

Journal of Entrepreneurship & Project Management

ISSN Online: 2616-8464

 **Stratford**
Peer Reviewed Journals & books

Effect of Information and Communication Technology (ICT) Implementation on Project Performance; A Case of Rusumo Cross Border Market Project

Sabrina Mukamihigo & Dr. Wilson Musoni (PhD)

ISSN: 2616-8464

Effect of Information and Communication Technology (ICT) Implementation on Project Performance; A Case of Rusumo Cross Border Market Project

Sabrina Mukamihigo¹, Dr. Wilson Musoni² (PhD)

¹ Master of Sciences in Project Management, University of Kigali, Rwanda

²University of Kigali, Rwanda

How to cite this article: Mukamihigo S. & Musoni W. (2024). Effect of Information and Communication Technology (ICT) Implementation on Project Performance; A Case of Rusumo Cross Border Market Project. *Journal of Entrepreneurship & Project Management*. Vol 8(1) pp. 93-112 <https://doi.org/10.53819/81018102t2325>

Abstract

This research assessed the effect of Information and Communication Technology (ICT) Implementation on Project Performance. A Case of Rusumo Cross Border Market Project" is guided by the following specific objectives: to assess the effect of ICT skills on the performance of Rusumo Cross Border Market project, to determine. The effect of ICT services on the performance of Rusumo Cross Border Market project, to analyze the effect of ICT infrastructure on the performance of Rusumo Cross Border Market project and to find out the effect of ICT management support on the performance of Rusumo Cross Border Market project. The study used descriptive research design and inferential research design. The population of the study comprised of 300 and sample size of the study was 300 employees of Rusumo Cross Border Market project. They study used universal sampling techniques because the sample size equals to the population of the study. Questionnaire and interview were used to collect data and descriptive statistics and inferential statistics such as correlation and multiple linear regressions were used as method of data analysis with a help of SPSS. The survey concluded that there was moderate correlation between ICT skills and project performance. Through the use of the ICT infrastructure and being equipped with necessary ICT skills, the RCBMP had improved their revenue collection as well as sourcing of donors. The findings revealed that through adequate security and storage of data as well as efficient sharing of data, ICT services improved performance of RCBMP. The findings revealed that ICT infrastructure greatly affected the performance of the RCBMP by way of improved communications between different RCBMP stakeholders, improved funding. The findings revealed that ICT management support influenced the performance of the RCBMP. In conclusion, ICT implementation such as Management support, ICT skills, ICT services and ICT infrastructure influence the performance of RCBMP. The researcher recommended that Government agencies like RDB, RURA, the Ministry of ICT and other government agencies should create better awareness about the benefits of ICT to encourage a higher rate of adoption. This can be done by having seminars or induction sessions to allow business to evaluate their new inventions.

Keywords: *ICT Implementation, Project Performance, Rusumo Cross Border Market Project, Rwanda.*

1. Introduction

Information and Communication Technology is one of the central elements of integrative project management. The project manager should select appropriate communication technology equipment that will help him coordinate the activities of the implementation team. However, the performance problems of project (cost overrun, time delay, quality deficiency) are caused by either in selection, planning, execution or control phase of the project and other factors.

In Rwanda, 30% of all projects are cancelled midstream, and over 50% of completed projects end in up to 190% over budget and 220% late because of the poor handling of the initial process of design documentation, there is a link between the project documents and the performance of the project and development projects are most of the time acknowledged as successful when they are concluded on time, within budget, and in line with specifications and to stakeholders' contentment. However, currently, many government projects in Rwanda exceed the original cost; get cancelled prior to completion, while others fail on terms of the delivered functionality (AG, 2017). Development projects including Rusumo Cross Border Market project are most of the time acknowledged as successful when they are concluded on time, within budget, and in line with specifications and to stakeholders' contentment.

Therefore, the past studies have mainly focused on the application of information and communication technology (ICT) in various sectors such as agriculture, education, small and medium enterprises (SMEs) and in cooperate organizations (Gingnell et al., 2018). However, limited research has explored the effect of information and communication technology on project performance through ICT skills, ICT services, ICT infrastructure and ICT management support. Therefore, the main gap that motivated the researcher to undertake this study was to find out whether the relationship between Information Technology and Project success in relation to ICT skills, services, infrastructure, and ICT management support has been given little attention and the impacts are not significantly assessed. Therefore, this study aims at closing this gap by analyzing the effect of information technology implementation on performance of Rusumo Cross Border Market project.

1.1 Objectives of the study

1.1.1 General objective

The general objective of this study is to examine the effect of information and communication technology (ICT) implementation on project performance with a case study of Rusumo Cross Border Market project.

1.1.2 Specific objectives

- (i) To assess the effect of ICT skills on the performance of Rusumo Cross Border Market project.
- (ii) To determine the effect of ICT services on the performance of Rusumo Cross Border Market project.
- (iii) To analyze the effect of ICT infrastructure on the performance of Rusumo Cross Border Market project.
- (iv) To find out the effect of ICT management support on the performance of Rusumo Cross Border Market project.

1.4. Research hypotheses

H₀₁: There is no significant relationship between ICT skills and the performance of Rusumo Cross Border Market project.

H₀₂. There is a significant relationship between ICT services and the performance of Rusumo Cross Border Market project.

H₀₃: There is no significant relationship between ICT infrastructure and the performance of Rusumo Cross Border Market project.

H₀₄: There is no significant relationship between ICT management support and the performance of Rusumo Cross Border Market project.

2.1 Empirical Review

2.1.1 ICT skills and project performance

Mmbughu (2019) assessed the influence of ICT on Project Management Team Performance. This study strived on knowing those relationships and how to strengthen the performance of project teams using ICT. Moreover, special focus of the study was on the effective application of ICT on meeting federation communication target through its projects for different stakeholders such as members and project staff/teams. The study employed the cross-sectional research design using both primary and secondary data types. A questionnaire data collection tool supported with personal communications was used targeting respective organization employees, specific project teams and specific type of data. Statistical Product and Service Solutions (SPSS) with the aid of Likert scales used to facilitate data analysis. The study noted that, there is strong relationship between projects which are implemented within an organization and the quality of project teams; however, interrelationship between them is somehow complex within and outside other projects. The usage of sophisticated technologies such as ICT for improving performance of the projects and organizations is necessary and have profound role in motivating the project team members. It is recommended that, integrating technology such as the advance used of ICT into project management process could be one of the best ways that contribute to project teams hence organization success.

