

Influence of Risk Management Strategy on Project Sustainability: A Case Study on Afya Pure Drinking Water in Kigoma Region

Eston Ranson Mogha, Augustine Y. Hangi, Jovin John

Faculty of Business Managements, Open University of Tanzania, Dar es Salaam, Tanzania
Email: estonmogha@gmail.com

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Abstract

Chronic starvation of the communities on the water invested projects is due to the partial or unfinished project which leads to the closure or non-sustainable water projects. The closure or non-sustainable water project were caused by many factors, including poor risk management of the project itself from the initial stage of the project to the final consumption stages. The objective of the study was to investigate the influence of risk management strategy on project sustainability. In pursuit of this objective, the study adapted a descriptive study design (qualitative and quantitative). Furthermore, data were analyzed qualitatively and quantitatively. The findings reveal that risk management strategy has a contribution to project sustainability. Additionally, the findings show that many of the responses, given through interviews, indicated that water projects need risk management to achieve water project sustainability. Observations made by a researcher saw non sustainable water projects, and the effects of water shortage were higher in Kigoma municipality. Risks that hinder project sustainability were poor community participation in projects especially when a top-down approach has much been used by the government in water projects. Based on these findings, the study recommends regular project assessment and that the community must be given the opportunity to participate fully in water projects, from the initial stage to the completion stage of monitoring and evaluation, for the purpose of achieving sustainability. However, a government has to adopt equal balance to both top-down and down-top approaches during participatory activities.

Keywords

Risk Identification, Community Water Supply, Reputations, Risk Assessment, Financial Risk, Operational Risk

1. Introduction

All companies were vulnerable to events or risks that could impact them. For a long time, Kigoma Municipality had been seriously affected by a water shortage. This was due to mismanagement of water risks that contributed to closing down many water sources. Women had to get up at 5:00 am in search of water from Lake Tanganyika during the night and other places where water ponds existed. This confirms that risk management was poor and its impacts were higher within the municipality locality to the extent that women risked their lives.

The risk events can arise from various factors, such as the company's employment practices, economics, natural disasters, pollution, poor governance, or poor management (Aven, 2016). Effective risk managers identify the different risk impacts on the reputation of a company or project. Reputation risk management has become an important strategic topic to ensure the stability of the financial system by using auditors to verify and evaluate the quality of the products with respect to the finance services (Giersch, 2019a, 2019b). The chronological development of risk assessment, analysis and management indicated that different researchers have identified different risk factors and their impacts throughout the world in various operating companies and organizations (Tesfaye et al., 2016). In addition, due to natural and human factors, such as drought, super floods and improper management caused by extreme meteorological conditions, water conservancy projects were always faced with the risk of failure. The effective quantification of the water conservancy project risks and proposing corresponding management and control measures have always been a concern (Ge, 2023).

Furthermore (Tukamuhabwa et al., 2023) and (Dobbie et al., 2016) support the strategy of effective risk management as an effort to minimize the damage that the risk factor could cause bad effects. Their explanations are "If the risk is not handled appropriately, this will lead to the derailment of a project and its intended objective does not materialize." Tukamuhabwa et al. (2023) state the relationship between constructive governance, project performance, and Risk management practices acts as mechanisms through which interactive governance maximizes the project performance in the context of water and sanitation projects in developing countries. Also, Dobbie et al. (2016) indicated that it is virtually impossible for a water project authority to be able to predict the exact risks that will affect it throughout its course because a company is exposed to all kinds of risk, such as market risk, operational risk, business Risk, financial risk, credit risk, and reputational risk. For this reason, measures against risks in water projects have proved failure, and new approaches to managing these risks were required in order to achieve water project sustainability.

