



Financial Management Factor on the Performance of the Community-Based Water Supply Organisations in Katavi Region, Tanzania

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Abstract

This study assessed the financial management factors that affect the performance of Community-Based Water Supply Organizations (CBWSOs) in managing water supply schemes in Katavi's rural areas. An inductive approach and exploratory design were employed in this study. The study population comprised 57 respondents, comprising the region's management team and supervisory board members of selected CBWSOs. Data was collected through one-on-one In-depth interviews, field observation and literature reviews. The findings revealed that financial management was a critical aspect, emphasizing the importance of community participation in the collection of funds. Community participation in the collection of funds fosters financial sustainability, a sense of ownership, responsible resource utilization, and transparency. Based on the findings, the study recommends future mechanisms and strategies to support financial sustainability, providing capacity building and implementing a monitoring and evaluation framework, that effectively enhance transparent and participatory governance structures within CBWSOs in the Katavi region.

Keywords: Performance, financial management, community participation, and Community-Based Water Supply Organizations (CBWSOs)

1 Introduction

Water is essential for life, yet global access to safe drinking water is a pressing issue. As of 2022, about 2.2 billion people lack safely managed drinking water, with 771 million without even basic services (UNICEF & WHO, 2024). In Tanzania, water supply and sanitation reforms have been implemented, but challenges persist, particularly in rural areas managed by Community-Based Water Supply Organisations (CBWSOs) under the Rural Water Supply and Sanitation Agency (RUWASA) (Nzilano, 2017; Water Supply and Sanitation Act No. 5 of 2019).

Most global studies on Community-Based Water Supply Organisations (CBWSOs) have examined

their impact on livelihoods and their importance (Jacob and Gichuki, 2017; Mayo and Nkiwane, 2013). However, financial management within CBWSOs has received less attention. Many CBWSOs struggle with financial management, leading to questionable revenue collection and service management (Karres et al., 2022; Omarova et al., 2019).

Research on rural water schemes in the USA and Africa, including Tanzania, has largely focused on technical and institutional factors (Karres et al., 2022; Kirenga et al., 2018). Few studies have specifically investigated the role of financial management in CBWSOs.

In Tanzania, Mgulo and Kamazima (2022) studied participatory rural development; community

participation focused on governance and management aspect disconnection, lack of quality services, and community participation, support, and involvement. The literature revealed various studies assessed adequate water supply sustainability, operation and maintenance, recordkeeping, and collection of water tariffs but did not focus on how financial management affects the performance of CBWSOs.

Leroy (2023) in Mexico investigated how institutional factors affected the performance of community-based water management. Tantoh et al. (2021) in Cameroon concentrated on pro-community-based water management system sustainability, public, private, and grassroots communities, involvement and engagement of all stakeholders, and strong traditional leadership. None of the studies focused on how financial management affects the performance of CBWSOs.

Organisational performance refers to the degree to which the organisation positions itself effectively with some informational, financial, and human resources (Conțu, 2020). Kifanyi et al. (2013) analysed the performance of Community-based projects and organisations in urban water supply and sanitation. Maral et al. (2023) identified the operational indicators associated with the performance of water utilities in Portugal, focusing on the influence of community participation, project management skills, technology, and monitoring and evaluation practices, which leaves a gap in financial management factor.

In Tanzania, water services sustainability was left to the beneficiary communities without any preparation for the management of the schemes (Mwendamseke, 2016). After the completion of projects, beneficiaries of water schemes complain about poor services provided by CBWSOs which manage the water schemes. The complaints about CBWOs are initiated by common challenges of difficulties in efficiently collecting water bills from customers, inadequate or delayed water service due to poor maintenance of the water system, insufficient capability of organisational water committee members, and a lack of setting applicable tariffs weakens system performance and management (GC et al., 2021). Katavi region has 182 villages where CBWSOs, through Rural Water Supply and Sanitation Agency

(RUWASA), serve 172 villages, with 124 villages reached with piped schemes and 41 villages with no piped systems.

The coverage by infrastructure in Katavi is 54%, which means improvement is required. In the financial year 2021/2022, the total budget was Tsh. 27,740,197,208.16, and up to December 2022 total of only TShs. 18,082,024,990.54 received by RUWASA for water infrastructure development in Katavi. On average, the volume of water produced should not be less than 42,984,480 litres per day, and revenue collection is supposed to be more than TShs. 42,984,480 per day (equivalent to TShs. 15,689,335,200 per annum) instead of TSh. 305,324,051 annually (extracted from RUWASA Service Delivery and Management System – RSDMS-2023). The problems of data collection tools and financial management, lower education to the community about data and awareness of the operation and maintenance, and geographical challenges CBWSO faces Katavi region. Also, despite the efforts of the Government to improve rural water supply management through a community participation approach (CBWSO system), the implementation of the strategy in the Katavi region is still doubtful. This study aimed to assess the financial factor that affect the performance of CBWSOs in managing water supply schemes for the sustainability of water services in Katavi rural areas.

