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Assessing the Effect of Rural Electrification Adoption on the Growth of Micro-Enterprises in Tanzania: A Case Study of the Grain Milling Business in Kisarawe District, Tanzania

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Abstract:

The study assessed the effect of rural electrification adoption on the growth of micro-enterprises in Tanzania, a case study of grain milling business in Kisarawe district. Specifically, the study aimed at examining social and economic factors affecting accessibility of rural electrification adoption, the reliability of rural electrification, and the perception on rural electrification adoption in Kisarawe grain milling business. A non-probability sampling technique was deployed and the required sample was selected using purposive sampling method. The obtained data were analyzed quantitatively using descriptive analysis and multiple linear regression analysis. Generally, it was found that socioeconomic factors had a strong significant relationship (R-Squire 0.886; p-value < 0.0001) with the adoption of rural electrification in the studied area; a significant strong correlation between the reliability of electricity and the adoption of rural electrification (R-Squire = 0.724; p-value < 0.0001) while users' perceptions have significant (p-value = 0.021) and moderate (R-Squire = 0.548) effects on the adoption of rural electrification. The study recommends that to rural electrifications should guarantee that their workers are educated and knowledgeable in community mobilization and public relations to improve public opinion of rural electrifications and to urge communities to apply for power connections. Project implementers must include community engagement in their project designs, implementation, and other decision-making processes to foster a sense of ownership and assure the sustainability of rural electrifications. Rural electrification project implementers must also ensure that monitoring is an intrinsic element of their initiatives.

Keywords: Rural electrifications, micro-enterprises, socioeconomic factors, reliability, perception

1. Introduction

Most discussions on rural electrifications such as (Bishoge et al., 2018; Groth, 2019; Kariuki et al., 2016 and Riva et al., 2018) accept that many people around the world, in rural areas don't have access and reliable electricity. Despite, Jimenez (2017) indicated that many initiatives in Tanzania including lighting rural Tanzania installed solar lanterns and solar home systems to mostly low-income households; Tanzania Renewable Energy Association (TAREA), which focuses on improving renewable energy technologies and expanding access to renewable energy in Tanzania, and provides ten distinct services including advocacy and awareness work, community access programs, and renewable energy policy initiatives, and; Tanzania Rural Electrification Expansion Program (TREEP), which started in 2013 and will end in 2022 with aiming of connecting 2.5 million poor Tanzanian households to the national electricity grid and thus build the country's renewable energy capacity and contribute to the government's energy development projects in Tanzania. Nevertheless, Kariuki et al., (2016) recommends that several communities in rural areas have been noticed to not get the required electrification services.

Generally, Robert et al., (2019) indicated that Tanzania's energy sector must continue to improve in order for the country to thrive economically, attract Foreign Direct Investment (FDI), and extend its regional and worldwide commercial relations. Despite Tanzania's installed generation capacity of 1,513 megawatts (MW), or 0.033 kW per capita, demand is high due to increased foreign investment and a growing population (Riva et al., 2018). Nevertheless, urban electrification takes more privileged than the rural regions in Tanzania Mainland, leading to a gap in power demand as per the growth and expansion of rural socio-economic growth and development, which is between 10-15% per year (Jongo et al., 2019).

Consequently, the socio-economic development in various rural areas still lags behind the advancements and practical improvements (Jimenez, 2017). Taking Kisarawe district as a case study, there is still poor electrification

development despite the area's high agricultural and industrial development potential which could be supported by grain mills, which is a major contributing factor of household socio-economic development.

Therefore, there is still a need to further learn and explore knowledge as to what extent the rural electrification can support small and medium enterprises (Grain Mills) in rural areas (Kisarawe District) in Tanzania. However, it is with no doubt that access to reliable electricity is the backbone of any modern economy. Hence, this study assesses the effect of rural electrification adoption on the growth of micro-enterprises in Tanzania.

Thus, the study specifically examines social and economic factors affecting accessibility of rural electrification adoption in Kisarawe grain milling business, the reliability of rural electrification adoption in Kisarawe grain milling business, and perception on rural electrification adoption in Kisarawe grain milling business.

