EFFECT OF PROJECT CHANGE MANAGEMENT ON SUSTAINABILITY OF WATER SUPPLY SERVICES IN RWANDA: CASE OF BUGESERA DISTRICT

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EFFECT OF PROJECT CHANGE MANAGEMENT ON SUSTAINABILITY OF WATER SUPPLY SERVICES IN RWANDA: CASE OF BUGESERA DISTRICT

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ABSTRACT

This study determined the effect of project change management on sustainability of water supply services in Rwanda. The study adopted a descriptive survey design. A descriptive survey method was used for this investigation. Stakeholders in the water industry, such as members of the district water board committee, WaterAid technical staff and chairs of water users' committees for water supply selling points, filled out a semi-structured and open-ended questionnaire that was then analyzed using statistical package for the social sciences (SPSS) version 21. Secondary data was collected via papers received from the Bugesera District office and from Water, Sanitation, and Hygiene (WASH) district partners, and primary data was collected through a survey. Respondents' perspectives formed the basis for the study's analysis and interpretations. Questions, interviews, and observations were administered to the participants; different strategies and incentives were also used; and all of these factors combined to form a new variable. Participants were asked to assess instruments' face-to-face and content validity at the request of the researcher. To maintain consistency, a test-retest procedure was implemented. Interviews were conducted with the help of a guide, and the results were analyzed with Content Analysis. Examples of inferential statistics include multiple regression, while descriptive statistics include percentages, rates, and counts. Multiple regression analysis was carried out in order to ascertain if a correlation existed between the dependent and independent variables. The reliability of the instruments was calculated using Cronbach's alpha. The instruments were declared trustworthy with a 0.7 test value. The analysis's findings revealed r = 0.596, p value of 0.01, positive association between project change management and sustainable water supply services. Thus, project change management improves services for sustainable water supply by 59.6%. According to the model summary the R-Square value is 0.064, indicating that about 6.4% of the variation in the availability of sustainable water supply services can be explained by project change management (p < 0.01). The study revealed a favorable correlation (r=0.253) between project change management and the provision of sustainable water supply services. The p-value for the analysis of variance in this study was less than 0.05 (F=20,294, =.000). Findings indicated a good connection between project change management and the availability of sustainable water supply services. The value of 20.029 was sufficient to demonstrate that the model was appropriate and applicable. The null hypothesis was rejected with a 95% confidence level due to the strong significance of the beta value t-statistics (α=0.000). Therefore,

the findings of this study emphasized a strong and statistically significant correlation between project change management and the provision of sustainable water supply services in Rwanda. According to the findings of the research conducted, there was a discernible and significant positive link between effective project change management and increased sustainability of water supply services in Rwanda. According to the findings of the study, implementing project change management in the country greatly helped to significantly improving sustainability of water supply services for Rwandans, with a confidence level of 95%. This was determined to be the case.

Keywords: *Bugesera district, Rwanda, Project change management, Sustainability of water supply services*

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INTRODUCTION

Globally, to reduce poverty, increase agricultural output to appease those worried about global food security, and benefit public health, water management must be prioritized (United Nations, 2021). Figures provided by the WHO (2019), indicated that there are 785 million people across the globe who do not have access to even the most fundamental drinking water facilities. Of these, 144 million people are reliant on surface water. It is projected that contaminated drinking water contributes to 485,000 fatalities related to diarrhea each year. A number of additional Sustainable Development Goals (SDGs), such as those pertaining to health, education, economic development, and the environment, are expected to be advanced as a result of the goals. They address each and every facet of the water cycle as well as the sanitation systems.

According to Cleland and Ireland (2012), project management is the primary method used in modern businesses to manage operational and strategic changes in the environment that is currently defined by change. Therefore, there is no question that using optimal project management practices are most likely result in a project being implemented successfully.