While previous studies have focused on people's livelihood, freshwater ecosystems and importance of Community Water Based Supply Organisations, the impact of financial management on CBWSO performance remains understudied. Failure in revenue collection significantly undermines service provision and jeopardizes the sustainability of water supply schemes. Previous studies analyzed the performance of rural water schemes in various countries, including the USA, South Africa, Kenya, Kazakhstan, and Tanzania, identifying social, technical, environmental, and institutional factors influencing performance (Karres et al., 2022; Mgoba & Kabote, 2020). However, these studies did not specifically examine the role of financial management in the performance of Community-Based Water Supply Organizations (CBWSOs).

In Sub-Saharan Africa alone, an estimated USD 1.2-1.5 billion has been lost over the past 20 years due to breakdowns in water infrastructure. Studies in Indonesia by Emil and Agusta (2019) focused on the sustainability of water supply and its driving factors, using multi-dimensional scaling and stakeholder theory, yet did not address the impact of financial management on community-based water organizations.

Similarly, studies in Brazil, Namibia, Ukraine, and Tanzania emphasized community engagement, user fees, capacity-building efforts, and participatory approaches as key factors in water service sustainability (Gc et al., 2021; Alam, 2022; Kvartiuk & Curtiss, 2019; Mgulo & Kamazima, 2022). These studies highlighted the importance of a strong enabling environment, water quality control, post-construction support, and financial schemes. Yet, none explicitly examined how financial management influences the performance of CBWSOs.

In Kenya and Mexico, Leroy (2023) identified stakeholder involvement, training, human resource management, and project ownership as major performance drivers in community water projects. Similarly, studies in Cameroon by Tantoh et al. (2021) and Simatele et al. (2019) discussed sustainable water supply challenges, emphasizing the need for strong traditional leadership and stakeholder engagement. However, the influence of financial management on CBWSO performance in rural areas remains underexplored.

Therefore, this study was guided by the research question, how does financial management impact the performance of Community-Based Water Supply Organisations (CBWSOs) in Katavi region, Tanzania?

Financial management is crucial for the sustainability of water services. Ineffective revenue collection and poor maintenance can undermine water supply schemes, a gap not extensively covered in existing research. Studies have explored various factors influencing water supply performance, including technical and institutional aspects, but financial management remains underexplored (Jacob and Gichuki, 2017; Karres et al., 2022; Omarova et al., 2019).

In Katavi, Tanzania, CBWSOs face issues such as inefficient revenue collection and inadequate service delivery despite substantial budgets and efforts to improve management (GC et al., 2021). This study aims to assess how financial management impacts the performance of CBWSOs in managing water supply schemes, addressing a gap in the literature and exploring an area critical for enhancing water service sustainability.

2 Materials and Methods

2.1 Methodology

The section articulated detailed information regarding research design, strategy and sampling procedures, including the study's area, the targeted population of the study, the sample size and sampling techniques, data collection methods, data management and analysis procedures, and the study's trustworthiness following a thematic analysis.

2.2 Research Approach

The study employed an inductive approach to generate discussions on financial management factor affecting the performance of the CBWSOs in managing water supply schemes in the Katavi region. The qualitative approach involves data generation subjected to rigorous qualitative analysis (Saunders et al., 2019).

2.3 Research Design

An exploratory research design was used in this study, in which propositions and questions about a phenomenon affecting the sustainability of the CBWSOs in managing water supply schemes in Katavi region were carefully examined and articulated at the outset.

2.4 Area of the Study

Katavi region in Tanzania was taken as a study area. Mainly focused on CBWSOs found at Mlele (6), Mpanda (3), and Tanganyika (3) districts in Katavi region. The area was chosen because it is a subset of any region in Tanzania where this study could be conducted.

2.5 Target Population of the Study

Population means the entire mass of observations, the parent group from which a sample will be formed (Saunders et al., 2019). Sampling was composed of CBWSOs with the highest and lowest performance in respective districts, as presented in Table 1 below. This study targeted 6 respondents: the management

discussions, with participants identified in collaboration with local government agencies and community leaders. The analysis focused on identifying key factors influencing financial management and overall performance, providing a comprehensive understanding of CBWSOs in the

Table 1: Summary of influential factors

LGA	CBWSOs		Number of Villages Served
	Good Performance	Poor Performance	
Mlele DC	Inyonga		3
Mpimbwe DC	Kibaoni		3
Mpimbwe DC	Majimoto		6
Mpimbwe DC		Mwamapuli and Chamalendi	5
Mlele DC		Nsenkwa**	3
Mpimbwe DC		Usevya and Ikuba*	5
Nsimbo DC		Mmasi CBWSO	9
Nsimbo DC		Muongano CBWSO	11
Nsimbo DC		Nsimbo CBWSO	13
Tanganyika	Kaparema		5
Tanganyika	Mpakato		11
Tanganyika		Msika	9

team and supervisory board of sampled CBWSOs.

