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Financial Indicators of Sustainable and Financialised Municipal Water Infrastructure

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A B S T R A C T

Organisations that operate utility infrastructure, such as water and electricity, within the municipal context have choices to make in terms of their preferred business model. Such choices include their business goal, implementing agent, and market structure. This study focuses on two of the possible business goals, namely to deliver a 'sustainable service' or a 'financialised service', defining these terms and exploring the general characteristics of the types of organisations involved in each, such as ownership profiles and exposure to financial market instruments. The study then goes into detail for two relevant case studies, which are Joburg Water, South Africa as a sustainable service, and Thames Water Utilities, England, as a financialised service. It takes a closer look at ten specific financial indicators calculated from the 2021/22 financial statements of Joburg Water and Thames Water Utilities. The study concludes with a tentative proposal for the financial indicators of sustainable and financialised services.

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1. Introduction

As the world's population continues to grow at a higher rate than the resources and infrastructure available to governments, municipalities in particular are struggling with ways of delivering services at the required standards of quantity and quality. Some of these are infrastructure-based services, such as water and electricity, which directly impact the quality of citizens' lives.

This study explores the financial indicators associated with the 'sustainable' and 'financialised' models of water and waste water infrastructure-related services, using Joburg Water, South Africa as a case study of sustainability and Thames Water Utilities, England, as a case study of financialisation. Using secondary data purposively extracted from the most recent annual reports and financial statements of these two organisations, this study uses ten common financial ratios to measure the four categories of revenue/profitability, spending/efficiency, debt servicing, and leverage for both water utilities.

Two main differences are observed, the first being the impact of financial costs, expenses, losses, and taxes on the differences between operating surplus/profit and net surplus/profit on the organisations' income statements, which is far higher for the financialised model, and results in differences in the revenue/profitability and spending/efficiency ratios which use these figures. The second difference is the impact of the value of various financial market instruments on the organisations' balance sheets, which again is far higher for the financialised model, and results in differences in the debt service and leverage ratios, which are calculated using these figures.

2. Municipal Infrastructure Business Model Choices

Amongst other spheres or levels of government, such as national/federal and also provincial/state government, local government is unique in that it generates, or has the potential and expectation to generate, its own revenue in order to fulfil its legislative obligations (Mbulawa, 2019), mostly from property rates and infrastructure-related services. From this perspective, the transactional nature of municipalities is thus more closely aligned to the nature and functions of state-owned companies or enterprises, rather than to the nature of administrative government departments (Nutt & Backoff, 1992).

Municipalities are faced with a number of choices that together can make up their own particular choice of 'business model' they prefer for the delivery of infrastructure-related services, such as water and electricity. At a basic level, these models include choices related to the three factors of business goal, implementing agent, and market structure as outlined in Table 1 below.

Table 1: Business model choices

Business goal:	Subsidised service	Sustainable service	Financialised service
Implementing agent:	Public agency	Private company	Public-private partnership
Market structure:	Monopoly	Oligopoly	Free market

(Source: Author)

Choices that may be made in terms of each of these factors, whether business goal, implementing agency, or market structure, are independent of one another. As such, a municipality could plan to attain the business model of 'a sustainable service, delivered through a public-private partnership, while retaining a monopoly', for example.

With specific regards to municipal infrastructure, the three basic business goals may be defined as follows:

a) **Subsidised service:** In cases where a particular municipality may have chosen the business goal of a subsidised service, then the infrastructure is developed, operated and maintained by the implementing agent for the purpose of delivering a public service to all who need it at the lowest possible cost, and, in some cases, for free to indigent households. In these cases, the infrastructure-related service is typically delivered at sub-cost recovery levels, resulting in financial losses for that specific service that are subsidised by general taxes;

b) **Sustainable service:** In cases where a particular municipality may have chosen the business goal of a sustainable service, then the infrastructure is developed, operated and maintained by the implementing agent, but income from the tariff structure associated with the sale of that particular service generates a modest surplus of income over expenditure for that specific service, and no subsidisation is needed. The implementing agent used to achieve this goal may be either the municipality (as a public service), or a private company (privatisation), or even a public-private partnership between the two. In cases where a private company is involved, then it is typically a company with credible experience in operating similar infrastructure. The rationale for including private companies is often for the municipality to access additional funding, and for the private company to improve on public sector inefficiencies, both of which contribute towards the goal of achieving a sustainable service (Hong, 2019); and

c) **Financialisation:** Finally, where a particular municipality may have chosen the business goal of a financialsed service, then this typically results in ownership of the infrastructure and its related service by 'investors', who in terms of their company history and profile have no apparent connection to the service being delivered, but who are attracted by financial profits, eg institutional investors, pension funds, and sovereign wealth funds. Financialisation is characterised by the company attracting investors by packaging the predictability of future revenue streams generated through largely monopolistic means (eg from households

paying their municipal bills for a utility service they cannot obtain elsewhere) and using these anticipated future revenue streams as security to raise new company debt through a financial process known as leverage (Grafe, 2019).

Even though the business model of 'subsidised service' is not included in the comparison in this study, it is not being omitted for the reason that it is unimportant, or a reflection of failure on the part of municipalities that adopt it. On the contrary, it takes impressive financial and general management skills to maintain a subsidised service, where the municipality is 'walking a tightrope' between the costs of the service, on the one hand, including the costs of complying with government, labour, and environmental regulations, as well as the unrecoverable costs of serving a certain portion of low income households, and, on the other hand, maintaining a trading deficit that is just covered by grants and other funding sources with very little margin for error. Even though municipalities may often offer infrastructure-related services in a monopolistic market, where they do not face direct competition from other service providers like in the private sector, they still need to be leanly structured and efficiently managed to be able to deliver a subsidised service year after year without collapsing (Ajam et al, 2021).