Despite of the 4% (70% - 74%) increased of safety managed drinking water user in the world from 2015-2020 still Most of the countries in Africa were straggling with demand of water resources which will result to insufficient progress towards SDG target 6.5 (United Nation, 2021, 2022). Moreover, since its commencement of the efforts, water projects had not been sustained and dogged behind due to

corruption, such as unwanted contract variations and renegotiation, Bribery of utility officials to evade water fee payments or allow illegal connections, political mismanagement of municipality utilities to win votes with low tariffs and official profiting from giving licenses to informal water providers (Tacconi & Williams, 2020). The study was conducted to examine risk management measures that need to be taken in order to achieve project sustainability, and many findings indicated that the major reason for closing down water projects in many parts of the world, including Kigoma Municipality-Tanzania is little or lack of community participation by using a top-down approach by the government which bad practice that has caused a doubling of the effect.

Conceptual framework:

In different countries in the world, water development projects have failed to achieve their objectives due to poor community participation at the initial stage of identification of risk events (Burkov et al., 2018). The diagrammatical presentation shows five stages of risk management for achieving water project sustainability. The stages were identification of risk events, reporting risk, risk decision on residual risk and risk monitoring as well as integration of community participation in the whole process of risk management. Water project sustainability is the function of community participation in the risk management process (Machete & Marques, 2023). In addition, Kerzner (2022) describes “there is a strong relationship between managing risks and project sustainability.” Figure 1 shows stages of risk management with integration of community in achieving project sustainability.

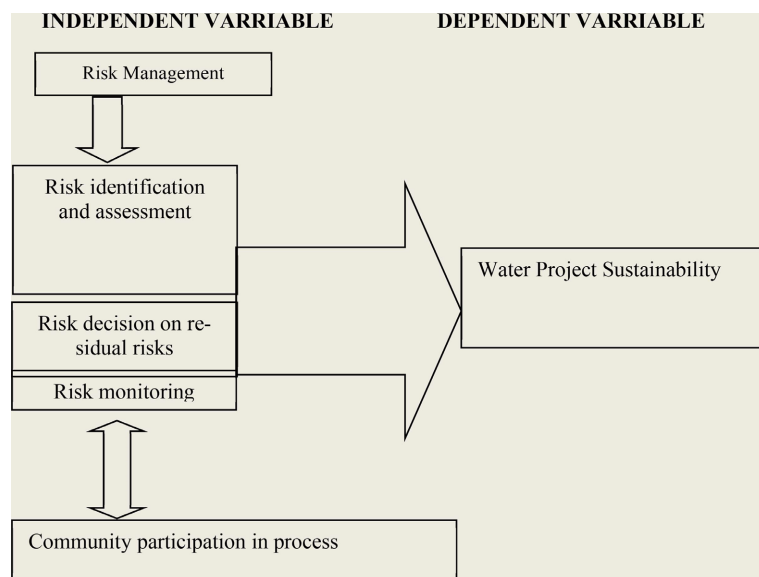


Figure 1. Risk managements in water projects.

2. Methodology and Case Study

This chapter describes how data were collected, analyzed, presented, and grouped. It discusses methods that were used to collect data, data procedures, research design, sample techniques, sampling procedures, sources from which data emanated,

target population, sample size and consideration for data validity and reliability.

2.1. Research Design

The plan structure and strategy of investigation are conceived so as to obtain answers to research questions and control variance. The study adapted a descriptive survey design (qualitative and quantitative). Furthermore, data were analyzed qualitatively and quantitatively. Qualitative data were analyzed using descriptions such as documentations, interviews, and observations and open questionnaires, the quantitative data were analyzed using SPSS software 28.0 version. According to Kothari (2019) and Kumar (2018), mixed research design comprises both qualitative and quantitative methods.

2.2. Targeted Population

Shukla (2020) defines population as a set or group of all units from which data can be collected, such as individuals, air facts, and events or organizations. Thus, the study population selected all water stakeholders at the Afya Pure Drinking water in Kigoma Municipality to be a representative of the whole population.

2.3. Study Area

The study was conducted at the Afya pure drinking water project located in Kigoma Municipality in Tanzania. The study area was obtained by random sampling procedures, from all names of all water projects in Kigoma Municipality in Tanzania. One piece of paper, named Afya pure drinking water project, was picked up by the researcher and was thus confirmed as the area for investigation.

2.4. Population Size

Table 1. Summary of the sample size.