2.6 Sample Size and Sampling Techniques for the Study

The study employed purposive sampling (Saunders et al., 2019) to select a sample of 61 respondents, including 36 management team members and 25 from the Supervisory Board of Community-Based Water Supply Organizations (CBWSOs) in Katavi Region. This sampling technique was chosen for its effectiveness in qualitative research, allowing the selection of participants based on specific criteria such as operational performance, geographical representation, and management structures. CBWSOs were selected based on their performance metrics, ensuring the inclusion of both well-performing and underperforming organizations. Data was collected through detailed interviews, surveys, and focus group

region.

2.7 Data Collection Methods

In-depth interviews, surveys, and documentary reviews were used to obtain detailed information concerning the study objectives. According to Saunders et al. (2019), research instruments are central to quality assurance and control.

2.8 Data Analysis Plan

The thematic analysis in this study followed Braun and Clarke's (2006) six-step process. This began with familiarizing with the data, which involved transcribing, reading, and noting initial ideas. The second step was generating initial codes, where interesting features of the data were systematically coded across the entire dataset. Third, these codes were collated into potential themes. Fourth, themes were reviewed to ensure they worked in relation to

both the coded extracts and the entire dataset, generating a thematic map of the analysis. Fifth, the themes were defined and named, refining the specifics of each theme and the overall narrative. Finally, the report was produced, selecting vivid extract examples and relating the analysis back to the research question and literature. The data was coded and analyzed using Microsoft Excel 2016 and NVivo, which helped generate tables and figures for the study's findings

2.9 Financial Distress Theory

Financial Distress Theory, traditionally applied to corporations, explores the conditions under which organizations face significant financial difficulties, potentially leading to bankruptcy or failure (Opler & Titman, 1994). The theory is relevant to Community-Based Water Supply Organisations (CBWSOs) as

importance of factors like debt ratio and asset management. However, there is a gap in applying this theory to the overall performance of CBWSOs. Adapting this theory to CBWSOs involves understanding their dependence on revenue from water sales, the impact of operational inefficiencies, the importance of cost recovery, debt management challenges, and the need to maintain stakeholder confidence.

By applying Financial Distress Theory to this study, the research aims to better understand the financial challenges faced by CBWSOs in the Katavi region and develop strategies to mitigate these risks, ensuring sustainable water supply services.

2.10 Stakeholder Theory

Stakeholder Theory, proposed by Freeman and

Table 2: Summary of influential factors outcome

Variables	N of VRs	Code	Sub variables	Source	Type of Scale
<i>Performance of CBWSOs</i>	3	PCBWSO	PCBWSO1: Supervisor's role in water delivery	Leroy, D. (2023).	Thematic
			PCBWSO2: Role of CBWSOs Board of Directors		Thematic
			PCBWSO3: Satisfaction with the level of service provided by CBWSOs		Thematic
<i>Financial Management</i>	5	FM	FM1: Revenue collection from water tariff	Daniel et al., (2023)	Ratio
			FM2: Revenue Duration		
			FM3: Revenue Condition/Tariff status	Domínguez, et al., (2019)	Interval
			FM4: Financial training		Thematic
			FM5: Community-run monitoring		Thematic

these entities often struggle with revenue generation, cost recovery, and debt management, which are key aspects of financial distress.

Studies such as Constantin et al. (2023) on financial distress in water utilities highlight the

Reed (1983), emphasizes the importance of considering the interests of all individuals or groups who can affect or be affected by an organization's actions. This theory is essential for understanding the dynamics within Community-Based Water Supply Organisations (CBWSOs), where both internal and

external stakeholders play critical roles. In this study, Stakeholder Theory complements Financial Distress Theory by highlighting the importance of community participation and stakeholder involvement in the success of CBWSOs. It guides the selection of

research from the interpretivism perspective (Saunders et al., 2019). The pilot study ensured the credibility and dependability of the research instruments (Cohen et al. 2018). The pilot study was conducted in Katavi region by selecting the

