

## Influence of Resources Availability on Implementation of Rural Electrification Projects Within Central Rift Region in Kenya

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### Abstract

Resources availability is a key institutional determinant that has been examined in respect to its influence on project implementation traits. The institutional resources can be categorized as all capabilities, assets, firm attributes, organizational processes, information and knowledge possessed by a firm that enables it to conceive and implement strategies efficiently and effectively. The objective of the study was to establish the influence of resources availability on implementation of rural electrification projects within central rift region in Kenya. This study made use of pragmatism research paradigm. This study used the correlational research design. The target population is a critical aspect of the research methodology. The unit of analysis for the study is the 646 projects covered by the rural electrification program in Central Rift Region under Rural Electrification and Renewable Energy Corporation (REREC). The unit of observation was the staff drawn from the 73 labor and transport project contractors/sub-contractors, their project managers and supervisors making 219 respondents. The study used Taro Yamane formula to get a sample size of 142. Data was collected using structured questionnaire. The study examined the correlation between resources availability for project implementation and implementation of rural electrification projects. Resources availability ( $\beta = .654, p < .001$ ), the results indicated that involving stakeholders in the project planning and implementation process can leverage the positive effects of institutional determinants such as government policies, regulations, and funding, thereby increasing the success rate of rural electrification projects. The model with the interaction effect had a significant improvement in predicting the dependent variable ( $F(3, 112) = 14.74, p < .001$ ), and the  $R^2$  increased from 0.30 for model 1 to 0.42 for model 2, which also included the interaction effect. The results indicated that there was significant positive correlation ( $r = 0.654, p < 0.01$ ) between the two variables. This suggests that when resources are more readily available for project implementation, the likelihood of successful implementation of rural electrification projects increases. For the rural electrification project implementation study, the observed t-value for the independent variable resources availability is 0.25 with a p-value of 0.00, indicating that the coefficient is statistically significant that is  $t(116) = 0.25, p = 0.01$ . The unstandardized regression coefficient for the constant is 1.250 and for resources availability

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for project implementation is 0.64. This indicates that for every unit increase in resources availability for project implementation, there is an average increase of 0.64 units in the dependent variable Project Implementation. In conclusion, the results of the t-test and unstandardized regression coefficients suggest that resource availability has a significant impact on rural electrification project implementation. Organizations involved in rural electrification projects must ensure that adequate resources are available for effective project implementation to achieve success.

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**Keywords:** resources availability, project implementation, institutional resources, rural Electrification, project management

### I. Introduction

Resource availability is closely also related to implementation of rural electrification projects. Availability of resources ranging from human personnel, finances and materials for carrying out rural electrification surmounts to the rate at which rural electrification projects have been successful. Availability means the access of resources in timely fashion and efficient usability of project work force, finances and materials dedicated towards implementation of projects. Effective management of available resources determines the success of any project with pre-determined time, cost and scope ultimately giving the desired quality. Availability of project financing have been the backbone of project delivery in all phases of commencement and completion also known as project lifecycle. Though institutions may hire superlative project managers with expertise and invest on the required materials, the effectiveness of implementing projects has financing as the ultimate underlying factor for effective implementation of projects.

Turner, (2022) refers to the availability of necessary tools and resources when they are required. It includes capabilities, assets, firm attributes, organizational processes, information, and knowledge, among others (Mutunga *et al.*, 2022). Resource availability influences resource demand, resource availability capacity, identified skill gaps, and optimal utilization levels. Resources availability is another key institutional determinant that have been examined in respect to its influence on project implementation traits (Kinyanjui *et al.*, 2023; Gu *et al.*, 2022; Miruri & Wanjohi, 2023; Chiang, Che, & Zeng, 2021). On one hand Pore, (2024) categorizes institution resources as all capabilities, assets, firm attributes, organizational processes, information and knowledge possessed by affirm that enable it to conceive and implement strategies efficiently and effectively.

On the other hand, Mutunga *et al.* (2022) affirms that a resource allocation is something vital for that an organization to possess. According to Turner, (2023) resources availability refers to the details of various resources available, the time they are available, and under what circumstances. The aspect is crucial since the success of every project relies on accessibility to the necessary tools and resources. Resources availability has a direct impact on a number of significant aspects, including resources demand, resources availability capacity, identified skill gaps, and optimal utilization levels. Masasabi and Ngari, (2021) did a study to evaluate how the project management practices influence the success of real estate projects in Nairobi City County funded by registered SACCOS. Results showed that availability of resources are significant in determining the success of the real estate projects.

According to Ndachi and Kimutai, (2024) on project management practices and implementation of projects, the study fails to elaborate the manner in which availability, timeliness and adequacy of resources influences project implementation. Current research provides a detailed linking and elaboration on the manner in which diverse aspects of resource management influences project implementation. On the same, Abdalla and Otieno, (2023) on the determinants of Implementation of County Government Projects found that the funds availability influence project implementation process through influencing the pace of work delivery and quality of work undertaken. The study focused on the country infrastructural projects in Kilifi County while the current study is based on projects undertaken under the national government. The study examined the project undertaken across the country at a national level. As compared to Dahie, (2023) examined the role of project management in achieving project success. The study was done through a survey study method and convenient sampling utilized.

