electricity sector in Kenya

The specific objectives of the study were as follows

- (i) To evaluate the influence of industry regulation on the performance of the electricity sector in Kenya
- (ii) To determine the influence of power utilities' restructuring on the performance of the electricity sector in Kenya
- (iii) To assess the influence of private sector participation on the performance of the electricity sector in Kenya
- (iv) To establish the influence of customer service on the performance of the electricity sector in Kenya

THEORETICAL REVIEW

Compliance Theory

Compliance and noncompliance are complex behaviours. Some of these behaviours can either be automatic or planned. Automatic behaviour is the product of habits and routines; hence, they must be monitored and evaluated over time. By contrast, planned compliance or noncompliance exemplifies the intentional quest for various goals, such as maximising one's utility, fulfilling a moral obligation such as duty or trust, or disposing of one's fear of sanctions. They may also sometimes be industry regulation explained as the result of industry regulation's incapacity, incompetence, ignorance, or misunderstanding of regulatory prescriptions (Brehm & Hamilton, 1996). To address this complexity, compliance theorists usually focus on compliance as planned

rather than automatic behaviour. They consider goal-oriented, purposive action a satisfactory estimate for actual processes.

Firstly, compliance theory should account for industry regulation's tendency to pursue several heterogeneous goals simultaneously. Empirical studies demonstrate that there can be a mixture of material, emotional and normative goals at play in compliance and noncompliance behaviours. For instance, a given regulation may be trying to make a profit, protect itself against a potential loss, and act appropriately all at once. Good industry regulation protects employees and the organisation in any litigation.

The most common reaction by compliance theorists has been combining several different action models. The best-known example is the work combining two conflicting ideas: the idea that choice results from a cost-benefit calculus and that individuals may follow moral norms internalised in trust relations. This theory will guide the study to establish how the various reforms due to policies and regulations that have been established and implemented have influenced Kenya's electricity sector performance.

Agency Theory

Agency theory describes why behaviour or decisions in an organization or group of participants differ. It explains the relationship between two parties: the principal who assigns work to another party, the agent. The differences in behaviour or decisions demonstrated by the two parties are often due to their different objectives and approaches toward risk, independent of their respective goals. The concept was derived as early as 1932 from the work of Adolf Augustus Berle and Gardiner Coit Means, who researched the issues of the agent and principal. Berle and Means explored the concepts of agency and their applications to the progress of organizations. They learned how the interests of a firm's management differed from those of the firm's owner and used the concepts of agent and principal to explain the source of organizational conflicts (Murtishaw & Sathaye, 2006).

In the 1960s and '70s, Jensen & Meckling refined the work of Berle and Means and developed agency theory as a formal concept. The theory recognizes that given a scenario, different organizations will make different decisions due to different motivations. It states that there will always be some goal conflict among parties, and information will always be somewhat unbalanced between the principal and agent. The theory has been applied successfully to different disciplines, including accounting, economics, politics, finance, marketing, and sociology (Nikkinen & Sahlstrom, 2004).

Further, Eisenhardt (1989) expounded that agency theory is concerned with resolving two problems that can occur in agency relationships: when the needs or objectives of the principal and agent conflict and when it is difficult or expensive for the principal to verify what the agent is

doing. Eisenhardt (1989) proposes that agency theory suggests two underlying control strategies: behaviour-based and outcome-based. Both strategies rely upon performance evaluation. Considering agency theory in this study, the various state organizations within the electricity sector respond differently to the instituted policies and reforms due to the different Board leadership and Management decisions. Consequently, this affects the performance of the various organizations, which collectively contribute to Kenya's electricity sector performance.

Resource-Based Theory

Birge Wenefeldt developed this theory in 1984. It involves analysing and identifying a firm's strategic advantages by examining its distinct combination of assets, skills, capabilities and intangibles as an organisation. The RBV's underlying principle is that firms differ fundamentally because each possesses an inimitable bundle of resources - tangible and intangible assets- and organisational capabilities to use those assets. Each firm develops competencies from these resources, and when developed exceptionally well, these become the source of the firm's competitive advantage (Pearce and Robinson, 2007). The resource-based theory is another important concept that can explain the strategic ability of the firms. It typically supports the idea of unique resources at the disposal of agencies. The theory typically views the organisational resources based on two dimensions: the tangible and intangible assets that firms use.

According to (Hassan, 2017), tangible assets are regarded as the physical resources firms own, including inventory, equipment, cash and property. On the other hand, intangible assets are invisible resources organisations own, including a brand name, expertise, intellectual property, reputation, and trademarks. Hassan (2017) indicated that intangible resources are the most critical in sustaining and achieving a competitive position as they have the attributes of value and inimitability. The resources are considered heterogeneous and distributed among organisations. The resources are also imperfectly mobile, so other firms cannot copy them. The resource-based theory argues that firms' resources are considered inputs in the production and manufacturing process. These can be classified into three main groups: physical capital, human capital, and organisational capital. The capability of a resource refers to its ability to accomplish a given task in the operation of a company (Miyawa, 2018).