Furthermore, sometimes discussions of sustainability and financialisation tend to focus on the revenue side of the financial equation, ie from where, and how much, municipalities derive their income. However, both sustainability and financialisation also cover the expenditure side of the financial equation as well, with choices of how much to spend, on what, also being critical to the long-term financial health of municipalities (Gorina, 2013).

Just on a stylistic note, there are some differences in the terminology associated with the sustainable and financialised business models. The implementing agent in a sustainable model may be a municipality, a municipal entity, or a public-private partnership, which reports a 'surplus' in its income statement, and is not liable for any taxes due to its non-profit status. However, a financialised service is typically delivered by a company, and is expected to report on 'profit', and also to pay taxes due to its for-profit status. To simplify, this study refers to 'organisations' and to 'surplus/profit' in the income statement.

2.1 Sustainability

Following the lead of Canada's Public Sector Accounting Board, the broader concept of 'financial health' or 'financial condition' is understood to include three critical components of sustainability, flexibility, and vulnerability (AYO – York Region, 2018).

Within this paradigm, sustainability is seen as the ability to maintain the required standard of public service delivery while covering all obligations to creditors without increasing indebtedness or taxation/subsidisation levels (IPSASB, 2013; Bisogno et al, 2017; Mbulawa, 2019). Flexibility is understood as the ability to raise taxes, or increase debt, in order to meet serviced delivery demands if and when needed, and vulnerability is the extent to which a municipality is dependent on revenue sources outside of its direct control, such as grants and transfers from central government (AYO – York Region, 2018).

Municipal sustainability, in turn, is a complex concept, and includes, on the one hand, 'predictors' of sustainability, and then also 'indicators' of sustainability on the other.

2.1.1 Predictors of sustainability

Predictors of sustainability are often broader, non-financial social and economic factors typically grouped into three categories (or latent variables), which are structural factors, organisational factors, and then hybrid factors (Rodríguez-Bolívar et al, 2016).

a) **Structural factors** typically include indicators such as the geographical size of the municipality, the population size and density, the socio-economic profile of the citizens and their income levels, including the dependency ratio and unemployment rate, the nett human movement rate (eg local or regional immigration or emigration), the development and current state of commerce and industry in the area, and the allocation of government resources;

b) **Organizational factors**, in turn, usually focus on indicators such as the quality of the municipality's strategic and operational planning, the measurement and management of performance, the effectiveness of budget and risk management, transparency and the accountability of political leadership and senior officials; and

c) **Hybrid factors**, finally, are understood as indicators such as inter-governmental relationships between the national/federal, provincial/state, and municipal/ local levels or spheres of government, the relevant market structure (eg monopoly, oligopoly or free market), the state of the general economy, eg expressed through the GDP rate, the inflation rate, the quantification and transfer of subsidies, etc. (Carmeli, 2008; Rodríguez-Bolívar et al, 2016; Bisogno et al, 2017).

While these types of predictors are indeed widely perceived as being closely related to municipal sustainability, they are, of course, often 'external' factors outside the control of any municipality, with some of them, such as economic trends and health pandemics, even being global in nature (Lysiak et al, 2020).

2.1.2 Indicators of sustainability

Since sustainability is not a directly observable phenomenon, it also includes measurable 'indicators'. Indicators that have been proposed over time cover a wide range, whether in terms of geographical scale (eg global, national, and local), or focus (eg social, demographic, economic, and financial factors). Some studies have even proposed very niche indicators that are difficult to generalise, such as how municipalities finance their staff pension obligations (Gorina, 2013). As such, the differences in, and complexities of, the identification and measurement of sustainability indicators is a topic that has not yet reached maturity (Lysiak et al, 2020).

This study excludes a wide range of non-financial indicators, focusing only on the narrow set of financial indicators, within which, for example, the IPSASB (2013) suggests that sustainability is indicated by a combination of three factors, which are:

a) **Services** – to provide sufficient quantity of services so as to satisfy demand, while maintaining the required level of quality;

b) **Revenues** – to generate sufficient revenues through user tariffs and taxation-based subsidies to fully cover the costs of the services; and

c) **Debt** – to meet the obligations of current debt servicing commitments, at the least, and steadily reduce long-term debt so as not to saddle future generations with inherited debt, at best.

In fact, within the traditional mindset of sustainability, long-term debt has become commonly perceived as the variable which has the greatest negative impact on the financial health, and thus on the sustainability, of a municipality, leading to the conclusion that "any increase in the financial indebtedness of a municipality will have an adverse impact on serviced delivery" (Mbulawa, 2019: 8). This perception is tested by comparing a sustainable service to a financialised service, where an increase in long-term debt is an essential part of the latter's business model.

Occasionally, there is not a clear divide between predictors and indicators of sustainability, with some factors blurring the boundary line. One example of this is intergenerational integration, where long-term debt incurred by one generation is inherited by the next generation, who are saddled with the obligation of settling it, which in some cases even jeopardises the ability of the next generation to meet their own needs (Lucianelli et al, 2018).

2.1.3 Case Study of Sustainability: Joburg Water

The features or characteristics of an organisation that has the business goal of providing a sustainable water service can be observed at Joburg Water, based in Johannesburg, South Africa. In terms of its legal persona, Joburg Water is an 'entity' of the City of Joburg Metropolitan Municipality. It is officially known as 'Joburg Water State-Owned Company Limited (or JW SOC Ltd), and originally commenced business in January 2001. In this context, a municipal entity is a wholly owned subsidiary that operates in a manner similar to a private company, but within the context of a local monopoly and still within the same legislative framework governing the parent municipality.

