Assessing the Impact of Corporate Social Responsibility Spending on Performance of Water Supply and Sanitation Authorities in Tanzania

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Abstract

This paper assesses the impact of corporate social responsibility spending on the performance of water supply and sanitation authorities in Tanzania, using revenue collection efficiency and non-revenue water as proxies of performance. The study employed a retrospective longitudinal research design with a quantitative research approach, using secondary data from 114 water supply and sanitation authorities over five years from 2015 to 2019. We applied both the random and fixed effect estimation techniques to assess the impact of corporate social responsibility spending on performance. The findings reveal that corporate social responsibility spending significantly influences the performance of water supply and sanitation authorities. In particular, corporate social responsibility spending increases revenue collection efficiency and decreases non-revenue water. Also, we found that control variables organization size, organization age, number of employees and customers' complaints significantly influence performance. The paper provides an in-depth and contextual understanding of how spending on corporate social responsibility activities for not-for-profit organizations in the public sector such as water supply and sanitation authorities enhances revenue collection efficiency and reduces non-revenue water. The practical implications of this study lies on the importance of corporate social responsibility investment by organizations in the water sector and advocate for policies that encourage corporate social responsibility activities to enhance their performance.

Key words: Corporate social responsibility spending, performance, water sector, public sector

1. Introduction

Corporate Social Responsibility (CSR) has gained considerable attention in the operations of firms and remains a debatable topic in business studies (Singh & Misra, 2019). Numerous studies have shown that many organisations significantly invest in CSR activities (Oyewumi et al., 2018; Singh et al., 2018). Organisations that spend on CSR activities benefit in several ways such as; fostering customer loyalty (Liu et al., 2020), reducing operating costs (Kim & Scullion, 2018), enhance employee working morale and improves performance (Kuntluru, 2019; Selcuk & Kiymaz, 2018). Further, Huy and Phuc (2020) point out that CSR provides a means for organisations to effectively manage their stakeholders by integrating their interests into the firms' operations. CSR activities can also help a company to improve its reputation, which promotes trust between the organisation and its stakeholders (Adinata, 2019).

In addition to the growing attention to CSR within organisations, there has been a noticeable increase in stakeholder awareness of organisations' social and environmental responsibilities towards communities (Rhou et al., 2016). This heightened awareness has led to a rising demand from stakeholders for firms to take responsibility for the environmental and social impacts of their operations (Abdelmotaleb & Saha, 2018) and to contribute to society through various forms of support or benefits resulting from their operations (Yu et al., 2017). Failure to respond to these social demands may have significant consequences. It may not only affect communities but also erode customer and stakeholder trust, potentially damaging the reputation of the organisation and, consequently, its overall performance (Singh et al., 2018).

Several studies have examined the relationship between CSR spending and firm performance. However, contradicting results have been reported making the impact of CSR spending on

firm's performance to remain a debatable issue. For instance, Matar et al., (2020), Nair and Battacharyya (2019), Oware and Mallikarjunappa (2020), Vaddul and Sager (2021), Yang et al. (2019) found a positive relationship between CSR spending and firm performance. On the other hand, studies such as Garg and Gupta (2020), Ghardallou and Alessa (2022), Husnaini and Khusnah (2021), and Mature and Muloli (2021) reported a negative relationship between CSR spending and firm performance. These conflicting results among the studies may stem from using different measures of performance, flawed analyses or the use of insufficient control variables, and/or differences in firms and country-specific characteristics in which the study was conducted (Galant & Cadez, 2017). For instance, Matar et al. (2020), Oware (2020), Vaddul and Sager (2021), and Yang et al. (2019) used accounting measures such as return on equity, return on total assets, return on sales, and earning per share. In contrast, Garg and Gupta (2020) used market performance (price-to-sales ratio) as a measure of firm performance.