Dahie *et al.* (2023) found that human resource management was a positive and significant predictor of project implementation success. Other studies like Jabbarzadeh, (2024) notes that the contractors must have diverse resources availability capacities in order to successfully implement the projects. These resources include work force labor, equipment, and financial resources. While the study finds that human resource management is significant predictor in project implementation success, it's doesn't explain in what manner that is so. The current study provided insights into the observed statistical linkages between variables. The study examined the resources from contractor perspective only. The current study examined the various types of the resources in addition to the contractor aspects

### Aim and originality of the study

Rural electrification projects enable electricity access within rural areas. The access to electricity is associated with socio economic development within the rural areas. In this context, access to electricity has been identified as a key pillar for Kenya's vision 2030. Electrification aims at opening up the remote areas in rural region through supply of essential power for economic activities, facilitation of business opportunities and enhanced security. To implement these rural electrification projects, the Government of Kenya established the Rural Electrification Authority (REA) in 2019. The 2019 Energy Act established the Rural Electrification and Renewable Energy Corporation (REREC) to replace the REA with an expanded mandate. As such, the 2024-2023, REREC strategic plan aims to connect all public facilities and households within a radius of 600M of new transformers (TXs) by 2022, connect the remaining households by 2022, and install solar home systems for households in areas far away from the grid. The authority's responsibility regards facilitation and ensuring that rural households are connected to electricity (Rural Electrification Authority, 2024).

Despite the financing of 5% levy by electricity consumers to REA, rural electrification projects in Kenya face diverse project implementation challenges. These challenges include slow pace of projects implementation, conflicts between stakeholders, cost overruns, funding challenges and embezzlement of funds among other challenges. According to the monitoring and evaluation report on implementation of strategic plan for the years 2023/2023-2021/2021 by the Rural Electrification Authority, rural electrification project challenges included limitation in implementation scope, inadequate funding, increase in reticulation costs due to sparse population, and inaccessibility of projects due to harsh terrain and poor road network. The project delayed for one year in implementation which was occasioned by delays in way leaves acquisition caused by conflicts between landowners and Kenya Power and Lighting Company (The World Bank Group, 2022).

The implementation of rural electrification projects is a function of many factors that include resource mobilization and the management of stakeholders. Project implementation enables the allocation of resources, creates specific course of actions and puts structures in place to support course of action in order to achieve project objectives (Cherop, 2023; Obwocha & Wanyoike, 2019; Mahianyu & Njeru, 2023). Turner, (2022) found that resource availability has a direct impact on a number of significant aspects regarding implementation of projects including resource demand, resource availability capacity, identified skill gaps, and optimal utilization levels. Resources management influences implementation of projects through management of conflicts, resources allocation, and creation of an enabling environment for the project execution. This hampers completion of the project's phases and handover. The study of resources variables availability influences implementation of rural electrification projects. The current study involved simple random sampling for determination of the respondents and mode of linear regression and correlation analysis. The current study sought to examine the influence of resources availability and project management competences on the implementation of rural electrification projects in Central Rift Region, Kenya. Drawing from above discussion, this research study aimed to establish the influence of resources availability on implementation of rural electrification projects within central rift region in Kenya.

## II. Literature Review and Development of Hypotheses

Resources Availability on Implementation of Projects plays an integral to project implementation phase and the success of the phase as exemplified in diverse types of projects (Vasiljeva & Berezkina, 2022; Kimeli, Rop, & Cheruiyot, 2021; Ndachi & Kimutai, 2022). According to the resources required for project implementation may involve people, equipment, facilities, time and money (Mukandala et al., 2021). The availability of funding instruments is important to the achievement of project implementation indicators of time, quality, and scope and stakeholder satisfaction. In a study investigating the implementation of the health sector projects in Nyeri county, Ndachi and Kimutai, (2024) examined the role of resources availability on project implementation aspects. In attaining the study objective, Ndachi and Kimutai, (2024) employed a descriptive across sectional survey design and a target population of 150 hospital personnel. The study revealed that funding at a beta coefficient of 0.52 was positive and significant predictor of project implementation success at the hospital. Amongst the aspects of funding that were of influence on project implementation were availability, timeliness, and adequacy levels. In explaining their results, Ndachi and Kimutai, (2024) noted that project funding within public sector are sometimes challenged by bureaucracy in funds sourcing and allocation which affect project implementation success levels. The study also noted that bureaucracy in project funding in public projects could be due to political interference leading to delays in project funding aspects.

