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Effects of Household Revenue Level Due to Rural Electrification on Growth of Small and Medium Enterprises (SMEs) in Coastal Region, Kenya

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Abstract:
Rural electrification is a very important process to provide access to modern energy, especially to the poor people in developing countries like Kenya. Rural electrification programs in Kenya focus on providing development assistance through the supply of electricity services to stimulate economic productivity and enhance the quality of life in rural areas. These projects do not start with an assessment of the needs of the people that they are meant to serve. The rural electricity evaluation programs at present are confined to measuring only quantifiable variables, such as the number of households electrified. Moreover, the impact of electrification on rural SME operations is also seldom evaluated. The objective of this research study was to establish the effects of household revenue levels due to rural electrification on the growth of small and medium enterprises in the coastal region of Kenya. The study area was the Coast region. This study adopted an exploratory research design. The target population for this study comprised 172,556 small and medium enterprises (SMEs) registered in the coastal region by 2023. The study adopted multi-stage sampling, systematic and simple random sampling techniques due to the large target population involved. A total of 381 responses were received out of a target population of 399 respondents. This represented a 95.5% response rate from these study results. The majority of the respondents agreed that there was an extent of revenue level growth of small and medium enterprises (SMEs) in Kenya, and the majority of the respondents agreed that there was an extent of revenue level growth of small and medium enterprises (SMEs) in the coastal region, Kenya. The results show a strong positive correlation coefficient of 0.944, which is statistically significant (p<0.05), showing that there is a significant effect of the revenue level of the household due to electrification on the growth of small and medium enterprises in the coastal region of Kenya. Further, the overall revenue level is positively affecting the growth of small and medium enterprises in the coastal region of Kenya. The study recommends that SMEs emphasize the use of machines a s i t enhances income due to improved quality products and services.

Keywords: Growth, revenue level, small and medium enterprises, gross domestic product

1. Introduction

1.1. Background of the Study

Economic growth was first introduced by the British professor Sir William Petty. He introduced the concept of Gross Domestic Product (GDP) between the 1650s and 1670s (Anis, 2019). It was introduced as British people faced high taxes. Therefore, petty emphasized that the total income should be equal to the total spending (The Economist, 2013). In 1965, Charles Devenant started developing an estimate of the GDP (Coyle *et al.,* 2014). The final and current version of the GDP concept was finalized in the US Congress in 1934, acknowledging GDP as a main instrument for measuring any country's economy and economic growth. Small and medium enterprises (SME) and economic growth (EG) are vital elements contributing to the progress of any developing or developed nation, as SMEs contribute an average of 95% of the private enterprises and between 60%-70% of jobs in most OECD countries (OECD, 2018).

However, the relationship between SME development and economic growth in developed countries such as the United Kingdom and developing countries such as Kenya is considered an under-researched topic. SMEs are vital in the 21st century in the development of most of the countries. They contribute to reducing unemployment, increasing exports and, most importantly, the creation of new innovative ideas (Ayandibu & Houghton, 2017). In the same context, economic growth is the main driver towards eliminating poverty in most of the countries, especially the developing ones. Moreover, it is affected by the GDP rate, workforce and evolving investments (OECD, 2017). The objective of this research study was

to establish the effects of revenue level due to rural electrification on the growth of small and medium enterprises in the coastal region of Kenya. The study area was the Coast region.

According to the Global Entrepreneurship Index, the UK is considered the 4th in the SMEs (Global Entrepreneurship Index, 2019); SMEs contribute tremendously to decreasing unemployment alongside their massive contribution to the GDP and increasing individual wealth (Roper & Hart, 2018). According to IEA and WB (2017), more than 1 billion people globally live without electricity access, and more than 3 billion are reliant on biomass to meet their household cooking needs. The problem is heavily concentrated in rural areas, where only 73 percent of people globally have access to electricity, compared to 96 percent in urban areas (IEA & WB, 2017).

Africa, as a developing economy, has the potential to drive growth by employing various sources of funding, such as crowdfunding. They can employ crowdfunding to leapfrog the traditional capital market structures and financial regulatory regimes of the developed world (World Bank, 2017). In the case of Sub-Saharan Africa, the World Bank estimates the market potential of crowdfunding to reach 2.5 billion by 2025 (Adekoya, 2019). Similarly, a report published by order of the UK Department for International Development concluded that crowdfunding can positively support development programmes through a number of applications.

In 2014, electricity produced from Kenya's natural endowments accounted for 56 percent of its capacity, with a large share coming from geothermal origins (19.1%), which continued to grow in 2015 (26.6%). Notably, Kenya owns the largest single geothermal plant in the world in Olkaria IV (140 MW) which produces the cheapest electricity in the country (Millien, 2017).

