

RELATIONSHIP BETWEEN TECHNOLOGICAL STRATEGIES AND VALUE PROPOSITION ENVIRONMENT BY KENYA POWER AND LIGHTING COMPANY PLC IN KENYA.

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**Abstract:** This research aimed to investigate the relationship between technological strategies and the value proposition environment within Kenya Power & Lighting Company PLC. Specifically, it seeks to determine the impact of technological strategies on the value proposition environment, while also exploring the moderating role of Michael Porter's Five Forces. The target population consists of households and Small Medium Enterprises (SMEs) in Murang'a, Embu, and Nairobi Counties, which collectively represent a significant portion of electricity consumers in Kenya. The approximate population of these counties is 313,868 for Murang'a, 1,573,402 for Nairobi, and 184,002 for Embu. The study employed a proportionate sampling method, with percentages for various industries randomly chosen after careful consideration. The Krejcie & Morgan table was utilized to ensure representative sampling. Questionnaires were distributed concurrently across the three counties to ensure data collection consistency. Despite logistical challenges, 259 questionnaires were collected out of the total 384 distributed. Analysis revealed strong positive correlations between technological strategies ( $r=0.742$ ), and Michael Porter's Five Forces ( $r=0.657$ ) with the value proposition environment. These correlations were statistically significant, as indicated by p-values ranging from 0.000 to 0.042. Regression analyses further supported the significance of these relationships. Technological strategies explained 55.0% of the variation. The study underscores the critical role of strategic decision-making in shaping the value proposition environment within Kenya Power & Lighting Company PLC. It highlights the need for comprehensive strategies that consider technological aspects to enhance consumer value and promote sustainable growth in the electricity sector. The study recommends embracing technological innovation for competitiveness, leveraging Porter's Five Forces framework for strategic insights, and fostering a culture of continuous monitoring and adaptation for sustained success.

**Keywords:** Electricity, Technology, Cost, Pricing, Strategies, Monopoly

## I. BACKGROUND OF THE STUDY

Kenya is developing policies that will assist it in attaining sustainable electricity to solve the challenges that have influenced the electricity sector in the country in the past (Constantinides & Slavova, 2020). Development has been associated with enhanced technological advancement and improved efficiency at the functional and service levels. A technological strategy is a set of verdicts related to the custom and development of technology intended to deliberate advantage to the firm. It is also a plan to achieve business goals with information technology (Abdel-Basst et al., 2020).

A value proposition is the benefit an organisation conveys to customers to entice them to purchase their product or enlist their services. It comprises four aspects: cost value, quality value, customer satisfaction and continuous improvement. The cost value is the proposed cost of a product or service vis-a-vis the translated benefit on the consumer (Ngeno & Kinoti, 2017). Quality value is the ability of a product or service to meet thresholds of performance or availability in a sense that makes the consumer feel aptly compensated for their investment (Abdel-Basst et al., 2020).

The electric utility industry's basic activities and structure are divided into three phases: generation, transmission, and distribution. This three-way structure is mainly responsible for the industry's universal regulation and thus requires cautious examination. The Kenya Power and Lighting Company PLC (almost defunct), in conjunction with the Kenya Electricity Transmission Company (KETRACO) and the Kenya Electricity Generating Company (KenGen), maintain a monopoly over the country's electricity sector. The three companies ensure that whichever source of electricity is generated, they retain the licensing to distribute and produce the power (Kott & Kott, 2018).

## II. PROBLEM STATEMENT

The Kenyan electricity sector, monopolized by government entities, has led to a perceived loss of value for consumers due to the disparity between payments and the quality of service provided. These entities, tasked with producing, distributing, and retailing electricity, seem to prioritize minimum service delivery, resulting in lower standards and an inability to meet the growing power demand. Despite calls for competitive electricity supply and distribution services, Kenya Power & Lighting Company remains the sole provider, struggling to meet increasing demand. This monopoly makes it challenging for new entrants. A functional value proposition in this sector requires a customer-centric approach, which is hindered by the existing monopolies. While research has explored competitive advantage strategies used by Kenya Electricity Generating Company PLC, further research is needed on private sector power generation and the overall electricity production industry in Kenya. Despite the majority of Kenya's electricity supply being renewable, the cost of electricity remains high, impacting the quality of life for families due to the price inelasticity of the electric bill. Addressing these challenges is crucial for improving the value proposition and ensuring affordable, sustainable power for the population.