Different from previous studies, the current study assesses the impact of CSR spending on the performance of Water Supply and Sanitation Authorities (WSSAs), which are not-for-profit public organisations in Tanzania. Lloyd (2018) suggests that a study based on a specific sector is essential to gain a holistic understanding of the impact of CSR within a specific sector. WSSAs have a critical role to play in providing essential services related to water and sanitation, which have a direct impact on the welfare of the communities. Thus, examining the influence of CSR spending within this sector helps to understand how WSSAs contribute to societal well-being and environmental sustainability in Tanzania. Moreover, unlike studies that used financial measures such as profitability, return on investment, return on equity, return on asset, Price-to-Sales ratio, and earnings per share to measure performance, given the nature of the organisations underwater sector, we employed Non-Revenue water (NRW) and Revenue Collection Efficiency (RCE) to measure their performance. NRW helps assess water and revenue losses, which are critical aspects of utility services (Kizilöz & Şişman, 2021). On the other hand, RCE provides a gauge of revenue generation efficiency, an essential measure for the financial sustainability of public entities (Sánchez-Hernández et al., 2020). These are standard measures of performance for WSSAs in Tanzania (EWURA, 2022) and other Eastern and Southern Africa Water and Sanitation (ESAWAS, 2015).

We used the fixed effect estimation technique to determine the effect of CSR spending on non-revenue water, which is one of the proxies of performance. This estimation technique is appropriate in this setting because of its ability to address endogeneity, account for serial correlation over time, accommodate heterogeneity across different water utilities, support causal inference, and provide a robust analysis of the relationship between CSR spending and performance (non-revenue water) in the water sector. To determine the impact of CSR spending on RCE, we used the random effect estimation technique. The use of either fixed effect or random effect was determined by the Hausman test performed.

The remainder of this paper is organised as follows: section two presents the literature review, followed by research methodology in section three. Section four presents the results and discussions. Lastly, the conclusion is presented in Section five.

2. Theoretical and Empirical Literature Review

Two important theories are relevant in explaining the relationship between CSR spending and the performance of the organisation. The first theory that offers insights into the relationship between CSR spending and the performance of organisations is stakeholder theory. According to stakeholder theory, organisations have responsibilities not only to their shareholders but also to a diverse range of stakeholders, including employees, customers,

suppliers, local communities, and government agencies (Yoon & Chung, 2018). To this effect, organisations that spend on CSR activities demonstrate commitment to addressing broader societal and environmental concerns beyond their primary functions, which in turn may lead to increased public awareness about the organisation and support, increased employee morale to work, increased customer loyalty, and enhanced performance (Benlemlih & Bitar, 2018). Additionally, by addressing social and environmental issues, public sector organisations can foster stronger collaborations and partnerships with other entities, including non-governmental organisations, private businesses, and academic institutions (Crowther & Seifi, 2020), and with communities at large. These collaborations can lead to more innovative and effective solutions to societal challenges and improve organisational performance (Blagoycheva, 2018). Therefore, stakeholder theory predicts that by spending on CSR activities, public sector organisations can build trust, legitimacy, and positive relationships with stakeholders, which can contribute to their performance.

Another important theory that explains the relationship between CSR spending and the performance of the organisation is the Resource Dependency Theory (RDT). The theory posits that organisations depend on external resources to survive and thrive, and this dependence influences their behaviour and decision-making processes (Delke, 2015). In the context of public sector organisations, the theory suggests that these entities rely on various stakeholders, including government agencies, donors, and other external entities, for resources such as funding and support (Abdelmotaleb & Saha, 2018). Based on RDT, Gupta et al. (2021) argue that public sector organisations engage in CSR activities as a strategic response to their external environment, driven by the need to secure crucial resources. Furthermore, RDT emphasises the importance of reducing uncertainty and risks associated with resource dependencies (Davis & Cobb, 2010). Public sector organisations may view CSR spending as a way to mitigate potential negative consequences resulting from stakeholders' demands or expectations (Xiao et al., 2018). Engaging in socially responsible practices can pre-emptively address community concerns and mitigate potential conflicts, thus reducing the risk of public backlash and reputational damage (Adinata, 2019). Moreover, through CSR spending, public sector organisations can cultivate positive relationships with the external environment, and foster collaborations and partnerships that offer access to additional resources, expertise, and funding, enhancing the organisation’s capacity to deliver its services effectively (Ji & Miao, 2020), and hence enhance performance.

