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Assessment of the Effects of Technical Skills on Water Service Delivery in Meru County, Kenya

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Abstract
Water service delivery is a critical component of public infrastructure that significantly impacts health, economic development, and overall quality of life. In Meru County, Kenya, the efficiency and effectiveness of water service delivery have become a focal point of concern for both residents and policymakers. One of the key factors influencing this vital service is the level of technical skills possessed by those responsible for water management and infrastructure maintenance. This study aimed to explore the correlation between technical skills and the quality of water service delivery in Meru County, examining how expertise in areas such as engineering, project management, and maintenance practices can enhance the reliability, accessibility, and sustainability of water resources. The research adopted a descriptive approach, targeting a population of 31,933 households in Meru County. The sample size was determined using Slovin's formula, with a census for County officials, department managers, NGO managers, development partners, and MEWASS and IMETHA officials. Simple random sampling was employed for household heads, resulting in a sample size of 395. Data collection was conducted using questionnaires for primary data, and the analysis utilized both descriptive and inferential statistical methods. The data collected were analysed using frequencies, as well as descriptive and inferential statistics. Descriptive metrics included frequencies, percentages, means, and standard deviation. The inferential analysis involved correlation and multiple regression analysis. The results indicated that technical skills were crucial factors influencing water service delivery. The researcher suggests that PPP management should ensure they procure the most cost-effective technical expertise in fields where required for the corporation's projects to achieve high output levels.
Keywords: *Technical skills, Water Service, Public Value, Delivery, Public-Private Partnership*

1.0 Introduction

Water service delivery is a critical component of public infrastructure that significantly impacts health, economic development, and overall quality of life. In Meru County, Kenya, the efficiency and effectiveness of water service delivery have become a focal point of concern for both residents and policymakers. One of the key factors influencing this vital service is the level of technical skills possessed by those responsible for water management and infrastructure maintenance.

A Public-Private Partnership (PPP) is a collaborative agreement between the public and private sectors designed to provide public goods or services. This approach leverages the operational principles of private enterprise alongside public administration to elevate the quality and efficiency of public service provision (Wang et al., 2018). With the rise of urbanization, there has been a notable push towards employing PPPs for the delivery of essential services, such as high-quality water services, to meet the increasing demands of urban populations (Liang & Wang, 2019).

The concept of Public-Private Partnerships (PPPs) originated in the United Kingdom in 1992 under John Major's Conservative government, where it was first introduced as the Private Finance Initiative (PFI). This initiative involved the UK government partnering with the private sector to finance, operate, and construct public services and infrastructure, typically focusing on long-term projects lasting up to 30 years. The main goal of these partnerships was to collaborate

with the private sector to deliver efficient, cost-effective, and measurable public services within modern facilities, while also reducing financial risks to promote financial sustainability.

Following the UK's pioneering efforts, the PPP model has gained popularity as a preferred approach by various governments worldwide to augment the effectiveness and efficiency of public service delivery across diverse sectors, including transportation, construction, housing, water, education, and health. Countries such as Australia, Canada, the USA, Germany, France, and Kenya have since implemented PPP initiatives, adopting this model for its potential to finance "mega-projects" (Alteneiji, Alkass, & Abu Dabous, 2020). However, as the project's value increases, the incentive for exploiting corruption for competitive advantage also grows, presenting a significant challenge to the integrity and success of PPPs (Dumitriu & Ahmed, 2018).

Not only does the water sector largely rely on infrastructure measures to improve water security over the long term, but it also depends on these activities to favorably effect economic growth and further development. There is still a substantial lack of investment for water infrastructure, despite the fact that there are urgent demands in the industry. According to research published by the African Development Bank in 2018, there is a gap in water infrastructure finance that is projected to be between $67.6 billion to 107.5 billion USD in Africa alone. This deficit has resulted in the loss of economic, social, and environmental advantages owing to rising water risks (OECD, 2017). The Sustainable Development Goals (SDGs) require that both greater investment levels and better protection of current investments be implemented in order to avoid the loss of resources. It is apparent that both of these measures are essential in order to accomplish the SDGs.