2. Literature Review

2.1. Key Concept

2.1.1. Micro Enterprises

In Tanzania, the United Republic of Tanzania's Ministry of Industry and Trade provides a description of micro-enterprises in its SMEs Development Policy. The total number of employees, total investments, and sales turnover are the most widely utilized metrics. Therefore Kariuki et al.,(2016) defines Micro-Enterprises as business that employ up to four individuals, most of whom are family members, and have a capital of up to TZS 5 million.

2.1.2. Rural Electrification

Rural electrification can simply be defined as the mechanism by which rural and remote areas receive supply (Sankaravelu, 2014). In Tanzania rural electrification program has been in place since the early 1970s, with the goal of providing dependable and high-quality supplies that may be used for home, industrial, and commercial reasons (Bezerra et al., 2017)

2.1.3. Socio Economic Factors

Socioeconomic factors is a combined economic and sociological complete measure of a person's or family's job experience, economic access to resources, and social status in relation to others (Bishoge et al., 2018).

2.1.4. Reliability

When a measure generates consistent results under the same conditions, it is considered to have high reliability. Agarwal et al., (2019) argued that a dependable power system has enough generation, demand response, and network capacity to reliably supply customers with the energy they need.

2.1.5. Adoption

Adoption is a behavior resulting from learning and deciding over a period of time (Bhandari & Thapa, 2018) explained therefore, adoption of a specific action is a result of repetitive decisions.

2.1.6. User Perception

Touch, sight, sound, smell, and taste are the five senses that make up perception (Jani, 2018). It also contains proprioception, a combination of senses that allows you to notice changes in your body's posture and movement

2.2. Theoretical Literature

Dufe (2015) examined the factors influencing accessibility of rural electrification in Kenya, with a specific focus on Naivasha Constituency. The study adopted a survey design and focused on the Rural Electrification Authority projects Naivasha. Data was collected from a sample size of 221, representing about 10% of the target population. The data was analyzed using thematic and content analysis. Findings indicated that the Rural Electrification Authority has adequate policies to facilitate its performance on the provision of rural electrification but lacks sufficient funding; monitoring is not conducted on a continuous basis and public participation was found to be lacking; demand for has been rising due to people's ability to pay due to improved incomes generated from employment and small business enterprises and lastly majority of the residents are aware of the alternative power sources available, e.g. solar and biogas which are relatively cheaper to install and more reliable in comparison to grid connection.

Zhang et al (2019) study socio-economic development and access in developing economies: Along-run model averaging approach. This paper adopts a Bayesian Model Averaging (BMA) approach to selects important factors related to access from 26 socio economic indicators using a sample of 48 developing countries, and reveal their long-term relationship with access. The results show that access to finance, education, economic development, infrastructure, and industrialization are positively related to access in the long-run.

Ngwenya (2013) examined stakeholders Perception of Socio-Economic Benefits of Rural Electrification Program in Zimbabwe: A Case of Umzingwane District. The findings of the study revealed that mostly literate respondents perceived that Rural Electrification Program brought more benefits on service delivery especially on health, communication and human resources retention, while the illiterate, who comprised mainly the villagers, perceived that the Rural Electrification Program did not bring much of benefits to them.

2.3. Theoretical Framework

2.3.1. Instance Theory of Attention and Memory (ITAM)

Logan, (2002) explained that, the ITAM presumes that users experience two choices processes when deciding between alternatives- the choice of attention and categorization. While attention is based on the competing displayed alternatives, categorization involves choosing between classes of displayed alternatives.

Categorization is a product of instances accumulation. Repetitive occurrence of instances leads to learning and forming memory. Memories are inward looking while attention is outward looking towards the choice of displayed alternatives. Memory theories perceives that a user on making a choice, looks into traces of memory formed over time while attention theories assumes that a choice towards displayed alternatives occur simultaneously on the time of making the choice.

ITAM holds that, the race beneath the two choices occurs on the same time and can therefore be considered one. A user can select and categorize a single alternative under the same cognition process (Logan, 2002).

2.3.2. Consumer Behaviour

A series of physical and psychological actions occurring before and after a purchase has been made are referred to as consumer behaviour (Mirzaei & Ruzdar, 2010). Consumer behaviour concept highlights that when making a purchase decision, a consumer consciously or unconsciously take into consideration four factors named as personal factors, social factors, cultural factors and psychological factors.