Each firm is regarded as a combination of capabilities and unique resources that provides the foundation for strategic objectives and the major source of profits. In the hypercompetitive business landscape, firms normally experience changing capabilities managed by dynamism to achieve above-average prices. As a result, the differences in the performance of organisations over a period can be determined mainly by the exceptional resources and capabilities but not the structural characteristics of an industry. The resource-based theory is essential for this research study as it highlights that an organisation must create values that depend on its available resources and distinct capabilities for using them (Kale et al., 2019). To ensure long-term profitability, an organization must develop successful business strategies and become competitive in the business environment.

Dynamic Capability Theory

The dynamic capability theory focuses on the survival and adaptability of organizations in a given sector instead of sustainability. According to Kurniawan et al. (2020), the prosperity of organizations in a business environment depends on their timely response, flexibility and quick actions to product innovation. Besides, it depends on the Management’s capability to help effectively redeploy and control external and internal competencies as opposed to the accumulation of valuable organizational resources (Kurniawan et al., 2020). The theory also argues that the value of a firm’s resources can be reduced through the rivals’ substitution or imitation.

As a result, firms should continuously develop new forms of competitive edge using their flexible capabilities to remain competitive. Dynamic capabilities are regarded as the highest capabilities levels that are achieved through systematic modification and generation of the operating capabilities created through continuous organizational learning. Bainwera and Wangombe (2018) define dynamic abilities as the explicit and recognizable routines or processes that help create market changes by utilizing resources. Furthermore, it is argued that acquisition, innovations, and strategic alliances are some examples supporting the reconfiguration of the competitive resources of firms.