In particular, this framework includes a series of three programmes by the South African national government, through its Department of Cooperative Governance and Traditional Affairs (COGTA), aimed at improving municipal sustainability through improved financial management. These three programmes are known as Project Consolidate (2004 – 2009), the Local Government Turnaround Strategy (2009 – 2014), and finally the Back to Basics Programme (2014 – 2018), but none of them achieved across-the-board success amongst the more than 250 municipalities in South Africa

(Mbulawa, 2019), thus elevating Joburg Water, which has achieved sustainability, into a worthy case study.

Joburg Water's primary functions are to provide water and sanitation (waste water) services to the residents of Johannesburg from the bulk Infrastructure through to the household level reticulation and metering. Joburg Water depends on its own revenue generation to survive, and in fact is expected to further generate a modest surplus that is 'swept' back to its parent municipality throughout the year (Joburg Water, 2023).

This is in keeping with Joburg Water's goal of providing a sustainable water service, which it describes in its 2022 financial statements as, "[Joburg Water] is a municipal entity wholly owned by the [City of Joburg Metropolitan Municipality] and is mandated to provide water and sanitation services to the residents of Johannesburg. [Joburg Water's] strategic objectives are linked to the Shareholder's priorities through the Service Delivery and Budget Implementation Plan, the Integrated Development Plan, and cluster plans … [Joburg Water's] business model is premised on the need to provide water and sanitation services while providing the Shareholder with a revenue stream" (Joburg Water, 2023: 27 and 42). This goal, together with the preceding features of Joburg Water, are typical of the common features within the 'sustainable' business model.

At the time its 2022 financial statements were published, Joburg Water employed about 2,800 staff operating ten network depots and six wastewater treatment plants. It supplied about 1,6 billion litres per day through a distribution network of about 12,400 kms, 129 reservoirs and water towers, and 37 pumping stations, reaching a client population of slightly over six million residents living in about 2 million households (Joburg Water, 2023).

Given that South Africa is a water-scarce country, the population of Joburg is growing at a faster rate than the population of the country as a whole (due mainly to urbanisation and immigration), the services of Joburg Water are dependent to a significant degree on the struggling electricity utility, Eskom, whose supply is outside of Joburg Water's control, and finally the impact of climate change, Joburg Water considers itself as operating within a stressful, but not yet distressed, context (Joburg Water, 2023).

2.2 Financialisation

While sustainability aims at covering costs and generating a modest surplus through its own revenue each year, a financialised service aims at maximising its revenues through a combination of selling infrastructure-related services and profiting from its use of debt, especially in the form of financial market instruments. Financialisation has been summarised as the "consolidation of urban infrastructure as a financial asset class, or more specifically the ability of financial intermediaries to extract value from illiquid assets by turning them into liquid forms" (Pryke & Allen, 2019: 1327).

It is generally recognised that O'Neill (2009) was one of the earliest to lay bare the techniques of infrastructure financialisation, when he investigated the methods used by the Australian bank, Macquarie, to acquire urban infrastructure and turn it into

"a set of financial products devised as highly liquid conduits for the capturing of recession-proof cash flows capable of being generated over long periods of time in accordance with the necessities and predictabilities of urban life" (2009: 175). The advances pioneered by Macquarie two decades ago have subsequently been widely copied and refined, with the securitisation of anticipated future revenue streams of basically recession-proof assets, the bundling and selling of such assets, the issuing of debt, the long-term management fees, the disposal of such assets during profitable market cycles, and the generation of fees at every stage in these processes, now being characteristic of modern infrastructure financialisation (Pryke & Allen, 2019).

Using the infrastructure related to public goods, such as water and electricity, for the business goal of providing a financialised service is not a value-free process, with people from a variety of ideological frameworks arguing about the morality of local monopolies on essential services, especially privately-owned monopolies, a view that services relating to basic human rights, such as access to water, should never be 'sold for profit', the worrisome impact that purely profit-driven owners may have on the environment and on poorer households. In addition, there are further concerns that financialisation brings with it increasingly shareholder-oriented corporate governance, as the focus shifts away from the public benefit value of infrastructure towards its exchange value, and substantial increases in borrowings becoming associated with a substantial increase in dividends to investors (Loftus & March, 2019).

In fact, some of the more vocal critics of financialisation point out that the concept of using anticipated future revenues from infrastructure-related services as security for leveraging finances is exactly the same concept of using anticipated future revenues from bundles of mortgage repayments as security for leveraging finances that caused the sub-prime mortgage crisis in the USA, which in turn caused the global 'great recession' of 2007 – 2008 (Grafe, 2020).

However, as much as the financialisation of municipal infrastructure may be associated with revenue and profit maximisation, this often takes place within a government-regulated context, and, in some cases, may be the only viable way of generating funds for good reasons, such as the large-scale redesign, retrofit and adaptation of infrastructure in the built environment to satisfy new environmental impact regulations, especially in an era of municipal austerity measures (Cousins & Hill, 2021).

For example, according to the United Nations, about 90% of natural disasters relate to, or impact on, water and waste water (UNISDR, 2015), at both extremes of floods on the one hand, and drought on the other. For example, hurricanes and tropical storms can easily overwhelm urban sewage and storm water infrastructure that was designed and constructed fifty years ago, causing flooding of raw sewage into communities' streets, natural waterways, and even into the drinking water system (BenDor et al, 2018). In areas where municipalities are barely coping to deliver all the necessary services to their communities at the required standards, the costs associated with the massive civil engineering works required to adapt the decades old infrastructure to new 'green infrastructure' that can capture, cleanse and store stormwater runoff, thereby turning it from a negative threat into a positive benefit, may

be overwhelming and unrealistic for the municipality and the communities it serves (Cousins & Hill, 2021).