Personal factors include color preferences, product model preference as well as level of consumer's income. Social factors include the social environment of the consumer which includes family, reference groups and consumers' social status. The psychological factors on the other hand involve the feelings and perception of the consumer towards alternatives.

Bray, (2008) indicated that, a consumer as an 'economic man' is considered rational and therefore seeks to obtain maximum utility form a purchase while using minimal costs or efforts. In this case, a consumer is aware of available alternatives on display and is able to rank the alternatives to choose an alternative that provides maximum utility. For this to hold true, a consumer needs to have information, time and motivation to make the right consumption decision which is not always the case in reality (Bamossey & Solomon, , 2016).

2.3.3. Theory of Change (ToC)

The Theory of Change (ToC) is a specific type of methodology for planning, participation, and evaluation that is used in companies, philanthropy, not-for-profit and government sectors to promote social change (Morrison and Lundgren, 2004). ToC defines long-term goals and then maps backward to identify necessary preconditions. ToC explains the process of change by outlining causal linkages in an initiative, i.e. its shorter-term, intermediate, and longer-term outcomes (Agrawal, 2007).

Since, the study is about the assessment of the effect of rural electrification adoption on the growth of micro-enterprises in Tanzania: Then, the TOC is applied with the implication that it has perspectives which can be applied increase the reliable electricity services in Tanzania. Moreover, ToC is related to this study in such a way that it can be applied to emphasize the rural electrifications management model. A theory of change explains how rural electrifications projects activities are understood to produce a series of results that contribute to achieving the final intended impacts. It can be developed for any level of implementations in enabling growth of micro-enterprises in Tanzania.

2.3.4. Control Theory

The Control Theory (CT) takes on several forms depending on the application. Control is typically defined by personnel administrators and behaviorists in terms of the effect it has on the individual being controlled or the instruments that the controller is likely to use. Personnel administrators and behaviorists are likely to define control in terms of the effect it has upon the individual being controlled or the tools which the controller is likely to employ. System analysts prefer to describe the functions of computers in relationship to controls.

The proposed control theory if applied may extend the application scope of the decision tree model under the rural electrification programme, it could be applied to different types of rural electrification and even urban electrification resource data. The control theory goes beyond the manual or paper work, whereas the computerization can be helpful by determining different issues, managerial perspectives related to rural electrification in the particular area. Control theory can be applied to determine the average growth of micro-enterprises, trends, and performance of rural electrification on grain mills, permanent sample plot data and unperformed rural electrification, unmet demand of micro-enterprises (grain Mills) data, which are basics for rural electrifications sustainability and interventions.

Generally, empirical evidence on the impact of electricity services on micro-enterprise success or failure is lacking for the case of Kisarawe. This lack of information/research about the role played by rural electrification services in the performance of micro-enterprises in rural areas may be reflected in the lack of attention paid by responsible institutions, policymakers, and other stakeholders about rural electrification programs. This research is expected to fill a part of this gap. This research on rural electrification of Kisarawe and it has been tried to find out how electrification can change the economic status as well as rural enterprises.

The framework of the relationship between the studied variables are conceptualized as illustrated in Figure1 below.

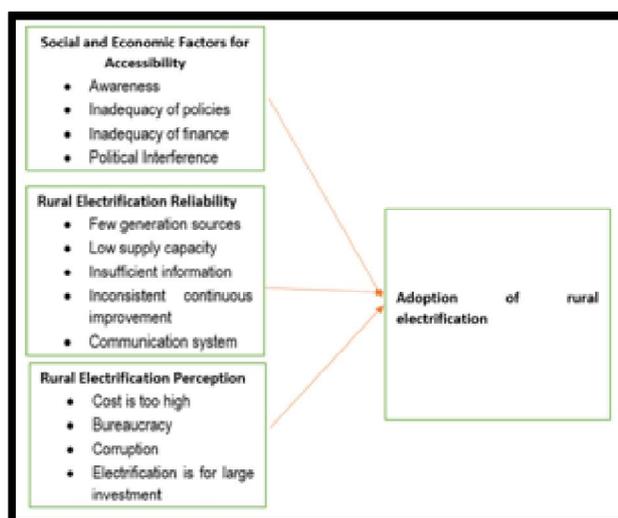


Figure 1: Conceptual framework
Source: Researcher Own Developed (2021)

3. Methodology

A non-probability sampling technique was deployed and the required sample was selected using purposive sampling method. The obtained data were analyzed quantitatively using descriptive analysis to illustrate the characteristics of study variables for each specific objective. Multiple linear regression analysis was applied to determine the significance level of each study independent variable in affecting or determining the dependent variable and to explain the results. Percentage values, commonly known as p-values, were used to assess such significance levels as well as establish correlation strength between independent and dependent variables using R-square.