Conceptual Framework

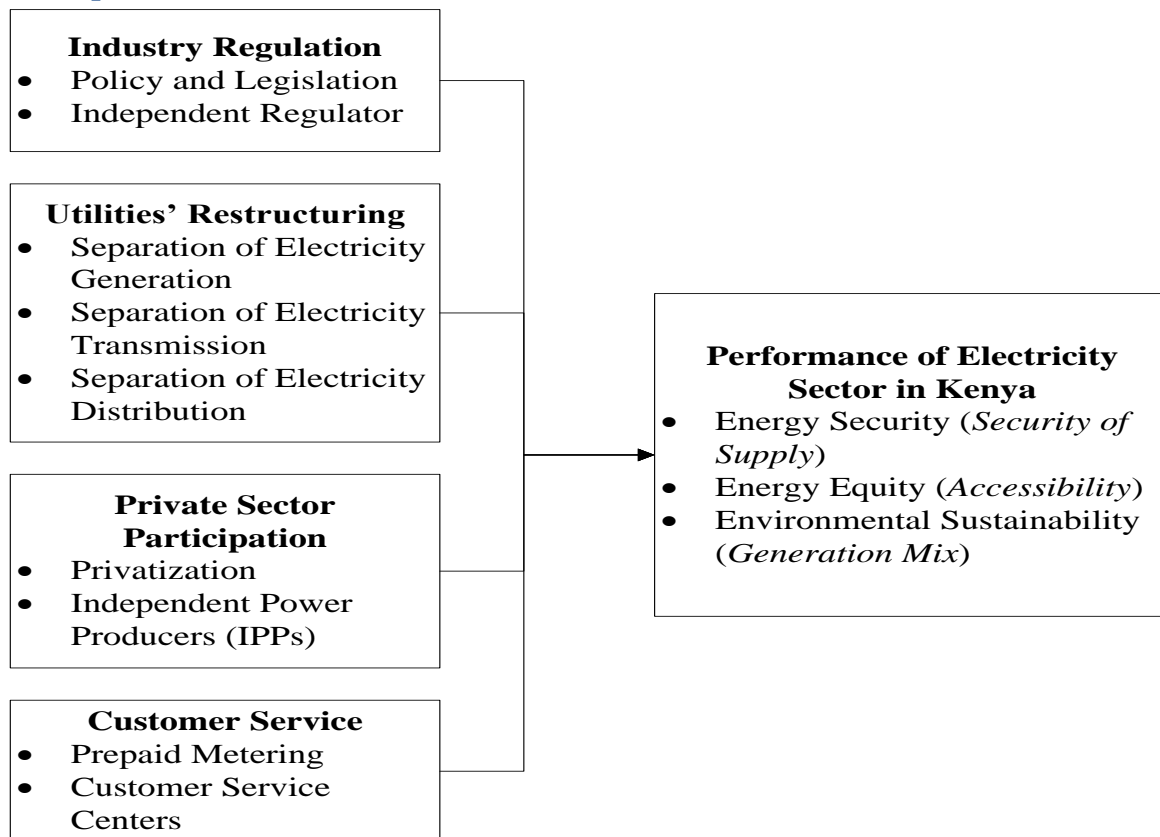


Figure 1: Conceptual Framework

Industry Regulation

Regulation of the sector is a critical aspect of the reform agenda as it spells out the electricity markets' legal, regulatory, and institutional frameworks (Lee and Usman, 2018). A good law normally commercializes the electricity service by encouraging cost-reflective tariffs, criminalizes power theft, and ring-fences the sector from political interventions (Besant-Jones, 2006). The National Energy Policy of 2018 and The Energy Act of 2019 have secured the legal and policy framework in Kenya. Independent regulation entails separating the regulatory roles from the government bodies and granting the new organ the right and freedom to decide on regulatory matters without prior consent from the government (Eberhard and Godinho, 2017; Polemis, 2016). Good regulatory decisions improve the sector's performance, protect consumers' and investors' interests, enhance the commercial operation of utilities, and help governments achieve policy objectives such as electricity connectivity, fuel diversity, and efficiency targets. In Kenya, the establishment of an independent regulatory body was initiated through the Electric Power Act of 1997, which brought into existence the Electricity Regulatory Board (ERB). Currently, the regulator is the Energy & Petroleum Regulatory Authority (EPRA) established through the Energy Act No. 1 of 2019.

Utilities' Restructuring

Gao, Gao, and Zhang (2018) define governance reformation as a process through which a firm changes its management team which involves actions such as changing top management teams, their tenures and reviewing their remunerations. Therefore, improving corporate governance necessitates improving a company's management team, which includes replacing senior management teams, their terms of office, and assessing their compensation. According to Alajmi and Worthington (2021), a company's performance necessitates the needs for reformation of cooperative governance. Additionally, the reformation may be an outcome of mergers and acquisitions in which the amalgamated firms decide that new management is required. The senior management team does play vital responsibilities, however organizational upheaval has an impact on those duties and disrupts business operations. Involving the top management team in the reformation process and outlining the rationale for the change is a crucial component of a successful reformation of corporate governance in a company.

Gao, Gao, and Zhang (2018) assessed the success of China's ownership reform of 2005 and looked at how changes in the largest shareholdings and state-owned shareholdings affected business performance. The analysis made use of data from 2004 and 2006 and a sample of 470 listed companies that were affected by China's ownership reform in 2005. First, the study compared the shareholder structures of the reformed listed companies before and after the reform to determine if the reform had decreased state-owned shareholdings as indicated by ownership concentration and the greatest shareholdings. Second, regression analysis was utilized to examine the connection

between corporate performance of Chinese listed companies and changes in ownership concentration and greatest shareholdings. The study shows that the shareholding reform is effective because both ownership concentration and largest shareholdings are declining. The study offers proof that China's 2005 ownership reform had a positive effect on business performance.

Alajmi and Worthington (2021) investigated, in the context of recent corporate governance reform, the relationship between ownership structure and business performance in Kuwaiti firms. Panel data robust regressions of company performance on ownership structure characterize the former using returns on assets and equity, the debt to equity ratio, leverage, and Tobin's Q, and the latter as family, government, local, and foreign institutional ownership. The study discovered that family ownership, followed by government ownership, has the greatest impact on a company's performance—but not in proportion to their actual ownership stakes. Importantly, it appears that corporate governance reform had little impact on the transition from a first voluntary then compulsory corporate governance code and guidelines, indicating that many companies had either adopted good governance principles under market pressure or left the sector in anticipation of the more strict regulatory controls.

Ruiters (2011) found that organizational restructuring was unavoidable due to changes in technology and the dynamics of service demand while examining the effects of restructuring on South African workers in the labor inspectorate department. The findings showed that the government of Southern Africa's organizational restructuring measures impacted the inspectors' emotions and led to poor performance. The analysis found that the reorganization process resulted in the loss of qualified employees because they chose to leave since they were unhappy with their new roles. On a temporary basis, less qualified workers took their places. The department also wound up spending more money on staff training to fill the gaps left by the inspectors.

Private Sector Participation

Private Sector Participation involves introducing private sector investment through temporary contractual arrangements or the sale of permanent assets (Foster et al. 2017). Private sector participation is crucial to energy reforms since it provides another option for securing investments to grow the electricity sector. Privatisation includes transferring public property or business to a private entity through the outright sale of assets, joint ventures, or disposal of shares in the stock market (Estrin and Pelletier, 2018). It also entails outsourcing state-owned utilities' (SOU) operations to a private firm for a specific period (concessions agreement), involving the private sector in SOU management (management and lease contracts), and constructing new projects that are either entirely private or a public-private partnership (Ullah, 2015).

Privatisation is premised on the assumption that private operators would be more efficient than the public sector as they would be less subject to political opportunism. In 2006, privatisation was

achieved through the government selling 30% of its stake in the national power generation company KenGen via a listing on the Nairobi Stock Exchange (NSE). In the same year, Kenya signed a two-year management contract with Manitoba Hydro International of Canada to manage the national power distribution company KPLC. The Canadian company met the ambitious target of 120,000 new customer connections within the first year, which included intensive rural electrification.