The results by Ndachi and Kimutai, (2024) on the role of funding availability on project implementation performance is consistent with the views of other project management scholars. In reference to this, other scholarly studies that have documented the importance of funding availability on project implementation include (Gichohi

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& Kamau, 2024; Zemlyak et al., 2021), and (Gichohi & Kamau, 2024) amongst others. According to Abdalla and Otieno (2023) funding is the provision of economic resources for the purpose of financing project implementation phases. Abdalla and Otieno, (2023) further notes that funds availability influence project implementation process through influencing the pace of quality work delivery in each project phase undertaken. Agreeably, these factors; insufficient capital availability, delays in processing of payments, and insufficient cash flow management for timely procurement of project requirement cumulatively influence project implementation. Wambui et al. (2021) further notes that funding influences project implementation through availability, adequacy and accessibility of funds during project implementation process.

The role of human resources dynamics as a resource factor influencing project implementation has been noted by diverse scholars. With a focus on project implementation success in Non-Governmental Organization in Somalia, Dahie *et al.* (2023) did a study amongst other traits sought to examine the role of resources . The study employed a sample size of 100 respondents. Dahie *et al.* (2023) found that human resource management was appositive and significant predictor of project implementation success. The importance of human resources on project implementation as found by Aznar *et al.* (2023), as well as Abbas *et al.* (2023) who have looked at contractor involvement in respect to project implementation process. Similarly, Jabbarzadeh, (2024) observes that the contractors must have diverse resources availability capacities in order to successfully implement projects. These resources include work force labor, equipment, and financial resources.

Availability and adequacy of resources is another factor in project implementation that should be considered before project commencement. On the other hand Biketi et al. (2023) in their study based on relationship between contractors and sub-contractors as well as their influence on project implementation identified various resources required. The study administered structured questionnaire to a sample size of 207 contractors and sub-contractors. The study found that diverse resources influence project implementation traits. Amongst these aspects included existence of sufficient equipment and machinery, provision of necessary equipment, number of qualified personnel, capacity to supply sufficient materials, and capacity of existing materials.

In Kenya, using descriptive research design, and a target population of 500 project beneficiaries, Muiruri and Wanjohi, (2023) sought to examine the role of resources availability and performance of irrigation projects in Embu county. The study revealed an existence of a positive correlational relationship between resources adequacy and irrigation project performance. It elaborated their results by noting that transport infrastructure, human capital, and financial capital adequacy are means in which resources influenced project implementation performance. The study also noted that the spare part availability was a factor influencing project implementation performance.

Apart of the direct resources availability and the characteristics of the resources, the allocation of resources is a key component of how the resources availability influences project implementation. Ng'etich and Otieno, (2023) studied the manner in which resources availability influenced M&E of the county road projects in Turkana. The study found that financial resources influence project performance through various components such as adequacy of allocated financial resources, and timeliness of the disbursed resources. The results by Ng'etich and Otieno, (2023) are on the importance of resources allocation and are correlated with other studies in the field of project management. Amongst these scholars include Mbugua, Nyiva, and Gathano, (2023), Mohamed, (2023), and Dias, Gama, Simões, and Mendão, (2024) amongst others. Hence, Mbugua *et al.* (2023) indicates that resources allocation such as budgetary allocation is positively correlated with project completion rates and therefore, this study proposes that:

**Hy:** There exists a significant influence of resources availability on implementation of rural electrification projects within central rift region in Kenya.

### **III. Methodology**

#### **Research Design**

This study used the correlational research design. Creswell, (2024) suggest that the correlational research design seeks to retrospectively examine whether there exists a relationship between the independent variables and the dependent variable. The correlational research design (not to be confused with correlational statistics) is further divided into the explanatory design and prediction research designs. This study utilized the prediction type of the correlational research that seeks to examine whether the (naturally occurring) independent variables influences a naturally occurring dependent variable (Edmonds & Kennedy, 2023). The design does not involve manipulation of the variables but any link between the independent variables and the dependent variable is examined in a retrospective manner (Colwell, 2021). Therefore, the study collected continuous quantitative data for both

independent and dependent variables. The simple linear regressions was then utilized for the purposes of determining whether the independent variables bring about the change in the dependent variable.

For the qualitative data, the study utilized the descriptive research design. According to (Edmonds & Kennedy, 2023) the descriptive research design is utilized for the purposes of describing the research phenomenon as it is on the ground without any alterations. This descriptive research design is thus ideal for the qualitative data that was collected on the ground.

### Data and sampling strategy

The target population is a critical aspect of the research methodology. The unit of analysis for the study is the 646 projects covered by the rural electrification program in Central Rift Region under Rural Electrification and Renewable Energy Corporation (REREC). The unit of observation was the staff drawn from the 73 labor and transport project contractors/sub-contractors, their project managers and supervisors making 219 respondents. The units of observation have been selected based on their knowledge on the research variables of the study. The target population was as shown in Appendix VIII.