## III. RESEARCH OBJECTIVE

To establish the relationship between technological strategies and value proposition environment by Kenya Power and Lighting Company PLC in Kenya.

## IV. LITERATURE REVIEW

### *Technological strategies and Value Proposition Environment*

In a study on the role of technology in presenting value proposition in medical Chalkidou (2021) utilised a case study approach to review the systems utilised in an American hospital. The research revealed that, the incorporation of technology into medical systems has both positive and negative implications on value proposition. The positive implications concentrate their attention largely on the technological components themselves and, in certain instances, on the people who are directly responsible for managing such systems. When it comes to choices about technical advancements, the negative aspects of the relationship can be seen. Indeed, the strategy to introduce technology and technological gadgets always has a distinct vision that directed the acquisition, distribution, and administration of information technology (IT) resources to assist the company in accomplishing its objectives.

According to Cammarano, Michelino, Lamberti, and Caputo (2019), a technical strategy is also the building of a complete business plan that incorporates concepts, objectives, and methodologies for employing technology to accomplish company goals. While studying the role of technology in R&D corporations, the research targeted corporations in the South American region, and utilized a cross-sectional study approach. The research revealed that distribution utilities are faced with new issues on a daily basis, some of which include the need to boost productivity and reduce the costs of installation and administration, all the while keeping a constant supply of power and a diverse selection of services available to consumers. The research is concurrent with Chalkidou (2021) research, which supports the use of information technology to improve organizational efficiency. Information technology should often be utilized in different ways to ensure that the organization is aware of the imminent trends that the customers desire, in order to eventually implement them. These are necessary tenets that organizational technology should consider if they are to promote value addition.

According to Cammarano et al. (2019), businesses from all over the globe are investing in research and development activities to create more innovative energy storage systems in the hopes of increasing their production while simultaneously reducing their expenses. Customers are putting more pressure on energy providers to provide technological innovations to enhance the quality of their customer relationships and shorten response times. Customers may now contact businesses via a variety of channels, including email, SMS, and the telephone. These channels are also being slowly replaced with better platforms such as social media and video conferencing tools. It is important that a business seeking to be competitive in the modern world, encourage its employees to embrace these tools. The beauty of the tools is that most of them are actually free to use, and guarantee efficiency is management of work, especially where it comes to long distance communication.