The topic of investment planning has recently generated debate among academics and industry professionals all around the world. In 2016, the Ministry of Infrastructure selected WaterAid as one of the few INGOs to support the implementation of the Area-Wide Approach in Rwanda with special technical leadership in the Bugesera district. Bugesera district's first-ever district investment plan was finished with long-term costing based on the "Life Cycle Costing" methodology (capital expenditures, replacement, and operational, direct & indirect support costs) (MINFRA, 2016). As part of the government-approved Area Wide Approach, the Rwandan Ministry of Infrastructure supported the creation of a costed water, sanitation, and hygiene (WASH) plan for the Bugesera district between 2017 and 2019. (DWA). By 2024, 100% access to at least basic water and sanitation services was to be achieved, and by 2030, coverage of safely managed water and sanitation was to be increased.

The creation of the WASH plan was a component of larger, collaborative initiatives to improve WASH infrastructure nationwide. As part of these initiatives, institutional arrangements are being clarified, roles and responsibilities within sectors are being strengthened, monitoring is being improved through the national management information system (MIS), and user feedback and accountability mechanisms are being established for rural water supply. As part of the National Strategy for Transformation (NST1) goals and Sustainable Development Goal, the Government of Rwanda has committed to the ambitious goal of achieving universal access to basic WASH services by 2024. (SDG) 6. But without specific strategies and plans to

direct the development and execution of the various WASH efforts and the long-term sustainability of their results, this is unlikely to be accomplished. The DWA, which places a strong emphasis on enhancing district planning procedures, was implemented by Rwanda's national government. DWA makes use of the district's position as the principal decentralized administrative body in charge of WASH planning, budgeting, implementation, and monitoring (Government of Rwanda, 2020)

With a population of 12.6 million, 52% of whom are under 20 years old, Rwanda has a surface area of 26,340 sq. km. Of this population, 16% live in urban areas and 84% do so in rural areas. With a current population density of 456 people per square kilometre, Rwanda exhibits signs of demographic rising up (National Institute of Statistics of Rwanda, 2019). By 2035, the population is expected to expand by more than 50% to 17.6 million, and by 2050, it might have doubled to 22.1 million (World Bank, 2021).

Administratively, Rwanda is divided into 30 districts and four provinces, including the capital city of Kigali. These are further broken down into 14,837 villages, 2148 cells, and 416 Sectors (National Institute of Statistics of Rwanda, 2019). All of these decentralized administrative bodies have elected or appointed leaders who are answerable to the people through central government and elected councils. The cornerstone of Rwanda's social and economic success is thought to be good governance. All frameworks and policies have a strong emphasis on people with disabilities, kids, the elderly, women, and girls, as well as inclusivity in development. National social protection and planning are informed by the social stratification program "Ubudehe." The nation firmly acknowledges the importance of gender mainstreaming in all fields. To address the "need for situating Gender Equality and Women Empowerment and outlining its critical role in anticipated Rwanda's socio-economic transformation indicated in National strategy for transformation and the 2050 objectives," the national gender policy was recently (2021) amended. With 61.3% of the deputies in the Chamber of Deputies, 36% in the Senate, and 55% in the cabinet, there are more women than men in the country's parliament and cabinet (World Bank, 2021).

According to the official and most recent WASH data, 85% of individuals in the highest quintile of wealth have access to basic drinking water services, compared to 38% of those in the lowest quintile. 41% of rural households and 11% of urban households say they must travel more than 30 minutes (round trip) to get to a source of drinking water. 61% of the population has access to basic sanitation (51% in urban areas versus 63% in rural areas). 84% of the households have a location for handwashing, but only 41% of them had water on hand when the observation was made, and only 32% had soap or another cleaning agent. Between 2016 and 2021, the WASH industry spent an average of USD 79.7 million year, with more than 93% of that sum going toward water supply services and very little toward sanitation and hygiene. Agriculture, industry, and the production of energy utilize the most water (World Bank, 2021).

Bugesera District is located in Rwanda's South-East Province and is made up of 15 Sectors, 72 Cells, and 581 communities, with a total population of 361,914 people. The area is characterized by socioeconomic water scarcity as a result of a lack of investment in extending and maintaining water delivery services to all communities, which is worsened during the dry season when households' access to rainwater decreases (National Institute of Statistics of Rwanda, 2019).