Source of data for study	Repeaters assumed expected population size	Percentages (%)	Method of sampling
Water users	27	44.4	Random
All Water technicians	7	11.4	Snowball
Water industrial manager	1	1.6	Purposive
Watchmen water project	2	3.4	Snowball
All water project officials	6	9.8	Snowball
Water engineer	1	1.6	Purposive
Accountant	1	1.6	Purposive
Clearing and forwarding workers	16	26.2	Random
TOTAL	61	100	-

2.5. Sampling Techniques and Procedures

The study employed three sampling techniques to select subjects, **Table 1**. These were random sampling, purposive, and snowball sampling techniques, method of sampling in 2.4 population size.

Random sampling describes that “We write the name of each element of a finite population on a slip of paper, and put a slip of paper into a box or a bag and mix them, and then draw (without looking) the required number of slips for the sample without replacement”. Random sampling method selected water users, clearing and forwarding workers randomly without bias. Similarly on Purposive sampling: the researcher targeted people who were believed to be the key informants for the required information as he/she considered them to be knowledgeable on the issues under the given study based on the set objectives and research questions. Purposive sampling technique was used to select the water engineer, accountant and industrial water manager. Snowballing: snowball sampling was used in selecting water project technicians, water officials, and watchmen at Afya Pure Water Project (Pace, 2021).

2.6. Instruments of the Study

The instruments for data collection namely research tools (Kumar, 2018). Data were collected using Four instruments, namely interview, documentation, observation, and questionnaires from both sources of data, likely primary and secondary sources.

Oral Interviews: The study involved the use of questions outlined to ask respondents in order to answer the research questions. The interview schedule was used and responses were recorded per question by the researcher.

Documentation: The researcher asked for written sources of data which in one way or another kept in looking for information and reading written materials such as reports on water projects notices, minutes of meetings, transcripts of speeches, and public records from Kigoma Ujiji related to water projects including the Afya Pure Drinking Water Project and translated its information in a descriptive manner.

Questionnaires: A questionnaire can be defined as a pre-formulated written set of questions to which participants record their answers. The respondents answered the questions on their own. The researcher in this study exercised both closed and open-ended questionnaires based on specific objectives and collected them for analysis.

Observation: The observation requires the use of five sense organs but seeing with your eyes is essential; in addition all observations must be planned based on specific objectives. Using an observation schedule, it was possible for the researcher to observe possible risks at Afya Pure Water Project through interaction with water buyers and company, clearing and forwarding workers, and sellers where he heard spoken words about the water project. The checklist for observation was used.

2.7. Reliability and Validity of the Research Instruments

Reliability refers to demonstrating that the operations of a study can be repeated

and still attain the same results (Kamper, 2019). Furthermore, much research conducted by different academicians and organizations possesses both validity and reliability. This study will be a valid and reliable source for decision making because:

The observation check list was produced from specific objectives that were confirmed by academicians in the research field. Questions were straight forward and precise in nature and discussed by peers as well as professionals, academicians, and faculty of project management students and those who have knowledge about research to confirm them. Questionnaires were directly related to the three specific objectives set and its research question from the central objective of the study as a focal point. Furthermore, interview schedules and SPSS 28.0 Software for closed questions were used to produce trustworthy results.

3. Results and Discussions

3.1. Demographic Information

3.1.1. Type of Institution

Respondents were asked to state whether they belong to a private, public, or any other category of institution. The results were presented in **Table 2**.

Table 2. Type of institution.

variables	No. of respondents	Percentages (%)
Private	33	54.1
Public	15	24.6
others	13	21.3
TOTAL	61	100

3.1.2. Year in Which Institution Was Founded

Respondents were asked when their respective institution was founded. The researcher was interested in knowing the experiences of the respondents in terms of time. These results show that most organizations were found between 2011 and 2015, followed by 2001 and 2010 years. This implies that respondents had adequate experience and history of water projects in Kigoma municipality. The results were presented in **Table 3**.