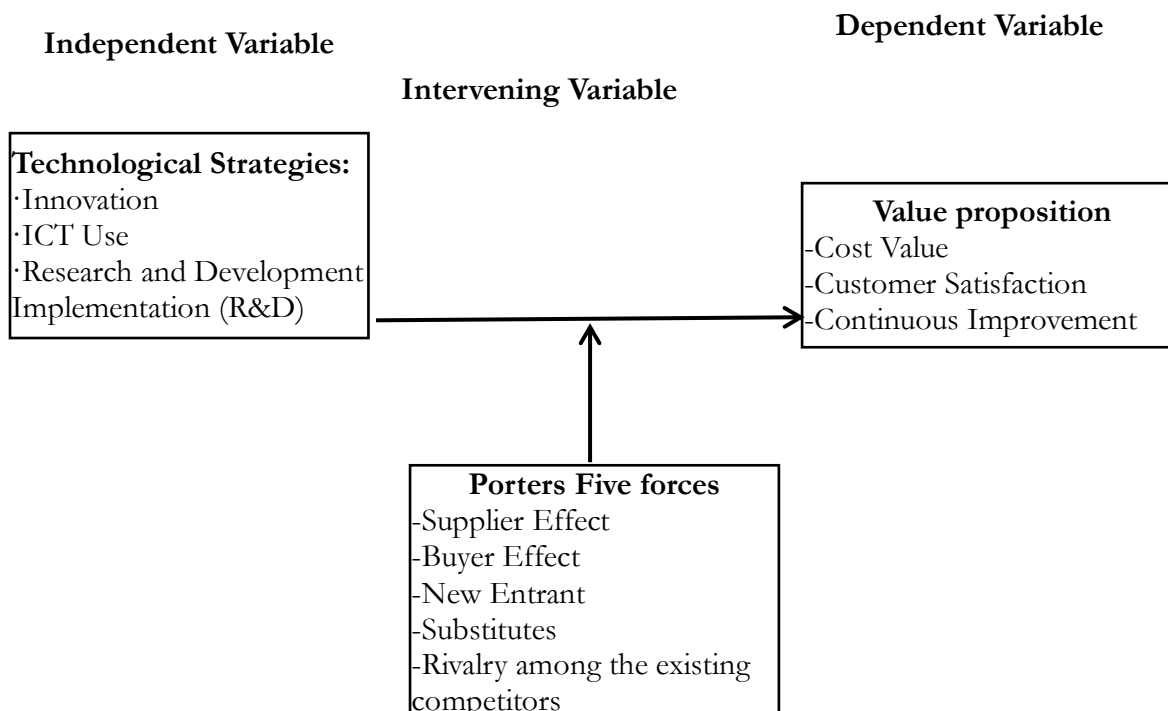
In contrast to Cammarano's study, Mohd Satar, Dastane, & Ma'arif (2019) conducted a study on how the introduction of e-commerce facilities influenced the element of perceived value by the consumer. Indeed, the research relied on a case study of a particular popular e-commerce site, and how consumers felt, about using the site as opposed to failing to use it altogether. The results revealed that many companies in the modern era are simply adding technology as an appendage to their production process. Nonetheless, there is no clear association with particular value tenets for some businesses. This study is in contrast to Chalkidou (2021) who believes that the introduction of technology in a business almost always guarantees value proposition for the consumers.

Utility companies are now being tested on their ability to adapt to the unpredictable nature of electricity generation and use. The search is on for software that will provide businesses the ability to operate the grid in a way that guarantees prompt replies and the highest possible grid performance. Businesses may reduce the amount of money they spend on contact center operations and the amount of time they spend on such operations by employing automated messages on social media. According to the research by Larson (2019), companies are increasingly using automated social media direct message to inform customers about service interruptions and the status of their bill payments.

### ***Conceptual Framework***

The provided conceptual framework encompasses technological strategies, Porter's Five Forces, and the value proposition, which are applied in the context of the Kenyan electricity sector. Technological strategies include innovation, the use of Information and Communication Technology (ICT), and the implementation of Research and Development (R&D). These strategies are essential for staying abreast of technological advancements, improving efficiency, and developing new solutions to meet customer needs. Porter's Five Forces - supplier effect, buyer effect, new entrants, substitutes, and rivalry among competitors - provide a comprehensive analysis of the competitive dynamics in the sector. This framework sheds light on the market conditions and strategic decisions that companies must consider to maintain competitiveness. The value proposition, encompassing cost value, customer satisfaction, and continuous improvement, is integral in attracting and retaining customers. In the monopolistic Kenyan electricity sector, these elements are crucial in delivering value to consumers despite the challenges posed by the monopoly.

The Kenyan government's Feed-in Tariffs (FiTs) policy, implemented to encourage private investment in renewable energy, plays a significant role. By providing favorable tariff structures and assured Power Purchase Agreements (PPAs), it fosters a mutually beneficial relationship between investors and the Kenya Power & Lighting Company. However, despite these efforts, the monopoly in the sector remains a significant barrier to entry, thereby hindering competition and the delivery of a strong value proposition to consumers.



