THE INFLUENCE OF CORPORATE GOVERNANCE PRACTICES ON PUBLIC SECTOR SUSTAINABLE DEVELOPMENT: A DEVELOPING ECONOMY STUDY

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Abstract

The study examines the relationship between corporate governance practices (CGPs) on the public sector's investment in water management (IWM). The critical question addressed in the paper was how good CGPs can provide a vehicle for increasing IWM in the context of local government. The need for addressing an underinvestment gap in local government is necessitated by the surge in poor CGPs that continue to constrain efforts to attract and manage water sector investments (WSIs) (Jacobs, 2019). The study employed secondary data (2009–2019) concerning a sample of eight South African metropolitan municipalities (SAMMs) collected from the annual reports. The multivariate regression analysis is employed using the pooled ordinary least squares (POLS) and feasible generalised least squares (FGLS) models. The results revealed that gender equity and external audit outcomes had a positive and significant relationship with IWM except for human resources which shows an insignificant effect. The results have important implications for water service authorities (WSAs), the public sector, and policymakers to incorporate good CGPs for improved management of water investments to eliminate water provisioning challenges. The research findings acknowledge the degree of adherence to good CGPs requires endless attention. Future studies should focus on ensuring local municipalities comply with the existing water provisioning governance framework to eliminate shortfalls in IWM.

Keywords: Investment, Governance, Sustainable Development, Water, Sustainability

1. INTRODUCTION

Globally, interest in corporate governance attracts attention in emerging economies due to a lack of transparency and accountability. The influence of corporate governance practices (CGPs) on the management of water sector investments (WSIs) remains a contentious issue in sustainable development discourses. Adhering to good CGPs remains a pillar of maintaining accountability and transparency in the public sector for improved governance of state resources (Kamau, Boiywo, & Kiprop, 2018). For water service authorities (WSAs) to effectively deliver water services to their citizens, investments in water management (IWM) are key to ensuring the maintenance and development of sustainable water infrastructure (SWI). The governance of water provisioning, particularly in developing countries consistently remains under threat because of a lack of funding, and this has undermined the efforts to achieve the sixth sustainable development goal (SDG 6) (African Capacity Building Foundation, 2016). The surge in an underinvestment gap is against increasing IWM. Thus, raising many questions about CGPs. Effective leadership and a good governance framework are pertinent to overcoming water service delivery challenges (WSDCs) (Hlongwane, 2018). Questionable CGPs persistently raise debate about attracting WSIs (Mercer Investment Consulting LLC, 2018). Continuous efforts on CGPs may be a strategic move to attract WSIs for improved water service delivery.

In the context of water and sanitation provision, good CGPs cannot be isolated. For WSAs to provide quality water services, good CGPs remain the focus to ensure adequate IWM. In South Africa, the State funds water and sanitation services through the local government equitable share (LGES) programme. Capital expenditure is financed through the basic services components of the municipal infrastructure grant (Republic of South Africa, Department of Treasury, 2019). Despite the State's effort to address WDSCs through increasing IWM, poor CGPs continue to derail these efforts. The Institute of Internal Auditors of South Africa (2020) reported that South Africa's country governance index score for 2020 and 2019 is 2.8 and 2.9, respectively. Even though the decrease is slight (3.6%), the financial consequences could be severe and thus calling for action to fight corruption for improved service delivery. Given the state of CGPs in the public sector, many factors, including compliance with internal controls, quality of human resources, lack of transparency, and accountability continue to attract attention in WSIs discourses. Amid poor performance, pressure is growing for municipalities in South Africa to adhere to good CGPs as envisaged in the Municipal Finance Management Act 56 of 2003 (MFMA) and the King IV report (Institute of Directors in Southern Africa [IDSA], 2016). Therefore, investigating the specific influence of CGPs on IWM provides an impetus for improving the corporate governance framework guiding WSAs in the public sector.

The influence of CGPs on municipal performance cannot be underestimated, as various studies confirmed this relationship (Cabaleiro-Casal & Buch-Gómez, 2020; Bishu & Heckler, 2021). The CGPs/municipal performance debate acknowledged the existence of poor financial management, asset management, and service delivery (Motubaste, Ngwakwe, & Sebola, 2017; Ndlela & Sibanda, 2018; Jacobs, 2019). However, none of the studies focused on the influence of CGPs on IWM in South African metropolitan municipalities (SAMMs). Studies done outside South Africa established that various measures of CGPs such as gender equity (Araujo & Tejedo-Romero, 2018), external audit outcomes (Kamau et al., 2018; Pamungkas, Ibtida, & Avrian, 2018), quality of human resources (Rocha, Orellano, & Bugarin, 2018) have had a strong link with performance in the public sector. The researchers lacked knowledge of any study that used an aggregated set of CGPs measures to measure their impacts on IWM. This study has pioneered a new approach within the water management discourses to address poor CGPs that are assumed to hamper efforts to deal with the long-standing water sector underinvestment gap in selected SAMMs.

This paper aims to address the research gap by seeking an understanding as to why underinvestment in the water sector remains an issue and not by giving empirical attention to various CGPs that have given rise to corruption, nepotism, cadre deployment and a lack of transparency and accountability (Jacobs, 2019). The study endeavours to find an answer relating to how CGPs influence IWM in the SAMMs. The paper focuses on addressing the following three objectives: 1) determining the relationship between the quality of human resources and the extent of IWM; 2) investigating the link between external audit outcomes and the extent of IWM; 3) examining the nexus between gender and the extent of IWM. To achieve these objectives, the paper employs panel data analysis techniques to establish the nexus between CGPs and IWM in the SAMMs. The study results inspire policymakers and WSAs to improve the current water governance framework in order to root out poor CGPs in municipalities and to improve the management of WSIs.