2.1.2. ICT services and project performance

Chua Yong Chan (2019) conducted an unpublished thesis on "ICT Application in Achieving Project Success: A Case Study of a Construction Company in Malaysia." The research aimed to explore the role of Information and Communication Technology (ICT) in enhancing project success within the Malaysian construction industry, assessing factors influencing ICT implementation. The study focused on a construction company, with eight high-level management interviewees. Factors affecting ICT implementation were identified at individual, organizational, and technological levels. The company adopted various ICT types, including electronic communication systems, documentation, accounting, quantity surveying, architectural/engineering design, and project planning. Results indicated that effective ICT implementation positively impacted project success criteria such as time, cost, quality, scope, and customer satisfaction. The study concluded that ICT is a key determinant of project success, suggesting that successful ICT practices enhance the likelihood of project success in the construction industry, providing valuable insights for those seeking to apply ICT in this context.

Cyprian et al. (2020) conducted an unpublished dissertation on the "Impact of ICT Capacity on Organizational Performance of Public Secondary Schools in Kisii County, Kenya." The study aimed to explore the influence of ICT capacity, specifically human resource ICT capacity (X1), school ICT infrastructure (X2), and institutional ICT environment (X3), on the organizational performance (Y) of public secondary schools in Kisii County funded by the government through the Economic Stimulus Programme. Employing an undisclosed research design, the target population and sample size are not specified. The research revealed that all

<https://doi.org/10.53819/81018102t2325>

three explanatory variables had a positive and significant impact on organizational performance. Consequently, the study recommended increased investment in ICT capacity building within educational institutions to effectively harness the potential of ICT and enhance organizational performance in public secondary schools in Kisii County.

2.1.3. ICT Infrastructure and project performance

Adhiambo (2021) did a study on the Influence of ICT tools during project monitoring influences the performance of relief aid projects at Red Cross Society of Kenya. As such, the study evaluated different ICT tools' use and the performance of projects at the Red Cross Society of Kenya. The study used a descriptive research design and stratified random sampling to study the 88 respondents. Primary data was gathered using a questionnaire which was then followed by a detailed research procedure to ensure credibility and accuracy in the data obtained. The data that was collected was then edited, coded, transcribed and then cleaned. The Statistical Package for java script was used in data analysis and the results were presented in frequency and tables. A regression analysis was also done on the responses to determine the extent of the relationship between ICT tools use in project monitoring and the performance of relief aid projects at the Kenya Red Cross Organization in Nairobi Region. The study showed that the use of ICT tools during project monitoring does indeed influence the performance of Red Cross projects. There is a correlation between the ICT tools' use and the project performance. The regression model shows that the use of ICT tools during monitoring is significantly related to the project performance by various coefficient values a constant of 3.974. Based on the findings, the study recommended that The Kenya Red Cross organization should incorporate ICT tools in project monitoring for the success of the project performance.

Yasin (2019) assessed the impact of information technology on project success at CARE International Hargeisa, Somaliland (CI Hargeisa). It adopted descriptive research design where all the staff at the organization in Hargeisa was the targeted for the study. The study used both quantitative and qualitative methods for data collection. All completed questionnaires proceeded to data analysis. A total of 63 questionnaires were returned while 7 interviewed. That represented a response rate of 93% which was sufficiently high to yield the results sought. Data was analyzed using IBM SPSS Version 20 for descriptive and inferential statistics. The study findings revealed that majority of the respondents had various IT organizations devices like 66.7% had laptops, 22.2% had organization mobile phone, 6.3% had desktop computer and 4.8% had iPad or tablet at their disposal to enable them to perform their duties. In addition, the regression result of the study shows that there is positive relationship between the IT and project success ($r = 0.175$ at $p < 0.05$ significant level.). The study findings revealed that use of IT had facilitated better data and knowledge management for the organization, IT had improved operational efficiency of employees, and IT had also improved accountability for the organization and in quality project delivery to its stakeholders; are better ways in which IT had improved project success at CARE International. The study recommends that CARE should embrace IT tools and services so as to have competitive edge and improve service delivery to their stakeholders.

2.1.4. ICT management support and project performance

Munyao (2017) conducted a study in Kitui County, Kenya, investigating the impact of Information and Communication Technology (ICT) on the performance of Community Based Organizations (CBOs). Employing a descriptive research design, the study targeted 168 CBO managers, employing stratified random sampling to select 85 organizations. Primary data was

collected through a questionnaire containing closed and open-ended questions. Descriptive statistics, including frequency distribution tables and regression analysis, were utilized for quantitative data, while qualitative data was presented in prose form. The findings revealed insufficient computer hardware resources among CBOs, but ICT infrastructure positively influenced communication. Adequate ICT skills were noted among staff, along with awareness of government policies. The study concluded that ICT infrastructure, management support, and government policy significantly influenced CBO performance, recommending government subsidies for computing devices, increased investment in ICT resources, regular staff training, and the development of local content for effective dissemination of information.