Table 3. Year in which institution was found.

variables	No. of respondents	Percentages (%)
1961 and bellow	05	8.1
1962-2000	06	9.9
2001-2010	20	32.9
2011-2015	30	49.1
TOTAL	61	100

3.1.3. Location of Institution

The study was interested to know the locations of these institutions in order to discover if respondents know water projects around them in Kigoma Municipality. These results showed that majority of these institutions were found in Kigoma Municipality and therefore they have knowledge about water projects in Kigoma municipality such as the Afya drinking water project. The results were presented in **Table 4**.

Table 4. Location of institution.

variables	No. of respondents	Percentages (%)
Rural	01	1.7
municipality	60	98.3
any	00	00
TOTAL	61	100

3.1.4. Sex of Respondent

Respondents were asked to state their gender. The researcher wanted to know the contemporary record of the respondents of both male and female population in Kigoma municipality. The grades show that a slight majority were males. The results were presented in **Table 5**.

Table 5. Sex of respondent.

variables	No. of respondents	Percentages (%)
Male	32	52.4
Female	29	47.6
TOTAL	61	100

3.1.5. Age of Respondent

The study was interested in knowing the age database of the respondents in Kigoma municipality. These results show that the majority of the respondents were youths between 20 and 30 years old. The results were presented in **Table 6**.

Table 6. Age of respondent.

variables	No. of respondents	Percentages (%)
20 - 30	23	37.7
31 - 40	09	14.7
41 - 50	13	21.4
51 - 60	10	16.4
60+	06	9.8
TOTAL	61	100

3.1.6. Level of Education of Respondent

Respondents were asked to state their h level of education in order to know their understanding with regard to risks in water projects, including Afya pure water drinking project. The findings show that degree holders were only 16.4 percent, while certificate and diploma holders were 66.6 percent. This implies that both groups have enough experience and understanding of risks in water projects. The results were presented in **Table 7**.

Table 7. Level of education of respondent.

variables	No. of respondents	Percentages (%)
standard seven and bellow	11	18.0
certificate	27	44.3
diploma	13	21.3
Bachelor	9	14.8
Master's Degree	01	1.6
Ph.D. Degree+	00	00
TOTAL	61	100

3.1.7. Marital Status of Respondent

Respondents were asked to state their marital status. The researcher was interested in knowing the rate of participation. The results were presented in **Table 8**.

Table 8. Marital status of respondent.

variables	No. of respondents	Percentages (%)
Married	31	50.9
Single	24	39.4
Widow	01	1.6
Widower	02	3.2
Divorced	03	4.9
TOTAL	61	100

3.2. Research Findings

3.2.1. The Contribution of Risk Management Strategy on Project Sustainability

Respondents were asked different research questions concerning the contribution of risk management strategy on water project sustainability, results were presented in **Table 9**.

Results presented in **Table 9**, show that risk management measures contribute on project sustainability that internal and external risks such as financial risk, reputation risk, and operation risk (workers), operation risks help to achieve water sustainability if controlled properly. The researcher found out that this argument is in line with other researchers, such as Soares et al. (2024), who stated that risk

management strategy on projects sustainability has become significant in many organizations.

Table 9. The contribution of risk management strategy on project sustainability.

Variables Questions	Frequencies of respondents (in percentage %)		
	Yes	No	Total
Have you been involved even at once in project management stages such as the initial stage, excursion stage, and completion stage of pure drinking water project?	70.5	29.5	100
Can risk management measures help to sustain water project such as pure drinking water project in Kigoma municipality?	72.1	27.9	100
From the list of internal and external risks such as financial risk, reputation risk, and operation risk (workers), operation risks can help achievement of water sustainability	67.2	32.8	100
All risks cannot be controlled	19.7	80.3	100
Internal risks management such as financial risk alone can lead to water project sustainability	86.9	13.1	100

3.2.2. The Risks That Hinder Project Sustainability

Under this objective, the study investigated the risks that hinder project sustainability, respondents were asked different research questions (Table 10). The findings revealed that the majority of the respondents (70.5 percent) confirmed that poor monitoring of risks, unskilled workers on water projects and competition from other water industries such as “Dassani,” affect the market of the pure drinking water industries. The findings were in line with researcher Gachie (2019), who found that the project’s sustainability includes three pillars, which are the economical pillar, the social pillar and the Environmental pillar. The study convinced that poor monitoring of risk and lack or little social pillar cause poor water projects sustainability. Moreover, the findings from the pure drinking water project responses given indicated that managing competition risk reduces risks in water projects.