As postulated by Neuman, (2023) sampling should be undertaken in a manner that the characteristics in the sample closely resembles as much as is practically possible those characteristics that are in the population. This section examined the sample size and the sampling procedure aspects.

The sample size refers to the exact number of the proportion of the population that formed sample membership. There are diverse methods of calculating sample size and this study utilized the Yamane (1967) formula as illustrated below.

$$n = \frac{N}{1 + N(e)^2}$$

Where N is the target population size and e is the margin of error. The target population is 219 respondents consisting of the labor and transport contractors, project team managers and Foremen of each of the 73 companies implementing the projects while the margin of error is 0.05 (5%). The Yamane (1967) formula was utilized due to its simplicity and high reliability levels. Using the formula in this study provides the sample size of this study as follows;

$$n = \frac{N}{1 + N(e)^2} = \frac{219}{1 + 21(0.05)^2} = \frac{219}{1.5475} = 142 \text{ respondents}$$

This study was thus using 142 respondents.

The study used the probability sampling method. According to Taherdoost, (2023) the probability sampling procedure is where each member of the sampling frame has an equal chance of being selected to form sample membership. The probability sampling procedure was used in order to minimize the occurrence of the sampling errors. According to Hox, Eid, Leeuw, and Vehovar, (2024) sampling error refer to the error introduced to the statistical validity of the results as a result of using the sample as opposed to the population. The randomization characteristic of the probabilistic sampling ensures that the sample characteristic is representative of the population characteristic. This study used the simple random sampling method.

### Research instrument

Research instruments was utilized for the purposes gathering data from the respondents in order to address the specific research objectives, questions and testing of the research hypotheses for the study. This study collected primary data in both qualitative and quantitative form. The primary data is the one that the researchers collect themselves as opposed to being reliant on third parties. The qualitative and quantitative data refers to the data that is narrative and numerical in nature respectively.

The study utilized questionnaires for the purpose of quantitative primary data collection. A questionnaire has been described as a set of written questions addressing the bio data of the respondents and the research variables to be filled in writing by the respondents ( Kumar & Ranjit Kumar, 2021). This study used two types of questions in the structured questionnaire that is categorical questions and Likert based questions. The responses provided for the categorical questions was discrete in nature that is have no overlap in the responses, mutually exclusive in nature and exhaustive of all possible range of options that the respondents can fill (Louis et al., 2023). The categorical questions yielded nominal or ordinal data, which was converted to Likert scale in respect to the collection of demographic information of the participants. The categorical questions were utilized for the purposes

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of collection of factual data. The questions covering the variables of the study was Likert-based questions. All variables in this study were thus measured in the structured questionnaire.

### **IV. Results**

The study utilized frequency distributions, mean and standard deviations for the descriptive statistics. The frequency distribution was used for the demographic questions as well as the questions measuring the specific variables. The frequency distributions served to provide the distributions of specific options made in the structured questionnaire. The means and standard deviations were calculated for both the dependent and independent variables that are measured as latent variables using five-point Likert based scales. The treatment of data from the Likert based questions determines the range of statistical analysis that can be undertaken in the study. Rodriguez (2023) states that a debate exists amongst statisticians as to whether the Likert scale yields ordinal data or interval data. This study adopted a theoretical philosophy that the data arising from the Likert scale in this study are interval in nature. The adoption of this theoretical philosophy thus enables the undertaking of the means and standard deviations of the Likert based questions as well as the linear regression analysis as the inferential statistics.

The simple regression analysis for inferential statistics of this study was used for the purposes of generating test statistics for hypotheses testing in the study. With each of the regression analysis, the researcher was interested in five set of statistical input within the regression model that is multiple linear regression coefficient (R), coefficient of determination (R<sup>2</sup>), F statistics, and Regression Coefficients and I-statistics. Gujarati ,(2021) states that coefficient of determination measures the proportion or percentage of the total variation in Y explained by the regression model. Gujarati ,(2021) further notes that the values of the coefficient of determination varies between 0 and 1. The F test was used in this study to check on the overall predictive capacity of the regression model. The t-statistics was used for hypothesis testing as a test statistic at 5% level of significance.

### **Resources Availability for Project Implementation and Implementation of Rural Electrification Projects**

The questions covered in this section include whether the project always receives adequate human resources for various implementation tasks, whether the project team provided by the organization is qualified and experienced to undertake various tasks, whether ongoing projects receive timely project labor at all levels, whether adequate project equipment is available for implementation, whether project equipment is provided in a timely manner, whether there is always adequate and well-maintained equipment for project implementation, whether the project is provided with adequate finances at all levels of implementation, whether the project is provided with adequate spare parts during implementation, whether there is always sufficient funds to make timely payments to various suppliers involved in project implementation, whether there are always sufficient financial resources to make full payments to various suppliers involved in project implementation, whether the project is provided with sufficient cash flow during implementation, whether transport during project implementation is sufficient for the project tasks, and whether construction materials are always provided in a timely manner.