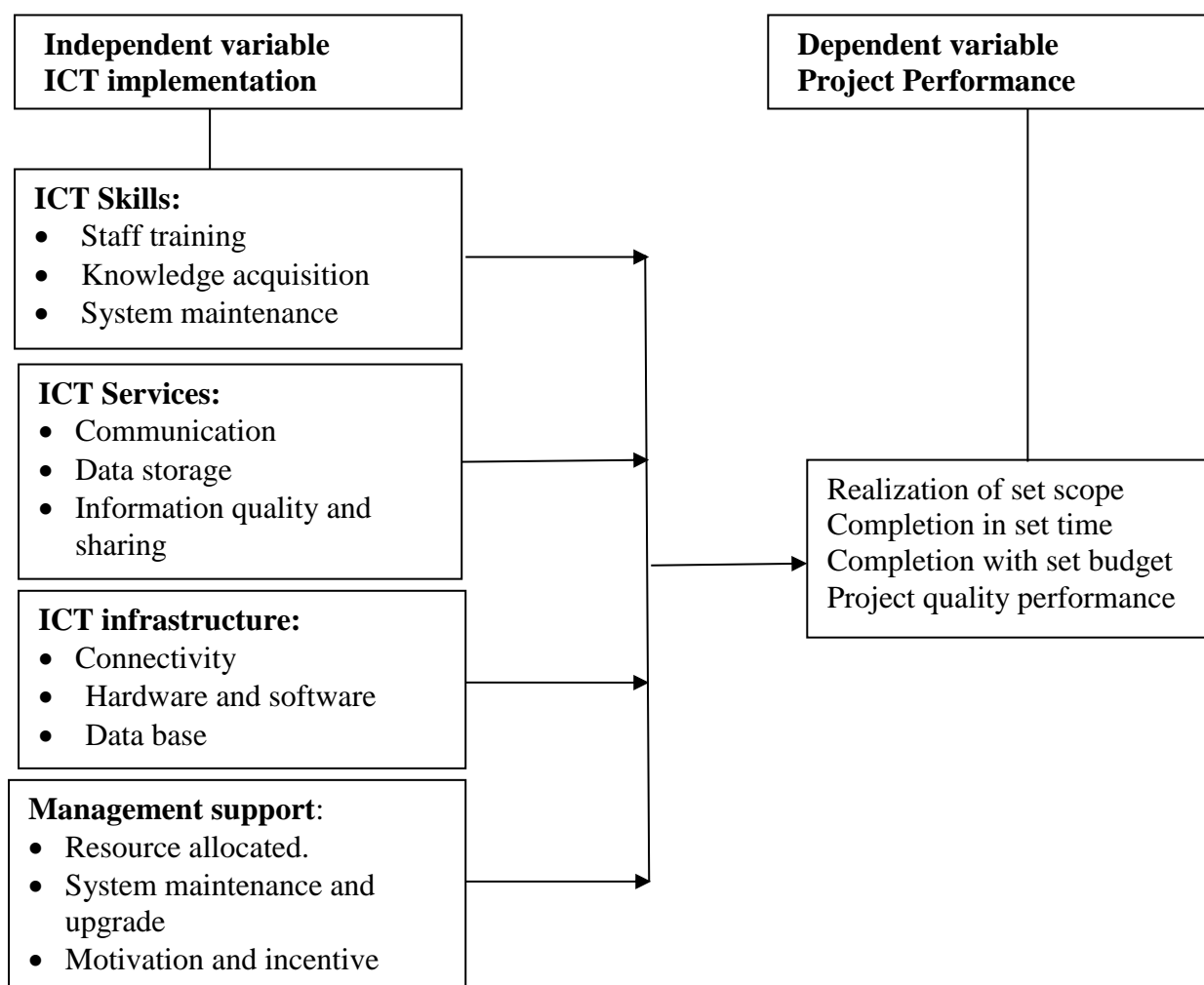
2.1.5. ICT and project performance

Mukamanzi and Ndikubwiman (2021) analysed the factors that influence the adoption and use of ICT by SMEs in Rwanda. It also examines perceptions of SMEs' employees and managements on adoption and use of ICT, assesses the level of awareness and skills of SMEs' employees and other variables which can be helpful in gaining valid outputs. It uses a specially designed structured questionnaire to collect data and uses t-test statistics to compare the mean difference between the level of awareness and adoption patterns of ICT facilities among SMEs. A regression analysis helps evaluate factors influencing ICT adoption choices in the SME sector and assess the perceptions of SMEs' employees towards ICT adoption. It uses the SPSS software to perform data entry and analysis. This study examines the relationship between ICT adoption and its five factors -- perceived benefits, perceived costs, ICT knowledge, external pressures and government support. The results show that perceived costs and external factors were insignificant in ICT adoption whereas perceived benefits, perceived costs and ICT knowledge were significant in ICT adoption. According to the results, perceived benefits had a strong and significant relation to ICT adoption and the relation between ICT knowledge and employees' skills about ICT adoption were also significant.

Umulisa and Noor (2017) assessed the impact of information technology on project success at CARE International Hargeisa, Somaliland (CI Hargeisa). It adopted descriptive research design where all the staff at the organization in Hargeisa was the targeted for the study. The study used both quantitative and qualitative methods for data collection. All completed questionnaires proceeded to data analysis. A total of 63 questionnaires were returned while 7 interviewed. That represented a response rate of 93% which was sufficiently high to yield the results sought. Data was analyzed using IBM SPSS Version 20 for descriptive and inferential statistics. The study findings revealed that majority of the respondents had various IT organizations devices like 66.7% had laptops, 22.2% had organization mobile phone, 6.3% had desktop computer and 4.8% had iPad or tablet at their disposal to enable them to perform their duties. In addition, the regression result of the study shows that there is positive relationship between the IT and project success ($r = 0.175$ at $p < 0.05$ significant level.). The study findings revealed that use of IT had facilitated better data and knowledge management for the organization, IT had improved operational efficiency of employees, and IT had also improved accountability for the organization and in quality project delivery to its stakeholders; are better ways in which IT had improved project success at CARE International. The study recommends that CARE should embrace IT tools and services to have competitive edge and improve service delivery to their stakeholders. The study also recommends that more study should be done on challenges facing information technology use in organizations in Hargeisa, Somaliland.

2.2 Conceptual framework

The conceptual framework means the parts of a building or an object that support its weight and shape. This research will deal with two variables that mean the independent variable: ICT implementation such as ICT skills, ICT services, ICT infrastructure and Management support) and dependent variable is project performance in terms of realization of set objectives, completion in set time, completion with set budget and project quality performance.



Source: Researcher compilation (2023)

Figure 2.1: Conceptual framework

2.3 Research Gap

While the existing empirical studies, including those by Mmbughu (2019), Chua Yong Chan (2019), Adhiambo (2021), Yasin (2019), Munyao (2017), Mukamanzi and Ndikubwiman (2021), and Umulisa and Noor (2017), have contributed valuable insights into the relationship between Information and Communication Technology (ICT) and project performance, there remains a research gap that this current study aims to address comprehensively. Most of the prior research has focused on specific aspects of ICT's impact on project performance, such as ICT skills (Mmbughu, 2019), ICT services in construction (Chua Yong Chan, 2019), ICT tools in project monitoring (Adhiambo, 2021), ICT capacity in educational institutions (Cyprian et al., 2020), and ICT infrastructure in community-based organizations (Munyao,

<https://doi.org/10.53819/81018102t2325>

2017). However, there is a lack of comprehensive research that systematically investigates the combined influence of key factors, namely ICT skills, ICT services, ICT infrastructure, and ICT management support, on project performance. This study aims to bridge this gap by integrating these critical dimensions and examining their collective impact on project performance, specifically in terms of realizing set objectives, completing projects within set timeframes, adhering to allocated budgets, and ensuring high-quality project outcomes. By synthesizing these diverse elements, the current study seeks to provide a holistic understanding of the relationship between ICT implementation and various aspects of project performance, offering a more comprehensive perspective compared to the previous studies that have tended to focus on specific aspects of this relationship.

3. Materials and Methods

The research employed a descriptive survey design, aiming to comprehensively describe and understand the relationships between Information and Communication Technology (ICT) implementation factors (ICT skills, ICT services, ICT infrastructure, and ICT management support) and the performance of the Rusumo Cross Border Market project. This design facilitated the gathering of data to depict the current status of the project's ICT utilization. The choice of a descriptive research design aligned with the study's objectives, as it allowed for the organization, tabulation, and visual representation of data related to ICT implementation and project performance. Following Kothari's (2018) perspective, the research design served as a framework, guiding the collection and analysis of data.