The remainder of this paper is structured as follows. Section 2 reviews the relevant literature. Section 3 analyses the methodology that has been used to conduct empirical research on the relationship between corporate governance practices and investment in water management. Section 4 and Section 5 presents and discusses the main findings of the study, respectively. Lastly, Section 6 provides the conclusion of the study.

2. LITERATURE REVIEW

This section presents a discussion on stewardship theory, corporate governance, conceptualisation, and hypotheses development relating to CGPs (quality of human resources, external audits outcomes, and gender representation in the municipal management structures) and the performance of municipalities.

2.1. Stewardship theory

The Constitution of South Africa stipulates that Municipalities must provide basic services such as water and sanitation to the citizens of the country with no compromise. Hence, the stewardship theory is relevant in addressing the corporate governance/

IWM debate. Stewardship implies that the local government must provide services efficiently and effectively to the client's satisfaction (Hlongwne, 2018). The top management in the local government sphere work as stewards, and link municipalities and people at the grassroots level. Political appointees such as mayors and councillors have the power and authority to control the delivery of basic services in the areas of their jurisdiction. They are responsible to stakeholders to practice good stewardship in the governance of state-owned water infrastructure. To ensure that the stewardship theory provides a yardstick for maintaining accountability and transparency, the government provides a framework by following the *"King Report on Governance for South Africa"* (King III) (Institute of Directors in Southern Africa [IDSA], 2009) and the Municipal Finance Management Act 56 of 2003. CGPs also follow Section 4(1) of the Public Audit Act 25 of 2004, which stipulates that the Auditor General has the power to audit and report on the accounts, financial statements, and management of all institutions that are listed as per Section 4(1) of the Public Audit Act including municipalities (Sambo, 2019). Concerning the framework guiding CGPs in local government, political agents like mayors and councillors must demonstrate due diligence in line with their duties to please their principal political parties. Thus, to understand the corporate governance/water management debate, the stewardship theory provides deep insights into the political appointees' conduct concerning expected CGPs for improved IWM.

2.2. Corporate governance

Corporate governance in the public sector is an evolving narrative, particularly within the institutions that provide basic services (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2015). Despite an existing coherent governance framework to guide the African countries' public sector entities to achieve better performance, Jacobs (2019) reiterate that maladministration, corruption, and poor leadership remain the enemy of progress in the public sector. The King IV report on corporate governance framework continues to influence South African municipalities to make progress in adopting good CGPs (IDSA, 2016). Good CGPs are composed of governance principles that assist an organisation in fulfilling legal and ethical requirements congruent with the agenda of sustainable development (Dzingai & Fakoya, 2017). According to the United Nations (UN, 2018) report on water and sanitation, good corporate governance relates to many elements, including explicit effectiveness in service delivery, openness, transparency, public participation, engagement, and responsiveness to dynamics in water demand management. In the context of South Africa's local government entities, CGPs linked to compliance with the MFMA (as prescribed by the Auditor General) promote good governance by enforcing public sector entities like local governments to comply with regulations and norms when dealing with financial management matters (Nelson, 2016). An effective corporate governance model in the local government ensures the effectiveness of sustainable water management and IWM to meet objectives relating to the provision of water and sanitation services in cities.

2.3. Conceptualization and hypotheses development

According to the literature concerning determinants of IWM, CGPs measures, including quality of human resources, gender equity, and external audit outcomes influenced the extent of IWM and consequently the performance in the delivery of water services (Figure 1).

Figure 1. Conceptual model
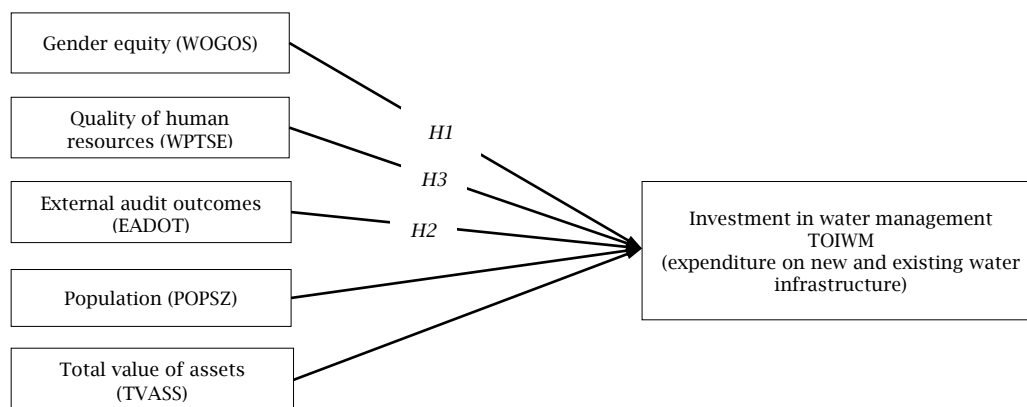
Source: Authors' elaboration.

In the following subsections, the hypotheses regarding the relationship between CGPs (quality of human resources, gender equity, and external audit outcomes) and IWM are developed and supported.

CGPs are composed of principles that promote transparency and accountability to achieve organisational goals. The quality of human resources as a dimension of corporate governance is a determinant factor in defining the performance of public sector entities. In pursuit of understanding the linkage between the quality of human resources and the performance of municipalities. Rocha et al. (2018) analysed the relationship between a mayor's private and public finance. They found that educated mayors tend to spend less on private expenditures. As a result, more funds tend to be

spent on providing social services to improve the performance of public entities to ensure that the government injects more funds in the form of conditional grants. To support the same results, Tuffour, Amoako, and Amartey (2020) assessed the effect of financial literacy among managers on small business performance. The data were analysed using structural equation modelling that reveals financial literacy (awareness, attitude, and knowledge) has had a significant positive influence on both non-financial and financial performance. However, individual characteristics such as age, educational level, and experience did not influence financial performance. In Brazil, Marino, Chaves, and dos Santos Junior (2018) investigated the municipalities' technical capacity to implement solid waste management. The study analysed three indicators for human resources, namely the education level of the manager, professional qualification level, and multidisciplinary, and the results suggest that bigger municipalities proved to have the capacity, unlike some smaller municipalities.