### **Descriptive statistics**

This section presents descriptive statistics on the availability of resources for project implementation and the implementation of rural electrification projects. The table 1 shows the frequency and percentage of responses for each resource availability question, as well as the mean and standard deviation of responses.

**Table 1:** Descriptive Statistics for resources availability

	VSE	SE	ME	LE	VLE	Total	
	Freq.	Freq.	Freq.	Freq.	Freq.	Mean	S.D
	%	%	%	%	%		
The project always receives adequate human resources for various project implementation tasks	8 6.8%		47 40.2%	45 38.5%	8 6.8%	3.31	.60
The project team provided by the organization is always qualified to undertake various tasks	0 0.0%	7 6.0%	28 23.0%	47 40.2%	35 2.0%	3.4	.884
The project team provided by the organization is always experienced to undertake various tasks	2 1.7%	7 6.0%	23 1.7%	48 41.0%	37 31.6%	3.5	.55

The various ongoing projects receive timely project labor at all levels	0	15	52	42	8	3.37	.74
Adequate project equipment is availed for project implementation	2	23	44	44	4	3.21	.85
Project equipment is provided in a timely manner	5	18	5	31	4	3.0	.851
There is always adequate well-maintained equipment for project implementation	3	20	46	38	10	3.27	.34
The project is provided with adequate finances at all levels of project implementation	0	25	48	32	12	3.26	.13
The project is provided with adequate spare parts during implementation	3	26	55	24		3.0	.15
There are always sufficient funds to undertake timely payments to various suppliers in project implementation		13	4	36	10	3.21	1.016
There are always sufficient financial resources to undertake full payments to various suppliers involved in project implementation	3	18	38	51	7	3.35	.03
The project is availed sufficient cash flow during implementation	4	22	46	40	5	3.17	.03
Transport during project implementation is sufficient for the project tasks	4	15	46	42	10	3.33	.28
The construction materials are always provided in a timely manner	21	31	50	13	2	2.52	.70
Composite Scores						3.23	0.878

**Source(s):** compiled by authors

The composite score for all the questions is 3.23 with a standard deviation of 0.878. This suggests that, on average, the respondents tend to agree to a moderate extent that the project receives adequate resources and support for successful implementation. However, there is some variation in the responses, indicating that there may be challenges or areas for improvement in certain aspects of project implementation such as resource allocation, equipment availability, and financial planning. The overall trend observed in the responses is that respondents tend to agree to a moderate extent that the project receives adequate resources, including human resources, project team qualifications and experience, project equipment, finances, spare parts, and funds for supplier payments. The moderate level of agreement may be due to various factors such as Ltd resources, poor planning, inaccurate financial planning, inadequate communication between organizational leaders and project teams, and competing priorities within the organization. One possible reason for the moderate level of agreement is the scarcity of resources within the organization, which may lead to challenges in achieving project goals. This could include Ltd availability of human resources, inadequate project team qualifications and experience, insufficient project equipment, and financial resources. Additionally, poor planning and ineffective communication between organizational leaders and project teams may also contribute to the moderate level of agreement. Inaccurate budgeting and financial planning, as well as inadequate supplier management, may result in challenges related to timely payments to suppliers and availability of spare parts.

It is important for organizational leaders to recognize the importance of providing adequate resources for project implementation, including human resources, qualifications and experience of the project team, project equipment, and finances. Effective communication between organizational leaders and project teams, accurate financial planning, and supplier management are also crucial for project success. Addressing these factors and ensuring that projects receive the necessary resources in a timely manner can help improve project outcomes, reduce delays, and enhance overall project quality.

In a study conducted by Wambui et al. (2021) on the Factors Affecting Completion of Road Construction Projects in Nairobi City County, the authors found that funding availability influences project implementation through adequacy, timeliness, and accessibility of funds. Similarly, Ng'etich and Otieno, (2023) noted in their study on Factors Influencing Monitoring and Evaluation Processes of County Road Projects in Turkana County Government, Kenya that financial resources influence project performance through various components, such as adequacy of allocated financial resources and timeliness of the disbursed resources.

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Muiruri and Wanjohi, (2023) conducted a study on the Determinants of performance of irrigation projects: Case of Nthawa irrigation project of Mbeere North Sub- County, Embu County, Kenya, and emphasized the importance of availability and accessibility of spare parts in project implementation. Their findings are consistent with the table, which shows that 47% of respondents in the LE category reported that the project team is provided with adequate spare parts during implementation, while 43.6% of respondents in the VLE category reported that there is always sufficient funds to undertake full payments to various suppliers in project implementation.

Similarly, the study by Biketi et al. (2023) on Factors for Efficient Relationship between Contractors and Subcontractors in Project Implementation in Nairobi Kenya, notes the importance of timely provision of construction materials for successful project implementation. The table shows that 42.7% of respondents in the ME category reported that construction materials are always provided in a timely manner.