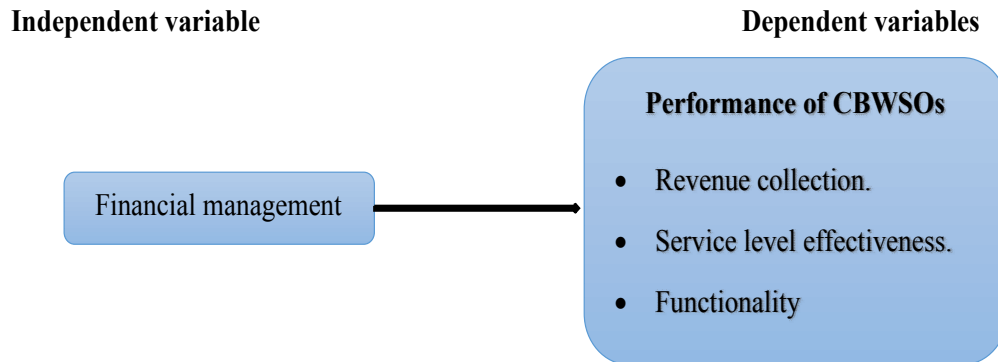


Figure 1: Conceptual framework

interview participants, ensuring diverse representation from various stakeholders across Mlele, Mpanda, and Tanganyika Districts, including areas such as Inyonga, Majimoto, Kibaoni, and others. While previous studies, like McNicholl et al. (2017), focused on network characteristics, this study uses Stakeholder Theory to explore how these diverse groups influence the performance and sustainability of CBWSOs.

2.11 Conceptual Framework

This section discusses the conceptual formwork for assessing the factors affecting CBWSOs' performance. A dependent variable measures one measure during the experiment and what is affected. Figure 1 illustrates the relationship between independent and dependent variables.

2.12 Variables and Measurements of the Study

The variables and measurement procedures of this study are presented in Table 2 below. The presentation below involves the type of variables and methods of measurement used for each variable by former researcher.

2.13 Validity and Reliability of the Qualitative Study

Credibility, dependability, transferability and confirmability are historically rooted in qualitative

Management team (6) and Supervisory Board (3) of CBWSOs which were not respondents. The pilot data obtained was included in the actual study and allowed for pre-testing of the research instruments.

2.14 Ethical Consideration of the Study

Trustworthiness is a state of demonstrating credibility, plausibility, and integrity (Saunders et al., 2019). The qualitative research inquiry aims to search for the common results, which is "truth" (Saunders et al., 2019). The researcher-maintained trustworthiness. This study ensured transferability by providing an in-depth description of the research methodology and a detailed description of the findings, enabling readers and other users to consult and make comparisons (Gay et al., 2012; Saunders et al., 2019). Confirmability is the degree to which others can confirm or corroborate the research findings (Yin, 2013). The researcher employed triangulation of data sources to ensure and enhance the results. The researcher obtained research clearance/permit from all required institutions and authorities, and therefore, the researcher also avoided data fabrication, falsification and plagiarism.

The research was conducted under the highest standards of moral and ethical considerations (Saunders et al., 2019). In the context of research, the researcher showed respect to the audience who read and use information from studies and therefore data was reported honestly, without changing or altering the findings to satisfy certain predictions or interested groups (Saunders et al., 2019). The researcher followed all procedures to advocate the rights of all participants by observing protocol and confidentiality

authorities including Regional Administrative Secretary and District Administrative Secretary of Katavi region.

Participants were informed about the purpose of the study and their rights to refuse to participate or withdraw from the discussion for whatever reason whenever they wished to do so without penalty

Participants in the study had the right to anonymity; their identities were kept anonymous. The researcher supposed to keep the respondent's answers private

Table 3: Demographic variables of the Interviewees participants

Demography	Frequency	Percentage	Percentage (valid)
District			
Mlele	24	42.11	42.11
Mpanda	5	8.77	8.77
Tanganyika	28	49.12	49.12
Age		100	100
18-30	23	40.35	40.35
31-40	21	36.84	36.84
41-50	13	22.81	22.81
Sex		100	100
Female	15	26.32	26.32
Male	42	73.68	73.68
Education		100	100
Advanced Secondary Education	20	35.09	35.09
Ordinary Secondary Education	32	56.14	56.14
Primary Education	5	8.77	8.77
Positions	57	100	100
Accountant	17	27.87	27.87
Chairperson	17	27.87	27.87
Supervisor	8	13.11	13.11
Technician	15	24.59	24.59
TOTAL (valid)	57	93.44	100
Missing	4	6.56	-
TOTAL	61	100	-

as follows:

The researcher got clearance/permit from the Open University of Tanzania before fieldwork and before conducting the research in the field, and from other

(Saunders et al., 2019). The researcher made sure that respondents' anonymity was adhered when presenting the research findings, as a result, letters and other labels were used.