Several empirical studies on the relationship between CSR spending and performance already prevail and their findings are diverse. For example, Biswas et al. (2020), Chowdhury and Nehal (2020), Giacomelli et al. (2020), Ishtiaq et al. (2017), Busch and Friede (2018), Haris-ul-mahasbi (2020), Delgado-Ceballos et al. (2017), Haris-ul-mahasbi (2020), and Matar et al. (2020) have found a positive relationship between CSR spending and financial performance, arguing that investing in CSR can improve financial performance in the long run. This argument is in line with the submission of stakeholder theory that organisations that consider stakeholders' interests in their operations attract more customers (Lymo & Gindo, 2022), and employees (Kucharska, 2020) who share similar values, leading to increased organisation performance. Correspondingly, Aunga and Nathan (2018) revealed a positive relationship between CSR and firm performance, arguing that firms should partner with non-profits and government agencies to solve social problems and should introduce wellbeing policies in their firms, supporting the view that socially responsible organisations may keep employees motivated and hence improve their performance. Similarly, Sánchez-Hernández et al. (2020) observed a positive relationship between CSR investment and RCE, suggesting that organisations engaged in socially responsible activities tend to cultivate customer loyalty and trust, resulting in improved revenue collection performance.

While some studies highlight a positive relationship between CSR spending and performance, in contrast, the work of Garg and Gupta, (2020) demonstrates a negative relationship between CSR spending and performance, implying that CSR spending might divert resources from core revenue-generating activities, potentially affecting RCE negatively. Moreover, Flammer (2015) reports a negative relationship between CSR spending and financial performance, potentially indicating the presence of initial cash outlays with delayed returns. However, the empirical findings overall lean towards a positive relationship between CSR spending and revenue collection efficiency, emphasizing the potential benefits of CSR investments for revenue generation and financial outcomes.

In line with the water sector, Muriithi et al. (2019) argue that public sector organisations performance is affected by water loss through, e.g., poor infrastructure or theft. As such, there are significant disparities between the water produced and distributed and the bills collected on the water that was consumed by the customers. Tran (2022) points out that CSR engagement is central in this setting to create loyal customers and communities that can reduce such malpractices. It is argued that CSR plays a pivotal role in helping organisations link with or obtain loyal customers by fostering a positive brand image and enhancing their reputation. When an organisation actively engages in CSR activities, such as supporting environmental conservation, promoting community development, or contributing to charitable causes, it creates a strong relationship with stakeholders, communities, and customers. A good relationship that is created between the organisation and stakeholders can raise awareness about water conservation and responsible water usage among the local communities, which can also help improve the organisation's performance (Kizilöz & Şişman, 2021).

Arguing from the perspective of WSSAs in Tanzania, spending on CSR activities may improve customers' loyalty (Lymo & Gindo, 2022), who may willingly pay their bills on time, leading to increased revenue collection efficiency, ensuring authorities cash inflows through revenue collection, and hence improved performance. Equally, spending on CSR may foster relationships between the organisation and communities, who in turn may support water authorities to reduce a very common wasteful practice of water in the country, reduce sabotage of water infrastructures by unethical citizens, timely report any water leakage, and hence reduce non-revenue water, which in turn may also increase performance. Similarly, spending on CSR by WSSAs may create responsible and motivated employees who can diligently work for their water authorities to thrive. From this view, we hypothesised that:

Hypothesis: CSR spending has a significant influence on the performance of WSSAs in Tanzania

3. Methodology

This section presents sample size, type of data and source, research design, variable measurements and estimation technique applied.