4. Findings and Discussions

4.1. Social and Economic Factors Affecting Accessibility of Rural Electrification Adoption in Kisarawe Grain Milling Business

The respondents were asked to tick the choices on a Likert scale that accurately reflects the extent to which social and economic factors affecting accessibility of rural electrification.

Generally, it was found that socioeconomic factors had a strong significant relationship (R-Squire 0.886; p-value < 0.0001) with the adoption of rural electrification in the studied area.

Socioeconomic factors that could significantly predict adoption of rural electrification were people's level of income (p-value < 0.0001), people's awareness of the need for power (p-value = 0.027), inadequacy of finance on effective rural electrification (p-value = 0.046), inability to pay (p-value < 0.0001), political interference (p-value = 0.002), and rural electrification project feasibility (p-value < 0.0001).

Other variables were noted to have no significant power to predict adoption of rural electrification since their p-values were greater than 0.05. These were: a lack of depth and frequency of monitoring (p-value = 0.690), inadequacy of policies (p-value = 0.161), people's negative perception towards power access (p-value = 0.159), and lack of alternative sources of power (p-value = 0.368).

4.2. The Reliability of Rural Electrification in Kisarawe Grain Milling Business

The second objective intended to determine the reliability of rural electrification in Kisarawe Grain Milling Business in Tanzania. Thus, the findings below are presented based on the responses from the respondents' choices on the Likert scale that accurately reflects the reliability of rural electrification.

The regression results show that there is a significant strong correlation between the reliability of electricity and the adoption of rural electrification (R-Squire = 0.724; p-value < 0.0001). However, reliability of electricity could contribute up to 70.8% of rural electrification (Adj R-Squire = 0.708). Three variables were found to have significant power to predict adoption of rural electrification. These were the current generation heavily depend on hydropower in the generation of electricity (p-value < 0.0001), low supply capacity (p-value = 0.003), and the absence of power outages without a reason (p-value < 0.0001) as well as continuous improvement for better supply (p-value = 0.049).

4.3. The Perception on Rural Electrification Adoption in Kisarawe Grain Milling Business

The third objective of the study intended to examine the perception on rural electrification adoption in Kisarawe grain milling business in Tanzania. Using questionnaire, the respondents were recommended to tick the choices on the Likert scale that accurately reflects the perception on rural electrification adoption in Grain Milling Business.

The results noted that users' perceptions have significant (p-value = 0.021) and moderate (R-Squire = 0.548) effects on the adoption of rural electrification. The result continued to show that perceptions that the cost of accessing and using electricity is high (p-value < 0.0001), that there is corruption in accessing electricity (p-value < 0.0001), the presence of long bureaucracy (p-value = 0.002), and the perception that electrification priorities are focused on public amenities (p-

value < 0.0001) were significantly affected the adoption of rural electrification in the study area. Perceptions that could not significantly affect adoption of electrification were perceptions that some areas had a better supply of electricity than Kisarawe (p-value = 0.378), electrification is not for grain mills but other large investments (p-value = 0.957), and grain mills are less involved in the implementation of electrification projects in rural areas (p-value 0.784), and the government does not give much emphasis on rural electrification (p-value = 0.061).

5. Discussions

5.1. Social and Economic Factors Affecting Accessibility of Rural Electrification Adoption in Kisarawe Grain Milling Business

The study findings revealed that most social and economic factors affecting accessibility of rural electrification adoption in Kisarawe Grain Milling business are; people level of income, Inadequacy of finance, Inability to pay, Political interference. Followed by the inadequacy of policy, poor rural electrification project feasibility, people's negative perception towards power access, and lack of depth, frequency of monitoring, lack of alternatives source of power and poor economic activities. Therefore, the social and economic status of a household significantly influences the electrification of rural households. From the results, it is clear that there is a direct connection between the (people level of income, Inadequacy of finance, Inability to pay, Political interference), and rural electrifications adoption in Kisarawe Grain Mills.