Bugesera is served by three primary water supply options: 1) WASAC-managed large-scale networks that treat and distribute largely surface water, 2) small-scale networks, and 3) hand pumps that come under a community-based management plus model. In terms of water supply service administration, WASAC manages the entire town of Bugesera; there is no private operator, as there is in other rural areas of the country. When the district's water infrastructure is completed, it requests that the national utility take control and provide services. To

administer water supply systems, the utility collaborates with the district and other local leaders at the lower level to establish and train water users' committees, from which water vendors are recommended and elected by community people. These contractors sign management contracts with WASAC and the district outlining each party's roles and responsibilities, as well as how and when water money was paid to the Utility and what the vendor's interest was, among other things (National Institute of Statistics of Rwanda, 2019).

Sector of Water and Sanitation: According to EICV5, 56.7% of the population in Bugesera District has access to basic water supplies, 5% has safely managed services, 28.9% is satisfied with water services, and 20.5% believes water services are too expensive. According to EICV5 data, 87.0% use improved sanitation, 72.7% use improved sanitation that is not shared with other HHs, 5% use shared latrines, and only 0.3% use flush toilets. Only 24% of households had access to hand washing facilities with water and soap (EICV4).

Statement of the Problem

Over the past decade managing projects involving water continues to be beset with a wide variety of obstacles all around the world. Concerns over the availability of clean water are becoming increasingly widespread in many parts of the world. It is considered to be one of the most essential human rights for all countries (UNDP 2016). More so, World Health Organization (2016) report that sanitary services and access to clean drinking water from improved sources continue to fall short of meeting acceptable standards in most rural parts of developing nations.

In Rwanda, most of the interventions to improved source of drinking water access consider access as the water point within 200 meters in urban areas and 500 meters in rural areas with time not exceeding 30 minutes for round trip. Access to basic sanitation is considered when the access to improved sanitation facilities is not shared with other households. In addition, the water quantity per capita considered is 40 Litter per day per capita in rural area and 80 litter per day capita in urban areas.

In Rwanda 82% of the private households use water from improved drinking water sources, with urban households having much better access (95.8%) than rural households (76.8%) (NISR, 2022). The main source of drinking water in urban area are water piped into households, plot or neighbor yard (50%) and public taps (26%) while in rural area, the main sources of drinking water are protected wells or springs (36%) and the public taps (31%). The male head family access water on 82.7% with 96.1% in urban and 76.9 in rural areas. For female head families the distribution is at 81.4% where 95.1 is in urban area and 76.4% in rural areas.

Many communities in Rwanda still lack access to safe and reliable water sources, despite the government's and other stakeholders' best efforts to address this issue, especially in rural areas. Despite political will, Rwanda's current WASH budget falls far short of the country's needs. The lack of funding for WASH is the industry's biggest obstacle. For the fiscal year (FY) 2018–19, for instance, the WASH sector received roughly FRW 50 billion ($50 million). By 2030, everyone should have access to a minimum set of services, but to do so will require an eightfold increase in resources to be carefully managed. This situation of limited resources for WASH is due to competing priorities resulting from the lack of common development plan & prioritizing across sectors. There is inequity in the available budget in WASH where more than 93% of the sector's expenditure is invested in only water supply services.

Political Economic Analysis (PEA) 2022 done by WaterAid Rwanda identified other main WASH sector barriers that include cross-sectoral coordination, focus on WASH coverage and less on access to WASH services, prioritizing WASH among other, limited financial resources, limited reliable evidence to inform decision-making, and the impact of climate change and disasters as well as capacity gaps.

In Rwanda, getting your hands on clean water might be difficult, especially if you live in a remote location. Many communities still don't have access to safe and reliable water sources, despite the government's and other stakeholders' best efforts. Only 61% of Rwandans had access to improved water sources in 2017, therefore many people still lacked access to clean water, according to the World Health Organization (WHO, 2019). The population's health and welfare are negatively impacted, but the absence of access to clean water also has far-reaching economic and social repercussions. The Water and Sanitation Corporation (WASAC) in Rwanda undertook an extensive study to determine how project investment planning affects people's ability to use sustainable water supply services. A total of 2,000 houses were used to compile data from across the country. Investment planning for projects and availability of sustainable water supply services were examined statistically. The results showed a definitive link between well-planned project investments and higher quality, more widely available sustainable water supply services. In particular, communities who benefited from well-planned water projects saw an increase in access to clean water sources, which in turn boosted water security and public health.