Independent power producers (IPPs) are private companies participating in power generation for sale to end-users or SOUs. The IPPs were introduced as the quickest way to increase the installed capacity, private investment, and competition in the sector and unburden governments from funding the new power plants (Yang and Urpelainen, 2019). IPPs were introduced in Kenya in 1992 under the country's Electricity Act. This Act allowed private sector investment in power generation to supplement the government's efforts to provide reliable and affordable electricity. The first IPP project in Kenya was the 50 MW Kipevu I Power Station, commissioned in 1997. As of June 2022, IPPs accounted for 34.8% of the electricity generation market share (EPRA, 2022)

Customer Service

Customer Service is a process involving a series of intangible activities which, in most cases, take place in interactions between the customer and service employees - and/or physical resources or goods and/or systems of the service provider - which are provided as solutions to the customer's problems (Grönroos, 2007). In the past, Kenya's electricity sector was plagued by poor customer service, including long wait times, frequent power outages, and inaccurate billing. This led to customer dissatisfaction, creating a negative image of the sector.

KPLC introduced prepaid metering in the early 2000s to enhance the effectiveness and dependability of the power supply, as well as to reduce technical and commercial losses. Prepaid metering allows customers to purchase electricity in advance and to monitor their usage in real-time, which can help to reduce wastage and improve energy efficiency. The initial rollout of prepaid meters began in 2004, with a pilot project in the Nairobi West area. A larger-scale rollout followed this in other parts of the country, including Mombasa, Kisumu, and Eldoret.

Since the introduction of prepaid metering, KPLC has continued to expand its use, intending to replace all postpaid meters with prepaid meters. This has been driven by the benefits of prepaid metering, which include more accurate billing, reduced costs of meter reading, improved revenue collection, and better customer satisfaction. Today, prepaid metering is considered a key component of the country's electricity sector reforms. The system has helped improve the sector's performance by reducing technical and commercial losses, improving revenue collection, and enhancing the overall customer experience.

Customer service centres, also established as part of the sector's reform efforts, aim to improve the quality of service and increase customer satisfaction. These centres are staffed by trained personnel to handle various customer issues, including billing inquiries, service requests, and complaints. By providing a dedicated point of contact for customers, the centres have made it easier for customers to get the assistance they need, which has helped to build trust between the electricity sector and its customers. The centres provide a platform for the company to share information about power outages, maintenance schedules, and other issues that may affect customers. This has helped to reduce uncertainty and frustration among customers and has improved communication between the electricity sector utilities and their customers.

Electricity Sector Performance

The World Energy Council officially devised the term energy trilemma in 2010 and developed the World Energy Trilemma Index (ETI) for evaluating the performance of the energy sector for different countries. The ETI evaluates the countries' ability to provide sustainable energy through three dimensions: energy security, energy equity, and environmental sustainability.

Environmental sustainability focuses on alleviating and avoiding potential environmental harm and impacts of climate change by transforming the country's energy system (World Energy Council, 2021). It focuses on ensuring that the electricity supply chain does not negatively impact the environment.

Energy equity refers to the ability of a country to offer universal access to electricity while ensuring that it is reliable, reasonably priced, and sufficient for both domestic and commercial use (World Energy Council, 2021). It includes the citizens having basic access to electricity and access to energy consumption levels, which will facilitate the affordability of electricity and the country's prosperity.

Energy security refers to effectively managing a country's energy supply from domestic and external sources, meeting the country's current and projected energy demands, and ensuring the country's energy infrastructure is reliable (World Energy Council, 2021). It measures the country's ability to meet its current and projected energy requirements with minimal interference to the quality and reliability of supply, including the management of the energy sources and the reliability and resilience of its energy infrastructure.

Empirical review

Gassner et al. (2009) undertook a World Bank study to relate the impact of private-sector participation (PSP) on certain electricity sector performance indicators (connections, bill

collections, energy sales and distribution losses). Using a regression and propensity score-matching model, the study was undertaken in 1,227 distribution utilities in developing countries. They found that performance in terms of sales per employee and connections per employee improved significantly. Specifically, they discovered that privatization is associated with an increase in bill collection rates by 45%, sales per employee by 32%, and a reduction in distribution losses by 11%. The study further disaggregated PSP into sub-categories by type of private-sector contract, full divestiture, partial divestiture, concession, and lease or management contract. It analyzed their impact on nine performance indicators from 1992 to 2004. The study suggested that the short-term nature of the PSP did not make it worthwhile to spend time or money on improving the performance of the utilities (Gassner et al., 2009).