In this study, the charging of water and waste water fees, and the use of development loans, are common methods of financing that are associated with sustainability. When these are insufficient, and a municipality needs to access additional sources of finance through the use of more sophisticated financial instruments, then this is characteristic of financialisation (Christophers, 2018). Such financial instruments may include:

d) **Private placements**, which is a method of raising capital by selling shares or stocks in a company , or other interest in a company such as warrants or bonds, through private, unregistered arrangements with a select pool of investors. Private placements are often regarded as an alternative to a public listing, or initial public offering (IPO), and are quicker, cheaper and less regulated than listing on a stock exchange, and also do not have similar public disclosure requirements. As such, private placements are popular and successful, with the US Securities Exchange Commission data for 2019 showing that private placements raised $1.5 trillion whereas registered public offerings raised $1.2 trillion that same year (FINRA, 2020);

e) **Bonds and green bonds,** which is where an organisation issues bonds on the bond market, in effect borrowing money that must be repaid with interest, to invest in revenue-generating infrastructure from which the value of the future returns of the new or upgraded infrastructure are expected to meet and exceed the value of the organisation's repayments;

f) **Tax increment financing,** which is where a municipality offers the value of future increments in its property rates and taxes (ie not tariffs associated with any particular service), whether in a defined portion or the whole of the municipal area, as security for leveraging access to finance; and

g) **Mitigation banking / credit trading,** which is where developers who wish to operate within the municipal boundaries can buy and sell 'credits' that allow them to offset the impacts that their development operations will have on existing infrastructure, the municipal budget, and especially on the environment (Cousins & Hill, 2021).

Rather than simply viewing the potential financial benefits arising from the use of such instruments as 'easy money', financialisation is actually associated with an increase in the risks to which an organisation is exposed, as it would then be carrying the original environmental risks plus now also the additional financial risks (Christophers, 2018).

As such, ideology aside, financialisation is a valid business goal for municipal infrastructure services, and has proceeded apace in some jurisdictions, with Thames Water Utilities Ltd, which supplies potable water and waste water treatment to the greater London metropolitan area and throughout parts of south-east England, having become well-known and worthy to feature in a case study (Allen & Pryke, 2013).

2.2.1 Case Study of Financialisation: Thames Water Utilities

Historically, Thames Water Utilities Ltd can trace its roots back to the New River Company, founded 1619. In 1904, nine water companies, all serving different parts of the fast-growing London metropolitan area, were merged into a new public company, the Metropolitan Water Board. In 1973, the Metropolitan Water Board was subsumed into the Thames Water Authority until 1989, when responsibilities for commercial shipping and environmental management were devolved to the National Rivers Authority. The water and waste water-related functions were privatised as Thames Water Utilities Ltd, which was listed on the London Stock Exchange and, by 1995, had become the world's third largest water company.

However, the UK government held a controlling interest during the first five years of privatisation, after which Thames Water Utilities Ltd was sold to RWE, a German utility company well-versed in infrastructure management. Five years later, Thames Water Utilities Ltd was sold again, this time to Kemble Water Holdings, a private equity consortium led by the Macquarie Group of Australia. Kemble created a new entity called Thames Water Utilities Finance plc, which, together with the original Thames Water Utilities Ltd was now held by Thames Water Utilities Holdings Ltd. Kemble Water Holdings then used the 'guaranteed' nature of the future revenue streams of its old subsidiary as security to enable the new subsidiary to raise new debt, with this new debt reaching about £8 billion by 2012, rapidly outpacing the holding company's equity. Attractive dividend payments, occasionally even exceeding profits, were financed in the same way, ie through borrowing against anticipated future returns.

These financial patterns soon started to attract the attention of financial giants, and now by 2023 Thames Water Utilities Holdings Ltd is about 32% owned by the Ontario Municipal Employees Retirement Scheme, 20% owned by the Universities Superannuation Scheme, 10% owned by a subsidiary of the Abu Dhabi Investment Authority, 9% owned by each of the British Columbia Investment Management Corporation, Hermes GPE of London, and the China Investment Corporation. Queensland Investment Corporation of Australia, Aquila GP Inc. of Canada, and the Stichting Pensioenfonds Zorg en Welzijn of Holland share ownership of the remaining 12.5% between them (Thames Water Utilities, 2023).

In its annual integrated report, Thames Water Utilities describes itself as, "Thames Water Utilities Limited is part of a group of companies owned by a consortium of institutional shareholders – mostly pension funds and sovereign wealth funds … The Group is part of a Whole Business Securitisation ("WBS") Group of companies … and [Thames Water Utilities Ltd] guarantees the funding activity of [Thames Water Utilities Finance plc], which raises debt finance in external debt markets through the issuance of secured bonds and the entry into loans (Thames Water Utilities, 2023: 77 and 166). This ownership structure, and the use of future income to leverage access to financial markets, is typical of a financialised infrastructure company.

Thames Water Utilities is the third largest water services provider in the world, employing around 7,000 staff, who provide about 2,5 billion litres of water each day to a client base of ten million customers. The vast majority of customers, ie nine million,

are within the high-density London metropolitan area, and around another 1 million customers throughout the remainder of its service area in south-east England. Thames Water Utilities manages 97 water treatment works and over 350 sewage treatment plants, as well as using its floating solar panel arrays, but mostly its own biomethane, to generate over 500 gigawatt hours of renewable energy per annum (Thames Water Utilities, 2023).

Thames Water Utilities is also operating within a context it experiences as stressful, including the impact of climate change, resulting specifically in large-scale flash flooding and sewer flooding in its area, spikes in energy prices, the impact of rising levels of inflation, the increasing costs of complying with environmental management regulations, and the UK's cost-of-living crisis impacting on customers' ability to pay (Thames Water Utilities, 2023).