Building new capacity and extending new transmission and distribution lines are considered Kenya's two main priorities. Consequently, two strategic projects: a quantified roadmap for building new capacity for which KPLC is responsible, and the Last Mile Connectivity project, which was launched by the REA in 2015 have been initiated (Millien, 2017).

1.2. Statement of the Problem

According to Maleko (2019), the growth of rural SMEs is influenced by the increased availability and reliability of different electrification projects. These stimulate the establishment and expansion of SMEs. A study by Yasin and Ali (2023) investigated the effect of electricity supply on the performance of SMEs by making comparisons between SMEs connected to the national grid and those that were not connected to the national grid. Despite the impressive gains the government has made in providing electricity to populations living in the coastal region, the SMEs in the region have not yet achieved the desired level of growth, even in areas where the rural electrification program has been rolled out fully (Ouma, 2018). Access to electric lighting in rural areas can increase the quantity and quality of agricultural products, and the use of electricity-powered tools and equipment such as refrigerators and freezers can make it possible for small and medium enterprises to produce more goods and services (Kumar, Mohanty & Samanta, 2022).

1.3. Objective of the Study

The objective of the study is: To examine the effect of household revenue level due to electrification on the growth of small and medium enterprises in the coastal region of Kenya.

2. Literature Review

An SME is successful if it is growing. Growth has various connotations: It can be defined in terms of revenue generation, value addition, and expansion in terms of the volume of the business. It can also be measured in the form of qualitative features like market position, quality of product, and goodwill of the customers (Kruger, 2004). SME's business growth is a vital indicator of a flourishing enterprise. There are many factors, such as the characteristics of the entrepreneur and access to resources like finance, electricity, and manpower, that affect the growth of the enterprise and differentiate it from a non-growing enterprise (Morone & Testa, 2008). Household income is defined as the total gross income before taxes received within a 12-month period by all members of a household above a specified age. The Census Bureau notes this threshold as 15 and older. It includes (but is not limited to) wages, salaries, self-employment earnings, Social Security benefits, pensions, retirement income, investment income, welfare payments, and income from other sources. The definition of household income and its components varies depending on the context. The term may be defined in law or regulation or may be determined by researchers or authors as an amount that includes or excludes specific items of income.

Some empirical studies (Khandker *et al.,* 2011) show that electricity access boosted household employment, income, or both, but they do not identify the actual productive activities that generated these results. In the Philippines, a study in four provinces found that 25% of households in the electrified areas are running a home business (mainly small retail shops) compared to 15% in non-electrified areas (ESMAP, 2002). Electricity and its reliability are among several considerations when MSEs make investment decisions to enhance productivity. An evaluation of Word Bank-assisted rural electrification projects in Asia indicates that rural electrification in Bangladesh and India enhances non-farm income, thereby significantly enhancing household well-being (Songco, 2002). A study conducted in Bhutan by the Asian Development Bank (2010) also found positive effects of electrification on non-farm income but not on farm income. Non-farm incomes of electrified households were found to be 50-72 % higher than those of non-electrified households, but these accounted for only 21-29 % of household income. On average, incomes for home businesses using electricity are higher than those who do not use electricity (Energy Sector Management Assistance Program, 2002).

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3. Research Design and Methodology

This study adopted a positivism paradigm since events of interest are objective, external and independent of the researcher (Bryman *et al.*, (2003). According to Cohen and Crabtree (2006) and Saunders *et al.* (2019), positivist philosophy is adopted when working with observable social reality, and the end product of the research can be generalized in the form of law. This study adopted descriptive and inferential statistics explanatory design. This is in accordance with Saunders *et al.* (2019), who stipulated that explanatory research seeks to establish a causal relationship between variables. The target population for this study was 172,556 rural registered and active micro and small and medium enterprises in Taita-taveta, Kilifi, Kwale, Lamu and Tana-river Counties (SME Founders Association, 2023). This study adopted a multi-stage sampling technique. This study adopted a multi-stage sampling technique. Multi-stage sampling is the probability sampling technique wherein the sampling is carried out in several stages, such that the sample size is reduced at each stage. This study adopted a multi-stage sampling technique. The survey was conducted using a structured questionnaire and structured record reviews of selected counties.

To operationalize these variables, proxy variables related to these indicators, several for each, were asked. These proxy variables were then subjected to Principal Component Analysis (PCA) to come up with one score that acted as the variable of interest. To determine the effect of independent variables on the dependent variable, multiple linear regression models were applied.