3 Results and Discussion

This section comprises the data analysis, data presentation and data interpretation. This includes the response of all measured variables on the factors affecting the performance of CBWSOs, a case of Katavi region measured.

3.1 Interviewees' Demography

To fully meet this study's objectives, the researcher conducted an in-depth interview with 57 participants, which is 93.44% of the targeted population; the sex of

participants based on variable demography is indicated in Table 3.

3.2 Data Analysis

The influence of financial management on the performance of CBWSOs. The influence of financial management on the performance of Community-Based Water Supply Organizations (CBWSOs) in the Katavi region is significant. Thematic analysis of the interviews with 48 respondents, 14 respondents highlighted key themes related to financial management, including revenue collection from water



Figure 2: Financial management knowledge map

participants was also crucial in understanding patterns in a qualitative study. The study findings indicated that most of the targeted population were men (73.68%), which shows that men are most decision-makers in CBWSOs. Furthermore, the education level of the study participants was investigated, and findings indicated majority (56.14%) attended up to secondary education and minority (8.77%) finished primary education. This made the in-depth interview reliable and trustworthy since all the 57 respondents could read and understand the interview questions, and this trend justified their positions in the CBWSOs committee. Besides the education levels of the participant, positions were also considered. The study interview included: technicians, supervisors, chairpersons and accountants. The frequency of

tariffs, revenue Duration, revenue condition/tariff status, financial training and community-run monitoring, as shown in Figure 2.

During the data collection from the field in Katavi region, 14 respondents provided insights on revenue collection from water tariffs for Community-Based Water Supply Organizations (CBWSOs), the importance of community-run monitoring for Community-Based Water Supply Organizations and timely revenue collection to ensure financial stability and sustainability. Respondents also highlighted the challenges in revenue collection from water tariffs, including late payments, unpaid bills, and financial mismanagement.

Table 4 represent fourteen respondents highlighted the challenges in revenue collection from water tariffs,

including late payments, unpaid bills, and financial mismanagement with statements to emphasize the findings.

By addressing these presented challenges and implementing the suggestions provided by the 20 respondents, CBWSOs can improve their financial stability, ensure sustainable water supply services, and foster a mutually beneficial relationship with the community.

4 Discussion of the Findings

The interviews with 20 respondents in the Katavi region highlight key themes related to financial management in Community-Based Water Supply Organizations (CBWSOs). These themes include revenue collection from water tariffs, revenue duration, revenue condition/tariff status, financial training, and community-run monitoring. The challenges identified

al., 2023). Using incentives for timely bill payment and flexible payment options for low-income communities has been suggested as effective strategies (Smith et al., 2023). Moreover, involving the community in monitoring activities has been recognised to ensure accountability and sustainability in water supply projects (Tantoh et.al., 2021).

Regarding relevant theories, the findings align with financial management and control principles. Effective revenue collection, shortening the revenue cycle, and maintaining a favourable revenue condition reflect the importance of financial management mechanisms to ensure the financial stability of CBWSOs (Ngunula, 2024). The application of financial training to enhance financial management skills and the community's involvement in monitoring aligns with the principles of accountability and transparency in financial governance (Hahn et al., 2014).

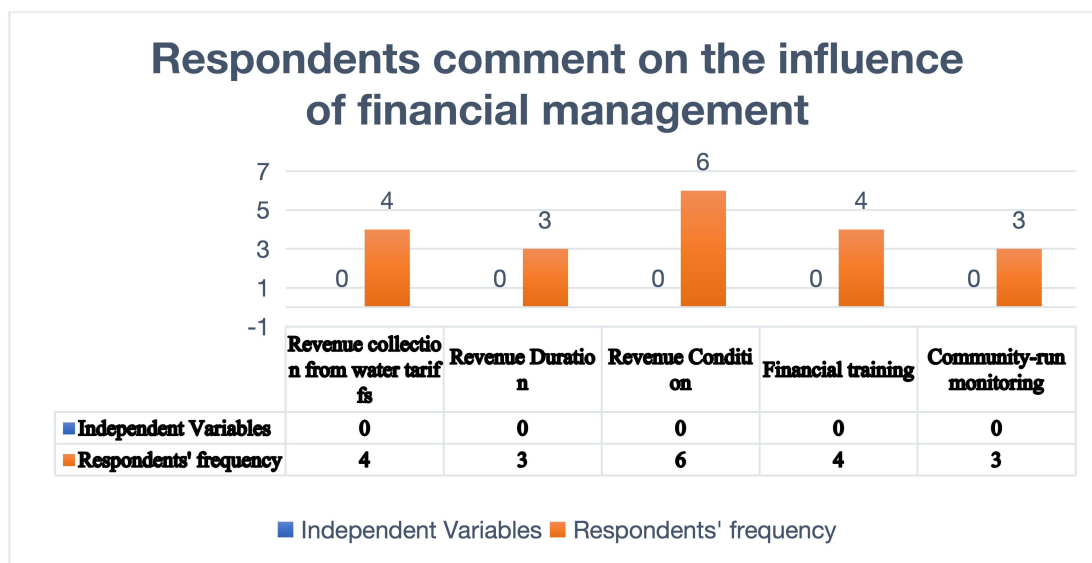


Figure 3: Respondents Comments

*0 – Respondents statements shown on Appendix 1.

include late payments and unpaid bills, mismanagement of funds and customer mistrust.