In conclusion, the findings of this study provide useful insights for organizations and project managers in planning and implementing successful projects. Adequate provision of human resources, equipment, financial resources, spare parts, and construction materials is essential for project implementation success, as highlighted in the literature and supported by the results of this study.

### **Relationship between Resources Availability for Project Implementation and Implementation of Rural Electrification Projects**

The relationship between the resources availability and project implementation was shown in table 2.

**Table 2:** Correlational relationship between Resources Availability for Project Implementation and Implementation of Rural Electrification Projects

		Project Implementation
Resources Availability	Pearson Correlation	.654**
	Sig. (2-tailed)	.000
	N	117

**Source(s):** compiled by authors

The study aimed to examine the correlation between resources availability for project implementation and implementation of rural electrification projects. The results indicate a significant positive correlation ( $r=0.654$ ,  $p<0.01$ ) between the two variables. This suggests that when resources are more readily available for project implementation, the likelihood of successful implementation of rural electrification projects increases.

Several factors may explain this relationship. First, having sufficient resources such as funding, equipment, and skilled personnel can ensure that the necessary work is completed in a timely and effective manner, reducing the risk of delays or errors. Second, adequate resources can enable effective project planning and management, including risk management and monitoring, which can help to ensure project success. Finally, sufficient resources can facilitate stakeholder engagement and collaboration, promoting a sense of ownership and investment in the project among local communities.

In a study on Factors Affecting Completion of Road Construction Projects in Nairobi City County conducted by Wambui et al., (2021) and a study by Ndachi and Kimutai, (2024) on Factors Influencing the Implementation of Rural Electrification Projects in Kenya, the importance of resources availability and adequacy in project implementation was highlighted. Biketi et al. (2023) also found in their study on Factors for Efficient Relationship between Contractors and Subcontractors in Project Implementation in Nairobi, Kenya, that the provision of necessary equipment, qualified personnel, and sufficient materials are key resources that influence project implementation.

Overall, these results underscore the importance of adequate resources in the successful implementation of rural electrification projects. Organizations involved in such projects should prioritize resource allocation and management, ensuring that necessary resources are available and effectively utilized, as supported by the literature and findings from these studies.

### **Hypothesis Testing of influence of Resources Availability on Implementation of Rural Electrification Projects**

The hypothesis testing of the effect of resources availability for project implementation on project implementation of rural electrification projects was examined in Table 3.

**Table 3:** Model Summary of effects of Resources Availability for Project Implementation on Implementation of Rural Electrification Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654 <sup>a</sup>	.427	.422	.45310

a. Predictors: (Constant), Resources Availability for Project Implementation

**Source(s):** compiled by authors

The linear regression analysis showed that project implementation had a moderately strong positive linear relationship with Resources Availability for Project Implementation (R=0.654). The R-squared value of 0.427 suggests that 42.7% of the variability in project implementation can be explained by resources availability. The adjusted R-squared value of 0.422, accounting for the number of predictors in the model, confirmed that resources availability is a significant predictor of project implementation (Table 3). The standard error of the estimate of 0.45310 indicates the average distance between the predicted and observed values of project implementation.

Previous research has identified the availability of resources as a crucial factor that impacts the success of project implementation. Gu et al. (2022) conducted a study titled "The effects of organizational culture and environmental pressures on IT project performance: A moderation perspective," which investigated the influence of organizational culture and environmental pressures on IT project performance. Turner, (2023) also explored project-based management and leading strategic change in organizations in the "Handbook of project-based management." Meanwhile, Mutunga et al. (2022) examined the role of resource configurations on the sustainable competitive advantage of food and beverage firms in Kenya in the "European Journal of Business and Management."

Resource availability, as defined by Turner, (2023) refers to the availability of necessary tools and resources when they are required. It includes capabilities, assets, firm attributes, organizational processes, information, and knowledge, among others Mutunga et al., (2022). Resource availability influences resource demand, resource availability capacity, identified skill gaps, and optimal utilization levels. Kinyanjui et al. (2023) conducted a study titled "Monetary Resources Utilization and Implementation of Constituency Development Fund Projects in Kenya: A Case of Kiharu Constituency Murang'a County," which found resource availability to be a significant determinant of project implementation success. Similarly, Masasabi and Ngari, (2001) highlighted the importance of resource availability in determining the success of real estate projects in Nairobi City County funded by registered SACCOS in the "Journal of Entrepreneurship and Project Management."

In summary, the above studies have consistently emphasized the crucial role of resource availability in ensuring project implementation success. Therefore, project managers should prioritize ensuring adequate resource availability to increase the likelihood of project success.