The population of the study comprised 300 employees of the Rusumo Cross Border Market project, encompassing top managers, HR personnel, technicians, monitoring and evaluation officers, and field workers. Utilizing Saunders et al.'s (2007) definition, the population included all elements meeting specific inclusion criteria for the study. The sample size equaled the total population, and a universal sampling technique was employed, ensuring representation from all categories of employees within the project.

Data collection instruments included a questionnaire and interviews. The questionnaire, chosen for its affordability, ease of dissemination, and consistent responses, employed Likert scales for closed-ended questions. An interview guide was designed for semi-structured interviews with the project manager, offering an open-ended exploration of specific themes. A piloting study was conducted to ensure clarity and eliminate ambiguity in the questionnaire. The validity of the research instrument was established through content validity, involving expert judgment, and the reliability was assessed using the split-half approach and test-retest method, with a resulting Cronbach's Alpha of 0.741, signifying reliability.

Data processing, analysis, and presentation involved transforming observations into systematic categories and codes, followed by quantitative analysis using SPSS version 23. Descriptive statistics, such as mean, frequency, and standard deviation, were employed to describe ICT implementation and project performance. The Pearson correlation test assessed statistical relationships, and multiple linear regression models explored the role of each predictor in project performance. Therefore, the study adhered to ethical considerations, seeking informed consent from respondents, assuring confidentiality, and emphasizing voluntary participation with the right to withdraw. Ethical norms were maintained throughout the research process, addressing legal and regulatory aspects. This comprehensive research methodology provides a robust foundation for investigating the intricate dynamics between ICT implementation and project performance within the context of the Rusumo Cross Border Market project.

4. Presentation of findings

4.1 Descriptive statistics

The study assessed the impact of ICT skills, ICT services, ICT infrastructure, and ICT management support on the performance of Rusumo Cross Border Market, with respondents rating their project on a Likert scale ranging from 1 to 5. The mean scores and standard deviations were utilized for data analysis. Results showed that the measurable variables fell within specific ranges, with a mean range of 1 to 1.80 indicating a response mode of "not at all" and interpreted as very low. The subsequent range of 1.81 to 2.60, with a response mode of "to a little extent," indicated a low interpretation. A range of 2.61 to 3.40, with a response mode of "to a moderate extent," represented a moderate interpretation. The range of 3.41 to 4.20, with a response mode of "to a great extent," indicated a high interpretation. The highest range, 4.21 to 5.00, with a response mode of "very great extent," was interpreted as very high. The analysis, presented as composite mean and standard deviation, provided a comprehensive understanding of the respondents' perceptions and the corresponding level of impact of ICT factors on project performance.

4.1.1 Information and communication technology (ICT) implementation

The general objective of this study is to examine the effect of information and communication technology (ICT) implementation such as on performance of Rusumo Cross Border Market project. The respondents were requested to indicate their perception on ICT skills, ICT services, ICT infrastructure and ICT management support in five point Likert scale. The researcher used Likert scale of five point ranging between 1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly agree.

4.1.1.1 ICT skills and performance of Rusumo Cross Border Market project

The study sought to assess the perception of respondents on ICT skills on performance of Rusumo Cross Border Market project. The results were presented in the table below:

Table 4.1: ICT skills and performance of Rusumo Cross Border Market project

	SD		D		N		A		SA		Mean	St. dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
The staff have the requisite knowledge to use ICT resources in the organization to access	62	20.7	35	11.7	8	2.7	29	9.7	166	55.3	3.67	1.68
The staff are able to access websites to search for information by through of mobile or other internet connection	8	2.7	22	7.3	4	1.3	54	18.0	212	70.7	4.47	1.02
The organization offers training to the staff whenever there is software or hardware upgrade	16	5.3	45	15.0	20	6.7	26	8.7	193	64.3	4.12	1.34
There is induction of new staff on use of ICT resources	28	9.3	23	7.7	5	1.7	49	16.3	195	65.0	4.20	1.33
Overall Mean											4.11	1.34

Source: Primary data, 2023

About ICT skills and performance of Rusumo Cross Border Market project, the results in Table 4.1, revealed that 20.7% of respondents strongly disagreed, 11.7% of respondents disagreed 2.7% of respondents were neutral whereas 9.7% of respondents agreed and the majority 55.3% of respondents strongly agreed that the staff have the requisite knowledge to use ICT resources in the organization to access with very high mean of 3.67 and standard deviation of 1.68. The results indicate that 2.7% of respondents strongly disagreed, 7.3% of respondents disagreed while 1.3% of respondents were neutral whereas 18% of respondents agreed and the majority 70.7% of respondents strongly agreed that the staff are able to access websites to search for information by through of mobile or other internet connection with very high mean of 4.47 and standard deviation of 1.02.

The results indicate that 5.3% of respondents strongly disagreed, 15% of respondents disagreed while 6.7% of respondents were neutral whereas 8.7% of respondents agreed and the majority 64.3% of respondents strongly agreed that the organization offers training to the staff whenever there is software or hardware upgrade with very high mean of 4.12 and standard deviation of 1.34. The results indicate that 9.3% of respondents strongly disagreed, 7.7% of respondents disagreed and 1.7% of respondents were neutral whereas 16.3% of respondents agreed and the majority 65% of respondents strongly agreed that there is induction of new staff on use of ICT resources with high mean of 4.20 and standard deviation of 1.33.

The overall view of respondents on ICT skills and performance of Rusumo Cross Border Market project was excellent with mean score of 4.11 and the standard deviation of 1.34 which implies that there is strong evidence of existing of fact and heterogeneity response. The findings revealed that project offers training whenever there is software or hardware up grade. Paolo and Seri (2012) stated that ICT skills affect project performance. The relation between employees’ ICT knowledge and skills was significant. It is important for projects to determine their employees’ knowledge and skills of ICT because this knowledge or previous experiences may influence an organization’s decision to adopt ICT.