Partial and full divestiture forms of PSP were found to be associated with significant increases in residential connections per employee, electricity sales per employee, and collection rates, mainly due to the transfer of ownership and risk to new owners. Concessions were found to provide some degree of incentive to improve billing and collection rates because this is likely to be the simplest to achieve. The significant increase in connections associated with concessions is a result of concession contracts often including this as an explicit target. None of the other forms of PSP was associated with an improvement in electricity supply disruptions and access because improvement in these indicators will likely require significant investments and time before the outcomes become visible.

Zhang et al. (2008) conducted a study to assess the impacts of regulation, competition, and privatization on the performance of electricity generation. The study utilized data spanning from 1985 to 2003, sourced from 36 developing and transitional countries. The study ascertained the effects of electricity reforms on the generation capacity, electricity output volume, labour productivity in electricity generation, and capacity utilization. Their research revealed that a 1% rise in the proportion of electricity generation capacity owned by private investors resulted in a corresponding 0.1% increase in electricity generation per employee. The study concluded that a 1% rise in the share of private sector participation resulted in a 0.1% gain in energy generation per employee.

Zhang et al. (2008) concluded that, individually, regulation and privatization do not result in visible gains in the performance of the economy, but introducing competition effectively increases performance. They found that, separately, private investment and regulation have little effect on performance and that competition is the most significant variable. The findings of this study have indicated that the statistical significance of the interaction between privatization and regulation is evident. This confirms that the private sector's ability to enhance performance may be considerably reliant on effective regulation in the absence of competition.

RESEARCH METHODOLOGY

Since this study aimed to analyze how energy reforms have influenced the electricity sector's performance, a descriptive research design was identified as the most appropriate. Furthermore, a descriptive research design was considered appropriate as the primary objective was to explore the relationship and discuss how the factor supports the under-investigated issue. The descriptive research design allowed data collection from primary sources to facilitate hypothesis testing. The main drawback of descriptive research design lies in its inability to answer the question of why amongst the study variables.

According to Public Service Commission 2022, the total number of employees in the six institutions who constituted the sampling frame was 14,768, i.e., 10,227 from KPLC, 2,572 from KenGen, 978 from GDC, 546 from KETRACO, 291 from REREC, and 154 from EPRA. Therefore, the study population for this study was 14,768. The study employed stratified sampling with a proportional allocation technique to achieve the desired representation from each stratum (the electricity sector organisations). This was followed by simple random sampling to ensure that every member of the population in each stratum had an equal chance of being selected to form the sample size. This sampling technique ensured proportionate sample distribution, ensuring a true representation of the target population. The study had six (6) heterogeneous strata from the energy sector state organisations: EPRA, KPLC, REREC, KenGen, GDC and KETRACO.

Since the study utilized a finite population and the population size is known, Yamane's (1967) formula was used to determine the sample size. This generated a sample of 390. Proportional allocation was used to ensure equal representation from each stratum, where the allocation of a given sample of size n to a different stratum is done in proportion to their sizes. i.e., in the i^{th} stratum.

This study collected both secondary and primary data. The secondary data was sourced from journals, books and published academic references. Primary data consists of first-hand information that has not been processed or evaluated (Greener, 2018). Primary data was collected using a questionnaire as a quantitative data collection tool. The questionnaire used was semi-structured, consisting of structured and unstructured questions. The structured questions enabled easy data analysis and reduced the time and resources needed for data collection and analysis. The unstructured questionnaires aided in getting in-depth responses from the respondents, allowing them to provide their views and suggestions on the various issues.

The data collection method refers to the process by which the data for a research study is gathered from the participants. Choosing an appropriate data collection method can help improve the study's accuracy. The research study used primary sources to retrieve the data for the research. The primary data sources are considered appropriate as they are from sources and are not impacted

by other factors (Snyder 2019). The primary data was collected using a questionnaire administered to the respondents physically and online. Questionnaires are considered appropriate as they are cost-effective and quick to retrieve participant data (Snyder 2019). The online questionnaires can reach many participants from various demographic backgrounds.

Pre-testing measured the reliability of the questionnaire, which will confirm, from the response, if the instrument is measuring what it is intended to measure. The researcher conducted a pilot study to ensure the validity and reliability of the data collection tool. Cooper and Schindler (2014) state that a pilot study should constitute 10% of the sample size. Therefore, the sample size for the pilot test study was thirty-nine (39). Proportional allocation was used to ensure the pilot study comprised equal representation from each stratum. The pilot study sample of size k was allocated to a different stratum in proportion to their sizes. i.e., the i th stratum. The construct validity test was carried out using confirmatory factor analysis (CFA) on all the variables, as Rahn (2014) recommended. The reliability of the questionnaire utilized in the study was assessed through the application of Cronbach's Alpha.

Statistical analysis was undertaken using descriptive and inferential statistics to determine the relationship between the independent and dependent variables. For descriptive statistics, the characteristics of key variables were described using mean scores, standard deviation, and frequency distribution. Quantitative and qualitative data was derived from closed-ended and open-ended questions. The Statistical Package for Social Sciences (SPSS version 25) was used to analyse quantitative data using inferential and descriptive statistics. On the other hand, qualitative data were analysed as per thematic areas, and the findings were presented in a narrative form. Before the data analysis, the researcher ensured the data was checked for completeness, followed by data editing, coding, data entry, and cleaning.