Anwar and Abdullah (2021), in their study, examined the impacts of human resources management practices on the organisation's performance. The study results established that all human management practices, including incentives, employee training, selective hiring, and job security have had a negative association with organisational performance except decentralisation. This implies that the organisation's decision to alter the structure of the decision-making from centralised to decentralise proved to be a good idea, as evidenced by increased productivity. Human resources practices encompass the motivation of employees which generally leads to increased organisational performance. Druskienė and Šarkiūnaitė (2018) analysed the motivational incentives of civil servants in Lithuanian municipalities. The results suggest that employees are motivated by providing monetary, moral, and political stimuli as well as increasing job satisfaction and responding to employees' grievances in time. Additionally, van der Kolk, van Veen-Dirks, and ter Bogt (2019) looked at the impact of management control on employee motivation and performance in the public sector. While the structural equation model results suggest that the use of personnel and cultural control has a positive association with intrinsic motivation, the use of result control has had a positive association with extrinsic motivation. Both extrinsic and intrinsic motivation positively influenced performance in the public sector.

In another study that utilised the Tobit regression model, Monkam (2014) analysed the local municipality's productive efficiency in South Africa. The results reveal that financial autonomy and the quality of human capital in management and administration influence the productive efficiency of the municipalities. However, poor governance issues such as poor financial management practices and corruption impair financial performance in municipalities leading to poor delivery of basic services (Jacobs, 2019). Given this scenario, gaining access to adequate private investments has become an unaccomplished task. Poor CGPs prevailing in municipalities range from inadequate planning, lack of resource management, and poor water demand management strategies have continued to impact

the level of investments in the water sector (Harding, 2017). Therefore, it is proposed that CGPs measured through the quality of human resources result in changes to the operations of municipalities. Thus, we hypothesise that:

H1: The quality of human resources significantly affects the extent of water investment management in local governments.

External audits serve as tools for monitoring the level of accountability by providing independent checks and verification on the financial statement prepared by the organisations (Pamungkas et al., 2018). Municipalities are public institutions that implement government policies that promote efficient service delivery to achieve socio-economic goals. To effectively apply public funds to municipalities, external audits are instrumental for improved financial management and accountability. However, municipalities struggle to achieve expected basic service delivery and financial performance. The impacts of audit outcomes continue to create debate around the narrative concerning the performance of organisations. In a study, Rahman, Meah, and Chaudhory (2019) examined the impacts of audit characteristics on firm performance. Through conducting multivariate regression analysis that utilised pooled ordinary least squares (POLS), the study found a significant and positive relationship between external audit quality and the audit committee responsible for companies' system of internal controls and compliance with the laws and regulations. To be consistent with the same results, Ayamga and Bagina (2019) evaluated the financial implications of the internal control system in the Kassena Nankana municipality. The results showed a strong relationship between the internal control system and organisational performance. If the internal control system is well monitored and evaluated from time to time, the probability of obtaining clean audit report increases. Pamungkas et al. (2018) examined factors that influence audit opinion of the Indonesian municipal governments' financial statements. The study was based on 182 municipal government financial statements covering the period 2015 and 2016 and found that non-compliance with regulation resulted in regional losses which are measured in the money, security, and goods owned by the state (Pamungkas et al., 2018). This implies that non-conformance with Government Accounting standards has hurt audit opinion resulting in influencing investors negatively. In terms of the quality of the audit, Donatella, Haraldsson, and Tagesson (2019) studied the relationship between the audit firm and audit cost/fee and earning management in Swedish municipalities. The results from the study indicate that the probability of earning management increased as audit costs/fees increased. Further, the study suggests that audit quality directly influences the probability of earning management

In Kenya, Kamau et al. (2018) studied the impacts of external audit outcomes on financial performance in the public sector. Inferential statistics from the regression analysis results revealed a positive nexus between external audit outcomes and financial performance. Likewise, Sambo (2019) analysed the link between audit outcomes and service delivery in the local

government sphere in South Africa. Concerning the results from the study, municipalities that have received fewer unqualified audit reports spent money on irregular expenditure resulting in poor service delivery challenges that triggered service delivery protests. A questionnaire survey administered study concerning a South African municipality revealed that municipal employees consented that qualified audit findings harm the operations of the municipality (Ndlela & Sibanda, 2018). Craig (2017) found a weak positive relationship between clean audits and service delivery in a study conducted in South Africa. However, overall the study results established that audit outcomes are not strongly related to municipal operational performance. Motubatse et al. (2017) examined the effect of governance on clean audits in South African municipalities. Concerning the results from the panel data analysis technique employed, financial management and leadership have a significant relationship with clean audits obtained by municipalities at the end of the audit process. It is, therefore, difficult for municipalities to attract enough investments if they cannot manage their affairs. We, therefore, expect external audit outcomes to have an influence on the IWM/performance of municipalities and suggest the following hypothesis:

H2: There is a significant relationship between external audit outcomes and the extent of water investment management in local government.