4.1.1.2 ICT services and performance of Rusumo Cross Border Market project

The study sought to assess the perception of respondents on ICT services on performance of Rusumo Cross Border Market project. The results were presented in the table below:

Table 4.2: ICT services and performance of Rusumo Cross Border Market project

	SD		D		N		A		SA		Mean	St. dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
The staff are able to access websites to search for information by through of mobile or other internet access	58	19.3	33	11.0	6	2.0	82	27.3	121	40.3	3.58	1.56
Sharing of information is sufficient	6	2.0	21	7.0	5	1.7	44	14.7	224	74.7	4.53	.97
Training of ICT use is a cost effective	15	5.0	39	13.0	30	10.0	25	8.3	191	63.7	4.13	1.30
Communication systems in the organization is sufficient	28	9.3	30	10.0	8	2.7	33	11.0	201	67.0	4.16	1.38
Overall Mean											4.10	1.30

Source: Primary data, 2023

<https://doi.org/10.53819/81018102t2325>

About ICT services and performance of Rusumo Cross Border Market project, the results in Table 4.2, show that 19.3% of respondents strongly disagreed, 11% of respondents disagreed, 2% of respondents were neutral whereas 27.3% of respondents agreed and the majority 40.3% of respondents strongly agreed that the staff are able to access websites to search for information by through of mobile or other internet access with very high mean of 3.58 and standard deviation of 1.56. The results indicate that 2% of respondents strongly disagreed, 7% of respondents disagreed while 1.7% of respondents were neutral whereas 14.7% of respondents agreed and the majority 74.7% of respondents strongly agreed that sharing of information is sufficient of Project with very high mean of 4.53 and standard deviation of 0.97.

The results indicate that 5% of respondents strongly disagreed, 13% of respondents disagreed while 10% of respondents were neutral whereas 8.3% of respondents agreed and the majority 63.7% of respondents strongly agreed that training of ICT use is a cost effective with very high mean of 4.13 and standard deviation of 1.30. The results indicate that 9.3% of respondents strongly disagreed, 10% of respondents disagreed and 2.7% of respondents were neutral whereas 11% of respondents agreed and the majority 67% of respondents strongly agreed that communication systems in the organization is sufficient with high mean of 4.16 and standard deviation of 1.38.

The overall view of respondents on ICT services and performance of Rusumo Cross Border Market project was excellent with mean score of 4.10 and the standard deviation of 1.30 which implies that there is strong evidence of existing of fact and heterogeneity response. The findings revealed that ICT services especially information sharing within improves efficiency as people are able to share new ideas, new markets and better ways of doing things. The manager of RCBMP stated that Information Technology take an important role for the success of projects, because it helps the communication between the project staff through sharing information, approving payments, problem solving by producing accurate reports also, to communicate donors and project partners as well as make easy to facilitate meeting through skype and zoom applications, and finally to demonstrate project success. Sharing information enables organizations to market their products and generally inform their customers about new products. Lee and Whang (2000) describe information sharing as an enabler for tight coordination among trading partners.

4.2.1.3 ICT Infrastructure and performance of Rusumo Cross Border Market project

The study sought to assess the perception of respondents on ICT infrastructure on performance of Rusumo Cross Border Market project. The results were presented in Table 4.3:

Table 4.3: ICT Infrastructure and performance of Rusumo Cross Border Market project

	SD		D		N		A		SA		Mean	St. dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
The project has sufficient computer hardware resources	0	0.0	33	11.0	2	0.7	46	15.3	219	73.0	4.50	.96
The project has reliable and fast internet connectivity	19	6.3	26	8.7	13	4.3	16	5.3	226	75.3	4.35	1.26
Existing infrastructure supports future system upgrade (scalability)	32	10.7	29	9.7	5	1.7	41	13.7	193	64.3	4.11	1.41
The existing ICT infrastructure enhances efficient running of ICT solutions and service delivery	20	6.7	36	12.0	5	1.7	25	8.3	214	71.3	4.26	1.32
Overall Mean											4.30	1.23

Source: Primary data, 2023

About ICT infrastructure and performance of Rusumo Cross Border Market project, the results from the table 4.3 revealed that 11% of respondents disagreed, 0.7% of respondents were neutral whereas 15.3% of respondents agreed and the majority 73% of respondents strongly agreed that the project has sufficient computer hardware resources with very high mean of 4.50 and standard deviation of 0.96. The results indicate that 6.3% of respondents strongly disagreed, 8.7% of respondents disagreed while 4.3% of respondents were neutral whereas 5.3% of respondents agreed and the majority 75.3% of respondents strongly agreed that the project has reliable and fast internet connectivity with very high mean of 4.35 and standard deviation of 1.26.

The results indicate that 10.7% of respondents strongly disagreed, 9.7% of respondents disagreed while 1.7% of respondents were neutral whereas 13.7% of respondents agreed and the majority 64.3% of respondents strongly agreed that existing infrastructure supports future system upgrade (scalability) with very high mean of 4.11 and standard deviation of 1.41. The results indicate that 6.7% of respondents strongly disagreed, 12% of respondents disagreed and 1.7% of respondents were neutral whereas 8.3% of respondents agreed and the majority 71.3% of respondents strongly agreed that the existing ICT infrastructure enhances efficient running of ICT solutions and service delivery with high mean of 4.26 and standard deviation of 1.32.

The overall view of respondents on ICT infrastructure and performance of Rusumo Cross Border Market project was excellent with mean score of 4.30 and the standard deviation of 1.23 which implies that there is strong evidence of existing of fact and heterogeneity response. Use of ICT applications for business purposes brings numerous advantages for users. the study is in the line with Adhiambo (2021) who showed that the use of ICT tools during project monitoring does indeed influence the performance of Red Cross projects. There is a correlation between the ICT tools' use and the project performance. The

regression model shows that the use of ICT tools during monitoring is significantly related to the project performance by various coefficient values a constant of 3.974.

4.1.1.4. ICT management support and performance of Rusumo Cross Border Market project

The study sought to assess the perception of respondents on ICT management support on performance of Rusumo Cross Border Market project. The results were presented in Table 4.4:

Table 4.4: ICT management support and performance of Rusumo Cross Border Market project

	SD		D		N		A		SA		Mean	St. dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
The project has adequate telephone line connections	53	17.7	33	11.0	14	4.7	9	3.0	191	63.7	3.84	1.64
The management facilitates organization to undertake System Monitoring at regular time to avoid breakdowns	35	11.7	29	9.7	13	4.3	42	14.0	181	60.3	4.02	1.45
Management has invested and continues to invest in ICT facilities	4	1.3	46	15.3	9	3.0	11	3.7	230	76.7	4.39	1.18
Management facilitates staff on training of new and emerging Technologies related to ICT	46	15.3	20	6.7	16	5.3	16	5.3	202	67.3	4.03	1.54
Our structure allows quick decisions and feedback	27	9.0	33	11.0	0	0.0	39	13.0	201	67.0	4.18	1.38
Overall Mean											4.09	1.43

Source: Primary data, 2023

About ICT management support and performance of Rusumo Cross Border Market project, the results in Table 4.4 revealed that 17.7% of respondents strongly disagreed, 11% of respondents disagreed 4.7% of respondents were neutral whereas 3% of respondents agreed and the majority 63.7% of respondents strongly agreed that the project has adequate telephone line connections with very high mean of 3.84 and standard deviation of 1.64. The results indicate that 11.7% of respondents strongly disagreed, 9.7% of respondents disagreed while 4.3% of respondents were neutral whereas 14% of respondents agreed and the majority 60.3% of respondents strongly agreed that the management facilitates organization to undertake System Monitoring at regular time to avoid breakdowns with very high mean of 4.02 and standard deviation of 1.45.