3.1 Sample size and data

The study employed the purposive sampling technique to select a sample of 114 WSSAs. The available WSSAs in Tanzania are 120. The sampled WSSAs were those established before 2015, those that disclosed annual CSR spending in their financial statements, and those that had complete information for the studied variables in each financial year. This sampling approach ensured consistent observation of the same units over time while minimising unit-related variations to enhance the reliability of the findings (Creswell, 2012). The quantitative data were obtained from the following two important secondary sources: (i) from the Water

Utilities Performance Review Reports, we collected information on non-revenue water, organisation size, number of employees, revenue collection efficiency, and customers' complaints resolved. (ii) From the annual financial reports, we collected information on CSR spending, age, and leverage of each respective water authority.

3.2 Variables and measurements

The dependent variable in this paper is performance, measured by revenue collection efficiency and non-revenue water. RCE is calculated as the percentage of total revenue collected over the total value of bills. This is a standard measure in the water sector used to measure performance and has also been applied in studies conducted outside Tanzania, e.g., Namaliya (2017). The second performance measure, which is also used in the water sector, is NRW. This measure represents water loss for the organisation (EWURA, 2022). Non-revenue water is a vital performance indicator for water utilities, signifying both revenue and resource loss, which affect organisation performance. NRW is measured as the difference between produced and sold water, expressed as a percentage of the water produced.

The independent variable of interest is the total actual spending on CSR activities (CSRSP) by each water authority in a given financial year. This variable is measured as the natural logarithm of the total CSR spending during that period. The following control variables were used to control for their influence on performance: (i) Organisation size (Ogsize). Ogsize was measured by the natural logarithm of the total number of water connections (LoStorto, 2022). (ii) Number of employees (NEP) measured by the natural logarithm of the total number of employees during a specific financial year (Haris-ul-mahasbi, 2020). (iii) Number of complaints (NCR) measured by the percentage of customers' complaints resolved by the organisation in a given financial year (EWURA, 2022), (iv) Organisation age (Ogage) measured by the natural logarithm of the total number of years of the organisation since its establishment to the year of data collection of this study i.e. 2019. (v) Lastly, leverage (lev) was measured by the ratio of total debt to total assets (Pradhan & Nibedita, 2019).

3.3 Empirical model and estimation technique

Based on the nature of our data, we used the Panel regression model to examine the impact of CSR spending on WSSAs performance. The empirical model for this purpose is specified in general term as follows:

$$PF_{it} = \propto_0 + \beta X_{it} + \beta CntV_{it} + \varepsilon_{it} \quad (1)$$

Where; β represents coefficients for the independent variables; X represents independent variable of interest; *CntV* stands for control variables and ε is the error term, α represent the intercept, i and t denote the cross-sectional units and period, respectively.

Using two proxies of performance *(i.e. RCE and NRW)* and independent variables described in section 3.2, we specify two full empirical models for the impact of CSR spending on performance as follows:

$$RCE_{it} = \alpha_0 + \beta_1 lnCSRSP_{it} + \beta_2 lnOgsize_{it} + \beta_3 lnNEP_{it} + \beta_4 NCR_{it} + \beta_5 lngage_{it} + \beta_6 Lev_{it} + \varepsilon_i \quad (2)$$

$$NRW_{it} = \alpha_0 + \beta_1 lnCSRSP_{it} + \beta_2 lnOgsize_{it} + \beta_3 lnNEP_{it} + \beta_4 NCR_{it} + \beta_5 lngage_{it} + \beta_6 Lev_{it} + \varepsilon_i \quad (3)$$

4. Results and Discussion

This section presents descriptive and diagnostic tests, followed by regression findings, offering a comprehensive analysis of the variables and relationships. Diagnostic tests are presented to ensure robust regression analysis.