Corporate governance issues in public and private sectors and gender inequity are fundamental dimensions of socio-economic transformation. Admittedly, gender parity is undeniably and perpetually the most topical issue in socio-political and socio-economic spectrums. Admittedly, Mamogale and Masehela's (2014) study on women's participation and representation in the South African legislature confirmed that women within the government structures increased drastically. However, women are still underrepresented. Studies on women in leadership continue to attract attention, Bishu and Heckler's (2021) study established that women leaders within the local government structures challenge their male counterparts by doing masculine-gender work to create more opportunities for women to join local government entities. To confirm the effects of women on the performance of local municipalities', Hernández-Nicolás, Martín-Ugedo, and Mínguez-Vera (2018) examined the nexus between the gender of mayors and budget items in the Spanish local government. The result of the study suggests that the presentation and participation of women in local government helped to improve the economic situation of the citizens by increasing the budget for security, protection, and social expenditure. In a study that aimed to promote gender diversity, Opstrup and Villadsen's (2015) study looked at gender diversity in the top management team and financial performance and established that diversity in management can result in a positive asset for an organisation due to the diverse knowledge and skills set that all parties bring to the table. According to the study, diversity in the high-level management within the ranks of municipalities is associated with higher performance, provided a cross-functional teamwork framework is in place. Contradictorily, Cabaleiro-Casal and Buch-Gómez

(2020) found different results that confirmed that women elected officials such as Councillors and Mayors tend to create budgetary imbalances that compromise the performance of municipalities in Spain. Likewise, Ionascu, Ionascu, Sacarin, and Minu (2018) studied business cases for women on the boards of companies in the European emerging market. The results confirm that gender diversity variables have no significant effects on firm performance.

Suzuki and Avellaneda (2018), after examining women and risk-taking behaviour in local public finance, found that female representatives elected mayors and legislatures as well as appointed administrative managers, proved to have a positive association with risk-averse behaviour in financial decisions. As such women representatives in public corporations are negatively associated with issuing municipal bonds. Conclusively, the study established that female representation has no effect on local financial decisions. Leung, Sharma, Adithipyangkul, and Hosie (2020) investigated gender equity and public health outcomes during the pick of COVID-19. The data from 210 countries suggests that women's role in managing public health cannot be taken for granted as the results strongly support the alternative hypothesis that supports a positive association between gender and public health expenditure. An increase in public health expenditure showed a significant impact on the number of diagnosed and critical cases. Galizzi, Bassani, and Cattaneo (2018) evaluated the adoption of gender-responsive budgeting by the Italian municipality. They adopted an interpretative approach and found that when gender-responsive budgeting is fully developing, with all the stakeholder involved, the public decision-making process becomes effective and contribute to greater incisiveness in the local government management process. And this turn leads to better service delivery. Tommaso, Pastore, and Andriolo (2019) analysed strategic governance and gender budgeting of local governance in Italy. The findings suggest that gender budgeting promotes accountability and transparency in the local government. The study further points out that gender report plays a vital role in the improvement of governance because it advances the narrative of self-evaluation resulting in increasing effectiveness in administering local government affairs. The results imply that increasing effectiveness in governance is a propensity for improvement in local government performance

While transparency and accountability are central to the stewardship theory, Araujo and Tejedo-Romero (2018) admitted that women's participation in the Spanish municipality has given rise to better transparency, communication, accountability, and information symmetry. In support of previous study results, therefore, there is a need to restructure management boards to accommodate more women as most developing countries experience hardships in fetching water from various sources. The presence of women on public entity boards is likely to influence the management of SWI and WSIs. Accordingly, we propose the following hypothesis:

H3: There is a significant relationship between gender equity and the extent of water investment management in local government.

3. RESEARCH METHODOLOGY

Local government in South Africa consists of three levels, namely national, provisional and municipal government. The study uses municipal governments as the sample which share a similar characteristic. Within the local governments, there are three categories which are as follows: category A (metropolitan municipalities), category B (district municipalities), and category C (local municipalities). The study employs a sample of eight municipalities (that fall in category A) in South Africa out of a population of 278. The choice of metropolitan municipalities is due to their ability to exercise constitutional powers to execute all the functions of the local government for the city. Additionally, metro councils generate more than 70% of the revenue from fiscal activities. As such, they have the autonomy to make decisions concerning the application of funds generated within their fiscal space, amongst which are decisions concerning the management of WSIs.

A correlational research design was employed as it establishes the relationship between variables and the extent of the relationship. Following Maleka, Nyirenda, and Fakoya (2017), the study adopted a correlational research design to examine relationships. The historical secondary data spanning from 2009 to 2019 gathered through a content analysis approach involving scrutinizing the annual reports of eight SAMMs was employed. The library information obtained from the municipal barometer, metropolitan municipality websites, the National Treasury, and the South African Cities Network provided reliable data sources. The available data in the information library is reliable and valid, as CGPs in the local government entities align with the *"King Report on Governance for South Africa"* (King III) (IDSA, 2009). The Local Government MFMA compels South African municipalities to comply with rigorous annual auditing regulations.

The study used quantitative data to analyse the relationship between CGPs and IWM in the SAMMs. Furthermore, the study employed the pooled ordinary least squares (POLS) and feasible generalised least squares (FGLS) models to examine the relationship.

The regression equation adopted by the study is as follows:

$$TOIWM_{it} = \alpha_i + \beta WPSTE_{it1} + \beta WOGOS_{it2} + \beta EADOT_{it3} + \beta POPSZ_{it5} + \beta TVASS_{it6} + \varepsilon_i \qquad (1)$$

where:
$TOIWM_{it}$ = Total investment in water management (ZAR);
α_i = Intercept;
β = Slope;
$WPSTE_{it1}$ = Water professionals and technically skilled employees;
$\beta WOGOS_{it2}$ = Number of women managers and councilors;
$\beta EADOT_{it3}$ = External audit outcome;
$\beta POPSZ_{it5}$ = Population size;
$\beta TVASS_{it6}$ = Total value of assets;
ε_i = Error term.