The results indicate that 1.3% of respondents strongly disagreed, 15.3% of respondents disagreed while 3% of respondents were neutral whereas 3.7% of respondents agreed and the majority 76.7% of respondents strongly agreed that management has invested and continues to invest in ICT facilities with very high mean of 4.39 and standard deviation of 1.18. The results indicate that 15.3% of respondents strongly disagreed, 6.7% of respondents disagreed and 5.3% of respondents were neutral whereas 5.3% of respondents agreed and

<https://doi.org/10.53819/81018102t2325>

the majority 67.3% of respondents strongly agreed that management facilitates staff on training of new and emerging Technologies related to ICT with high mean of 4.03 which implies that the fact appear. The results indicate that 9% of respondents strongly disagreed, 11% of respondents disagreed whereas 13% of respondents agreed and the majority 67% of respondents strongly agreed that their structure allows quick decisions and feedback with very high mean of 4.18 which implies that there is strong evidence of existing of fact and standard deviation of 1.38 implies heterogeneity of responses.

The overall view of respondents on ICT management support and performance of Rusumo Cross Border Market project was excellent with mean score of 4.09 and the standard deviation of 1.43 which implies that there is strong evidence of existing of fact and heterogeneity response. This implies that ICT management in different factors is necessary for better use of ICT. The findings concur with Thong et al (2018) who stated top management support is based on five factors which include frequency of attendance of computerization project, involvement in information requirement analysis, decision making relating to the computerization project, reviewing consultant’s recommendation and level of monitoring the project.

4.2.2. Level of performance of Rusumo Cross Border Market project

The study sought to assess the perception of respondents on the level of performance of Rusumo Cross Border Market project. The results were presented in Table 4.5:

Table 4.5: Level of performance of Rusumo Cross Border Market project

	SD		D		N		A		SA		Mean	St. dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
Projects completed within the provided budget.	87	29.0	49	16.3	9	3.0	12	4.0	143	47.7	3.25	1.79
Projects completed within the desired quality	8	2.7	22	7.3	0	0.0	58	19.3	212	70.7	4.48	1.01
Projects met customer’s satisfaction.	23	7.7	39	13.0	24	8.0	24	8.0	190	63.3	4.06	1.39
Projects completed within the scheduled time	39	13.0	27	9.0	0	0.0	43	14.3	191	63.7	4.07	1.47
The planning of the project activities is normally undertaken at the right time allowing all stakeholders to participate	2	0.7	71	23.7	11	3.7	11	3.7	205	68.3	4.15	1.31
Overall Mean											4.00	1.39

Source: Primary data, 2023

About ICT skills and performance of Rusumo Cross Border Market project, the results from the table 4.9, showings that 29% of respondents strongly disagreed ,16.3% of respondents disagreed 3% of respondents were neutral whereas 4% of respondents agreed and the majority 47.7% of respondents strongly agreed that projects completed within the provided budget. with very high mean of 3.25 and standard deviation of 1.79. The results indicate that 2.7% of respondents strongly disagreed, 7.3% of respondents disagreed whereas 19.3% of respondents agreed and the majority 70.7% of respondents strongly agreed that projects completed within the desired quality with very high mean of 4.48 and standard deviation of 1.01

The results that 7.7% of respondents strongly disagreed, 13% of respondents disagreed while 8% of respondents were neutral whereas 8% of respondents agreed and the majority 63.3% of respondents strongly agreed that projects met customer's satisfaction with very high mean of 4.06 fact and standard deviation of 1.39. The results indicate that 13% of respondents strongly disagreed, 9% of respondents disagreed whereas 14.3% of respondents agreed and the majority 63.7% of respondents strongly agreed that projects completed within the scheduled time with high mean of 4.07 and standard deviation of 1.47. The results indicate that 0.7% of respondents strongly disagreed, 23.7% of respondents disagreed and 3.7% of respondents were neutral whereas 3.7% of respondents agreed and the majority 68.3% of respondents strongly agreed that the planning of the project activities is normally undertaken at the right time allowing all stakeholders to participate very high mean of 4.15 and standard deviation of 1.31. The overall view of respondents on the level of performance of Rusumo Cross Border Market Project was excellent with mean score of 4.00 and the standard deviation of 1.39 which implies that there is strong evidence of existing of fact and heterogeneity response.

4.3 Inferential statistics

This section presents the results of inferential statistics that were used which included; Pearson correlation coefficient and multiple regression analysis.

4.3.1 Correlation analysis

Correlation between variables is a measure of how well the variables are linearly related. The correlation coefficients results are between -1 and 1. A result of -1 means that there is a perfect negative correlation between the two values, while a result of 1 means that there is a perfect positive correlation between the two variables. Result of 0 means that there is no correlation between the two variables (Gujarat, 2004). Before carrying out a test on research hypotheses, the study examined how the predictor variables were related with the dependent variable. The results are presented on Table 4.12.

Table 4.6: Correlations coefficients

		X1	X2	X3	X4	Y
X1=ICT skills	Pearson Correlation	1				
X2= ICT services	Pearson Correlation	.837**	1			
X3= ICT infrastructure	Pearson Correlation	.557**	.508**	1		
X4= ICT management support	Pearson Correlation	.331**	.298**	.507**	1	
Y=Performance of Rusumo Cross Border Market project	Pearson Correlation	.605**	.609**	.469**	.339**	1
	Sig. (2-tailed)	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

The results in Table 4.6 indicates that there is significant moderate positive relationship between ICT skills and Rusumo Cross Border Market Project as shown by correlation ($r=0.605^{**}$; $p\text{-value}=0.000<0.01$). This means that ICT skills had a positive effect on University Rusumo Cross Border Market Project.

The results indicates that there is significant moderate positive relationship between ICT services and Rusumo Cross Border Market Project as shown by correlation ($r=0.609^{**}$; $p\text{-value}=0.000<0.01$). This means that ICT services had a positive effect on University Rusumo Cross Border Market Project.