Previous studies indicate that the high number of water projects that have been abandoned demonstrates the existence of unidentified fundamental project management practices that are likely to have an effect on the actual implementation of the project. For example, Velayudhan and Thomas (2016) feel that, in addition to the triple criterion, a large number of other aspects should be reviewed. However, there have only been a handful of studies that have empirically studied the relationship between the effective execution of water projects and performance of the projects. In this context, the study looked into the impact of project investment planning on speeding sustainability of water supply services in Rwanda.

LITERATURE REVIEW

Project change management

Project change management plays a pivotal role in ensuring the sustainability of water supply services, a critical aspect of infrastructure and public well-being. Sustainable water supply services are essential for meeting the ever-growing demands of growing populations, protecting ecosystems, and mitigating the impacts of climate change (UN, 2019). Effective communication strategies and mechanisms for involving stakeholders in decision-making processes are crucial for garnering support, managing expectations, and building trust (Reed *et al.,* 2014).

Projects have been utilized by businesses ever since the inception of the discipline making it both essential and desirable (Iqbal, 2018). Projects have been incredibly significant, and in some cases, they have been the motivation for cultural transformations that may be witnessed and experienced even to this day. These adjustments can be observed and experienced all over the world (Cleland & Ireland, 2014). During the process of putting the plan into action, alterations may be made either on purpose or by accident. All of these examples are examples of changes that were made with the intention of increasing the organization's ability to successfully compete on a global scale. Alterations can also be made to the project's scope, which may or may not result in suitable outcomes for the deliverables that are linked with the project (Mekki & Sahnoun, 2019). When formulating and putting into effect organizational plans, one must take into consideration the change's influence on the organization in terms of how much it costs, how long it takes, and how well it can technically perform. Change can occur on three separate levels inside any given organization. Leadership is a vital requirement for successfully navigating any degree of change management (Cameron & Green, 2015).

The project manager is responsible for communicating any unanticipated changes to the project's stakeholders in the form of a change request and adapting the project's activities to

reflect the new circumstances (Cabrey & Haughey, 2014). A project manager's ability to lead has the potential to significantly improve the effectiveness of change management. These traits can have a direct and beneficial effect because they promote open lines of communication and teamwork between a project management and the members of that manager's team (Chen & Lee, 2018).

One of the fundamental aspects of project change management in the water supply sector is the need to address sustainability challenges. As highlighted by Tsur and Dinar (2022), water resources are finite, and their sustainable management is crucial to meet the growing demand for water supply services. Project change management strategies should incorporate sustainability principles to ensure the long-term availability and quality of water resources.

Moreover, the importance of stakeholder engagement and participation in change management cannot be overstated. Research by Koontz *et al*., (2015) underscores the significance of involving various stakeholders, including local communities, in decision-making processes related to water supply projects. Effective stakeholder engagement contributes to the success and sustainability of water supply initiatives.

Furthermore, the integration of technology and innovation is a central theme in modern water supply project change management. Technologies such as smart meters, data analytics, and remote monitoring have the potential to enhance the efficiency and sustainability of water supply systems (Farley & Trow, 2015). Successful adoption of these technologies requires a change management approach that addresses potential resistance and maximizes their benefits.

The role of policy and regulation is another critical aspect of project change management in water supply services sustainability. Effective policies and regulations can provide a framework for sustainable water management and guide project implementation (Schultz *et al.,* 2019). The alignment of projects with relevant policies and regulations is essential for long-term success and sustainability.

Theory of Change

The dynamic environment that causes change has taught us that people and organizations must always prepare for the impending shift. Change is a constant and cannot be halted. Three stages: unfreeze, change, and refreeze make up the Kurt Lewin change management model. Lewin compared stages of transition to water as an analogy. Ice that is square in shape must be unfrozen, then changed or poured into round containers, and then refrozen. Current organizational structures should be disassembled, rearranged, and institutionalized as permanent structures in organizations where change is necessary. Understanding the difficulties of societal change is made easier by change theories. Today, change management is used, although the methods used vary based on the type of change, the individuals involved, and the type of business. When a project is implemented, an organization undergoes change, and how this change is handled determines the project's success.