These findings align with existing studies and theories related to financial management in CBWSOs. Prior research has emphasized the importance of revenue collection, efficient billing systems, and customer engagement in improving the financial sustainability and performance of CBWSOs (Smith et

Maintenance of water schemes is identified as essential for their long-term functionality and sustainability. These findings align with studies emphasising the significance of proactive maintenance practices, a skilled workforce, and financial resources for effective maintenance (Tadese et al., 2022). Community involvement in maintenance activities is an important aspect that fosters a sense of

ownership and responsibility among community members (Teshome et al., 2021).

The findings highlight that trust among community members fosters strong relationships, cooperation, effective decision-making, responsible resource utilisation, and accountability. The findings reflect the finding of research conducted by Hamdan et al., (2021) for comparative analysis of the study findings with previous research on financial management and performance of CBWSOs our research found that effective financial management, including transparent fund collection, community participation, and responsible resource utilization, is crucial for the performance and sustainability of Community-Based Water Supply Organizations (CBWSOs) in the Katavi region. We observed that community involvement in financial processes fosters a sense of ownership and responsibility, enhancing financial sustainability.

In comparison with previous studies such as Chuenchum et al., (2024) emphasized the importance of financial management in achieving sustainable water services, like our findings. Both studies highlight the significance of financial transparency and community involvement. However, Chuenchum et al., (2024) focused more on the overall sustainability of water services, while our study provides detailed insights into the specific financial practices within CBWSOs. Ananga et al., (2021) highlighted that community-based organizations rely heavily on community mobilization and participation for successful operations. Ananga et al., (2021) findings align with our observation that community involvement is essential for financial performance. However, our study further details the specific financial management practices that enhance this performance. Another study by Nzilano (2017) identified that water supply projects in Africa often struggle with cost recovery and financial sustainability. In comparison our study supports this finding but provides a more focused analysis on the financial management practices that can mitigate these challenges within CBWSOs in Tanzania.

On the other hand, the Impact of Financial Training Programs we found that financial training programs had varied impacts on CBWSOs, with some

organizations showing significant improvement while others showed minimal change. To compare with previous studies, (Mengistu & Assefa, 2020) suggested that tailored training programs are more effective in improving financial practices which is in line with our findings that supports this by showing the variability in impact might be due to the initial financial literacy levels and the relevance of the training content. Tailoring training programs to the specific needs of each CBWSO can enhance their effectiveness.

In community participation and financial transparency our study found that high levels of community participation did not always correlate with improved financial transparency and management. To compare with previous studies, Wang et al., (2021) suggested that community participation is critical for transparency and accountability. While our study agrees that participation is important, it also highlights that without financial literacy, community involvement alone may not lead to improved transparency, suggesting the need for capacity-building initiatives. Jacob and Gichuki (2017) emphasized the role of education and capacity building in enhancing community participation and financial management. Our findings support this by indicating that enhancing financial literacy and providing targeted training can maximize the benefits of community participation in financial processes.

In summary, our study aligns with previous research in emphasizing the importance of financial management, community involvement, and the need for tailored training programs. However, it also provides new insights into the specific challenges and practices within CBWSOs, highlighting the need for a balanced approach to regulation and the customization of training and governance models to local contexts.

4.1 Unexpected Findings

Despite Financial Distress Theory predicting that financial challenges would lead to poor performance, some CBWSOs in Katavi showed resilience, continuing effective operations. This resilience was attributed to strong community support and informal

networks, which provided stability even in tough financial times.

The study also found that high community participation did not always result in better financial transparency, possibly due to a lack of financial literacy. Monthly financial audits alone did not improve financial management as expected, highlighting the need for comprehensive approaches that include both audits and financial training. The effectiveness of financial training varied, influenced by initial literacy levels and the relevance of the training.

Community dynamics, cultural factors, and traditional leadership significantly shaped financial management practices, while capacity and resource constraints limited the ability of CBWSOs to implement effective practices. Variability in the implementation of financial audits and training programs led to differing outcomes, and adaptive strategies within CBWSOs helped maintain service continuity despite financial difficulties.