From this result, it is clear that there is a direct connection between the ability to pay for connection and the number of number of beneficiaries, because when more people are able to pay, the more the number of beneficiaries and vice versa, and thus effective rural electrifications adoption in Kisarawe regions.

Therefore, if the number of beneficiaries is high such that level of income, effective monitoring, people's need of power, supportive policies, adequate financing, ability to pay, good governance, and great economic activity of the area, then there is a probability of the number of activities depending on increasing and this in turn will encourage the transformation of a society from the usage of traditional forms of energy to, and hence effective grain mills operations. On the other hand, although most factors if are positively executed for better rural electrifications be willing to pay for. Some factors may still not work such as alternatives sources of power, poor economic activity and people's negative perception for rural electrifications may result into poor connection leading to low adoption rates. Likewise, if there are few connections, then the grid coverage will be small resulting in poverty in many people depending on for economic sustenance (Grain Mills businesses). Ideally, in cases where individuals have access to the grid, it is not guaranteed that that the surrounding people are willing to get connected as some people are normally misinformed of the benefit and cost that comes with this form of energy. Therefore, a society where people are well informed of the numerous benefits that come with electrical energy, the number of connections is likely to increase.

Similarly, the study carried out by Blimpo & Davies (2019) revealed that although most individuals were willing to be connected with, most lack the required amount of funding to cover the capital and operating costs. Additionally, the findings were in agreement with Kariuki et al., (2016) research findings that proved that although most rural households are willing to pay for connections, their inability to pay for electrification is one of the primary factors that influence the electrification of rural households. Further, findings of this research were in agreement with Schmidt (2014) research in San Francisco Libre, Nicaragua where it was proved that most Nicaraguans who lived in rural areas associated with societal empowerment hence the high numbers of applications for connections.

5.2. The Reliability of Rural Electrification in Kisarawe Grain Milling Business

The study revealed there is unreliable rural electrification in Kisarawe Grain Mills. Whereas, people still live without, live with unreliable or expensive power, which poses a key barrier to economic development in emerging economies. Both grid and off-grid solutions are vital for achieving universal access, but they must be supported by an enabling environment with the right policies, institutions, strategic planning, regulations, and incentives. Therefore, the study establishes unreliable rural electrification in Kisarawe regions; that supply capacity is low, don't shut down without a reason and current generation relies heavily on hydropower. Other factors for unreliable rural electrification due to situations such as gets off for more than 24 hours. On the hand, respondents less agreed that there is continuous improvement for better supply, there is sufficient information before the off, would only be unavailable for few minutes. Also, the respondents less agreed that there is reliable payment and communication system.

Furthermore, Kareithi&Muhua (2018) unreliability is pervasive even when access is achieved, reliability of supply is a major constraint in Africa. The proportion of firms experiencing outages is higher than in any other region. A majority of enterprises in the region use generators as a coping strategy for unreliable; this too is a higher proportion of enterprises compared with other regions. Outages have become a characteristic feature of most economies in Africa. Households and firms endure several hours of the day and night without access to power. Even in instances when power is available, brownouts are prevalent, thereby limiting end users' potential utilization of. Khandker et al., (2014) in other words, more than two-thirds of firms in these countries experience outages, with direct implications for their operations. Firms in Liberia, Namibia, and South Sudan are relatively better off than their counterparts in other countries, with the share of firms with a reliable of. Khandker electricity of Khandker.

Bishoge et al. (2018) similarly, at the household level reliability is a significant concern; the share of households with reliable access is low in many countries. Apart from South Africa, less than two-thirds of households in these countries have reliable access to electricity. In Nigeria, Kenya, Mali, and Tanzania, for instance, less than a third of households have access to reliable. Vietnam's experience in rural electrification provides some lessons for accelerating the pace of electrification across the continent. The authorities undertook serious planning and coordination, prioritized

productive uses of, and ensured funds were available for financing capital costs. Thereafter, all efforts from all stakeholders could be catalyzed through the framework that the government established. Vietnam's success took political commitment to set goals and leadership to plan and then coordinate implementation - Strong government leadership, careful planning, and coordination.