Table 10. The risks that hinder project sustainability.

Variables Questions	Frequencies of respondents (in percentage %)		
	Yes	No	Total
Unskilled workers on water project is among the challenge facing pure water drinking projects in Kigoma municipality	70.5	29.5	100

Continued

Other water industries such as “Dassani”, affect market of pure drinking water industry in Kigoma Municipality	72.1	27.9	100
Poor monitoring of risk is among of the challenges facing water projects	67.2	32.8	100
All risks cannot be controlled	19.7	80.3	100
There number of risks that face afya pure drinking water project sustainability	86.9	13.1	100

3.2.3. The Risk Management Measures That Need to Be Taken in Order to Achieve Project Sustainability

Under this objective, the study required to examine the risk management measures that need to be taken in order to achieve water project sustainability. Respondents were asked different research questions, and Results were presented in **Table 11**.

Table 11. The risk management measures that need to be taken in order to achieve project sustainability.

Variables Questions	Frequencies of respondents; (in percentage %)		
	Yes	No	Total
Do project stakeholders take time to ensure water project risk control?	49.2	50.8	100
Community involvement and monitoring are among the measures that can be taken to sustain water projects.	82	18	100
Regular project assessment is most factors for controlling risk in water project	83.6	16.4	100
Is the community given opportunity in water project risk control?	11.5	88.5	100
Do you accept that risk measures that were being taken to sustain water projects have failed?	57.4	42.6	100
Do we need extra measures to avoid risks on water projects?	62.3	37.7	100

The findings revealed that there are risk management measures that need to be taken in order to avoid risks on water projects. Such risk management measures are regular project assessment, community involvement, and monitoring. The finding is in line with the researchers such as [Schulte & Knuts \(2022\)](#), who indicated that the risk management approach to meet customer needs was to Identify risk, assess and treat risk so as to increase decision for sustainability. Furthermore, other research documents and reports at the Afya Pure Drinking Water Project

indicated collaborative effort between the project team and the cost-risk teams to minimize risk. They also insisted that large organizations use formal control systems organized on a divisional basis as an effort to improving control of risks. The study observed that effective monitoring of risks, community involvement, and regular project assessment of water projects help in reaching desirable sustainability.

4. Conclusion

The objective of the paper was to assess the influence of the risk management strategy on project sustainability. Based on the study on the Afya Pure drinking water findings showed that, for project sustainability, water Projects should include Risk measurements from the initial of the projects to the final or closure of the project. Also, Social or community inclusion in water projects accelerates sustainability such as human labor practices, training and education, equality, equity, and regular communication among stakeholders. Furthermore, project sustainability can be achieved when internal and external risks are appropriately controlled, community/stakeholders' involvement, and regular effective water risks monitoring and assessment from the initial to desirable sustainability. Despite these findings, the study faced several limitations and delimitation during the study, such as some important documents were not simply found since some respondents regarded the information as confidential. The researcher was forced to use other documents and methods like books, questionnaires, interviews and observations in order to achieve the objectives of the study and required results. It was not possible to interview everybody at once; therefore, the researcher arranged convenient times to meet every research subject.

Author Contributions

Mogha E.R. contributed to all section, Hangi, A.Y contributed to all sections; and John, J. contributed to the results and discussions. The authors read and approved the final manuscript.

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Conflict of Interest

The authors declare that they have no competing interest regarding the publication of this paper.

References

Aven, T. (2016). Risk Assessment and Risk Management: Review of Recent Advances on Their Foundation. *European Journal of Operational Research*, 253, 1-13.