It should be noted that *TOIWM*, *POPSZ*, and *TVASS* are given in their natural logarithm form.

The total investment in water management (*TOIWM*) is a dependent variable. *TOIWM* is the sum expenditure of maintenance of water assets and capital expenditure on new water assets (*CENWI*). The study utilised CGPs as an independent variable measured through three dimensions. Firstly, water professionals and technically skilled employees (*WPSTE*) represented the quality of human resources. Secondly, following Araujo and Tejedo-Romero (2018), gender representation is measured through the number of women managers and councillors (*WOGOS*) serving in municipal councils represented as a measure of corporate governance. Thirdly, external audit outcomes (*EADOT*) were measured using a Likert scale. The five-point Likert scale used allowed for the categorisation of external audit outcomes as follows: 5 scores — an unqualified audit report with no findings; 4 scores — an unqualified audit report with findings; 3 scores — a qualified audit report; 2 scores — an adverse audit opinion and 1 score — disclaimer audit opinion and outstanding audit report.

This study employs only two control variables to mitigate potentially omitted variable bias, namely population size and the total value of assets to the regression models. Population size plays a crucial role in influencing the cost of service delivery, as established in various studies (Seroa da Motta & Moreira, 2006; Kleynhans & Coetzee, 2019). Additionally, the municipalities receive government grants based on the size of the population. As such, population size determines the IWM. Further, the total value of assets represents an essential dimension of the confounding variables, as indicated in the literature (Nyirenda, Ngwakwe, & Ambe, 2013). In the case of municipalities, the firm size determines the scale of operation, which is linked to expenditure and capability to generate adequate revenue. Hence, controlling for the effects of firm size on IWM help to account for potential spuriousness in the regression model.

3.1. Panel data estimators

To examine the relationship between CGPs and IWM, the study employs two-panel data estimators, POLS and FGLS.

POLS regression model allows the researcher to gather small-to-big sets of data that are assumed have the same characteristics. POLS regression model ignores individual-specific effects, and thus regression estimators are normally biased in the presence of serial correlation (Nakale, Coetse, Arashi, & Bekker, 2013). According to Howie and Kleczyk (2007), in the absence of cross-sectional differences, data can be pooled across time series and cross-sections and perform the ordinary least squares (OLS) regression model. However, failure to observe regression assumptions in the panel data before performing the OLS model means that inconsistent estimators are likely to be produced resulting in compromising the reliability of the results (Adeboye & Agunbiade, 2017). To ensure the adequacy of the models, as it was done in the previous studies (Tembo, 2018), certain assumptions were made, mainly to achieve internal validity. Therefore, Tembo (2018) stresses that OLS

results are unbiased when the following regression assumptions are met: homoscedasticity, lack of multicollinearity, and no serial correlation.

Generalised least squares (GLS) is one of the panel data models which has long been in use in econometrics and is known for producing a more efficient estimator (Hahn, Hausman, & Kuersteiner, 2004). Nakale et al. (2013) propose that GLS is a generalised OLS technique that is the best linear unbiased estimator, particularly when the serial correlation coefficient is known. If the covariance matrix is unknown and needs to be estimated, the GLS estimator is not feasible, but the commonly used estimator is FGLS (Hahn et al., 2004). Unlike in an FGSL model, the presence of serial correlation and heteroscedastic errors, OLS-based inferences, leads to tests with distorted results. The FGLS regression model can simultaneously address the problem of cross-sectional, heteroscedasticity, and serial correlation. The researchers considered FGSL in examining the relationship between *TOIWM*

and IWM in SAMMs because of the model's strengths in circumventing violations of regression assumptions. Despite the advantages, the motive of choosing FGLS to examine the connection between CGPs and IWM in SAMMs was influenced by the extensive application in various empirical studies (Philippe & Durand, 2011; Miller & Startz, 2018). Lastly, for this study, the FGLS estimator was applied alongside OLS to ensure the robustness of the results.

4. RESULTS

4.1. Descriptive statistics

The descriptive statistics of all the variables used in the study are shown in Table 1. *TOIWM* variable showed a mean (R522m), which was smaller than the standard deviation (R435m).

Table 1. Descriptive statistics

Variables	Mean	Max	Min	Std. Dev.	Obs.
Total investment in water management (*TOIWM*)	R522m	R2,34b	R21m	R435m	88
Total value of assets (*TVASS*)	R38b	R95,4b	R3,5b	R22,2b	88
External audit outcomes (*EADOT*)	2.625	5	1	0.748	88
Number of women managers and councillors (*WOGOS*)	307.09	1410	39	330.89	88
Number of water professionals and technically skilled employees (*WPSTE*)	185.23	545	43	113.91	88
Population size (POPSZ)	2,6m	5,7m	0,7m	1,5m	88

The *WOGOS* data recorded a mean of 307.091, and the standard deviation was confirmed to be 330.89. However, if the variance is more than the mean, this implies a high variation in women's participation in the management of the metropolitan councils. The recorded maximum and minimum values are 1410 and 39, respectively. In the context of *WPSTE*, the maximum and minimum recorded were 545 and 43, respectively. The mean and the standard deviation of 185.239 and 113.929, respectively, were noted. The results concerning *WPSTE* imply that a low coefficient of variation across the municipalities existed.

4.2. Correlation matrix

As seen in Table 2, positive and significant correlations exist between *TOIWM* and the majority of the independent variables, including *WOGOS*, *WPSTE,* and *EADOT*. A weak and positive (0.011) relationship existed between *TOWIM* and *EADOT*. While the correlation between *WOGOS* and most of the variables proved to have a positive but significant correlation, *WPSTE* showed a positive and weak relationship (0.161).

WPSTE was positively correlated with all the variables. Furthermore, the study conducted multicollinearity tests to determine the aggregated collinearity of all independent variables.