5.3. The Perception on Rural Electrification Adoption in Kisarawe Grain Milling Business

The study findings revealed that, respondents strongly perceive those rural electrifications prioritize on public amenities, there are some areas with better electricity supply than Kisarawe and corruption still hinder supply in the country. On the other hand, the perceptions such that electrifications are not for Grain Mills but other large investments, current electricity cost is high, government do not give much emphasis on rural electrifications. Nevertheless, respondents didn't have much perceive that Grain Mills are less involved in implementations projects, and electrifications supportive projects face bureaucracy.

Agarwal et al., (2019) adds that delaying electrification may cause to have perception which portray a high opportunity cost in terms of the timing of technology adoption and the quality-of-service delivery, such as health care and education. It may also affect how urbanization unfolds, whether new cities emerge, or existing cities continue to be crowded. Therefore, countries with financial capacity should not delay the rolling out of electrification to keep good perception among beneficiaries. Government should rethink their strategies to speed up the progress and impacts of electrification. Perception can highly be impacted by contemporaneous megatrends which must not be ignored in planning four trends that will affect the region's future: urbanization, technological change, regional integration, and climate change. Therefore, good perception is enhanced as suggested by Almeida et al., (2019) at the same time, achieving greater access to in rural areas to mitigate urbanization, reducing the flow of people into already overcrowded cities where infrastructure is stretched. Both scenarios, if handled correctly, can be positive developments for Africa. Furthermore, early investment in infrastructure, including electrification, can positively shape indigenous minds and Africa's cities, which are growing rapidly as people migrate from rural areas. Since, Cities in Africa are projected to increase by 76 million people between 2015 and 2020, and by 2050, they will be home to more than 1 billion residents. Infrastructure needs to be planned to reduce costs and increase efficiency.

Samad & Zhang (2016) finds that delaying the provision of infrastructure, such as, until after settlement can significantly increase bad perception to rural electrifications, the cost of access and induce the growth of slum communities. The study notes that provision is greater the more densely populated a city is and the closer residents are to the central business district. Bishoge et al., (2018) finds that plots where services, including, were installed in advance have higher values than other locations in the city. It shows evidence from Tanzania on strong long-run benefits of the World Bank's Sites and Services Project, in which infrastructure services are provided ahead of the development of urban settlements.

6. Conclusions

Accessibility of rural electrification is to a great extent achieved based on the ability to pay for the connectivity costs, frequent monitoring, people awareness and need for electrifications supportive policy, sufficient budgets, and good governance, the ability to pay is largely dependent on the level of incomes among the residents. The individual financial status and personal preference inform decisions on the choice between connecting to the national grid through the rural electrification projects or using alternative power sources. The availability and awareness of these alternative sources means a reduced demand for connection to the national grid which may be considered relatively expensive in comparison, but this again depends on the use for which power is required.

Nevertheless, the reliability of the rural electrifications far exceeds the grid connection which suffers frequent outages. To a large extent, the demand for is instrumental at influencing accessibility to electrification. This is because those with a pressing need for it will acquire it through the available means, either through grid connection by the REA, or use of alternatives. On the other hand, the government as the supply side is key in that no grid connection can take place without their involvement. It can therefore be said that the accessibility, reliability and people's perception interact to influence the accessibility of rural electrification. However, it is also worth noting that although there has been not substantial progress in enhancing rural electrification in terms of provision of funding and having adequate policies to guide the work of the rural electrifications. Therefore, a lot more requires to be done in terms of identifying additional sources of funding, improving community participation and monitoring of projects.