Lastly, the research underscored the importance of digital transformation in water utilities, revealing how technological readiness, organizational culture, regulatory environment, and resource availability impact the adoption of digital technologies.

These findings emphasize the need for a multifaceted approach that integrates both formal financial practices and informal community dynamics to enhance CBWSO performance and sustainability.

4.2 Theoretical Implications

4.2.1 Enhancement of Financial Distress Theory

The application of Financial Distress Theory to Community-Based Water Supply Organizations (CBWSOs) extends the traditional understanding of financial distress, which is typically applied to corporations (Opler and Titman, 1994). This research demonstrates that the theory can be adapted to non-profit and community-based organizations, providing a new dimension to the theory. It highlights how financial mismanagement, inadequate revenue collection, and operational inefficiencies can lead to

financial distress even in community-managed entities.

4.2.2 Extension of Stakeholder Theory

This study expands Stakeholder Theory by applying it to the water utility sector in a developing country context. The theory, which traditionally focuses on corporate stakeholders, is shown to be relevant for CBWSOs where diverse stakeholders such as community members, local government, NGOs, and donors play crucial roles (McNicholl et al., 2017). It underscores the importance of inclusive stakeholder engagement in improving the financial and operational performance of CBWSOs.

4.3 Practical Implications

4.3.1 Policy Recommendations

The findings can inform policymakers in Tanzania and other developing countries on the critical factors that need to be addressed to enhance the performance of CBWSOs. Policies focusing on improving technological infrastructure, providing financial support, and fostering a supportive regulatory environment can significantly boost the adoption of digital technologies in water utilities.

4.3.2 Operational Improvements

Water utilities can use the insights from this study to improve their operational efficiency. By understanding the impact of digital customer service platforms and electronic billing systems on their operations, water utilities can implement these technologies to enhance revenue collection, service delivery, and overall functionality.

4.3.3 Capacity Building

The research highlights the need for capacity building among CBWSO staff and management. Training programs focusing on financial management, digital literacy, and effective stakeholder engagement can empower CBWSOs to manage their resources better and leverage digital tools for improved performance.

4.3.4 Community Engagement

The study underscores the importance of community influence and organizational culture in the adoption of digital technologies. Water utilities and policymakers should engage communities in the decision-making process and foster a culture that embraces innovation and change. This can lead to higher acceptance and more successful implementation of digital transformation initiatives. By addressing these theoretical and practical implications, the research not only advances academic knowledge but also provides actionable insights that can lead to significant improvements in the performance of water utilities in Tanzania and similar contexts.

5 Conclusions

The study findings emphasize the importance of financial management in the performance of community water supply schemes in the Katavi region. Effective financial management, including transparent fund collection, community participation, and responsible resource utilisation, is essential for the long-term viability of water supply systems. Also, Community involvement in the collection of funds promotes financial sustainability, fosters a sense of ownership and responsibility, and enables equitable financial burden sharing. By actively engaging the community, fostering trust, and promoting participation, CBWSOs can effectively enhance sustainability. Based on the findings, the researcher recommends that CBWSOs strengthen financial management by implementing monthly financial audit and provide quarterly financial management training to CBWSOs. Therefore, a holistic approach that addresses financial management is essential to operate community water supply schemes successfully.

Furthermore, the study recommends future studies to explore the mechanisms and strategies that can effectively enhance transparent and participatory governance structures within CBWSOs in the Katavi region.

5.1 Specific Areas for Future Research Based on Study Limitations and Unexpected Findings

Future research should explore effective mechanisms and strategies for enhancing transparent and participatory governance structures within CBWSOs in the Katavi region.

The long-term impact of regular financial management training on the performance and sustainability of CBWSOs can be assessed and to evaluate how continuous education and skill development in financial management influence operational efficiency and accountability.

Future study on various community engagement techniques and their effectiveness in promoting financial performance and sustainability and a sense of ownership among community members. Also to compare different methods to identify best practices for fostering active community participation.

Further investigation on the effectiveness of implementing monthly financial audits in improving financial transparency and accountability in CBWSOs, and to focus on the impact of frequent audits to reduce financial mismanagement and enhancing trust among stakeholders.

The further research should focus on examine the specific impacts of community involvement in fund collection on financial performance and service quality, and to assess how different levels of community participation affect financial outcomes and the overall success of water supply schemes.

Further research should study how CBWSOs can optimize resource utilization and allocation to enhance financial performance and operational efficiency of water supply systems.