Analysis of the respondents' demographic information was undertaken using descriptive statistics to summarise their responses concerning their views on the various aspects of the variables. Descriptive statistics enable researchers to present the data meaningfully, allowing simpler and easier interpretation. Pearson correlation coefficient and multiple regression analysis were used for inferential data analysis. Inferential statistics determine the probability that an observation happens by chance or is dependable in the study. The relationship between the study variables was tested using multivariate regression models.

RESEARCH FINDINGS AND DISCUSSIONS

Response Rate

The study's sample size was 390 respondents drawn from the electricity sector organizations, i.e., EPRA, KPLC, REREC, KenGen, GDC and KETRACO. Table 4.1 shows the frequency of the

participants who provided or failed to provide their responses and the percentage of participants who either responded or failed to respond to the questions as a percentage of the total number of participants. Out of 390 distributed questionnaires, 306 respondents completed and returned their questionnaires. These included 204 responses received from KPLC, 58 from KENGEN, 23 from GDC, 12 from KETRACO, 6 from REREC, and 3 responses obtained from EPRA, resulting in a 78.5% response rate. The response rate was considered satisfactory to evaluate the study.

Table 1: Response Rate

Agency	Sample Size		Not Responded		Responded	
	Frequency	%	Frequency	%	Frequency	%
KPLC	270	69.2	66	78.6	204	66.7
KENGEN	68	17.4	10	11.9	58	19
GDC	26	6.7	3	3.6	23	7.5
KETRACO	14	3.6	2	2.4	12	3.9
REREC	8	2.1	2	2.4	6	2
EPRA	4	1	1	1.2	3	1
Total	390	100	84	21.5	306	78.5

Demographic Data Analysis

The descriptive statistics on data about the gender variable showed that 187 participants were male, representing 61.1%, and 119 participants were female, representing 38.9% of the total participants. The gender distribution showed that opinions provided by participants for the study were obtained from both males and females. The respondents between 36 and 40 years recorded the largest proportion of 26.5% of the population participating in the study, closely followed by 31 to 35 years with 23.9%. The other categories were 41–45 years, with 18.3%, 26-30 years, and 46–50 brackets, with 13.1% each, and the lowest was the bracket of 51 years and above, with 5.2%. These results demonstrated that the respondents were well-distributed in terms of age. These results imply that the staff in the electricity sector organizations are mainly aged between 31 and 50 years. However, few members are below 30 years indicating that the organizations have adopted a medium age bracket in the placement of staff.

More than sixty five percent of the respondents were bachelor’s degree holders, while 18.3% were master’s degree holders. Diploma holders recorded 13.4%, and PhD holders occupied only 2.6% of the study population. From these results in relation to the level of education, all the respondents had graduated with various tertiary education awards and thus understood the information sought by this study. 46.1% of the respondents worked as assistant managers, 32.4% were departmental/functional management staff, and 21.6% were senior management staff. All these respondents were involved in formulating and implementing the decisions regarding the influence of energy reforms on Kenya’s electricity sector performance.

More than forty five percent of the respondents indicated that they had worked in their roles for 6-10 years, 35.9% of them had worked in their roles for not more than five years, 11.4% of the respondents served in their roles for a period of between 11 and 15 years while 9.2% of the

respondents indicated that they had been working in their respective organizations for more than 15 years.

Industry Regulation and Kenya's Electricity Sector Performance

The research revealed that the performance of the electricity sector in Kenya is moderately influenced by industry regulation. The study established that policy legislation influences performance of Kenya's to a great extent. Additionally, policy formulation influences performance to a great extent, while an independent regulator has a moderate influence on the performance. From the study, there have been increased regulations with the objective of safeguarding the interests of consumers and investors within the electricity sector; industry regulation reforms have led to an independent regulator being established; there have been industry regulations that dictate the process of policy formulation and legislation; the electricity sector organizations have undertaken regulation reforms to enhance the commercial operation of utilities; and the energy sector organizations have been at the forefront to establish dynamic policy objectives for the electricity sector.

Utilities' Restructuring and Kenya's Electricity Sector Performance

The study determined that utilities' restructuring has a moderate influence on the performance of the electricity sector in Kenya. From the study, the separation of electricity transmission influences performance to a great extent. Additionally, to a great extent, the separation of electricity distribution influences the performance, while the separation of electricity generation moderately influences the performance. The study further revealed that the organizations had taken part in restructuring competitive activities in the energy utility; the utilities' restructuring eliminates conflicts of interest throughout the electricity supply chain and that the utilities' restructuring has led to a reduction of monopolistic control of the electricity sector.