Observably, access to electricity is important, reliability is critical for magnifying the impact of access; poor quality imposes notable economic losses in Kisarawe region. The extent of electricity reliability is unevenly distributed across economic and geographic groups. Most respondents perceive that is more reliable in urban than in rural localities and among households in the upper-income quintiles relative to low-income households. Nevertheless, reliability is an important driver of the uptake of electricity. Unreliable supply community reduces the expected benefits of, hence reducing the incentive of households to invest in connections. Unreliability has a strong negative impact on households, firms, and governments. For grain mills businesses, unreliable access has a negative impact on employment and income. For governments, unreliable electricity has a negative impact on public finance, particularly tax revenue mobilization. Unreliability reduces the tax compliance perception of citizens in the region and lowers tax revenues. Overall, the evidence from the chapter suggests that reliability is paramount in every network to maximize the gains from access. Reliability matters not only for the impact of access, but for uptake as well. To this end, electrification efforts in the region should focus on not only expanding access, but also improving reliability. Upgrading reliability would require sufficient investment in the maintenance of infrastructure and reforming the sector to improve revenue collection by utilities.

As a result, this study still establishes that the electrification of rural households is a challenging investment, as can be seen in the findings part that a lot of the respondents confirmed on the unreliability and hindrances in term of social and economic factors. So, the electrification of productive uses of energy are highly proposed by this study throughout in order to make both the rural electrification investments viable and improve the socio-economic conditions (Kisarawe district) Grain Mill business and other respective firms of these areas. If the grain mill businesses become the main investor in a household rural electrification activity and this can be considered a part of an electrification investment, it is possible to see higher electrification rates in the short term. This approach is fully in line with the guidelines for institutional and policy frameworks for micro grids that have been adopted by the African Union Commission and are also fully in line with the policy and regulatory frameworks of many Sub-Saharan African countries.

7. Recommendations

The following are the recommendations of the study, to improve public perception of rural electrifications and to motivate the communities to apply for power connection, the rural electrifications should ensure that its employees are skilled and knowledgeable on community mobilization and public relations. In order to create a sense of ownership and ensure sustainability of the rural electrifications, project implementers need to build in community participation in their project designs, implementation and other decision-making processes. To be able to implement effective and sustainable projects that are evidence based, rural electrification project implementers also need to ensure that monitoring is an integral part of their projects and that lessons learnt are properly documented and used to inform future projects.

The government also needs to support and provide incentives for investments in alternative power sources. These need to be seen as complementing rural electrifications efforts to improve and increase accessibility while at the same time promoting the use of renewable energy as opposed to fossil generated. The rural electrification should, where possible and feasible, use partnerships with dedicated educational or community outreach organizations to both ensure that material is suited to the target audience and to leverage the geographical reach of such institutions as this is probably wider than the current rural electrification reach in rural areas (Kisarawe region).

The rural electrifications, being a public solution and other businesses facilitator as for this study, grain mill businesses were selected as the case study. Therefore, rural electrifications project since they are using public funds, needs to be cost-conscious and conservative in all its activities, and there is thus a limit to the level of effort and resources that can be put into outreach activities. On the other hand, due to the nature of the rural electrification programs, successfully implemented outreach activities are critical to the success of most businesses supported projects and thus need to be considered as an integral part of the operational budget.