4.1 Descriptive statistics

Table 1 indicates that, on average, the revenue collection efficiency by most of WSSAs is 86 percent. This result suggests that water and sanitation authorities are relatively efficient at collecting revenue. It is worth noting that the RCE values range from a minimum of 49 percent to a maximum of 113 percent, highlighting that some organisations are very efficient in revenue collection while others are not as efficient. Additionally, Table 1 shows an average NRW of 0.37, indicating that, on average, WSSAs experience a non-revenue water loss of 37 percent. The standard deviation of 0.133 suggests variability in NRW among WSSAs. The minimum NRW of 17 percent indicates that some WSSAs in the sample had relatively low water losses, while the maximum water loss (NRW) was 63 percent, suggesting that some WSSAs experience significant water losses, potentially indicating problems in their water supply infrastructure or water management practices. Furthermore, on average, corporate social responsibility spending was Tanzania Shillings (TZS) 99.4 million, indicating that some WSSAs spend a substantial amount of money on CSR activities.

Furthermore, Table 1 reveals that the average organisation size, as indicated by the number of water connections, was 6,063. This suggests that the majority of the WSSAs under study fall into the category of medium-sized WSSAs, which authorities identify as having a number of water connections ranging from 5,000 to 20,000 (ESAWAS, 2018). The average number of employees in WSSAs was 37, with a relatively high standard deviation of 46.74, indicating significant variability in employee counts among the WSSAs. The percentage of resolved complaints received by the WSSAs from their customers averaged 83 percent. This falls within the WSSAs service benchmark level of efficiency in responding to complaints, which ranges between 80 and 100 percent. Therefore, the average of 83 percent of customers' complaints being resolved suggests that WSSAs are responsive to their stakeholders' inquiries, potentially contributing to improved performance. Lastly, Table 1 reveals that most of WSSAs are 16 years old, with a minimum of 11 and a maximum of 22 years during the period of this study. The leverage ratio of most WSSAs was 0.84, indicating a lower reliance on debt and financial capacity to finance organisational activities, including CSR activities. This leverage ratio also suggests that WSSAs face less pressure to reduce CSR spending in order to service debts.

Table 1: Descriptive Statistics

Variable	N	Mean	Std. Dev.	……Quantiles……					Skewness	Kurtosis
				Min	25th	50th	75th	Max		
RCE	570	0.86	0.16	0.49	0.76	0.89	0.99	1.13	0.16	2.46
NRW	570	0.37	0.133	0.17	0.28	0.35	0.45	0.68	0.63	2.84
CSRSP	570	99.4	33.6	61	71	91	112	142	0.91	2.87
Ogsize	570	6,063	7,209	209	731	1,660	3,632	158,900	0.55	2.63
NEP	570	37	46.74	6	12	18	38	188	0.04	2.11
NCR	570	0.83	0.13	0.48	0.8	0.76	0.95	1	-0.85	2.92
Ogage	570	16	3.28	11	13	15	18	22	0.41	2.10
Lev	570	0.84	0.5	0.01	0.51	0.79	1.192	1.92	0.26	2.29

Note: variable CSRSP is in millions of TZS.

4.2 Diagnostic tests

Diagnostic tests were performed to assess the validity of the assumptions and identify potential issues with the regression model. These tests help ensure that the underlying assumptions of the regression analysis are met and that the detected violations of the assumptions are addressed (Chamberlain, 2021). The normality of the data was tested by skewness and kurtosis. Table 1 indicates that the data were normally distributed, as the skewness for all variables was less than +/-2 and the kurtosis was less than +/-3 (Hair et al., 2015). We tested multicollinearity to establish the relationship between variables using the variance inflation factor (VIF). Table 2 indicates that there was no multicollinearity problem because VIF values for all variables were below the threshold of 10 (Hair et al., 2015).