## V. METHODOLOGY

### *Research design*

This study adopted a mixed-method research design. The approach is pragmatic and uses both descriptive/qualitative and quantitative data. Scholars maintain that pragmatism provides the philosophical foundation for social science research, in general, and mixed-methods research, in particular (Morgan, 2014a). Daniel, Kumar, and Omar (2018) describe quantitative research design as a blueprint for data collection, measurement and analysis. They further suggest that the plan and structure of the investigation are used to obtain answers to research questions. It constitutes the overall structure of the research. A qualitative approach was used. According to Kumar (2018), the qualitative study describes characteristics associated with a subject population, which includes asking questions such as who, when, what, and how. Descriptive designs show profiles of persons, events or situations (Daniel et al., 2018). He further states that descriptive design could be used to get information regarding the status of a given situation. Qualitative and quantitative analysis was selected for this study because they help describe the problem under investigation and the relationship between the variables.

The target population consists of households and Small Medium Enterprises (SMEs) in Murang’a, Embu, and Nairobi Counties, which collectively represent a significant portion of electricity consumers in Kenya. The approximate population of these counties is 313,868 for Murang’a, 1,573,402 for Nairobi, and 184,002 for Embu. The study employed a disproportionate sampling method, with percentages for various industries randomly chosen after careful consideration. The Krejcie & Morgan table was utilized to ensure representative sampling. Questionnaires were distributed concurrently across the three counties to ensure data collection consistency. Despite logistical challenges, 259 questionnaires were collected out of the total 384 distributed.

### *Data Collection and Analysis*

The researcher collected data through one primary method: questionnaires. The questionnaires were carefully designed with simple questions to be answered by respondents. The questionnaires shall include online surveys. Questionnaires were offered to the relevant sources to be filled, and responses were mailed to the researcher. The questionnaire had open-ended and closed questions to give objectivity in determining or reinforcing the claims the

researcher had already coined earlier.

Data analysis formed a critical part of the study. Analysing the information was a step towards correctly inferring meaning from the data. Descriptive and inferential statistics were computed (Denis, 2018). Descriptive analysis involved measures of central tendency (mean, mode and median) and dispersion (variance, standard deviation). Inferential statistics included statistical tests, ANOVA and regression analyses.

**VI. RESULTS AND FINDINGS**

The study sought to determine the relationship between technological strategies and value proposition environments, focusing on Kenya Power & Lighting Company PLC in Murang’a, Embu and Nairobi Counties. Various constraints on technological strategies were analysed, and the findings were summarised in the table below.

**Table 1: Descriptive Statistics of Technological Strategies and Value Proposition Environment**

	SD	D	N	A	SA	M	SD
<b>Innovation</b>							
The network coverage improve the reliability of power supply to customers.	3%	12%	9%	51%	25%	4.031	0.808
The provision of quality of power supply has strengthened the electricity network and streamlined processes to improve the customer experience.	6%	7%	13%	48%	26%	4.020	0.907
The increase of installation of transformers provide further access of electricity to the consumers.	5%	15%	11%	42%	27%	3.977	0.915
<b>ICT Use</b>							
The communication and engagement programmes has been effective in customer satisfaction.	14%	20%	17%	42%	6%	2.864	1.426
The system expansion and network upgrade projects affect the cost value and customer satisfaction.	7%	13%	11%	43%	29%	3.942	0.996
Automation of street lights with a complete central monitoring system increase income.	8%	8%	13%	40%	32%	4.000	1.050
<b>Research and Development</b>							
Smart meters will improve efficiency, revenue and customer satisfaction.	10%	14%	19%	30%	27%	4.023	0.837
Introduction of fibre network will increase revenue.	4%	0%	10%	57%	29%	4.062	0.875
Technology advances are expected to reduce the cost of electricity connection.						4.121	1.023
<b>Technological Strategies</b>	11%	12%	14%	36%	27%	<b>3.893</b>	<b>3.982</b>