2.3 Financial Indicators

As mentioned previously, since sustainability is not a directly observable phenomenon, it also includes measurable 'indicators' in the areas of service delivery, revenues and debt. Apart from defining the scope within which indicators will be identified and measured, eg demographic variables versus financial variables, there is the secondary issue of how such indicators should be measured, eg using qualitative or quantitative methods.

Qualitative methods hold the advantage of being more in-depth, and yielding potentially richer data, which in turn leads to a more complex and nuanced understanding of sustainability, while quantitative methods have the advantage of being based on public data, able to be calculated objectively and consistently, and allowing for measurements of, and comparisons between, larger samples of organisations (Lysiak et al, 2020).

In their review of a number of previous studies, Hong et al (2019) remark that it has become necessary to distinguish between the more important mandatory indicators of municipal sustainability, that are typically quantitative and can be calculated from readily available data, versus the additional indicators that add value to particular lines of research in certain contexts, which may be qualitative and explore deeper cause-and-effect relationships between various predictor factors and sustainability indicators.

In terms of scope, this study focuses on financial indicators, in particular in the two key areas identified by IPSASB (2013) as revenue and debt indicators, and it does so using quantitative methods. Revenue and debt have usually been measured through various combinations of financial ratios. Such combinations have remained reasonably consistent over time, such as the cash, budgetary, long-run and service-level solvency ratios put forward by Groves et al (1981), up to the short-run, service-level and budgetary solvency ratios proposed by Zafra et al (2009) nearly thirty years later. This consistency had led Bisogno et al (2017) to conclude that, "Although there is no consensus, spending, revenues and debt features are present in every definition of financial sustainability" (2017: 64).

Working within this established paradigm, and in a manner very similar to the four groups of eleven indicators used by Lysiak et al (2020: 53), this study uses four groups of ten financial indicators which are described in more detail below.

2.3.1 Revenue/Profitability Ratios

The first group of two financial ratios both focus on profitability, the first using net surplus/profit or loss for the year, and the second using operating surplus or profit.

a) **Profit margin ratio** – this is a profitability ratio that compares the net surplus/profit or loss for the year operating surplus/profit of the organisation to its total revenue. This ratio may be interpreted as showing the amount of money that the organisation retains as net profit out of each unit of currency that it generates in revenue. It is calculated as "Net surplus/profit or loss ÷ Total revenue" and the higher the ratio, the more profitable the organisation.

b) **Operating margin ratio** – this is a profitability ratio that compares the operating surplus/profit of the organisation to its total revenue. This ratio may be interpreted as showing the amount of money that the organisation retains as gross profit out of each unit of currency that it generates in revenue. It is calculated as "Operating surplus/profit ÷ Total revenue" and the higher the ratio, the more profitable the organisation (Brooks, 2021).

2.3.2 Spending/Efficiency Ratios

The second group of another two financial ratios both focus on efficiency, the first using net surplus/profit or loss for the year, and the second using operating surplus or profit.

a) **Return on assets ratio** – this is an efficiency ratio that compares the net surplus/profit of the organisation in relation to the value of its total assets. The ratio may be interpreted as showing the amount of money that the organisation generates as net surplus/profit for each unit of currency that it holds in asset value. It is calculated as "Net surplus ÷ Total assets" and the higher the ratio, the more efficient the organisation.

b) **Asset turnover ratio** – this is an efficiency ratio that compares the operating surplus/profit of the organisation in relation to the value of its total assets. The ratio may be interpreted as showing the amount of money that the organisation generates as operating surplus/profit for each unit of currency that it holds in asset value. It is calculated as "Operating surplus ÷ Total assets" and the higher the ratio, the more efficient the organisation (Brooks, 2021).

2.3.3 Debt service ratios

The third group of three financial ratios focuses on the degree to which an organisation can service its debt, including the associated financial costs, expenses, and losses.

a) **Interest coverage ratio** – this is a debt service ratio that compares the organisation's operating surplus/profit with the amount required to cover the organisation's finance-specific costs and losses. The ratio may be interpreted as showing the number of times that the money available to the organisation as operating surplus/profit may cover the organisation's finance-related costs and losses. It is calculated as "Operating surplus ÷ (Finance costs + Finance losses)" and the higher the ratio, the more comfortably the organisation can service its debt obligations.

b) **Short-term liquidity ratio** – this is a debt service ratio that compares the value of the organisation's current (less than 12 months) assets with the value of its current liabilities. The ratio may be interpreted as showing, if hypothetically the organisation was to convert all its current assets into cash, how far this cash could settle all the organisation's current liabilities. It is calculated as "Current assets ÷ Current liabilities" and the higher the ratio, the more comfortably the organisation can service its debt obligations.

c) **Long-term solvency ratio** – this is a debt service ratio that compares the value of the organisation's non-current (greater than 12 months) assets with the value of its non-current liabilities. The ratio may be interpreted as showing, if hypothetically the organisation was to convert all its non-current assets into cash, how far this cash could settle all the organisation's non-current liabilities. It is calculated as "Non-current assets ÷ Non-current liabilities" and the higher the ratio, the more comfortably the organisation can service its debt obligations (Brooks, 2021).