According to WaterAid (2021), theory of change is an output that documents the consensus reached through an organized and rigorous process of considering, debating, analyzing, and agreeing on how and why change occurs within a particular program. When water supply initiatives are put into practice, certain improvements, like networking, may be impulsive, emergent, informal, or intermittent, while others are planned and clearly specified.

For every firm to survive and thrive in today's fiercely competitive business world, change management is crucial. Lewin contends that unless group norms and practices are also altered, reforms cannot be maintained. Refreezing is frequently necessary in organizational terms due to changes in organizational strategy, practices, values, traditions, and conventions (Sarayreh, 2013).

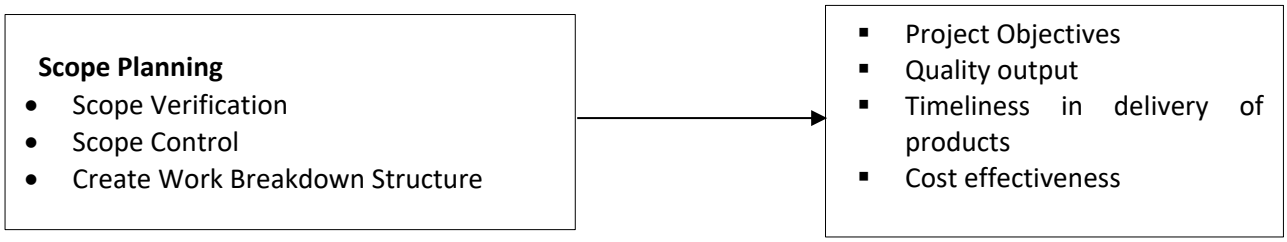
Research by Smith and Johnson (2018) highlights the importance of a clear ToC in water supply projects,

emphasizing the need to identify key drivers and assumptions underlying project sustainability. Effective change management, as outlined in the ToC, can involve stakeholder engagement, capacity building, and adaptive management strategies. Moreover, the study by Brown et al. (2020) underscores the role of change management in water service sustainability. It argues that robust change management processes can address resistance to new practices, ensure the alignment of project objectives with community needs, and foster the long-term acceptance and ownership of water supply services.

In Rwanda, where water supply infrastructure projects are critical for improving access to clean water, understanding the causal pathways between change management and sustainability is crucial. By implementing change management practices informed by a well-constructed ToC, projects can enhance community engagement, local capacity, and the resilience of water supply services, ultimately contributing to their sustainability. Theory of Change framework, supported by research evidence, provides a structured approach to understanding how effective project change management can influence the sustainability of water supply services in Rwanda. It emphasizes the importance of stakeholder engagement, capacity building, and adaptive management in achieving sustainable outcomes.

Conceptual Framework

It is a middle hypothesis in a graph structure that endeavor to interface the factors under examination. It is a guide that offers intelligence to exact request (Goldman et al., 2016). An applied structure gives a diagram of the favored methodology in the exploration and layouts the connections and the ideal impacts, framing free and ward factors, separately.



Independent Variable **Dependent Variable**

Figure 1: Conceptual framework

Source: Researcher, 2023

METHODOLOGY

Research design encompasses various aspects, including the choice of research methods, data collection techniques, and the overall plan for conducting research (Creswell & Poth, 2017). One of the fundamental decisions in research design is the selection of a research approach, such as qualitative, quantitative, or mixed-methods (Creswell & Creswell, 2017). The choice of approach depends on the research objectives and the nature of the research questions. The study used a triangulation design, which combines qualitative and quantitative descriptive research methods. It essentially offers a structure that could be helpful in precisely and methodically determining solutions to an exam problem. For both quantitative and qualitative facts, both instruments were given to the participants at the same time. Data collection took place simultaneously, but quantitative and qualitative data was also collected and examined separately to help the researcher fully grasp the issue. A clear summary was used because it is intended to provide the scientist with accurate information about the variables under control.