On a worldwide scale, Public-Private Partnerships (PPPs) have grown more prevalent in industrialized countries such as the United Kingdom, Canada, Australia, and Japan. These nations have public-private partnership (PPP) units that are devoted and specialized, and they function as policy instruments to enable initiatives and attract finance for growth. One country in particular that has effectively applied this strategy is Canada, which has 291 ongoing projects with a total value of 134.5 billion USD. Canada's founding of the Canadian Council for Public-Private Partnerships (CCPPP), a national non-profit organization that was established in 1993, is credited with contributing to this achievement. The mission of the CCPPP is to advocate for the utilization of public-private partnerships (PPPs), educate stakeholders and the community on the economic and social advantages of PPPs, and encourage the adoption of worldwide best practices (Whiteside, 2020). The CCPPP has a wide range of representatives from both the public and private sectors.

According to Opara and Rouse (2019), the Public-Private Partnership (PPP) model that is used in Canada is usually considered to be among the most successful models utilized all over the world. According to the Canadian Council for Public-Private Partnerships (CCPPP), public-private partnerships (PPPs) in Canada involve delivering public services or infrastructure with a crucial aspect being the transfer of risk from the public sector to the private sector. Over the last several years, the government of Canada has been more aware of the benefits that public-private partnerships (PPPs) provide, and as a result, it has included this model into long-term infrastructure plans that have been executed by consecutive governments. It is important to note that the provincial governments have been in the forefront of advancing the public-private partnership (PPP) sector in Canada. There are many different kinds of public-private partnership (PPP) agreements that can be found in Canada. One of them is the Operation and Maintenance Contract, which is a contract in which a private operator runs a publicly-owned facility, such a water or wastewater treatment plant, for a certain period of time while the public body continues to retain ownership of the asset (Silva et al., 2020). Under the Build-Finance model, the private sector is responsible for the building of an asset, the financing of the capital cost is limited to the time during which the asset is being constructed, and the private sector receives returns depending on the agreement with the government. Under the Design-Build-Finance-Maintain (DBFM) model, the private sector is tasked with the design, construction, and financing of an

asset, as well as providing long-term facility management or maintenance services. In the Design-Build-Finance-Maintain-Operate (DBFMO) model, the private sector is also responsible for operating assets, such as bridges, highways, and water treatment facilities. As an additional point of interest, the Concession model requires a concessionaire from the private sector to make investments and run a facility for a certain amount of time before the ownership is transferred back to the public sector. There are now 291 operational public-private partnership projects in Canada, with a total value of USD 134.5 billion. These projects are spread throughout a variety of industries, such as health, transportation, water, accommodation, and energy, among others. Additionally, there are 68 projects in the process of being developed (El Kawam, 2023).

The states that make up the Gulf Cooperation Council (GCC), in particular Kuwait, the United Arab Emirates (UAE), and Qatar, have shown a growing willingness to embrace the idea of Public-Private Partnerships (PPPs). Since 2015, the drop in oil income has been putting increased pressure on government finances (Alteneiji et al., 2020). This trend has been exacerbated by the fact that oil revenues have started to decline. According to Deloitte (2016) and Almarri (2019), Kuwait, the United Arab Emirates, and Qatar have all stated their intention to use public-private partnerships (PPPs) as a method to entice investment in the infrastructure sector, which includes housing developments. This is in reaction to the financial issues that they are now facing. With that being said, in order to make the most of public-private partnerships (PPPs) in water projects, it is very necessary to give careful consideration to the many stakeholders involved in each project and to strictly adhere to the neo-institutionalism principles that regulate them (Al Rashidi, 2021).

Despite the fact that Public-Private Partnership (PPP) legislation and institutions are becoming more widespread in Sub-Saharan Africa (SSA), they are still in a state of underdevelopment in many situations (Motsoane, 2022). By enacting certain legislation or structures, a number of African countries have shown their support for public-private partnerships (PPPs). While some nations are still in the preliminary stages of developing frameworks, others have already established legal and regulatory structures. Some laws are currently undergoing policy discussions within government ministries or parliamentary processes, and others do not have a clear roadmap for a functional public-private partnership framework (Tshombe et al., 2020). In spite of this, the difficulty that these nations have is to ensure that their rules and regulations are solid and that they are effectively implemented (Thorn, 2022).