**KEY:** n= 123, SA=Strongly Agree, A= Agree, N= Neutral, D=Disagree, SD= Strongly Disagree, M=Mean, SD= Standard Deviation

Source. Authors data. 2022

The respondents expressed strong agreement regarding the potential of technological advances to reduce the cost of electricity connection (Mean=4.121, SD=1.023). They also perceived the introduction of a fibre network as a means to increase revenue (Mean=4.062, SD=0.875), and believed that smart meters would enhance efficiency, revenue, and customer satisfaction (Mean=4.023, SD=0.837). Additionally, there was consensus that automating street lights with a complete central monitoring system could lead to increased income (Mean=4.00, SD=1.050). Furthermore, respondents recognized the positive impact of network coverage on the reliability of power supply to customers (Mean=4.031, SD=0.808), and the strengthening of the electricity network through the provision of quality power supply, which streamlined processes to enhance the customer experience (Mean=4.020, SD=0.907). While they acknowledged the increase in transformer installations for broader electricity access (Mean=3.977, SD=0.915), they also noted the effects of system expansion and network upgrade projects on cost value and customer satisfaction (Mean=3.942, SD=0.996). However, there was less agreement on the effectiveness of communication and engagement programs in enhancing customer satisfaction (Mean=2.864, SD=1.426). Overall, these findings suggest a generally positive outlook on various technological and infrastructural initiatives within the electricity network, albeit with some variation in perception regarding communication strategies.

**Table 2: Correlation analysis**

		Value Proposition	Technological Strategies
Value Proposition	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	259	
Technological Strategies	Pearson Correlation	.742**	1
	Sig. (2-tailed)	0.000	
	N	259	259

The technological strategies exhibit a robust positive correlation ( $r = 0.742^{**}$ ) with the value proposition environment. This suggests that investments in technological advancements and innovations by Kenya Power and Lighting Company PLC contribute significantly to improving the value proposition environment in the electricity sector. Wang and Guo et al. (2019) demonstrated that companies leveraging technology effectively can gain a competitive edge and enhance customer value propositions, which is consistent with the findings of this study.

**Table 3: Regression Model Results on Technological Strategies**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742 <sup>a</sup>	.550	.548	.67068

a. Predictors: (Constant), Technological Strategies

**ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	141.208	1	141.208	313.922	.000 <sup>b</sup>
	Residual	115.603	257	.450		
	Total	256.811	258			

a. Dependent Variable: Value Proposition

b. Predictors: (Constant), Technological Strategies



Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.304	.156		8.341	.000
	Technological Strategies	.684	.039	.742	17.718	.000

a. Dependent Variable: Value Proposition

The study sought to establish the relationship between technological strategies and the value proposition environment in Kenya Power and Lighting Company PLC in Kenya. From this, the hypothesis of the study was drawn: *H01: To establish the relationship between technological strategies and value proposition environment by Kenya Power and*

*Lighting Company PLC in Kenya.*

The null hypothesis was examined to determine whether technological Strategies had any significant effect on the value proposition environment in Kenya Power and Lighting Company PLC in Kenya. A coefficient of determination was calculated to determine the degree to which technological strategies impacted the value proposition environment as shown in Table 3. The model indicated that the adoption of technology strategies accounted for 55.0% of the variation in Kenya Power and Lighting Company PLCs in Kenya and value proposition environment. Analysis of Variance (ANOVA) was used to ascertain whether technological strategies were a significant predictor of the value proposition environment in Kenya Power and Lighting Company PLC in Kenya as shown. The table indicates technological strategies was a significant predictor of the value proposition environment in Kenya Power and Lighting Company PLC in Kenya [ $F(1, 258) = 313.922, p < .05$ ].

The hypothesis that, *there is no statistical significant relationship between technological strategies and value proposition environment in Kenya Power and Lighting Company PLC in Kenya*, was rejected, since it was evident that the relationship was substantial.