The phrase "target population" refers to the specific group of persons from whom the researcher expects to draw conclusions (Cooper & Schindler, 2018). In

the district of Bugesera, WaterAid Rwanda and District authority are responsible for carrying out water supply projects, therefore the population that was targeted consisted of 154 people (Information from Water Aid projects 2021).

According to Kombo and Tromp (2017), having a rigorous selection process for the sample ensures that the sample is representative of the total population as well as the relevant attributes. Slovin's (1967) method, which was also used by Bryman (2016), was utilized to collect data from a target population of 154 respondents in order to generate a sample size of 112 respondents for the study. According to his calculation, the size of the sample was based on the population that was being investigated.

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

Where n = the sample size.

e = probability of error, i.e., the desired precision, 0.05 for 95% confidence

$$n = \frac{154}{1 + 154(0.05)^2} = 112$$

Table 1: Sampling Size

	Population	Sample
District WASH Board members	6	5
District One Stop center officers and Managers	24	19
Operator's technicians	18	14
Members of Water users' committees	64	34
Project Monitoring managers including WaterAid staff	42	17
Total	**154**	**112**

RESULTS AND FINDINGS

Project change management on sustainability of water supply services

The major purpose of the research was to investigate the effect that project change management has on the capacity of Rwandans to acquire dependable water supply services. In order to accomplish this goal, we utilized five statement items to conduct an analysis of the influence that each statement item had on the others. In Table 2 the frequencies and percentages that were used to total the responses are presented.

Table 2: Respondents views on project change management

Statements	1	2	3	4	5	Mean	Std Dev.
The project manager communicates crucial details to all of the stakeholders.	3 3.6%	6 7.2%	12 14.5%	23 27.7%	39 47.0%	4.07	1.11
Before the launch of the project, there were consultations to determine whether or not it was necessary.	5 6.0%	3 3.6%	5 6.0%	22 26.5%	48 57.8%	4.27	1.13
Our individual, group, and overall project problems can all be addressed by the project manager.	2 2.4%	4 4.8%	3 3.6%	23 27.7%	51 61.4%	4.41	.95
All parties involved in the project are informed of the upcoming modifications that will be brought about by it.	2 2.4%	2 2.4%	8 9.6%	25 30.1%	46 55.4%	4.34	.93
Final activities incorporated modified actions depending on interests that materialized.	2 2.4%	3 3.6%	14 16.9%	21 25.3%	43 51.8%	4.20	1.00
Mean Average						**4.26**	

Source: **Primary data**, (2023).

Based on the findings displayed in Table 2, nearly half of the respondents (47%) expressed strong agreement with the statement, while 27% indicated regular agreement. Furthermore, around 14.5% somewhat agreed, 7.2% disagreed, and 3.6% strongly disagreed with the statement. Respondents were generally in agreement, but not strongly so (Mean=4.07) that the project manager effectively conveys key information to all parties involved. The vast majority of respondents seemed to agree that most water supply projects effectively share information with all relevant parties. The respondents were also questioned as to whether or not discussions were held prior to the project's introduction. From the data collected, the study deduces that 57.8% of respondents strongly agreed, 26.5% agreed, 6.0% moderately agreed, 3.6% disagreed, and 3.6% strongly disagreed with the statement. The majority of respondents (Mean=4.27) somewhat agreed that there were consultations prior to the commencement of the project to establish its necessity.

Participants were also questioned if the project manager had the ability to solve problems at the individual, group, and project levels. According to the results, 61.4% of respondents strongly agreed, 27.7% agreed, 3.6% moderately agreed, 4.8% disagreed, and 2.4% strongly disagreed with the statement. Respondents overwhelmingly agreed (Mean=4.41) that the project manager can help with issues at the individual, group, and project levels. Furthermore, the respondents were questioned on whether or not the future changes brought about by the project have been communicated to all parties concerned. According to the data, 55.4% of people provided strong agreement, 30.1% provided agreement, 9.6% provided moderate agreement, 2.4% provided weak disagreement, and 2.4% provided strong disagreement. Respondents generally agreed (Mean=4.34) that everyone involved in the project is aware of the changes that will be made.