In accordance with Werneck and Saadi (2015), the success of a public-private partnership (PPP) programme is contingent upon the legislative framework that provides a legal environment that is transparent, equitable, predictable, and stable. Public-private partnerships (PPPs) have been more common in Rwanda over the course of the last twenty years, notably in the fields of water, transportation, energy, and healthcare service sectors (Nkurunziza, 2021). In this nation, the general consensus is that public-private partnerships (PPPs) may flourish despite the presence of political limitations, with an emphasis on openness in contract negotiations. Even if public-private partnerships (PPPs) have the potential to improve service delivery, there is a case to be made for rationalizing PPP models in order to ensure efficient service supply. According to research conducted in Rwanda, the Build Own Operate and Transfer (BOOT) model is considered to be one of the most popular public-private partnership (PPP) models. It is deemed to be the greatest choice for implementing PPPs in the provision of public services (Tshombe et al., 2020).

According to Tsitsifli et al. (2020), water is seen as a fundamental human right, an essential component in the commercial and industrial sectors, and a significant resource that contributes significantly to the growth of the economy. As noted by Aung, Jiang, and He (2018), as well as Martínez Fernández, Neto, Hernández-Mora, Del Mora, and La Roca (2020), water is considered essential for all living organisms, serving as a medium for transportation, a crucial component in agricultural production, a solvent, and a temperature regulator. This understanding prompted efforts to enhance the water supply in terms of efficiency, public engagement,

accountability, and financial stewardship (Langford, 2005; Means, Ospina, & Patrick, 2005). As a result of this process, water became a crucial focus of the United Nations Millennium Development Goals (MDGs), which aimed to halve the number of people lacking access to water and basic sanitation (Hering et al., 2015; Lester & Rhiney, 2018). By 2015, the United Nations Children's Fund and the World Health Organization reported a shift towards increasing investment in the sector to improve global access to water.

Aligned with the Sustainable Development Goals (SDGs), economies have strived to monitor broader aspects of water service provision, encompassing access, quality, efficiency, integrated management, transboundary cooperation, and public engagement (Ait-Kadi, 2016). According to Satterthwaite (2016), the Sustainable Development Goals (SDGs) also place a greater focus on the financial sustainability of the supply of the many parts of water. The fact that some nations reported declining access rates as of the end of the term was the impetus for the need of taking sustainability into consideration. A review of the Millennium Development Goals (Satterthwaite, 2016). According to Satterthwaite (2016) and Alaerts (2019), according to the Sustainable Development Goals (SDG), the economies that are a part of SDG 6 have committed to tackling the issue of ensuring that water management is accessible and sustainable for all people by the year 2030. This is in accordance with the seventh Sustainable Development Goal. Despite global commitments to improving access to water and sanitation, access rates in Kenya remain low, with only 59% having access to water and 17% to sewerage services. The annual growth rates for these services are just 0.9% for water and 0.2% for sewerage (WASREB, 2020).

Although public-private partnerships (PPPs) in the Sub-Saharan Region are still in the process of developing, there are indicators that their applications are growing. SA (South Africa) The public-private partnership (PPP) sector is the most successful in Africa because the nation has a robust legal framework that is executed by its National Treasury. This framework helps to control risk and stabilize returns for private investors, and it has been in place since the middle of the year 2000. As of the year 2021, 34 public-private partnership projects with a total value of USD 5.6 billion have been completed in a variety of industries, including health, transportation, tourism, water and sanitation, and office rooming. Uganda, Rwanda, and Kenya are some of the other nations that have embraced public-private partnerships (PPPs). As of 2018, Uganda had 28 projects worth USD 1.9 billion that had reached their final close. Rwanda had 10 PPP projects worth USD 694 million during the same time period. Kenya had 23 projects worth USD 2.9 billion that had reached their final conclusion. Our next step is to investigate public-private partnerships (PPPs) in Kenya, which currently has a pipeline of over seventy projects in various stages of approval and across a variety of economic sectors.