The results indicates that there is significant weak positive relationship between ICT infrastructure and Rusumo Cross Border Market Project as shown by correlation ($r=0.469^{**}$; $p\text{-value}=0.000<0.01$). This means that ICT infrastructure had a positive effect on University Rusumo Cross Border Market Project and there is significant weak positive relationship between ICT management support and Rusumo Cross Border Market Project as shown by correlation ($r=0.339^{**}$; $p\text{-value}=0.000<0.05$). This means that ICT management support had a positive effect on University Rusumo Cross Border Market Project.

4.3.2 Multiple linear regression model

To fit the data into the conceptualized model in the conceptual framework, regression analysis was employed. The regression coefficient summary was used to explain the nature of the relationship between the dependent and independent variables. The purpose of the regression analysis was to determine the statistical significance of the attempted prediction and determine the strength of association between ICT implementation and performance of Rusumo Cross Border Market Project and the multiple independent variables. In this section the coefficient of determination (R square) was used as a measure of the explanatory power, to show how the independent variables explain the dependent variable. The F statistics (ANOVA) was used as a measure of the model goodness of fit.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.655 ^a	.430	.422	.50790

a. Predictors: (Constant), X4= ICT management support, X2= ICT services, X3= ICT infrastructure, X1=ICT skills

The findings in Table 4.7 indicate that the model summary shows that adjusted R² (coefficient of determination) of 0.43 implies that 43% of the ICT management can be explained by ICT skills, ICT services, ICT infrastructure and ICT management support at 95% of confidence interval. The remaining 57% can be explained by other variables which were not in the study and chase variations. It can therefore be deduced from the R square and adjusted R values that above average variation between the study variables can be explained by the model.

Table 4.8:ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.298	4	14.325	55.530	.000 ^b
	Residual	76.099	295	.258		
	Total	133.397	299			

a. Dependent Variable: Y=Performance of Rusumo Cross Border Market project

b. Predictors: (Constant), X4= ICT management support, X2= ICT services, X3= ICT infrastructure, X1=ICT skills

Using F statistics, for alpha = 5%, numerator Df= 4 and denominator Df=295, F-critical = 2.46. The F-critical (4; 295) was 2.46 while the F-calculated was 55.530 as shown in Table 4.11. This shows that F-calculated was greater than the F-critical and hence linear relationship between the ICT management and project performance. In addition, because p-value=0.00 is less than 0.05 it depicts that there is a significant relationship to ICT skills, ICT services, ICT infrastructure and ICT management support as independent variable and project performance. The overall regression model is significant indicating that ICT management significantly predict project performance.

Table 4.9: Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.030	.214		4.817	.000
	X1=ICT skills	.218	.078	.235	2.807	.005
	X2= ICT services	.298	.076	.318	3.947	.000
	X3= ICT infrastructure	.122	.057	.124	2.132	.034
	X4= ICT management support	.084	.042	.104	2.025	.044

a. Dependent Variable: Y=Performance of Rusumo Cross Border Market project

The unstandardized coefficients in Table 4.9 can be substituted into the study model to enable prediction of the value of ICT implementation from the values of the multiple independent variables.

$Y = 1.030 + 0.218X_1 + 0.298X_2 + 0.122X_3 + 0.084X_4$ Where: Y = Performance of Rusumo Cross Border Market project, X1= ICT skills, X2 = ICT services, X3= ICT infrastructure and X4= ICT management support.

According to the regression equation established, taking all factors into account (ICT skills, ICT services, ICT infrastructure and ICT management support) constant at zero, performance of Rusumo Cross Border Market project was 1.030.

The regression results revealed that ICT skills have significance positive effect on performance of Rusumo Cross Border Market project as indicated by $\beta_1= 0.218$, p-value= $0.005<0.05$. This shows that taking all other independent variables at zero, a unit increase in ICT skills will lead to increase in performance of Rusumo Cross Border Market project by 0.218 units.

The regression results revealed that ICT services have significance positive effect on performance of Rusumo Cross Border Market project as indicated by $\beta_2= 0.298$, p-value= $0.000<0.05$. This shows that taking all other independent variables at zero, a unit increase in talent ICT services leads to increase in performance of Rusumo Cross Border Market project by 0.298 units.

The regression results revealed that ICT infrastructure have significance positive effect on performance of Rusumo Cross Border Market project as indicated by $\beta_3= 0.122$, p-value= $0.034<0.05$. This shows that taking all other independent variables at zero, a unit increase in ICT infrastructure will lead to increase in performance of Rusumo Cross Border Market project by 0.122 units.

The regression results revealed that ICT management support have significance positive effect on performance of Rusumo Cross Border Market project as indicated by $\beta_4= 0.084$, p-value= $0.044<0.05$. This shows that taking all other independent variables at zero, a unit increase in ICT management support will lead to increase in Rusumo Cross Border Market project by 0.084 units.

4.4. Research hypothesis testing

Hypothesis	Results	Conclusion
H ₀₁ : There is no significant relationship between ICT skills and the performance of Rusumo Cross Border Market project.	Statistically significant relationship between ICT skills and the performance of Rusumo Cross Border Market project ($\beta= 0.218$, $p=0.005<0.05$)	H ₀₁ Rejected
H ₀₂ : There is a significant relationship between ICT services and the performance of Rusumo Cross Border Market project.	Statistically significant relationship between ICT services and the performance of Rusumo Cross Border Market project ($\beta= 0.298$, $p=0.000<0.05$)	H ₀₂ Rejected
H ₀₃ : There is no significant relationship between ICT infrastructure and the performance of Rusumo Cross Border Market project.	Statistically significant relationship between ICT infrastructure and the performance of Rusumo Cross Border Market project ($\beta= 0.122$, $p=0.034<0.05$)	H ₀₃ Rejected
H ₀₄ : There is no significant relationship between ICT management support and the performance of Rusumo Cross Border Market project.	Statistically significant relationship between ICT management support and the performance of Rusumo Cross Border Market project ($\beta= 0.137$, $p=0.044<0.05$)	H ₀₄ Rejected

Source: Primary data, 2023

4.5. Analysis and discussions

The study examined the impact of ICT skills on the performance of Rusumo Cross Border Market project, revealing an overall positive view of respondents with an excellent mean score of 4.11 and a standard deviation of 1.34. This indicates a strong consensus among

<https://doi.org/10.53819/81018102t2325>

participants regarding the effectiveness of ICT skills. The findings align with existing literature, such as Reynolds et al. (1994), who emphasized the significance of small business owners/managers' familiarity with basic technologies before adopting more sophisticated ones. The study suggests that the knowledge and skills of managers or owners about ICT contribute to the ease of ICT use, fostering a conducive environment for project success. The positive relationship between ICT skills and project performance is supported by the rejection of the null hypothesis ($\beta = 0.218$, $p = 0.005 < 0.05$).