Private Sector Participation and Kenya's Electricity Sector Performance

The study determined that, to a great extent, private sector participation influences the performance of the electricity sector in Kenya. Independent power production influences performance to a great extent, privatization practice influences performance to a great extent, and private sector procurement influences performance to a moderate extent. The organizations within the electricity sector have enlisted the participation of the private sector in diverse capacities via concession agreements. The private sector's involvement has been primarily through investments in the electricity sub-sector, facilitated by joint ventures, and independent power producers have played a significant role in the generation of electricity. Additionally, the private sector has invested heavily in temporary contractual arrangements and has been instrumental in the sale of permanent assets within the sector.

Customer Service and Kenya's Electricity Sector Performance

The study established that customer service moderately influences the performance of the electricity sector in Kenya. The study revealed that prepaid metering influences performance to a great extent, service quality influences performance to a great extent, and customer service centres influence performance to a moderate extent. It was evident that the introduction of prepaid metering has improved the efficiency and reliability of the power supply, and the efficient billing efforts have reduced technical and commercial losses; customers' waiting time has been reduced significantly and continuous staff training on customer service has facilitated quality improvement.

Performance of Kenya's Electricity Sector

According to the study, the electricity sector's performance was deemed to be average. The results indicated that energy equity (accessibility) was rated as good, while energy security (security of supply), and environmental sustainability within the electricity sector were rated as moderate. The inclusion of an independent power production approach has led to the realization of energy provision targets, and industry regulation has enhanced service delivery in the sector.

Electricity supply has increased over the last five years from 11,051.70GWh in 2018 to 12,669.40 in 2022 to meet the demand increase and ensure the security of supply. Electricity accessibility has been following an upward trend, with 76.54% of the population accessing electricity in 2021 compared to 61.18% in 2018. On average, 90% of the electricity supply was generated from renewable sources demonstrating that Kenya is committed to ensuring environmental sustainability.

From the model summary, the R-Square value of 0.723 implies that the independent variables (energy reforms) would contribute 72.3% of the dependent variables (performance) when the external factors are not eliminated from the model. From the ANOVA test, the computed F was higher than the F critical (at 4, 301; F critical = 2.841). This was an indication of the model's overall importance. From the regression analysis, the model indicates that holding the predictor variables constant, Kenya's electricity sector performance would be 5.970. The results from the regression analysis revealed that there were beta coefficients of 0.612, 0.898, 0.755, 0.734 for industry regulation, utilities' restructuring, private sector participation and customer service, respectively. Accordingly, a unit increase in the studied energy reforms aspects of the performance of the electricity sector in Kenya improved as a result.

Inferential Results

Variables	Measure	The performance of the electricity sector	Industry regulation	Utilities' restructuring	Private sector participation	Customer service
The performance of the electricity sector	Pearson Correlation	1	0.762	0.847	0.746	0.892
	Sig.		0.000	0.000	0.000	0.000
Industry regulation	Pearson Correlation	0.762	1	0.873	0.641	0.854
	Sig.	0.000		0.014	0.023	0.032
Utilities' restructuring	Pearson Correlation	0.847	0.873	1	0.854	1.739
	Sig.	0.000	0.014		0.018	0.024
Private sector participation	Pearson Correlation	0.746	0.641	0.854	1	0.748
	Sig.	0.000	0.023	0.018		0.032
Customer service	Pearson Correlation	0.892	0.854	0.739	0.748	1
	Sig.	0.000	0.032	0.024	0.032	
Model	R	R-Square	Adjusted R-Square		Std. Error of the Estimate	
1	0.850	0.72327044	0.693		0.0958	
Model	Sum of Squares	Df	Mean Square	F	Sig.	
Regression	1.6100	4	0.40250	3.328	.010(a)	
Residual	2.7662	301	0.00919			
Total	4.3762	305				
Model	Unstandardized Coefficients			Standardized Coefficients	t	Sig.
	B	Std. Error		Beta		
(Constant)	0.856	0.567			1.5101	0.023
Industry regulation	0.612	0.438		0.174	1.3982	0.039
Utilities' restructuring	0.898	0.589		0.309	1.5248	0.021
Private sector participation	0.755	0.502		0.261	1.5046	0.027
Customer service	0.734	0.492		0.258	1.4929	0.032

The regression model ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$) becomes.

Y=0.856 +0.612X₁+ 0.898X₂+0.755X₃+0.734 X₄.....Equation 5

Substituting the dummy variables with the study variables culminates in the following equation:

Performance of electricity sector = 0.856 + 0.612 Industry regulation + 0.898 Utilities' restructuring + 0.755 Private sector participation + 0.734 Customer service.....Equation 6

The model indicates that holding the predictor variables constant, the performance of the electricity sector would be 5.970. The results from the regression analysis revealed that there were beta coefficients of 0.612, 0.898, 0.755, 0.734 for industry regulation, utilities' restructuring, private sector participation and customer service, respectively. The corresponding t and p values for industry regulation (t= 1.3982; p= 0.039), utilities' restructuring (t=1.5248; p=0.021), private sector participation (t= 1.5046; p= 0.027) and customer service (t= 1.4929; p= 0.032) which are statistically significant, because p values were less than 0.05.