PPPs have emerged as a popular option in Rwanda (Nuwagaba, 2013). These public-private partnerships are in the industry of water, transportation, energy, and health care services. PPPs are seen to be able to work well within the confines of politics and in situations where transparency is the norm when it comes to contract negotiations in this nation. It is further maintained that public-private partnerships (PPPs) have the potential to enhance service delivery; nonetheless, it is essential to rationalize PPP models for service delivery. According to the findings of the research, the Build Own Operate and Transfer (BOOT) model is one of the most chosen public-private partnership (PPP) models. This model is thought to be the greatest alternative when it comes to the implementation of PPPs in the provision of public services. According to Provost (2010), public-private partnerships (PPPs) have been the norm in the water industry at the level of municipal governments. Local government organizations, such as those in the Northern Province (Byumba), have participated in public-private partnerships (PPPs) in the water sector. These PPPs include the contracting authority delegating the management and maintenance of their water delivery systems to local private operators. For the management of local governments, the public-private partnership (PPP) model in the water sector is regarded to be a source of income. In addition, it is believed that public-private partnerships (PPPs) in Rwanda make it possible for the government to harness the financial resources and technical

skills of the private sector. In spite of the fact that a Public-Private Partnership Act was passed in 2016, there are still limitations on capability and insufficient knowledge on prospects for public-private partnership investments in Rwanda (World Bank, 2017). On the other hand, the Rwandan government need to be presented with the opportunity to evaluate the contract with the private sector in cases when the consumers are not receiving benefits that are in accordance with their expectations.

Kenya's Public-Private Partnerships (PPPs) may be traced back to the PPP Policy Statement of 2011, which was revised in 2013 via Act 15, also known as the 'Public Private Partnership Act.' This act is responsible for the formation of PPPs in Kenya. This piece of law stipulates that the government retains full strategic control over the services, which therefore requires the government to acquire new infrastructure as its assets after the contract has been completed. One of the parties that has the greatest capacity to manage or minimize the risks associated with the project and performance is the one that receives the allocation of such risks. Kenya is not just one of the most mature public-private partnership (PPP) marketplaces in Africa, but it also has a robust legal framework. In order to rectify the shortcomings of the Public Private Partnerships Act of 2013, the Public Private Partnerships (PPP) Bill 2021 was passed into law in December of 2021. A simplified project process that includes specified timetables, broader procurement alternatives, and strong processes for Privately Initiated Investment Proposals (PIIP) is introduced as a result of the new legislation.

Regulatory adjustments have been made in order to better assist the growth of public-private partnerships (PPPs) in Kenya. One of these modifications is the addition of debt instruments as an investment class that is permitted under the Retirement Benefits Regulations. Pension plans are able to invest up to ten percent of their assets in public-private partnerships (PPPs) at this time. Furthermore, in accordance with these modifications, the government has raised the Public-Private Partnership (PPP) Unit to the position of Directorate under the National Treasury, as mentioned in the FY'2022/23 Budget Statement. The Public Debt Management Office and the Public Private Partnership Directorate was to be better able to coordinate their efforts in order to achieve effective fiscal exposure management, as described in the new PPP Act 2021. Additionally, it was to build a collaborative planning framework for Public Investment Management and Public-Private Partnerships. In addition, preparations are being made to enable the Public-Private Partnership Project Facilitation Fund to undergo full operationalization. During the preparatory phase, tendering procedures, and project evaluation, the purpose of this fund is to provide financial assistance to the operations of the Public-Private Partnership Directorate and contracting authorities.

According to Schwartz, Tutusaus, and Savelli (2017), the delivery of water services is not only a crucial factor in ensuring that everyone has access to water, but it is also a key concern for growth partners who are interested in funding the industry. High levels of inefficiency, sub-optimal water pricing, excessive reliance on subsidies, a lack of accountability, failure to address various risks associated with water provision, failure to implement current technology in the management of water, and low water coverage are all potential factors that could contribute to an inability to realize quality water service delivery. One of the most important factors that drives socioeconomic growth in Kenya is the availability of water in rural regions. It is not only beneficial to the general quality of life to improve the water supply in rural areas, but it also increases production, assures food security, and contributes to the reduction of poverty. This target has not been met, and many rural areas are experiencing severe water scarcity. This is despite the fact that the Kenyan government has committed to achieving Sustainable Development Goal 6, which aimed to double the number of people who do not have access to safe drinking water by the year 2015 and ensure that everyone has access to water by the year 2030. For the purpose of ensuring that water is available for rural development, community engagement is an essential component. Kenya is considered to be a water-scarce nation, as stated by Langat, Kumar, and Koech (2019). This highlights the need of maintaining a constant monitoring, assessment, and evaluation of water resources in order to guarantee protection of