2.3.4 Leverage Ratios

The fourth and final group of financial ratios focuses on the degree to which an organisation is using financial leverage, ie using borrowed funds to acquire profitable assets.

a) **Debt to profit ratio** – this is a leverage ratio that compares the value of the organisation's net surplus/profit or loss with the value of its total current and non-current debt (eg borrowings and financial liabilities only, not including all other general liabilities). The ratio may be interpreted as showing, if hypothetically we ignore the time value of money, then how many years of profit are required to settle the organisation's debt. It is calculated as "Total debt ÷ Net surplus/profit or loss" and the lower the ratio, the less leveraged the organisation is.

b) **Debt to earnings ratio** – this is another leverage ratio that compares the value of the organisation's operating surplus/profit with the value of its total current and non-current debt (eg borrowings and financial liabilities). The ratio may be interpreted as showing, if hypothetically we ignore the time value of money, then how many years of earnings are required to settle the organisation's debt. It is calculated as "Total debt ÷ Operating surplus/profit" and the lower the ratio, the less leveraged the organisation is.

c) **Debt to asset ratio** – this is the final leverage ratio in this study, which compares the value of the organisation's total current and non-current assets with the value of its total current and non-current debt. The ratio may be interpreted as showing, if hypothetically the organisation was to convert all its assets into cash, how far this cash could settle all the organisation's debt. It is calculated as "Total debt ÷ Total assets" and the lower the ratio, the less leveraged the organisation is (Titman et al, 2018).

Debt has the potential to be a hotly debated issue in public sector financial management. Those in favour of using some degree of debt in the management of municipal infrastructure argue that debt is necessary in situations where infrastructure needs to be developed in advance of future growth, and is useful in that it spreads out the cost of the infrastructure assets over a longer period of their useful lives. On the other hand, opponents of debt are concerned that access to large amounts of debt has become too easy and too cheap, that servicing the debt crowds out spending on other priorities, and, in the worst cases, crosses the generational timeline to start burdening the next generation who still have to continue paying the costs of what is, by then, old infrastructure (AYO – York Region, 2018).

However, in this study, debt is only being used as a neutral indicator that is expected to be a key indicator of the financial differences resulting from the choice between a sustainable or a financialised business model for municipal infrastructure-related services, without any further ideological connotations.

2.4 Accounting Standards

Different jurisdictions around the world may adhere to different accounting standards, so it is no surprise that Joburg Water has prepared its financial statements according to the Generally Recognised Accounting Practice (GRAP), which includes interpretations, guidelines and directives from the Accounting Standards Board, as well as the South African Local Government: Municipal Finance Management Act No. 56 of 2003 (with special reference to National Treasury's MFMA Circular 63), the South African Companies Act No. 71 of 2008, and the King IV Report on Corporate Governance for South Africa (Joburg Water, 2023).

Since the UK's exit from the EU on 31 January 2020 ('Brexit'), Thames Water Utilities has prepared its financial statements according to the International Financial Reporting Standards (IFRS), and also the UK's Companies Act of 2006 (Thames Water Utilities, 2023). A necessary step in any comparison between financial statements from different jurisdictions is thus adapting the statements' composition and structure to make the comparable (Lysiak, 2020). As such, there are a few minor differences in the presentation of the annual financial statements of Joburg Water and Thames Water Utilities, but only one difference impacts on this study – the presentation of operating expenditure in two parts with a different basis for the division. This difference has been smoothed over by simply adding together both parts of operating expenditure into a single figure for both Joburg Water and Thames Water Utilities, and using the total figure in the calculation of all ratios that require it.

3. Data Collection

This study uses secondary data, purposively extracted from the most recent statements of financial performance (income statement) and financial position (balance sheet) of Joburg Water and Thames Water Utilities found within their integrated annual reports for the financial years 2021/22 (Joburg Water, 2023; Thames Water Utilities, 2023). The relevant extracts are presented in Table 2 below.

Table 2: Extracts from Joburg Water & Thames Water Utilities Financial Statements

JOBURG WATER			THAMES WATER UTILITIES		
FINANCIAL PERFORMANCE	**2022**	**2021**	**FINANCIAL PERFORMANCE**	**2022**	**2021**
Revenue from exchange transactions	14 099 956	12 952 381	Revenue	2 092 000	2 032 900
Total operating expenses	**13 356 200**	**11 973 154**	**Total operating expenses**	**1 843 300**	**1 739 500**
Revenue from non-exchange transactions	601 324	521 112	Other operating income	95 700	121 800
Operating surplus	**1 345 080**	**1 500 339**	**Operating profit**	**344 400**	**415 200**
Investment revenue	176 895	176 018	Finance income	128 800	187 700
Less: Finance costs	252 220	271 826	Less: Finance expenses	513 300	395 800
			Less: Net losses on financial instruments	895 500	522 200
			Profit/loss before tax	**-935 600**	**-315 100**
			Less: Taxes	106 400	57 000
Net surplus	**1 269 755**	**1 404 531**	**Profit/loss for the year**	**- 1 042 000**	**-258 100**
FINANCIAL POSITION	**2022**	**2021**	**FINANCIAL POSITION**	**2022**	**2021**
Current assets	4 915 598	4 401 803	Current assets	1 090 300	1 128 100
Non-current assets	13 725 920	12 912 682	Non-current assets	19 250 600	18 623 300
Total assets	**18 641 518**	**17 314 485**	**Total assets**	**20 340 900**	**19 751 400**
Current liabilities	3 860 806	3 775 092	Current liabilities	1 632 700	1 857 000
-Incl: Loans from shareholder	*1 772 240*	*1 833 849*	*-Incl: Borrowings*	*749 200*	*1 124 900*
			--Incl: Derivative financial liabilities	*103 000*	-
Non-current liabilities	2 625 313	2 653 749	Non-current liabilities	17 163 800	15 317 400
-Incl: Loans from shareholder	*2 037 465*	*2 150 349*	*-Incl: Borrowings*	*12 547 500*	*11 643 300*
			-Incl: Derivative financial liabilities	*2 238 700*	*1 469 900*
Total liabilities	**6 486 119**	**6 428 841**	**Total liabilities**	**18 796 500**	**17 174 400**
NET ASSETS	**12 155 399**	**10 885 644**	**NET ASSETS**	**1 544 400**	**2 577 000**

(Source: Joburg Water, 2023: 236 – 237) (Source: Thames Water Utilities, 2023: 134 – 135)

The gaps in the table relating to Joburg Water, eg losses on financial instruments and taxes, mean that it does not have equivalent figures due to its non-profit status (no taxes) and non-financialised business model (no financial market instruments and their associated liabilities).