Similarly, the assessment of ICT services and their impact on Rusumo Cross Border Market project performance yielded an excellent overall view from respondents, with a mean score of 4.10 and a standard deviation of 1.30. The study emphasized the importance of data security in ensuring privacy for sensitive customer information, preventing litigations, and safeguarding organizational data. The role of ICT services in information sharing, communication systems, and customer loyalty was highlighted, aligning with the findings of Bhansali (2003) and Sawaya (2018). The rejection of the null hypothesis ($\beta = 0.298$, $p = 0.000 < 0.05$) further confirms the significant relationship between ICT services and project performance.

The investigation into ICT infrastructure and its influence on the Rusumo Cross Border Market project revealed an excellent overall view from respondents, with a mean score of 4.30 and a standard deviation of 1.23. Participants expressed satisfaction with internet speed, emphasizing its impact on customer experience, satisfaction, and loyalty. The study identified the crucial role of Information Technology in supporting information sharing, resource flow, and overall project sustainability. The findings support the rejection of the null hypothesis ($\beta = 0.122$, $p = 0.034 < 0.05$), indicating a significant relationship between ICT infrastructure and project performance.

Assessing the impact of ICT management support on Rusumo Cross Border Market project performance, the study found an excellent overall view from respondents, with a mean score of 4.09 and a standard deviation of 1.43. Perceived costs were identified as a direct influencer of ICT adoption, with financial support options available. The study highlighted the positive effects of ICT on staff performance, increasing work effectiveness and efficiency. These findings are consistent with the work of Tumuti (2011) and support the rejection of the null hypothesis ($\beta = 0.137$, $p = 0.044 < 0.05$), signifying a significant relationship between ICT management support and project performance.

Finally, the overall performance of Rusumo Cross Border Market project was assessed, revealing a high mean score of 4.00 and a standard deviation of 1.39. Respondents strongly agreed on several key performance indicators, including projects being completed within the provided budget, meeting desired quality, satisfying customers, and adhering to scheduled timelines. The study highlighted the role of ICT adoption, especially in skills and services, in daily project activities. The overall positive view on project performance is in line with the literature advocating the benefits of ICT in making organizations more efficient, effective, and competitive (Fink and Disterer, 2019; Apulu, 2019). The study concludes that ICT implementation, encompassing skills, services, infrastructure, and management support, significantly impacts the performance of Rusumo Cross Border Market project.

5.1 Conclusion

In conclusion, the findings of this study revealed that there is a significant positive relationship between ICT implementation project performances. This is evidenced by the findings Internet allows a company to cross international boundaries. Use of ICT applications

<https://doi.org/10.53819/81018102t2325>

for business purposes brings numerous advantages for users. Perceived costs were found to have a direct impact on ICT adoption. The findings revealed that 70.7% of respondents strongly agreed that projects completed within the desired quality, 63.3% of respondents strongly agreed that projects met customer's satisfaction. 63.7% of respondents strongly agreed that projects completed within the scheduled time 68.3% of respondents strongly agreed that the planning of the project activities is normally undertaken at the right time allowing all stakeholders to participate. The relation between employees' ICT knowledge and skills was significant. It is important for RCBMP to determine their employees' knowledge and skills of ICT because this knowledge or previous experiences may influence an organization's decision to adopt ICT. Moreover, managers or owners' knowledge or skills about ICT is increasing the opportunity of ICT use among businesses. In conclusion, performance is influenced greatly by adoption of ICT. Management support, ICT skills, ICT services and ICT infrastructure influence the performance of RCBMP.

5.2 Recommendations

The study recommends that government agencies, including RDB, RURA, and the Ministry of ICT, should conduct awareness programs and seminars to promote the benefits of ICT adoption. Rusumo Cross Border Market project should integrate ICT tools for effective project monitoring, ensuring success. The complexity of ICT systems should be addressed by making them user-friendly, and the project should invest in a robust ICT infrastructure. Additionally, capacity building programs for volunteers in using ICT tools are recommended to enhance project performance.

5.3 Acknowledgement

I express my gratitude to God, the University of Kigali (UoK) and its lecturers, and my research supervisor Dr. Wilson Musoni for support during this research. Appreciation is extended to the Postgraduate faculty for valuable education. Special thanks are given to the management of Rusumo Cross Border Market Project for cooperation. I acknowledge these contributions with heartfelt thanks.

6. References

- Adhiambo, A.O (2021). *Influence of Information Communication and Technology Tools on the Performance of Relief Aid Projects in Kenya: The Case of Red Cross Organization in Nairobi County*, Unpublished Thesis, University of Nairobi.
- Apulu I. (2018). *Developing a Framework for Successful Adoption and Effective Utilization of ICT by SMEs in Developing Countries. A Case Study of Nigeria*, PhD. Thesis University of Wolverhampton
- Chua Yong Chan (2019). *ICT Application in Achieving Project Success: A Case Study of a Construction Company in Malaysia*, Unpublished Thesis, University Malaysia Pahang
- Cyprian O. Nyambane, D.M. Nzuki and Korir, J. (2020). *The Impact of ICT Capacity on Organizational Performance of Public Secondary Schools in Kisii County, Kenya*, Unpublished dissertation,
- Gingnell, L. et al.(2018). *Quantifying Success Factors for IT Projects. An Expert-Based Bayesian Model*, Information Systems Management, 31, pp. 21–36.
- Kothari, C. R. (2020). *Research methodology: Methods and techniques (2nd ed.)*. New Delhi, India: New Age International (P) Limited.
- Mmbughu, E.A. (2019). *Assessing The Influence of ICT on Project Management Team Performance: A Case of Selected Tanzania Federation of Cooperative Projects*, Dar Es Salaam, Unpublished Thesis, Open University of Tanzania
- Mukamanzi, F and Ndikubwimana, F (2018). *The effects of ICT adoption on Small and* <https://doi.org/10.53819/81018102t2325>

Medium sized enterprises in Rwanda: A Case study of Kigali City, Unpublished thesis, University of Rwanda

Munyao, M. p (2017). *Effect of The use of Information and Communication Technology on Performance of Community Based Organizations in Kitui County, Kenya*, Unpublished thesis, Kenyatta University.

Umulisa, M. and Dr. Noor, I H. (2017). *Assessment of Factors Affecting Implementation of ICT Projects in Telecommunication Industry of Rwanda: A Case Study of Airtel Rwanda*. Unpublished thesis, Jomo Kenyatta University of Agriculture and Technology, Kigali, Rwanda.

Yasin, F. A (2019). *The Impact of Information Technology on Project Success: A Case Study of Care International Organization in Hargeisa, Somaliland*, Unpublished thesis, Admas University Hargeisa.