water supplies. The importance of recognizing trends and understanding climatic patterns cannot be overstated. It is necessary to have efficient management in order to improve the supply of water services because of the unequal geographical distribution of water resources, both surface and subsurface. (Connor, 2015) Kenya is facing severe economic consequences as a result of inefficient management of its water resources.

According to the Ministry of Water and Irrigation, there are over 680 piped water systems that provide over 740,000 water connections throughout the nation. In addition, there are an additional 350 community-managed water schemes. It is unfortunate that a significant proportion of these connections remain dormant as a result of insufficient administration and maintenance (Wasilwa, 2020). This situation is especially worse in urban areas during the rainy season due to a lack of proper storage and cleaning water systems by the water service provider (MEWASS, 2015). In spite of the numerous efforts made by the County government to improve water service delivery, a significant portion of the residents of Meru County do not have access to drinking water that is adequate and reliable according to the circumstances.

The Meru Water and Sewerage Services Board (MEWASS), the registered trustees in Meru County, has been facing numerous challenges due to massive urban sprawl and encroachment into agricultural and water catchment areas. Rapid urbanization and population growth, high unemployment and low-income levels, disorganized urban and rural development, inadequate infrastructure and utility services, poor transport services, environmental degradation, poor sanitation, and uncoordinated water management governance have all contributed to the poor water supply in the county (MEWASS Technical Report, 2022). These issues have significantly strained water resources and catchment areas in Meru County. Consequently, a public-private partnership is necessary to improve the water supply services throughout the county. This study aimed to explore the correlation between technical skills and the quality of water service delivery in Meru County, examining how expertise in areas such as engineering, project management, and maintenance practices can enhance the reliability, accessibility, and sustainability of water resources. By understanding these dynamics, the research seeks to provide insights that could inform capacity-building initiatives and policy reforms aimed at improving water services in the region.

The lack of financial sustainability is the primary issue that arises in partnerships between the public sector and private businesses. Marson and Savin (2015) conducted research that analyzed the sustainability levels of water and waste water utilities throughout Sub-Saharan Africa. The study revealed that there is a downward trend in the sustainability levels of these utilities. In Kenya, there are a number of obstacles that have been identified as contributing to the decline in the financial viability of water projects. These obstacles included an excessive reliance on public financing for operation and maintenance, highly leveraged projects, cooperation disarrangements, a lack of clear leasing periods and concessions, financial operation costs and management, to name just a few. Since the beginning of the process of financing water projects, Kenya has been taking the initiative to provide the community with a variety of water supply projects. Despite the progress that has been made, the majority of projects have failed or been significantly delayed due to funding issues. For instance, the Kiptogot water project, which was supposed to begin providing service in January 2021, has not been finished as of yet, which has caused a great deal of concern. The idea that was presented before calls for an exhaustive examination, which is why the purpose of this research was to investigate it.

According to Ryan and Eunil (2011), long-term concessions, for instance, might result in considerable problems for the general public, which can lead to the collapse of a project. This is due to the fact that accurate forecasting of urban expansion and traffic demand is difficult to achieve, while investors want assurances about the prospective revenues. That is more insight on appropriate allocation of sufficient resources for the project (Bhatia, 2021), government guarantees, contractual guarantees, and preparation of a financial, fiscal framework to include tax reduction (Mohammad, 2021). In order to ensure that the project is financially viable and sustainable, the officials in charge of the project need to be well informed about the decisions

regarding cooperation. If they are not, the project will collapse. In order to prevent the failure of a project, it is essential to have a thorough understanding of joint ventures, which provides a reduction in risk, access to the market, and a source of financing throughout the execution of a project. The Naari/Nturukume water project in Buuri Sub-County, Meru County, which failed due to a lack of funds for purchasing water pipes, is an example of a project that could have collapsed (Kenya News Agency, 2022). In addition, in order to portray consistency in terms of lease fees, operating fees, and maintained fees, there should be a mutual agreement between the parties involved.