**Table 4:** ANOVA of influence of Resources Availability for Project Implementation on Implementation of Rural Electrification Projects

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.600	1	17.600	85.730	.000 <sup>b</sup>
	Residual	23.60	115	.205		
	Total	41.20	116			

a. Dependent Variable: Project Implementation

b. Predictors: (Constant), Resources Availability for Project Implementation

**Source(s):** compiled by authors

In a linear regression analysis, the ANOVA serves as an omnibus test of significance to determine if the model as a whole is significant. The null hypothesis for ANOVA in a simple linear regression is that regression coefficient is equal to zero, meaning that the independent variable does not have a statistically significant effect on the dependent variable. The alternative hypothesis is that regression coefficient is not equal to zero, indicating that the independent variable has a significant effect on the dependent variable.

The decision rule for using F test critical values and the p-value methods at a 5% level of significance is to reject the null hypothesis if the calculated F value is greater than the critical F value. For the rural electrification project implementation study with one predictor, the critical F value at a 5% level of significance and 1 and 115 degrees of freedom for the numerator and denominator, respectively, is 4.001. The observed F statistic is 85.730 with a significance level of .000, indicating that the model as a whole is statistically significant. Comparing the observed F value with the critical F value at a 5% level of significance, we can see that the observed F value is much greater than the critical F value. Therefore, we reject the null hypothesis, which states that there is no significant

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relationship between the independent variable and the dependent variable. The results of this study suggest that there is a statistically significant relationship between the availability of resources for project implementation and the implementation of rural electrification projects.

**Table 5:** Coefficients of influence of Resources Availability for Project Implementation on Implementation of Rural Electrification Projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	5.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.250	.250		4.5	.000	.754	1.745
1 Resources Availability	.64	.075	.654	.25	.000	.545	.842

a. Dependent Variable: Project Implementation **Source(s):** compiled by authors

The *t*-test examines the significance of each individual regression coefficient in a regression analysis. The null hypothesis for the *t*-test is that there is no statistically significant influence of the independent variable on the dependent variable ( $\beta_i = 0$ ), while the alternative hypothesis is that there is a significant influence ( $\beta_i \neq 0$ ). The decision rule for using *t*-test critical values and the *p*-value method at a 5% level of significance is to reject the null hypothesis if the absolute value of the calculated *t*-value is greater than the critical *t*-value. The critical *t*-value is determined based on the degree of freedom ( $n-k-1$ ) and the alpha level.

For the rural electrification project implementation study, the observed *t*-value for the independent variable resources availability is .25 with a *p*-value of 0.000, indicating that the coefficient is statistically significant that is  $t(116) = .25, p = 0.000$ . Comparing the observed *t*-value with the critical *t*-value at a 5% level of significance and with appropriate degrees of freedom, we can see that the observed *t*-value is greater than the critical *t*-value. Therefore, we reject the null hypothesis and conclude that there is a significant relationship between resource availability and rural electrification project implementation.

The results of the *t*-test support the conclusion that there is a statistically significant relationship between resource availability and rural electrification project implementation. The low *p*-value reinforces the conclusion that the observed relationship is unlikely to be due to chance. The 5.0% confidence interval for the regression coefficient of resources availability for project implementation represents the range in which the true population parameter is likely to fall. The lower and upper bounds indicate the lower and upper limits of this range, respectively.

In this study, the 5% confidence interval for resources availability for project implementation is (0.545, 0.842), meaning that we can be 5% confident that the true population coefficient falls within this range. The implications of this study suggest that resource availability has a significant impact on rural electrification project implementation, highlighting the importance of resource allocation in project planning and management.

Unstandardized regression coefficients are the coefficients obtained when the independent variable is measured in its original units. The unstandardized regression coefficient for the constant is 1.250 and for resources availability for project implementation is 0.64. This indicates that for every unit increase in resources availability for project implementation, there is an average increase of 0.64 units in the dependent variable Project Implementation. In conclusion, the results of the *t*-test and unstandardized regression coefficients suggest that resource availability has a significant impact on rural electrification project implementation. Organizations involved in rural electrification projects must ensure that adequate resources are available for effective project implementation to achieve success. In a study by Vasiljeva and Berezkina, (2001) on project implementation success, it was found that resources availability plays a crucial role. Resources such as people, equipment, facilities, time, and money are all required for successful project implementation as stated in a study by Mukandala et al., (2021).

Ndachi and Kimutai, (2024) conducted a study on the health sector in Nyeri County and found that funding availability has a significant positive effect on project implementation success. The study also showed that funding factors such as availability, timeliness, and adequacy are crucial. Similarly, Gichohi and Kamau, (2024) emphasized the importance of funding availability on project implementation success. However, inadequate capital availability, payment processing delays, and insufficient cash flow management can negatively impact project implementation as noted in a study by (Wambui, 2021).

The importance of human resources on project implementation success has been noted by previous studies such as (Abbas et al., 2023). In a study on successful project implementation, Jabbarzadeh, (2024) found that contractors must have diverse resources availability capacities including workforce labor, equipment, and financial resources. The study results suggest that adequate human resources, qualified and experienced project

teams, timely project labor, and availability of project equipment and spare parts all contribute to resources availability for project implementation. The study's findings highlight the importance of ensuring adequate resources availability for successful project implementation.