Table 2. Correlation matrix

	TOIWM	WOGOS	WPTSE	EADOT	POPSZ	TVASS
TOIWM	1.0000					
WOGOS	0.00127***	1				
WPTSE	0.00309***	0.161	1			
EADOT	0.679***	0.00068**	0.00317***	1		
POPSZ	0.929***	305.9***	86.37***	0.684***	1	
TVASS	0.970***	355.4***	335.4***	0.652***	0.917***	1

*Note: *** p < 0.001, ** p < 0.05, * p < 0.01. The smaller the probability value (as represented by three asterisks), the stronger the significance of the relationship.*

4.3. Multicollinearity

Multicollinearity occurs when there is a strong relationship between the explanatory variables. The presence of multicollinearity is likely to lead to model misspecifications and biased results (Williams, Grajales, & Kurkiewiez, 2013). According to the results displayed in Table 3, the variance inflation factor is 3.72 which is below 10. Thus, implying that multicollinearity does not exist.

The use of the VIF threshold of 10 is in line with other empirical studies (Nyirenda et al., 2013).

Table 3. Multicollinearity

Variable	VIF	1/VIF
POPSZ	7.78	0.128537
LTVASS	5.42	0.184430
WOGOS	3.64	0.274584
EADOT	2.13	0.469540
WPTSE	1.89	0.528222
Mean VIF	3.72	

4.4. Normality

According to Osborne and Waters (2002), violation of the normality assumption in panel data leads to untrustworthy inferences due to underestimated regression estimation coefficients and distortion of the significance of relationships. As shown in Table 4, the regression assumption concerning normal distribution proved a non-violation.

Table 4. Skewness/Kurtosis tests for normality

Variable	Obs.	Pr(Skewness)	Pr(Kurtosis) adj.	chi²(2)	Prob>chi²
TOIWM	88	0.4027	0.8377	0.78	0.6746
EADOT	88	0.9479	0.8601	0.04	0.9825
WOGOS	88	0.0829	0.2888	4.29	0.1171
WPTSE	88	0.5676	0.8237	0.38	0.8251
POPSZ	88	0.0000	0.0000	30.41	0.0000
TVASS	88	0.8998	0.0267	4.89	0.0868

4.5. Heteroscedasticity

Homoscedasticity is one of the regression assumptions, which is unlikely to hold in the panel dataset. The absence of homoscedasticity in the dataset automatically implies that heteroscedasticity exists. Heteroscedasticity leads to inconsistent estimates of regression coefficients, which are inefficient and biased (Baltigate, 2008). Breusch-Pagan tests and White's test were conducted to confirm the existence of heteroscedasticity in the panel data. Both results suggest that *H1* cannot be rejected, as the p-value is greater than a significant level of 0.05. Therefore, the data is homoscedasticity, which is desirable (see Table 5).

Table 5. Heteroscedasticity

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity			
Ho: Constant variance			
Variables: fitted values of *LTOIWM*			
chi²(1) = 0.02			
Prob > chi² = 0.8750			
White's test for Ho: homoscedasticity			
against Ha: unrestricted heteroscedasticity			
chi²(27) = 32.02			
Prob > chi² = 0.2314			
Cameron & Trivedi's decomposition of the IM-test			
Source	chi²	df	p
Heteroskedasticity	32.02	27	0.2314
Skewness	5.01	6	0.5425
Kurtosis	1.15	1	0.2842
Total	38.17	34	0.2853

4.6. Panel data estimator results

The study employed POLS and FGLS models to evaluate the relationship between CGPs and IWM in South African municipalities. The researchers employed two different regression equations. The first equation excludes population size and the total value of assets (control variables) to establish how CGPs impact IWM. The second regression equation includes examining the relationship in the presence of control variables.

From Table 6, the interpretation of the results considers the regressors of coefficients and asterisks (*) to determine the direction (+/-) and significance of the relationship.

Table 6. Pooled ordinary least squares and feasible generalised least squares results

	Pooled ordinary least squares		Feasible generalised least squares	
	Excluding control variables	**Including control variables**	**Excluding control variables**	**Including control variables**
Dependent	*logTOIWM*	*logTOIWM*	*logTOIWM*	*logTOIWM*
Independent				
EADOT	0.482***	0.156	0.482***	0.156
	-3.93	-1.24	-4.02	-1.28
WOGOS	0.000897***	-0.000351	0.000897***	-0.000351
	-3.76	(-1.09)	-3.85	(-1.13)
WPTSE	0.00133	-0.000561	0.00133	-0.000561
	-1.74	(-0.72)	-1.79	(-0.74)
logPOPSZ		0.479*		0.479*
		-2.08		-2.16
logTVASS		0.582**		0.582**
		-2.7		-2.8
N	88	88	88	88

*Note: *** p < 0.001, ** p < 0.05, * p < 0.01. The smaller the probability value (as represented by three asterisks), the stronger the significance of the relationship.*

The results from both POLS and FGLS models report that there is a positive and significant relationship between *WOGOS* and *TOIWM*, as evidenced by a regression coefficient of 0.000897***. However, after incorporating two control variables in the regression equation, the result turned negative and insignificant, with a regression coefficient of -0.000351. The relationship between *WPSTE* and *IWM* showed a regression of coefficient of 0.00133, which demonstrates a positive and insignificant relationship. Inconsistent with positive results, after controlling for the effects of population size and the total value of assets, a negative and insignificant connection was produced and thus implying that both variables have a connection with *IWM*. On the same note, *EADOT* shows a positive but insignificant relationship with *IWM* as denoted by the regression coefficient of 0.482***. More interestingly, control variables only reduced the strength of the relationship but a positive direction if the nexus was maintained.