With only a limited amount of information about public-private partnerships (PPP) for water projects, the majority of research had focused on PPP as a general paradigm for the development of diverse infrastructure. For example, Anna and Dariusz (2016) in Poland provide some insight into the fundamentals of public-private partnership (PPP) finance by using discounted subsidy, internal rate of return, and risk variant analysis. The researchers came to the conclusion that public and private sectors are significant, despite the fact that they do not correspond with one another. Since partnership is only a kind of collaboration, further study was required. In addition, Julius and Okech (2021) conducted research on the impact of public-private partnerships (PPPs) on the financial sustainability of water service providers (WSPs) in Kenya. They came to the conclusion that PPPs have a positive and statistically significant impact on the financial sustainability of WSPs in Kenya. In order to improve connection in the last mile, the researchers suggested that all funding bids should take into consideration an end-to-end finance strategy. Although it had been expected that investments would be made in the water industry, the questions of how sustainable they were in terms of the realization of the financial gap remain unanswered. Therefore, it was necessary to conduct research with the objective of determining the impact that Public Private Partnerships have on the provision of water services in Meru County.

2.0 Literature Review

2.1 Theoretical Literature

This particular pragmatic theory of public value theory was developed by Barry Bozeman (2019) by himself. According to Alford and Hughes (2008), public value is defined as value that is realized at the macro level during the use of public services, but not at the micro level. Value is created whenever the advantages of an intervention outweigh the expenses of the activity, according to author Spano (2021). Public values act as a normative consensus at the social level about what rights, privileges, and obligations citizens should have (and shouldn't have), as well as what duties they have to society, the state, and each other. They also establish the values that should guide government and policy (Bozeman, 2007).

According to Rutgers (2015) and Sufna and Fernand (2015), public value is a method that allows for the resolution of democratic gaps, the evaluation of the feasibility of projects, the making of decisions, as well as the definition, measurement, and improvement of performance. Because of this, PV may provide managerial values like efficacy and efficiency as well as democratic principles like equality, honesty, and fairness while carrying out duties (Bonina & Cordella, 2009). Through the resolution of market defects such negative externalities, natural monopolies, and incomplete information, PV operations maximize the welfare of citizens. Furthermore, these actions enhance public trust in the government and its legitimacy (Alford & Hughes, 2008 & Talbot, 2008).

These conclusions are based on those that have been presented above. The development of economic activity and employment, the improvement of social networking for prosperity, the transparency of conversations and the engagement of citizens, the regeneration of morals, and the reduction of environmental degradation are all outcomes that may be attributed to such factors. While PV is criticised for its emphasis on accomplishing and assessing medium to long-term aims, governments that are determined by voting procedures tend to place more of

an emphasis on short-term targets. This is despite the fact that PV had the advantages that have been discussed above. On the other hand, this may be restricted if public servants instead focus on programme politics rather than party politics. This is because the actual political context might constrain their autonomy in service delivery (Alford & Hughes, 2008).

In a manner that is analogous to the New Public Service Theory, the Public Value Theory calls for the responsibility of public organizations not just to political authorities but also to the general public. According to Blaug, Horner, and Lekhi (2006), it goes beyond the constraints of political democracy, which are restricted to election procedures, and places an emphasis on the ability of bureaucrats to satisfy the desires of residents via administrative systems that take into consideration the realities of the local community's environment. As opposed to simply conforming to the frequently impractical demands of the general public, water service providers need to actively shape and guide public interests based on purposeful interactions and logical decisions in order to ensure that Public-Private Partnerships (PPPs) have a positive impact on the delivery of services (Blaug et al., 2006). In order to do this, it is necessary for managers of water companies to possess the capacity to persuade institutions, politicians, and individuals to react favorably to the supply of water services and to apply new approaches in order to accomplish this achievement. Using the suggestions made by Coats (2006) as a foundation, public managers have the ability to guarantee that public-private partnerships (PPPs) provide value for the general public by implementing strategies that expand, improve, react to, disclose, and innovate in ways that put the interests of people first.