Table 2: Multicollinearity Test: dependents: RCE and NRW

Variable	VIF	1/VIF
Ogsize	3.15	0.317
NEP	2.66	0.375
CSRSP	1.73	0.577
Ogage	1.86	0.583
NCR	1.12	0.901
Lev	1.11	0.913
Mean VIF	1.94	

Further, diagnostic tests were conducted to validate the assumptions of the panel models used to estimate the impact of CSR spending on the performance of WSSAs. Since the performance of WSSAs was measured by RCE and NRW, we performed the diagnostic tests based on the estimation equations (2) and (3). Starting with the test for heteroskedasticity, we used the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity. The results reveal a p-value of 0.270 for equation (2) and 0.104 for equation (3). We failed to reject the null hypothesis, meaning that there is constant variance in the residuals. Thus, the assumption of homoscedasticity was not violated. The presence of endogeneity was tested using the Durbin-Wu-Hausman test with the null hypothesis that variables are exogenous. The results for equation (2) show the p-values of 0.07 and 0.08, which are greater than 0.05. We fail to reject the null hypothesis, which indicates the absence of the endogeneity variable.

Moreover, in the test of panel effect using the Breusch-Pagan Lagrange multiplier (LM), for equation (2) the finding shows p-values of 0.0003 and 0.0000 for equation (3) which are both less than 0.05, suggesting that individual heterogeneity exists in the data. In this case, the Pooled OLS is not an appropriate estimation technique, so the Random Effect (RE) or Fixed Effects (FE) models are more suitable to account for this heterogeneity. The Hausman test was performed with the null hypothesis that RE is the appropriate estimation. The findings of the Hausman test for equation (2) show a p-value of 0.094, which is greater than 0.05, suggesting that random effect estimation was an appropriate technique, while the Hausman test results for equation (3) show a p-value equal to 0.001, which is less than 0.05 indicating that the fixed effect estimation technique was an appropriate technique when performance was measured by NRW. Therefore, equation (2) is appropriately estimated by random effect estimation techniques, while equation (3) is the appropriately estimated by fixed effect estimation technique.

4.3 Estimation Results for Random Effect Estimation Technique

The equation (2) is estimated using Random Effect Estimation Technique. The general to specific approach has been applied towards presenting the outcomes (Brooks, 2002). First, we presented estimation results of all six independent variables (i.e. full specification of model). Thereafter we deleted variables with insignificant coefficients in subsequent rounds. This approach of presenting estimation results allows for testing the stability of the outcomes with respect to significant variables for different specifications of the model (Hermes et al. 2012). Table 3 presents the results of the random effect estimation technique for the impact of CSR spending on the performance of WSSAs. The random effect estimation technique was applied to estimate the impact of CSR spending on revenue collection efficiency, which is a proxy for performance in this setting. The findings in Table 3 reveal that CSR spending positively and significantly influences the revenue collection of WSSAs in Tanzania. In particular, revenue collection efficiency increases significantly when spending on CSR activities increases. This finding suggests that spending on socially responsible actions such as community development programmes and environmental conservation efforts enhances organisations' reputation, support, and trust among their stakeholders, including customers, employees, and regulatory authorities. This increased trust could potentially result in higher customer satisfaction, greater employee commitment, and better regulatory compliance, which ultimately contribute positively to their overall performance as denoted by revenue collection efficiency. This finding aligns well with the stakeholder theory, which states that organisations are responsible for a wider range of stakeholders; thus, by spending on CSR activities, organisations fulfil their responsibilities to these various stakeholders, which eventually help organisations foster long-term sustainability and performance. The result is also in line with the resource dependency theory, which insists organisations maintain mutual relations with stakeholders because they rely on external resources to function effectively (Jiang et al., 2022). By engaging in CSR activities, WSSAs establish cooperative relationships with the community, government, and other entities, thereby gaining access to valuable resources and support that boost their performance.

The finding in Table 2 also shows that organisation size has a significant influence on organisations performance. Larger water authorities have many water connections, which enable them to produce and sell a large amount of water to customers, generating more revenue and allowing them to spend more on CSR activities. Such spending leads to improved public perception, enhanced reputation, and increased customer loyalty, which ultimately contribute to a better performance outcomes. We also find that number of employees positively and significantly influences the performance of the organization when measured by revenue collection efficiency. This finding suggests that larger workforce may indicate an increased capacity for effective customer service, billing, and revenue management, which can contribute to improved revenue collection. This finding aligns well with the stakeholder theory that more employees may enhance stakeholder engagement, contributing to improved revenue collection efficiency. Stakeholders include customers, and a larger workforce may respond to their needs more effectively.