4.7. Hypotheses testing

The researchers accept the effects of the control variables but for the sake of determining the outcomes of the relationship, the first regression equation that excludes population size and the total value of assets provides the final results of the study. Figure 2 shows POLS and FGLS results, a positive and significant relationship between *WOGOS* existed, as shown by the regression coefficient of 0.000897***. Hence, *H1* is supported and cannot be rejected. *WPSTE* in the water department managed to influence *TOIWM* positively, but the extent of the relationship is insignificant.

Figure 2. Conceptual model results
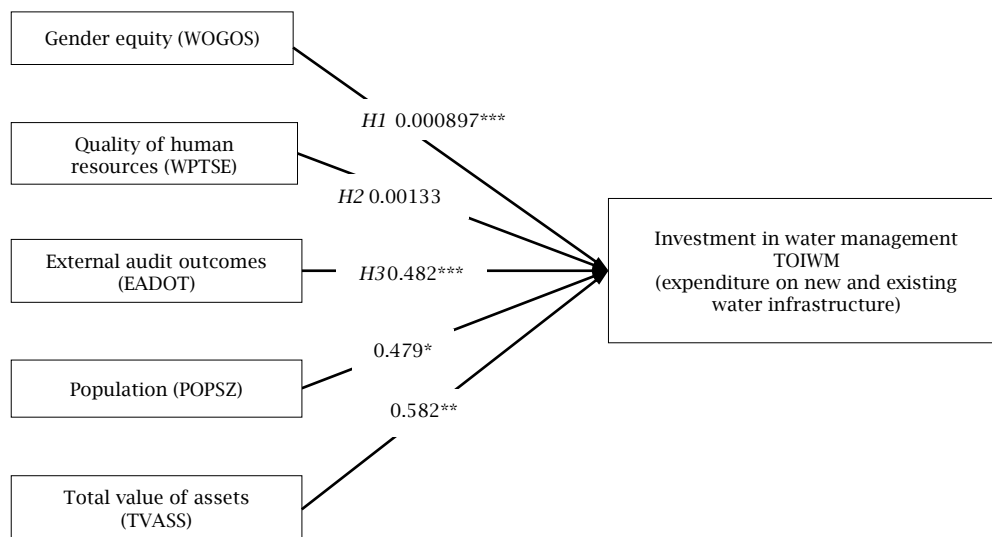
*Note: *** p < 0.001, ** p < 0.05, * p < 0.01. As shown in Table 6 and Figure 2 above, the outcomes from ordinary least squares (OLS) are not different from feasible generalised least squares (FGLS).*

On the same note, the results demonstrate that the relationship between *EADOT* and *IWM* is positive but significant (0.482***). Overall, the result confirms that the alternative hypotheses suggesting all corporate governance measures in question influence the extent of IWM.

5. DISCUSSION OF THE RESULTS

The study aimed to establish if CGPs influence IWM. The study employed data spanning 11 years (2009–2019) to analyse the relationship between CGPs and IWM in the SAMMs. The diagnostic tests performed, included the assumption of normal distribution, heteroscedasticity, and multicollinearity. The test results confirmed the adequacy of the econometric models to produce valid and reliable results. The study performed a regression equation analysis by adopting POLS and FGLS.

5.1. POLS and FGLS: The relationship between gender equality and the extent of water investment management in local governments

According to Table 6, the results revealed that a positive and significant relationship existed between women in management (*WOGOS*) and IWM. With the significant levels set at 0.01, 0.05, and 0.001, it is clear that the relationship is strong, as evidenced by the number of asterisks which are shown on the regression coefficient of 0.000897***. The results imply that changes to the number of female managers and councillors have had meaningful impacts on decisions concerning IWM. Therefore, the results suggest that an alternative hypothesis (*Ha*) cannot be rejected.

The results are consistence with prior researchers such as those who stated Galizzi et al. (2018) and Tommaso et al. (2019) who stated that gender-based budgeting promotes accountability and transparency in the local government as well as improves the decision-making process in the local municipality resulting in better performance. Furthermore, Araujo and Tejedo-Romero (2018)

emphasised that women's presence in municipal structures has given rise to better transparency, communication, accountability, and information symmetry in Spain. Despite other scholars agreeing with the results, Suzuki and Avellaneda (2018), established that female representation has no effects on local finance decisions, as most women are risk-averse when it comes to making financial decisions resulting in a negative attitude toward issuing the bond. Similarly, a negative relationship is in line with the study of Cabaleiro-Casal and Buch-Gómez (2020), who found that female politicians tend to worsen the performance of municipalities in Spain. Notwithstanding the arguments against women in leadership, the narrative of promoting gender equity in management remains atop the agenda in gender-based discourses. Based on the results, SAMMs' efforts toward gender transformation continue to yield positive results. However, fostering a skills capacity development programme to equip females with the right skills to manage local government affairs remains an indispensable theme in addressing service delivery issues.

5.2. POLS and FGLS: The relationship between quality of human resources and the extent of water investment management in local government

According to the results shown in Table 6, the number of professionally trained water experts (*WPTSE*) positively influenced IWM. Though the relationship is positive, as shown by the regression coefficient of 0.00133, the number of professionally trained water experts significantly failed to influence IWM. The fact that total investment in water management (*TOIWM*) responded positively implies that the hypothesis concerning the relationship between the two variables (*H1*) is well supported, hence it cannot be rejected.

Consistent with positive results in human resources and IWM are various scholars that supported that motivating employees results in increased productivity. Druskienė and Šarkiūnaitė (2018) found that providing moral, monetary, and increasing job satisfaction plays a role in improving the employees' motivation leading to increased productivity. In support of the same sentiments, van der Kolk et al. (2019) reiterate that the use of personnel, cultural and result control positively influences intrinsic and extrinsic motivation that in turn has positive impacts on performance in the public sector.