- <https://doi.org/10.1016/j.ejor.2015.12.023>
- Burkov, V., Burkova, I., Barkhi, R., & Berlinov, M. (2018). Qualitative Risk Assessments in Project Management in Construction Industry. *MATEC Web of Conferences*, 251, Article 06027. <https://doi.org/10.1051/mateconf/201825106027>
- Dobbie, M. F., Brown, R. R., & Farrelly, M. A. (2016). Risk Governance in the Water Sensitive City: Practitioner Perspectives on Ownership, Management and Trust. *Journal of Science Direct Environmental Science and Policy*, 55, 218-227. <https://doi.org/10.1016/j.envsci.2015.10.008>
- Gachie, W. (2019). Project Sustainability Management: Risks, Problems and Perspective. *Problems and Perspectives in Management*, 17, 313-325. [https://doi.org/10.21511/ppm.17\(1\).2019.27](https://doi.org/10.21511/ppm.17(1).2019.27)
- Ge, W. (2023). Editorial: Risk Assessment and Management of Water Conservancy Projects. *Frontiers in Earth Science*, 11, Article 1330621. <https://doi.org/10.3389/feart.2023.1330621>
- Giersch, J. H. (2019a) *OCC Handbook: Corporate and Risk Governance* (p. 100). Office of the Comptroller of the Currency.
- Giersch, J. H. (2019b). *Managing Reputational Risk Mapping: Risk Appetite against Risk Exposure*. Berlin Risk. CAMS Audit-White Paper 2019.
- Kamper, S. J. (2019). Reliability and Validity. *Journal of Orthopaedic & Sports Physical Therapy*, 49(1), 286-287. <https://www.jospt.org/doi/10.2519/jospt.2019.0702>
- Kerzner, H. (2022). *Project Managements: A Systems Approach to Planning, Scheduling, and Controlling* (13th ed.). John Wiley & Sons Publication, Inc.
- Kothari, C. R. (2019). *Research Methodology* (4th ed.). New Age International Publication Ltd.
- Kumar, R. (2018). *Research Methodology* (5th ed.). SAGE-Publication.
- Machete, I. F., & Marques, R. C. (2023). *Project Risks Influence on Water Supply and Sanitation Sector Financing Opportunities*. Instituto Superior Técnico, University of Lisbon.
- Pace, D. S. (2021). Probability and Non-Probability Sampling. *International Journal of Quantitative and Qualitative Research Methods*, 9, 1-15.
- Soares, I., Fernandes, G., & Santos, J. M. R. C. A. (2024). Sustainability in Project Management Practices. *Sustainability*, 16, 4275. <https://doi.org/10.3390/su16104275>
- Schulte, J., & Knuts, S. (2022). Sustainability Impact and Effects Analysis—A Risk Management Tool for Sustainable Product Development. *Sustainable Production and Consumption*, 30, 737-751. <https://doi.org/10.1016/j.spc.2022.01.004>
- Shukla, S. (2020). *Concept of Population and Sample*. <https://www.researchgate.net/publication/346426707>
- Tacconi, L., & Williams, D. A. (2020). Corruption and Anti-Corruption in Environmental and Resource Management. *Annual Review of Environment and Resources*, 45, 305-329. <https://doi.org/10.1146/annurev-environ-012320-083949>
- Tesfaye, E., Berhan, E., & Kitaw, D. (2016). A Comprehensive Literature Review on Construction Project Risk Analysis. *International Journal of Risk and Contingency Management*, 5, 1-15. <https://doi.org/10.4018/ijrcm.2016100101>
- Tukamuhabwa, B. R., Mutebi, H., Akandwanaho, E., Kabagambe, L., & Tumukunde, I. (2023). Enhancing Water and Sanitation Project Performance in a Developing Economy: Role of Governance Mechanisms and Risk Management Practices. *Cogent Business & Management*, 10, Article 2263994. <https://doi.org/10.1080/23311975.2023.2263994>
- United Nation (2021). *Progress on Integrated Water Resources Management Report*.
- United Nation (2022). *The Sustainable Development Goals Report*.

Abbreviations

ER: External Risks

IR: Internal Risk

PIS: Project Information System

PMI: Project Management Institute

RM: Risk Management

RMI: Risk Management Institute

SPSS: Statistical Package for Social Science

UNDP: United Nations Development Programme

SDG: Sustainable Development Goal