Lastly, Table 3 shows that customer complaints resolution positively and significantly relates to the performance of Authorities. This finding means that as the percentage of customers' complaints resolved increases, revenue collection efficiency also increases. This finding suggests that addressing customer concerns and feedback contributes to better performance, possibly by enhancing customer satisfaction and trust. This aligns with stakeholder theory, emphasizing the importance of considering the interests and concerns of stakeholders, in this case, customers, to improve overall organizational performance and reputation. Therefore,

Table 3 presents the findings on the random effect estimation technique where organization performance was measured by revenue collection efficiency.

Table 3: Random effect estimation: RCE a dependent variable

Variable	(1)	(2)	(3)
CSRSP	0.217	0.217	(0.217)
	(0.001)***	(0.001)***	(0.001)***
Ogsize	0.231	0.230)	0.230
	(0.005)***	(0.006)***	(0.006)***
NEP	0.276	(0.217)	0.217
	(0.006)***	(0.005)***	(0.005)***
NCR	0.007	0.002	0.002
	(0.040)**	(0.038)**	(0.028)**
Ogage	0.217		
	(0.208)		
Lev	-0.003	-0.003	
	(0.118)	(0.112)	
Constant	-4.587	-4.587	-4.588
	(0.004)***	(0.004)***	(0.004)***
Observations	*570*	*570*	*570*
R-squared	0.48	0.48	0.48
Breusch-Pagan Lagrange multiplier (LM) test	(0.000)***	(0.000)***	(0.000)***
Breusch-Pagan/Cook-Weisberg	0.270	0.270	0.270
Durbin-Wu-Hausman	0.070	0.070	0.070
Hausman Test	*0.094*	0.094	0.094

Robust standard errors are reported in parentheses. *p<0.10, **p<0.05 and ***p<0.01.

4.4 Estimation Results for Fixed Effect Estimation Technique

The non-revenue water is another performance measure in our study, which introduces another dimension to our analysis. To assess the impact of CSR spending on NRW in equation (3), we employed the fixed effect estimation technique. The findings, as presented in Table 4, reveal that CSR spending significantly influences performance in terms of reducing water losses. Notably, the coefficient associated with CSR spending is negative and statistically significant in relation to NRW. This implies that spending on CSR activities fosters more positive relationship between WSSAs and the community they serve. This improved relationship, in turn, encourages the community to utilise water resources prudently and promotes effective management of water infrastructure. Consequently, this leads to an overall reduction in water losses. These findings are consistent with the stakeholder theory, which emphasises the importance of engaging with various stakeholders, including the community, in achieving desirable firm performance.

Furthermore, we found that organisation age negatively relates to NRW. The significant negative relationship between organisation age and NRW implies that older organisations tend to have lower non-revenue water levels, possibly due to experience or infrastructure improvements. This finding aligns well with the stakeholder theory in that older organisations may have established stronger relationships with stakeholders, including customers and regulators who lead to better management practices and reduced non-revenue water levels,

aligning with stakeholder interests in efficient water service. Table 4 also shows that organisation size negatively and significantly relates to NRW, implying that as the size of the organisation increases, water loss (NRW) decreases. This finding suggests that large organisations may have accumulated more resources, both financial and human capital, over time. These resources can be leveraged to invest in infrastructure and technology, reducing non-revenue water. Lastly, a significant negative relationship between the number of employees and non-revenue water implies that a larger workforce improves water resource management and efficiency.