Regarding the dimension of education as a human resources practice, Rocha et al. (2018) found that educated mayors tend to spend less on their expenses, and more funds on service delivery improve the performance of municipalities to meet the conditions of government grants. However, Anwar and Abdullah's (2021) on the impacts of human resources management practices on organizational performance produced a neutral result, as incentives, employee training, selective hiring, and job security have an influential impact on organisational performance except for decentralisation.

Given the results, an increase in water serving in municipalities contributed positively to influencing investments in water management.

However, a lack of strong relationships suggests that human resources management practices require more attention, particularly hiring and retaining qualified water experts.

5.3. POLS and FGLS: The relationship between external audit outcomes and the extent of water investment management in local governments

External audits are monitoring tools to ensure accountability and transparency are achieved. The results in Table 6 show a positive regression coefficient of 0.482*** with three asterisks. The results demonstrate that a strong and positive relationship exists between external audit outcomes and total investment in water management in the SAMMs. A positive relationship suggests that changes to external audit outcomes automatically resulted in an increase of 48% in IWM. The statistical results imply the relationship between external audit outcome and water investment management, exists. Hence the alternative hypothesis (*Ha*) is accepted.

The existing positive relationship between external audits and water investment management followed results from previous literature. Kamau et al. (2018) confirmed a positive relationship between financial performance and independent audit outcome. Alluded to the same results, Motubatse et al. (2017) posit that financial management and leadership have a significant relationship in a study that examined the impacts of governance on clean audits in South African municipalities.

Compliance with municipalities exhibited through a positive influence on IWM improved organizational performance. Resonating with the study results, Pamungkas et al. (2018) established that non-compliance with government accounting standards by municipal governments resulted in regional losses, which are measured through assets, security, and money. Similarly, in a study by Sambo (2019), municipalities that received less qualified reports tend to overspend on irregular expenditures, resulting in poor service delivery. Despite a positive and significant relationship, the results imply that the extent of financial management and accountability in the local municipalities are impressive but more should be done to maintain the good governance trajectory in the water sector.

6. CONCLUSION

The study examined the relationship between CGPs and IWM in the SAMMs. The objectives of the study were achieved by employing a multivariate regression analysis that used POLS and FGLS to determine the link between GCPs and IWM. The results drawn from both POLS and FGLS confirm a positive relationship between CGPs and IWM exists. The rationale for conducting the study originated from, firstly, no previous studies regarding the influence of CGPs on IWM focused on SAMMs. Secondly, unlike this study that employed regression equation analysis, most studies utilised qualitative approaches. Therefore, this study sought to address an existing knowledge gap within the field of water investments. Additionally, the study significantly contributed to the corporate governance/water management debate, especially in developing countries like South Africa.

The stewardship theory adopted by the study gives insights into the responsibilities exercised by the municipal governors in discharging their corporate governance duties in creating stability in the water sector investment environment. The stewardship theory encourages local government officials entrusted with the responsibility to ensure that the desired levels of accountability and transparency are maintained in managing state resources. However, the study results suggest that municipalities recognized stewardship theory as a pillar of promoting CGPs as evidenced by the positive influence of the quality of human resources and external audit performance on water management.

The study adopted a quantitative approach to address the research objectives. Given the nature of the study objectives, the study utilised a causal research design to examine the relationship between CGPs and TOIWM. The quantitative data employed by the study were sourced from the information library composed of municipalities' websites, the South African Local government association, South Africa Cities Network, and the municipal barometer. The study used eight SAMMs because of their economic significance in South Africa. Furthermore, three measures of CGPs, namely quality of human resources, gender equity, and external audit outcome were employed. Additionally, two control variables, namely: population size and value of total assets are incorporated in the regression equation as control variables.

The results revealed that female managers and councillors had a significant and positive impact on IWM, implying that metro councils are treating the gender transformation narrative with urgency. Notwithstanding the efforts towards encouraging women to occupy management positions, more should be done to break the glass ceiling by providing training and education to women. On the same note, the quality of human resources as presented by water experts has had a positive and insignificant relationship with IWM. Although efforts have been made to attract and retain skilled employees in the municipalities, the study results provide adequate evidence concerning the skills gap that needs to be addressed to ensure significant and

positive impacts on the management of water investments. Moreover, external audit outcomes influenced IWM positively and insignificantly. The positive relationship suggests that municipalities need to intensify efforts in addressing corrupt activities ranging from poor recruitment practices to financial mismanagement. Additionally, the results confirm that municipal managers who are regarded as permanent employees of municipalities continue to ensure adherence to government accounting standards. Overall, the results demonstrate that CGPs in question have affected water management. Notwithstanding the positive and significant results involving gender equity and external audit outcomes, this suggests improvements to the current corporate governance framework to address IWM challenges that propel water delivery challenges, the human resources management practices.

Since the study pioneered to evaluate the relationship between CGPs and IWM, its contributions to the body of knowledge are pertinent to addressing water delivery challenges by influencing investments in the water sector. The findings provide insights into another dimension of addressing water investments and water delivery challenges, rather than over concentrating on increasing funding to improve the water delivery system. The study also creates opportunities for researchers focusing on water investments to make further research inquiries.

Concerning the limitations, this study focused on only eight out of 278 municipalities in South Africa, and, therefore, the study results can be generalised across the whole of South Africa under limited considerations. The study failed to capture all measures of CGPs because of data collection constraints. Hence, the corporate governance measures employed may present some limitations in providing conclusive results. Given the study limitations, the researchers encourage future studies to expand the CGP/IWM debate by increasing the sample size to include other districts and local municipalities. Also, consider more corporate governance measures and other latent variables to apply structural equation modelling for improved robust results.

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