Conclusions

Based on the findings, the study has deduced that industry regulation is crucial to the performance of the electricity sector in Kenya. This has been achieved through the establishment of an independent regulator, development of regulations which were aimed at protecting consumers' and investors' interests and the establishment of dynamic policies. Industry regulation has promoted the commercialization of the electricity sector which has opened the sector to investments and enabled implementation of cost-reflective tariffs. The study determines that formulation and development of regulations within the electricity sector has been supported immensely by the electricity sector organizations.

The study concludes that utilities' restructuring improved the electricity sector's performance by providing clear guidelines on the functions of the different utilities, enhancing the commercial operation of the utilities, and helping the government to achieve policy objectives such as electricity connectivity. Restructuring the utilities eliminates conflicts of interest throughout the electricity supply chain, improves the management of the electricity sector organizations, fosters transparency and competition within the sector, prevents cross-subsidies, and boosts the overall sector performance. Furthermore, the utilities' restructuring has reduced monopoly within the sector especially in electricity generation and eliminated conflicts of interest across the electricity supply chain through the distinct separation of roles and responsibilities.

The research findings suggest that private sector participation has a significant influence on the performance of the electricity sector in Kenya, as it offers an alternative means of securing investments to foster sectoral growth. The research findings suggest that the commercialization of utilities has stimulated private sector participation in the electricity sector, leading to a rise in the number of independent power producers and an increase in the installed energy capacity, consequently enhancing the country's electricity supply. The private sector has been instrumental in selling assets within the sector, and private sector investments have eased the government's

burden of funding new power plants. Independent power producers were introduced in 1992 as the quickest way to increase the installed capacity, private investment, and competition in the sector and unburden the government from funding new power plants.

The study concludes that customer service aspects have yielded a great change in the performance of the electricity sector through changes in customer interactions and the provision of services. Prior to the implementation of reforms, the electricity sector in Kenya was beset by inadequate customer service, characterized by extended waiting periods, frequent power interruptions, and erroneous billing. These issues resulted in customer discontentment and a detrimental perception of the sector. From the results, the introduction of prepaid metering has improved the efficiency and reliability of the power supply, efficient billing efforts have reduced technical and commercial losses, and continuous staff training on customer service has facilitated service quality improvement. In addition, electricity reforms have ensured that there have been reduced cases of power outages and a general reduction in customer waiting time and overall quality improvement. The study concluded that Kenya's electricity sector has performed relatively moderately in terms of various aspects. The energy reforms in the electricity sector have strengthened the regulator's independence, partially privatized the electricity generation company, established complementary electricity entities, encouraged private sector participation, and enhanced service delivery by adopting innovative technologies. They have helped to reduce uncertainty and frustration among customers by improving communication between the electricity sector organizations and their customers. Kenya's electricity sector continues to display improved performance with the ongoing energy reforms, as evidenced by the increase in electricity demand and supply, increased electricity access rate and around 90% of electricity generated from renewable sources. The performance improvement can also be attributed to the energy reforms that have assisted the electricity sector organizations refocus their strategies and perpetual cause to meet their core mandates.

Recommendations

The study recommends developing more regulations and reviewing the existing regulations, thereby providing frameworks and structures based on the continually changing environment directed to the pursuit of improving the performance of Kenya's electricity sector. All the key stakeholders should contribute towards the industry regulation reform agenda by proposing significant regulatory interventions.

The study further recommends establishing policies for long-term contractual arrangements within the organizations to enhance the performance of the restructured utilities. To facilitate their efficiency, performance plans may be created with measurable deliverables, performance contracts implemented between the utilities and the government, creation of structures for monitoring performance, the introduction of incentives for management to meet and out-perform performance

plans such as bonuses, undertaking capacity building and training to meet performance standards, and recruiting new or additional management with relevant expertise.

The study established that private sector participation has contributed significantly to better sector performance. Thus, a more conducive environment is needed where the private sector can continue participating. Private sector participation can be increased from electricity generation to fully private power markets (i.e., generation, transmission, distribution, and retail). Kenya can begin with private investment in power generation, building the legal, financial, and technical capabilities pre-requisite to more advanced stages of private participation. This will ensure Kenya retains a strong role at the regulator level even if the electricity market is in private hands.

From the study, customer service is a key differentiator in the performance outcome of organizations in the electricity sector. Therefore, these organizations should invest in robust customer service departments and formulate strategies to improve service delivery. Investing in a robust customer service strategy improves customer satisfaction levels and tangibly impacts the bottom line. Any initiative that drives choice, value and organizations working harder for their customers has to be welcomed. What's more important is understanding what the customers want and how their priorities are, or should be, driving the customer service strategy.

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