The regression coefficients were also computed. The findings showed that the coefficient for technological strategies was 0.684. The model was computed as follows:

$$Y = 1.304 + 0.684X_1 + \epsilon$$

The findings indicated that a unit increase in technological strategies led to a 0.684 increase in the value proposition environment in Kenya Power and Lighting Company PLC in Kenya. The p-value was found to be  $0.00 < 0.05$  which showed a significant relationship between technological strategies and the value proposition environment in Kenya Power and Lighting Company PLC in Kenya. Hence, the study rejected the null hypothesis that there is no relationship between technological strategies and value proposition environment in Kenya Power and Lighting Company PLC in Kenya. We therefore conclude that technological strategies have a statistically significant influence on value proposition environment in Kenya Power and Lighting Company PLC in Kenya.

## VII. DISCUSSION OF FINDINGS

The research findings highlight the significant impact of technological factors on electricity distribution, presenting challenges for Kenya Power in setting consumer-friendly prices. Larson's (2019) discussion on the influence of technology in the electricity sector underscores the intricate relationship between technological advancements, electricity consumption, and production. The study delves into the expansion of information and communication technology (ICT) and its effects on power consumption, offering insights into the implications for energy policy. Indeed, technology plays a pivotal role in shaping the landscape of electricity distribution in Kenya. The adoption of ICT solutions facilitates the optimization of operational processes, enhances service delivery, and improves the overall efficiency of electricity utilities. However, these technological advancements also come with associated costs and complexities.

The introduction of smart meters, automation systems, and other technological innovations incurs significant investment and operational expenses for organizations like Kenya Power. While these technologies offer

numerous benefits, such as real-time monitoring, data analytics, and remote management capabilities, their implementation poses financial challenges for the organization. Moreover, technological factors introduce additional considerations for pricing strategies and value proposition dynamics within the electricity sector. The integration of advanced metering infrastructure (AMI) and smart grid technologies enables more precise monitoring of electricity consumption patterns, facilitating demand-side management and tariff optimization. However, the deployment of these technologies necessitates careful cost-benefit analysis to ensure that the benefits outweigh the associated expenses. By leveraging technology effectively, Kenya Power can enhance its operational efficiency, improve service quality, and optimize pricing strategies to better meet consumer needs and preferences. However, it is essential to strike a balance between technological advancements and cost considerations to ensure the sustainability and affordability of electricity services for consumers.

## VIII. CONCLUSION OF THE STUDY

The extensive review of literature on technological strategies and their implications for corporate value creation underscores the critical importance of embracing technology as a strategic lever for driving innovation, enhancing operational efficiency, and creating sustainable value for stakeholders within the electricity utility sector, particularly for Kenya Power and Lighting Company PLC (KPLC). By adeptly utilizing technological strategies, KPLC can bolster its competitive advantage, enhance stakeholder perceptions of value, and foster sustainable growth. Strategic investment in technological infrastructure, digital solutions, and innovation is crucial for enhancing operational efficiency, reducing costs, and delivering superior customer experiences. The findings collectively emphasize that strategic alignment with technological trends and innovations is essential for KPLC to maintain relevance, sustain competitive advantage, and drive long-term success in the rapidly evolving energy landscape. The synthesis of these insights underscores the strategic imperative for KPLC to invest in technology, digital transformation, and innovation as essential drivers for enhancing operational efficiency, customer experiences, and long-term competitiveness in the electricity utility sector.

## IX. RECOMMENDATIONS OF THE STUDY

The technology used in Kenya power needs to be consistently reviewed and upgraded. There are cases where, with technology, consumers still managed to compromise the integrity of the devices used. The improvement of technologies is vital, as technology does become out-dated with time. Kenya Power should thus not take exception with their technology as well. They need to have the technology constantly reviewed and improved where necessary. Technology issues often arise with the case of delay in receipt of tokens upon purchasing the power tokens online. These delays need to be handled in a manner that they will not reoccur in the future.

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