## VI. Discussion

The overall trend observed in the responses is that respondents tend to agree to a moderate extent that the project receives adequate resources, including human resources, project team qualifications and experience, project equipment, finances, spare parts, and funds for supplier payments. The moderate level of agreement may be due to various factors such as limited resources, poor planning, inaccurate financial planning, inadequate communication between organizational leaders and project teams, and competing priorities within the organization. One possible reason for the moderate level of agreement is the scarcity of resources within the organization, which may lead to challenges in achieving project goals. This could include limited availability of human resources, inadequate project team qualifications and experience, insufficient project equipment, and financial resources. Additionally, poor planning and ineffective communication between organizational leaders and project teams may also contribute to the moderate level of agreement. Inaccurate budgeting and financial planning, as well as inadequate supplier management, may result in challenges related to timely payments to suppliers and availability of spare parts.

It is important for organizational leaders to recognize the importance of providing adequate resources for project implementation, including human resources, qualifications and experience of the project team, project equipment, and finances. Effective communication between organizational leaders and project teams, accurate financial planning, and supplier management are also crucial for project success. Addressing these factors and ensuring that projects receive the necessary resources in a timely manner can help improve project outcomes, reduce delays, and enhance overall project quality. According to a study conducted by Wambui, Ombui and Kagiri, (2023) on the Factors Affecting Completion of Road Construction Projects in Nairobi City County, the authors found that funding availability influences project implementation through adequacy, timeliness, and accessibility of funds. Similarly, Ng'etich and Otieno, (2021) noted in their study on Factors Influencing Monitoring and Evaluation Processes of County Road Projects in Turkana County Government, Kenya that financial resources influence project performance through various components, such as adequacy of allocated financial resources and timeliness of the disbursed resources.

Muiruri and Wanjohi, (2021) conducted a study on the Determinants of performance of irrigation projects: Case of Nthawa irrigation project of Mbeere North Sub-County, Embu County, Kenya, and emphasized the importance of availability and accessibility of spare parts in project implementation. Their findings are consistent with the table, which shows that 47% of respondents in the LE category reported that the project team is provided with adequate spare parts during implementation, while 43.6% of respondents in the VLE category reported that there is always sufficient funds to undertake full payments to various suppliers in project implementation. Similarly, the study by Biketi, Munala, and Tituskivaa, (2021) on Factors for Efficient Relationship between Contractors and Subcontractors in Project Implementation in Nairobi Kenya, notes the importance of timely provision of construction materials for successful project implementation.

Several factors may explain this relationship. First, having sufficient resources such as funding, equipment, and skilled personnel can ensure that the necessary work is completed in a timely and effective manner, reducing the risk of delays or errors. Second, adequate resources can enable effective project planning and management, including risk management and monitoring, which can help to ensure project success. Finally, sufficient resources can facilitate stakeholder engagement and collaboration, promoting a sense of ownership and investment in the project among local communities. Overall, these results underscore the importance of adequate resources in the successful implementation of rural electrification projects. Organizations involved in such projects should prioritize resource allocation and management, ensuring that necessary resources are available and effectively utilized, as supported by the literature and findings from these studies. Previous research has identified the availability of resources as a crucial factor that impacts the success of project implementation. A moderation perspective, "which investigated the influence of organizational culture and environmental pressures on IT project performance. Turner, (2023) also explored project-based management and leading strategic change in organizations in the "Handbook of project-based management." Meanwhile, Mutunga et al. (2014) examined the role of resource configurations on the sustainable competitive advantage of food and beverage firms in Kenya in the "European Journal of Business and Management."

## VII. Conclusion

The results of the hypothesis testing indicate that resources availability has a significant influence on the implementation of rural electrification projects within central rift region in Kenya. The study found that organizations with adequate resources tend to have more successful project implementation milestones. The

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findings underscore the importance of resources availability in promoting successful project implementation and suggest that organizations should prioritize resources allocation to enhance timely project implementation outcomes. Furthermore, the study identified resources availability as a critical factor in promoting successful project implementation. However, it did not investigate the impact of specific resources such as financial, human, and technological resources on the implementation of rural electrification projects. Further studies can explore this aspect to determine the specific resource types that have the greatest impact on successful project implementation.

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All authors contributed to the development of this manuscript, its revision, proof read, and provided in-depth suggestions for final version. Specifically, Mr. Methodius Kiarie Njoroge developed and revised the main manuscript; Prof. Christopher Gakuu, edited and made sure the manuscript followed the recommended guideline. Prof. Harriet Kidombo Dr. was involved in restructuring and approving the manuscript for submission and finally Augustine Mwangi Gatotoh participated in approving the research design, data analysis and the outcome of the research.

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