8. References

- i. Agarwal, S., Bali, N., & Urpelainen, J. (2019). Rural Electrification in India: Customer behaviour and demand. The Rockefeller Foundation, February, 55–71.
- ii. Bhandari, U., & Thapa, K. (2018). Research Review on AdoptionProcess.DOI:10.13140/RG.2.2.19255.21920.
- iii. Bishoge, O., Zhang, L., & Mushi, W. (2018). The Potential Renewable Energy for Sustainable Development in Tanzania: A Review. *Clean Technologies*, 1(1), 70–88. <https://doi.org/10.3390/cleantechnol1010006>
- iv. Blimpo, M. P., & Cosgrove-Davies, M. (2019). Access in Sub-Saharan Africa.
- v. Bray, J. P. (2008). Consumer behaviour theory: approaches and models. United Kingdom: Eprints.
- vi. Da Silveira Bezerra, P. B., Callegari, C. L., Ribas, A., Lucena, A. F. P., Portugal-Pereira, J., Koberle, A., Szklo, A., & Schaeffer, R. (2017). The power of light: Socio-economic and environmental implications of a rural electrification program in Brazil. *Environmental Research Letters*, 12(9). <https://doi.org/10.1088/1748-9326/aa7bdd>
- vii. Dufe, E.M.(2015). Factors influencing accessibility of rural electrification in Kenya: a case of Naivasha constituency (Doctoral dissertation, University Of Nairobi).
- viii. Eras-Almeida, A. A., Fernández, M., Eisman, J., Martín, J. G., Caamaño, E., & Egidio-Aguilera, M. A. (2019). Lessons learned from rural electrification experiences with third generation solar home systems in latin America: Case studies in Peru, Mexico, and Bolivia. *Sustainability (Switzerland)*, 11(24). <https://doi.org/10.3390/su11247139>
- ix. Groth, A. (2019). Socio-economic impacts of rural electrification in Tanzania. *International Journal of Sustainable Energy Planning and Management*, 21, 76–92. <https://doi.org/10.5278/ijsep.2019.21.6>
- x. Jani, D. (2018). Residents' perception of tourism impacts in Kilimanjaro: An integration of the social exchange theory. *Tourism*, 66(2), 148–160.
- xi. Jimenez, R. (2017). Development Effects of Rural Electrification Infrastructure and Energy Sector Energy Division POLICY BRIEF No. Inter-American Development Bank, January. <http://www.iadb.org>
- xii. Jongo, J. S., Tesha, D. N. G. A. K., Kasonga, R., Teyanga, J. J., & Lyimo, K. S. (2019). Mitigation Measures in Dealing with Delays and Cost Overrun in Public Building Projects in Dar-Es-Salaam, Tanzania. 8(3), 81–96. <https://doi.org/10.5923/ij.jcem.20190803.01>
- xiii. Kareithi, R., & Muhua, G. (2018). Factors Influencing Implementation of Rural Electrification Programme in Kenya: A Case of Kieni East Sub County, Nyeri County. *European Scientific Journal, ESJ*, 14(21), 236. <https://doi.org/10.19044/esj.2018.v14n21p236>
- xiv. Kariuki, D., Kimuyu, P., & Nyangena, D. (2016). Rural Electrification and Microenterprises Performance: Some lessons from Muranga County, Kenya. *International Journal of Economics*, 1(1), 31–45.
- xv. Khandker, S. R., Samad, H. A., Ali, R., & Barnes, D. F. (2014). Who Benefits Most from Rural Electrification? Evidence in India Author (s): Shahidur R. Khandker, Hussain A. Samad, Rubaba Ali and Douglas F. Barnes

Published by : International Association for Energy Economics Stable URL : <http://www.jstor.org/st.> The Energy Journal, 35(2), 75–96.

- xvi. Logan, G. D. (2002). An Instance Theory of Attention and Memory. *Psychological review*, 376-400.
- xvii. Mirzaei, H., & Ruzdar, M. (2010). The Impact of Social Factors Affecting Consumer Behaviour on Selecting Characteristics of Purchased Cars. *Journal of Payame Noor University*, 1-11.
- xviii. Riva, F., Ahlborg, H., Hartvigsson, E., Pachauri, S., & Colombo, E. (2018). Access and rural development: Review of complex socio-economic dynamics and causal diagrams for more appropriate energy modelling. *Energy for Sustainable Development*, 43, 203–223. <https://doi.org/10.1016/j.esd.2018.02.003>
- xix. Robert, F. C., Sisodia, G. S., & Gopalan, S. (2019). Sustainable trade-off between reliability and prices for geographically isolated communities. *Energy Reports*, 5, 1399–1407. <https://doi.org/10.1016/j.egy.2019.09.064>
- xx. Samad, H., & Zhang, F. (2016b). Benefits of Electrification and the Role of Reliability: Evidence from India. *Benefits of Electrification and the Role of Reliability: Evidence from India*, November. <https://doi.org/10.1596/1813-9450-7889>
- xxi. Sankaravelu, R. (2014). Rural Electrification: Pros and Cons, Strategies and Policies. *International Journal of Advanced Technology & Engineering Research (IJATER)*, March, 124–131.
- xxii. Schmidt, S., (2014). Sustainable rural electrification in developing countries-A field study assessing changes of load curve characteristics in San Francisco Libre, Nicaragua (Master's thesis).
- xxiii. Zhang, T., Shi, X., Zhang, D. and Xiao, J., (2019). Socio-economic development and electricity access in developing economies: A long-run model averaging approach. *Energy Policy*, 132, pp.223-231.