These data are analysed through the use of the ten financial ratios discussed above.

4. Findings

The results of analysing the selected extracts from the two organisations' income statements and balance sheets are presented in Tables 3 – 6 below.

Table 3: Revenue/Profitability Indicators for Sustainable & Financialised Services

	JOBURG WATER		THAMES WATER UTILITIES	
Revenue/profitability ratios	**2022**	**2021**	**2022**	**2021**
Profit margin ratio	0,09	0,10	-0,48	-0,12
Net surplus/profit or loss ÷ Total revenue	*Averages:*	*0,10*		*-0,30*
Operating margin ratio	0,09	0,11	0,16	0,19
Operating surplus/profit ÷ Total revenue	*Averages:*	*0,10*		*0,18*

(Source: Author)

The first group of financial ratios, which both focus on revenue/profitability, show a small difference in the results of the operating margin ratio (Joburg Water average = 0.10 and Thames Water Utilities average 0.18), but a much larger difference in the results of the profit margin ratio (Joburg Water average = 0.10 and Thames Water Utilities average -0.30). As expected, the ratio based on operating surplus/profit shows the smaller difference, which the ratio based on net surplus/profit and loss for the year shows a more significant difference.

Table 4: Spending/Efficiency Indicators for Sustainable & Financialised Services

	JOBURG WATER		THAMES WATER UTILITIES	
Spending/efficiency ratios	**2022**	**2021**	**2022**	**2021**
Return on assets ratio	0,07	0,08	-0,05	-0,01
Net surplus ÷ Total assets	*Averages:*	*0,07*		*-0,03*
Asset turnover ratio	0,07	0,09	0,02	0,02
Operating surplus ÷ Total assets	*Averages:*	*0,08*		*0,02*

(Source: Author)

The second group of financial ratios, which both focus on spending/efficiency, again show a small difference in the results of the asset turnover ratio (Joburg Water average = 0.08 and Thames Water Utilities average = 0.02), but a much larger difference in the results of the return on assets ratio (Joburg Water average = 0.07 and Thames Water Utilities average -0.03). As before, the ratio based on operating surplus/profit shows the smaller difference, which the ratio based on net surplus/profit and loss for the year shows a more significant difference.

Table 5: Debt Servicing Indicators for Sustainable & Financialised Services

	JOBURG WATER		THAMES WATER UTILITIES	
Debt service ratios	**2022**	**2021**	**2022**	**2021**
Interest coverage ratio	5,33	5,52	0,24	0,45
Operating surplus ÷ (Finance costs + Finance losses)	*Averages:*	*5,43*		*0,35*
Short-term liquidity ratio	1,27	1,17	0,67	0,61
Current assets ÷ Current liabilities	*Averages:*	*1,22*		*0,64*
Long-term solvency ratio	5,23	4,87	1,12	1,22
Non-current assets ÷ Non-current liabilities	*Averages:*	*5,05*		*1,17*

(Source: Author)

The third group of financial ratios, which all focus on aspects of debt servicing, show a pattern that Joburg Water, by factors ranging between approximately x2 up to x10, is very much more comfortable in servicing its debt (Joburg Water average = 5.43, 1.22 and 5.05 and Thames Water Utilities average = 0.35, 0.64 and 1.17 respectively). These results are caused by Thames Water Utilities' far higher levels of debt and financial losses, particularly related to its financial market instruments, to which Joburg Water is not exposed.

Table 6: Leverage Indicators for Sustainable & Financialised Services

	JOBURG WATER		THAMES WATER UTILITIES	
Leverage ratios	**2022**	**2021**	**2022**	**2021**
Debt to profit ratio	3,00	2,84	- 15,01	- 55,17
Total debt ÷ Net surplus/profit or loss	*Averages:*	*2,92*		*- 35,09*
Debt to earnings ratio	2,83	2,66	45,41	34,29
Total debt ÷ Operating surplus/profit	*Averages:*	*2,74*		*39,85*
Debt to asset ratio	0,20	0,23	0,77	0,72
Total debt ÷ Total assets	*Averages:*	*0,22*		*0,74*

(Source: Author)

Finally, the fourth group of financial ratios, which all focus on leverage, again show a systematic pattern with Joburg Water being significantly less leveraged by factors ranging between x3 less down to x12 less, while Thames Water Utilities is clearly much more highly leveraged (Joburg Water = 2.92, 2.74 and 0.22, while Thames Water Utilities = -35.09, 39.85 and 0.74 respectively).

5. Discussion

Joburg Water is situated in Johannesburg, the largest city in South Africa, while Thames Water Utilities is situated in London, the largest city in England. While there are demographic and economic differences between the countries of South Africa and England, in general, and also between the cities of Johannesburg and London, in particular, these differences are not relevant to the interpretation of this study's purely finance-focused findings.

Other combinations of a wider range of indicators are influenced, or explained, by demographic and economic differences, especially when comparing larger and smaller municipalities or municipal entities within the same country, where differences in population size, income levels, number of businesses, etc. will no doubt have an impact on the findings (Lysiak et al, 2020).

However, Johannesburg and London share similar demographic and economic profiles within their own contexts, such as being the cities with the largest populations, the highest levels of income, the greatest concentrations of commerce and industry, etc. in their own countries, thus the differences in the indicators between Joburg Water and Thames Water Utilities are better explained in terms of their different business models, ie sustainable versus financialised.