The future study should explore trust-building measures that CBWSOs can implement to foster community trust and cooperation. management practices of CBWSOs. Research could evaluate how policy changes influence financial transparency, accountability, and overall performance of community water supply schemes These areas for future research will help address the limitations and unexpected findings of the current study, providing deeper insights and practical recommendations for

improving the financial management, performance and sustainability of Community-Based Water Supply Organizations in Tanzania the future study should examine holistic approaches to financial management that integrate various aspects such as budgeting, fund allocation, revenue collection, and expenditure tracking to enhance the overall performance of CBWSOs. The future research should study the impact of existing regulatory policies on the financial management practices of CBWSOs. Research could evaluate how policy changes influence financial transparency, accountability, and overall performance of community water supply schemes. These areas for future research will help address the limitations and unexpected findings of the current study, providing

deeper insights and practical recommendations for improving the financial management, performance and sustainability of Community-Based Water Supply Organizations in Tanzania

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Conflict of Interest

Authors declare no conflict of interest

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Appendix 1

Respondents' statements	Factors	Respondents' statements	Factors
"Late payment of water bills, especially by schools and hospitals, is a problem. There is also a lack of collection due to misuse of funds and customer mistrust in using accounts."	Revenue collection from water tariffs	2023)	Revenue Condition
"One way to encourage timely bill payment is by incentivising customers who pay promptly. These incentives could include discounts, rewards, or special privileges. Clear communication and transparency about these incentives ensure customers are aware and motivated to participate."		"Unpaid debts and loss at domestic points are issues. There is also a lack of suppliers. Using an accounting system, direct involvement of all board members, and following a code of ethics can help address these challenges." (Interview field data, May 2023).	
"The flexible payment options, such as instalment plans or subsidised tariffs, is important for economically disadvantaged households to alleviate the financial burden and ensure regular bill payments from low-income communities." (Interview field data, May 2023)		"The low income of people affects the collection of water bills. Controlling leakages and collecting bills on time should be prioritised. Cash collection methods are aligned with addressing these issues." (Interview field data, May 2023)	
"CBWSOs should implement robust mechanisms to ensure timely and accurate collection of user fees. This June involve adopting transparent billing systems, promoting community awareness about payment obligations, and addressing any challenges or barriers hindering timely revenue collection." (Interview field data, June 2023)		"Creating a good environment for bill collection and utilising systems for collection are proposed solutions." (Interview field data, May 2023).	
"Timely payment of water bills is crucial for CBWSOs. Seminars and education can effectively improve the situation, but the response is not aligned due to regular motors burning causing high expenditure." (Interview field data, May 2023)		"CBWSOs can consider forming partnerships with local businesses, and NGOs, or seeking external funding opportunities to supplement their financial resources. Diversifying funding sources can enhance financial stability and support long-term sustainability." (Interview field data, June 2023)	
"There are late payments of bills and a lack of skills in payment through accounts. In rural projects, there is a low collection of money. Collecting water bills through accounts and educating customers can help address these issues." (Interview field data, May 2023)	Revenue Duration	"Uncontrolled borrowing can lead to a debt trap, where CBWSOs become overwhelmed by repayment obligations and struggle to invest in infrastructure or provide quality services. It is important to carefully assess the borrowing capacity and seek professional financial advice when considering taking on debt." (Interview field data, June 2023)	Financial training
"CBWSOs should develop annual budgets that align with their objectives and operational requirements. It is crucial to allocate funds wisely, prioritize investments, and monitor expenditure to ensure effective utilization of resources." (Interview field data, June 2023)		"CBWSOs should establish mechanisms to assess the impact and effectiveness of resource allocation. Regular monitoring and evaluation help identify gaps or inefficiencies in the allocation process and enable timely adjustments to optimize resource utilization." (Interview field data, June 2023)	
		"There is a high number of shallow wells. However, the response regarding the use of public funds is not aligned." (Interview field data, May 2023) "There is a high number of shallow wells. However, the response regarding the use of public funds is not aligned."	

Respondents' statements	Factors
<i>(Interview field data, May 2023)</i>	
<i>"Keeping accounting records up-to-date, monitoring the financial position, and becoming more efficient are suggested actions." (Interview field data, May 2023)</i>	
<i>"It is essential to invest in training and capacity-building programs to enhance the financial management skills of CBWSO personnel. This includes providing them with budgeting, financial reporting, and financial analysis knowledge, empowering them to make informed financial decisions." (Interview field data, June 2023)</i>	
<i>"Creating a good environment for bill collection and utilising systems for collection are proposed solutions." (Interview field data, May 2023).</i>	Community-run monitoring
<i>"The response highlights many shallow wells and the importance of banking money after collection." (Interview field data, May 2023)</i>	
<i>"Using an accounting system, direct involvement of all board members, and following a code of ethics can help address these challenges." (Interview field data, May 2023)</i>	