At last, participants were questioned on whether or not their final activities integrated interest-driven action modifications. Results showed that 51.8% were in complete agreement with the statement, 25.3% were in agreement, 16.9% were in moderate agreement, 3.6% were in disagreement, and 2.4% were in complete disagreement. Respondents generally agreed that outcomes typically involved adapted actions in light of actual interests (Mean=4.34).

The findings corroborate those of research by Lee *et al.,* (2015) on the effects of project change management on project success. The competencies of project managers were the focus of the research. Indirect changes affecting project performance were found to be associated with social intelligence competencies via accumulated team social capital.

Regression results for project change management

A further regression research was conducted to examine the notable correlation between project change management and the availability of sustainable water supply services. According to the model summary in Table 3, the R-Square value is 0.064, indicating that about 6.4% of the variation in the availability of sustainable water supply services can be explained by project change management ($p < 0.01$). The study revealed a favorable correlation ($r=0.253$) between project change management and the provision of sustainable water supply services.

Table 3: Model summary for project change management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.253**[a]	**.064**	.061	.55315

a. Predictors: (Constant), Project change management

Source: **Primary data**, (2023).

The p-value for the analysis of variance in this study was less than 0.05 (F=20,294, =.000). Findings indicate a good connection between project change management and the availability of sustainable water supply services. The value of 20.029 is sufficient to demonstrate that the model is appropriate and applicable.

Table 4: ANOVA results on project change management ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.209	1	6.209	**20.294**	**.000[b]**
	Residual	91.179	82	.306		
	Total	97.389	83			

a. Dependent Variable: Sustainability of water supply services
b. Predictors: (Constant), Project change management

Source: **Primary data**, (2023).

Therefore, it was appropriate to employ a regression model to confirm or disprove the null study hypothesis.

The equation for the linear regression model, based on the study's beta coefficient data, is Y=2.131+0.275X1. Project change management is represented by X1, and Y is the availability of reliable water supply services. A beta of 0.275 indicates that for every 1 unit of construction project performance, 0.275 units of project change management are used. Sustainability of water supply services in Rwanda is explained by project change management, and this relationship is statistically significant (p=0.000 and p0.05).

The key study hypothesis, "Ho1: There is no notable effect between project change management and sustainability of water supply services in Rwanda," was tested using regression analysis, which yielded a significant t-statistic value. The null hypothesis was rejected with a 95% confidence level due to the strong significance of the beta value t-statistics (α=0.000). Therefore, the findings of this study emphasize a strong and statistically significant correlation between project change management and the provision of sustainable water supply services in Rwanda.

Table 5: **Regression coefficient for Project change management Coefficients (a)**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	**2.131**	.196		10.883	.000
	Project change management	**.275**	.061	.253	**4.505**	**.000**

a. Dependent Variable: Sustainability of water supply services

Source: **Primary data**, (2023).

CONCLUSIONS AND RECOMMENDATIONS

According to the findings of the research conducted, there was a discernible and significant positive link between effective project change management and increased sustainability of water supply services in Rwanda. According to the findings of the study, implementing project change management in the country greatly helped to significantly improving sustainability of water supply services for Rwandans, with a confidence level of 95%. This was determined to be the case.

The study advises managers of water supply projects to improve project investment planning because it is

crucial for using project life cycle planning tools to ensure long-term and sustainable services. It shows capital expenditures, operational and management expenditures, direct and indirect estimated costs, future repairs and finally directs activities to be completed on time, reduces errors, and also ensures proper use of project resources that are available. The study suggests that it would be beneficial for management to adopt stakeholder practices in order to formulate strategies and involve them in accordance with stakeholder theory. Furthermore, the paper suggests that managers who are engaged in water supply projects, namely those related to project change management, should possess a comprehensive of change management principles. The report advises water supply project managers to embrace project financial planning so they may efficiently use resources.

Suggestions for Further Studies

Additionally, the research needs to be carried out in order to establish the impact that providing feedback from the water users has on the efficiency of the quality of services in Rwanda's water supply projects.

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