Turning to the findings, it is clear that there are two main differences visible between the financial indicators of Joburg Water and Thames Water utilities. The first, in the revenue/profitability and spending/efficiency ratios, relates to Thames Water Utilities' additional financial costs, expenses, losses, and taxes as reflected in the income statement. The second, in the debt service and leverage ratios, relates to Thames Water Utilities' borrowings and derivative financial liabilities in its balance sheet, which Loftus & March (2019) describe as overleveraged.

The first main difference between Joburg Water and Thames Water Utilities that explains the differences in the revenue/profitability and spending/efficiency ratios is the effect of Thames Water Utilities' financial costs, expenses, losses, and taxes, on its income statement, where they cumulatively pull its operating profit down into a net loss. Joburg Water has both decent operating and net surpluses, as the organisation only has two very modest loans (covered in more detail in Note 7 in its financial statements, showing the Conduit Mirror and French Development Agency loans) (Joburg Water, 2023: 267), for which the annual service costs of R252.22 million do not damage the operating surplus of R1,345.08 million), while the organisation also does not pay any tax due to its public non-profit status.

However, the situation is very different for Thames Water Utilities, where financial costs, expenses, losses, and taxes, which are reported in more detail in Notes 5 and 6 in Thames Water Utilities financial statements (Thames Water Utilities, 2023: 154 – 155), have a significant impact on the differences between operating profit and net profit or loss, and also between assets and liabilities. The notes disclose issues such as interest expenses (-£388.3 million), RPI accretion on loans (-£229.6 million), losses on foreign currency borrowings (-£42.3 million), losses on the cash flow hedge transferred from equity (-£31.1 million), taxes (-£106.4 million), and the big one, net losses arising on swaps (-£822.1 million). Together, these items pull an otherwise healthy operating profit of £344.4 million down to a net loss of -£1,042 million.

The second main difference between Joburg Water and Thames Water Utilities that explains the differences in their debt service and leverage ratios is the effect of Thames Water Utilities' far larger borrowings and derivative financial liabilities on its balance sheet. Whereas Joburg Water's financial statements only show modest loans amounting to a total of about R3,800 million (or 59% of total liabilities), the situation with Thames Water Utilities is very different.

Notes 18 and 19 in Thames Water Utilities' financial statements reveal items such as 22 secured bank loans and another 11 private placements (amounting to £3.4 billion), and then also 37 active bonds issued in Thames Water Finance's name (amounting to nearly £10 billion), for a total of about £13.3 billion of finance-related debt (or 77% of total liabilities) (Thames Water Utilities, 2023: 162 – 164).

This situation, as heavily leveraged as it is, represents an improvement on previous years. Back in 2014, England's National Audit Office (NAO) criticised Thames Water Utilities for increasing its borrowings in order to pay sizeable dividends to its owners while in the process becoming so over-leveraged that it threatened Thames Water Utilities' capacity to provide its core water and waste water treatment services to its customers (Loftus & March, 2019). In 2021, the Board of Thames Water Utilities launched an 8-year turnaround plan focused on improving the organisation's financial position, with the financial statements used in this study representing their first year's progress (Thames Water Utilities, 2023: 1).

6. Conclusion

The financial indicators associated with the 'sustainable' and 'financialised' models of water and waste water infrastructure-related services, in particular with Joburg Water, South Africa representing sustainability, and Thames Water Utilities, England, representing financialisation, show two main differences.

The first is the impact of financial costs, expenses, losses, and taxes on the differences between operating surplus/profit and net surplus/profit on the organisations' income statements, which is far higher for the financialised model, while the second difference is the impact of the value of various financial market instruments reflected as liabilities in the organisations' balance sheets, which again is far higher for the financialised model.

As such, this exploratory study, from its base of two case studies, thus tentatively proposes the financial indicators characteristic of sustainable and financialised municipal infrastructure services reflected in Table 7 below.

Table 7: Proposed Financial Indicators for Sustainable and Financialised Services

	Sustainable	Financialised
Revenue/profitability ratios		
Profit margin ratio (Net surplus/profit or loss ÷ Total revenue)	0,05 or higher	0.05 or lower
Operating margin ratio (Operating surplus/profit ÷ Total revenue)	0,08 or higher	0,10 or higher
Spending/efficiency ratios		
Return on assets ratio (Net surplus ÷ Total assets)	0,05 or higher	0.05 or lower
Asset turnover ratio (Operating surplus/profit ÷ Total assets)	0,05 or higher	0,05 or higher
Debt service ratios		
Interest coverage ratio (Operating surplus ÷ (Finance costs + Finance losses))	1.50 or higher	1.50 or lower
Short-term liquidity ratio (Current assets ÷ Current liabilities)	1.00 or higher	1.00 or lower
Long-term solvency ratio (Non-current assets ÷ Non-current liabilities)	1.50 or higher	1.50 or lower
Leverage ratios		
Debt to profit ratio (Total debt ÷ Net surplus/profit or loss)	2,00 or lower	5.00 or higher
Debt to earnings ratio (Total debt ÷ Operating surplus/profit)	2,00 or lower	5.00 or higher
Debt to asset ratio (Total debt ÷ Total assets)	0,20 or lower	0,50 or higher

(Source: Author)

Of course, the findings derived from the small samples typical of exploratory research, as in this study, still need to be tested through further research amongst a wide range of organisations that are delivering water infrastructure-related services through both the sustainable and financialised business models.

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Author Contributions:

Brad Bell - Idea, Purpose, Planning and Design, Literature and Citation, Method, Data Collection, Data Analysis and Discussion, Writing and Format, Final Approval and Responsibility, Overall Contribution - 100%.

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