Table 4: Fixed effect: Non-Revenue Water a dependent variable

Variable	(1)	(2)	(3)
CSRSP	-0.049	-0.046	-0.045
	(0.009)***	(0.002)***	(0.004)***
Ogsize	-0.187	-0.187	-0.189
	(0.031)**	(0.035)**	(0.026)**
NEP	-0.059	-0.609	-0.05
	(0.006)***	(0.005)***	(0.006)***
NCR	-0.001		
	(0.693)		
Ogage	-0.707	-0.080	-0.079
	(0.025)**	(0.036)**	(0.021)**
Lev	-0.008	-0.008	
	(0.413)	(0.411)	
FemaleMD	-0.013		
	(0.671)		
Constant	0.244	0.331	0.335
	(0.730)	(0.620)	(0.614)
Observations	570	570	
R-squared	0.51	0.51	0.52
Breusch-Pagan Lagrange multiplier (LM) test	0.000	0.000	0.000
Breusch-Pagan/Cook-Weisberg	0.104	0.104	0.104
Durbin-Wu-Hausman	0.080	0.080	0.080
Breusch-Pagan Lagrange multiplier (LM) test	0.001	0.001	0.001

Robust standard errors are reported in parentheses. *p<0.10, **p<0.05 and ***p<0.01.

5. Conclusions

The results reveal significant understandings of the relationship between CSR spending and the performance of WSSAs. In particular, corporate social responsibility spending has a significant influence on the increase in revenue collection efficiency and the reduction of non-revenue water.

In relation to RCE, our findings indicate that CSR spending increases the revenue collection efficiency of WSSAs. This finding shows the importance of considering the interests of stakeholders in organisations' strategies, whereby CSR involvement strengthens relationships with customers, employees, regulators, and communities, which helps to foster cooperation and support. An increase in relationships creates a sense of ownership and loyalty, whereby customers and other users of water services feel an obligation to pay their bills without pushing, leading to reduced operating costs for WSSAs while increasing revenue collection.

Reducing non-revenue water is fundamental for the success of WSSAs. CSR spending has a significant influence on the reduction of NRW. Thus, WSSAs that spend their funds on CSR activities create strong positive relationships with communities and employees who eventually support water authorities in their efforts to reduce water losses (non-revenue water) and promote good water management practices. Furthermore, our study highlights the importance of enhanced water connections for many customers. WSSAs with a larger number of water connections have more resources and are better positioned to effectively implement CSR initiatives, leading to a substantial positive performance in terms of revenue collection efficiency.

An increase in employees who are motivated and committed may results in reduced non-revenue water and, hence, good performance. However, the efforts to reduce non-revenue water are somehow turned down by the infrequent replacement and repair of water infrastructure by some old WSSAs. Most old WSSAs in Tanzania do not regularly replace or maintain their water infrastructure, leading to increased non-revenue water and lower performance.

This paper offers three important policy implications: Firstly, policymakers should recognise that addressing non-revenue water is a critical aspect of water management. Thus, encouraging CSR spending and promoting socially responsible practices within water utilities can effectively mitigate non-revenue water issues, thereby enhancing overall organisational performance. Secondly, WSSAs should enhance CSR spending culture to build strong relationships with communities, customers, and employees to foster positive performance. Lastly, WSSAs should implant a policy that requires frequently replacement and repair of water infrastructure so as to reduce non-revenue water.

This paper contributes to the existing literature on the effect of CSR spending on the performance of firms. It builds upon the work of previous researchers, adding to in-depth and contextual understanding on how CSR spending enhances revenue collection efficiency and reduces non-revenue water in WSSAs.

Future studies could explore several avenues. Investigating the nuances of CSR practices and their specific impact on different dimensions of WSSAs performance would provide deeper insights. Additionally, understanding the interplay between CSR spending, organisational culture, and employee engagement could shed light on how these factors collectively influence performance outcomes. Exploring the role of technology and innovation in optimising water management and the potential linkages with CSR initiatives is another promising area. Lastly, cross-national studies could be employed to identify contextual factors that affect the relationship between CSR spending and performance across diverse regions. Lastly, a longitudinal analysis could provide insights into the sustainability of the observed performance improvements over time.

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