4. Results and Discussions

4.1. Descriptive Statistics

To assess the extent of the effect of the revenue level of the household due to electrification on the growth of small and medium enterprises in the coastal region of Kenya, respondents were requested to respond on five attributes of the revenue level of the small and medium enterprises in the coastal region, Kenya they represented. Descriptive data shown in table 1 presents the relevant results on a scale of 1–5 (where 5 = Strongly Agree and 1 = Strongly Disagree) and were ranked on a scale as follows: 1.0–1.7 (strongly disagree); 1.8–2.5 (disagree); 2.6–3.3 (neutral); 3.4–4.1 (agree); and 4.2–5.0 (strongly agree).

Statements	N	Mean	Std. Deviation
The use of machines enhances income due to improved quality products and services.	381	4.5197	.61367
The availability of electricity enables enterprises to operate for more hours, leading to enhanced income.	381	4.2546	.61195
Electrification leads to the diversification of businesses that enhance income for households.	381	4.1076	.76878
Electrification enhances income by attracting more people t o rural areas due to a ready market for goods and services.	381	4.3517	.99323
The use of electricity reduces operation costs and results in increased profit.	381	4.2126	.69164
Overall average	381	4.2892	.7359

Table 1: Household Revenue Level and the Growth of SMEs

From these study results, the majority of the respondents agreed that there was an extent of revenue level on growth of small and medium enterprises (SMEs) in the coastal region of Kenya. These results are supported by the results of Khandker *et al.* (2013), which show that electricity access boosted household employment, income, or both. However, they do not identify the actual productive activities that generated these results. Further, in the Philippines, a study in four provinces found that 25% of households in the electrified areas are running a home business (mainly small retail shops) compared to 15% in non-electrified areas (ESMAP, 2002). Electricity and its reliability are among several considerations when SMEs make investment decisions to enhance productivity (Mudi & Waswa, 2020). Moreover, the aspect of "Use of machines enhances income due to improved quality products and services" scored the highest mean (M=4.5197, SD = 0.61363) among the other aspects of revenue level, meaning that it is the most vital aspect in the growth of small and

medium enterprises (SME's) in Coastal region, Kenya. On average, the study revealed that there was a strong extent of revenue level (M=4.2892, SD=0.7359) on the growth of small and medium enterprises (SMEs) in the coastal region of Kenya.

4.2. Inferential Statistics

After normality tests for the distribution of data on the variables were successful, correlation analysis was carried out to test the effects of rural electrification on the growth of small and medium enterprises in the coastal region of Kenya. Table 2 presents bivariate correlation results between revenue level and the growth of small and medium enterprises in the coastal region of Kenya.

		SMEs' Growth	Revenue Level
SMEs' growth	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	381	
Revenue level	Pearson Correlation	.944**	1
	Sig. (2-tailed)	.000	
	N	381	381

Table 2: Bivariate Correlation Results between Revenue Level and the Growth of
Small and Medium Enterprises in Coastal Region, Kenya

4.2.1. Testing of the Null Hypothesis

To examine the effect of revenue level of the household due to electrification on the growth of small and medium enterprises in coastal region, Kenya, a null and alternate hypothesis was tested.

The null hypothesis that there is no significant effect of the revenue level of the household due to electrification on the growth of small and medium enterprises in the coastal region of Kenya was tested against the alternate.

The following is the null hypothesis used:

- H_{01}: There is no significant effect on the revenue level of the household due to electrification on the growth of small and medium enterprises in the coastal region of Kenya.

The results in table 2 show a strong positive correlation coefficient of 0.944 which is statistically significant ($p<0.05$). This leads to rejecting the null hypothesis and accepting the alternate hypothesis that there is a significant effect of the revenue level of the household due to electrification on the growth of small and medium enterprises in the coastal region of Kenya.

This means that the overall revenue level is positively affecting the growth of small and medium enterprises in the coastal region of Kenya.

5. Conclusions and Recommendations

5.1. Conclusions

This study was guided by one objective, and after data analysis, it is concluded that the revenue level of the household due to electrification affects the growth of small and medium enterprises in the coastal region of Kenya.

The results show a strong positive correlation coefficient of 0.944, which is statistically significant ($p<0.05$).

5.2. Recommendations

Based on the findings of this study, it is recommended that the board and management of small and medium enterprises in the (SMEs) Founders Association should start thinking of using machines as the use of machines enhances income due to improved quality products and services. This was demonstrated when the revenue level variable attribute scored the highest mean (M=4.5197, SD = 0.61363) among the other aspects of variables, meaning that it is the most vital aspect in the growth of small and medium enterprises (SMEs) in the coastal region, Kenya.

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