The "Public Value Scorecard" that was established by Meynhardt (2017) is one of the many key instruments that may be used to advance the public value paradigm in a true public-private partnership context. It is an efficient management tool that can be used to evaluate the appropriateness of project implementation choices by using the chance and risk method. Additionally, it can be used to determine whether or not planned public-private partnership water projects are viable. Five criteria are traded off by the tool in the process of analyzing and evaluating the various public-private partnership (PPP) operational structures and system settings: profitability, usefulness, decency, positive experience, and political realism/acceptance. Ensuring that public-private partnership (PPP) policies and performance targets are legitimate, practical, sustainable, ethical, and suitable for the individuals and private parties engaged is the aim of the Public Value Scorecard. Essentially, the PV approach raises awareness among the public about the difficulties faced by public managers and politicians, as well as the limitations of what can be provided, and ensures effective management, which is why it was chosen for this study. It also advances actions that are based on well-informed solutions and challenges the technocratic led performance approach.

2.2 Technical Skills and water service delivery

Technical skills in water service delivery encompass a broad range of competencies essential for the effective planning, implementation, operation, and maintenance of water supply systems. These skills ensure the provision of safe and sustainable water services to communities, addressing both immediate needs and long-term sustainability goals. According to a report by the OECD (2015), addressing disparities through national initiatives can be facilitated by aligning skills requirements with constructive responses from various initiatives. This approach empowers communities and allows them greater control over the policies they derive benefit from. However, a significant gap exists between the skills possessed by workers and those sought by managers, leading to a costly misalignment. The cost of this misalignment varies based on the efficacy of learning systems and education methods but is deemed significant even in advanced countries, reaching approximately 7% of gross domestic product in European countries (Tsirkas, Chytiri, & Bouranta, 2020).

In many regions, the gap between the existing technical skills and those required for efficient water service delivery is notable. This discrepancy not only affects the quality of water services but also incurs substantial economic costs. For instance, in Europe, the skills gap is

estimated to cost around 7% of the gross domestic product, highlighting the importance of addressing this issue through improved education and training systems (Tsirkas et al., 2020). Effective water service delivery depends on a workforce that is well-trained in various technical areas, including hydraulic engineering, water quality testing, infrastructure maintenance, and the use of advanced technologies for monitoring and management.

The engagement of the private sector in public-private partnerships (PPPs) has been shown to significantly enhance the success of various infrastructure projects, including those in the water sector. Nshimiyimana (2022) explored the effect of private sector engagement on the success of PPP projects in housing construction in Kigali, Rwanda. The study, conducted in Gasabo, Nyarugenge, and Kicukiro, found a strong positive correlation between technical skills and the successful implementation of housing projects, with a correlation coefficient of 0.736** and a significance level of $p<0.001$. These findings underscore the necessity for government strategies and regulations to attract housing investments, thereby addressing the housing shortage exacerbated by rapid urban population growth.

The role of technical skills in the successful execution of PPPs cannot be overstated. In Rwanda, the correlation between technical skills and project success suggests that enhancing technical capabilities within the workforce can lead to more efficient and effective implementation of housing projects (Nshimiyimana, 2022). This highlights the importance of targeted training and development programs that equip workers with the necessary skills to meet the demands of complex projects. Additionally, government policies should focus on creating an enabling environment that encourages private sector investment, thereby leveraging the technical expertise and resources that the private sector can provide.

Vocational education plays a crucial role in developing the technical skills required for successful water service delivery and other infrastructure projects. Marques, Remington, and Bazavliuk (2020) investigated the role of public-private partnerships in vocational education in Russia. Their research revealed that the resource capabilities of Russian public institutions for professional training were inadequate to address their issues. This finding suggests the need to make opportunities for companies more appealing through the formation of PPPs. By fostering collaborations between public institutions and private companies, vocational education programs can be enhanced, ensuring that they provide relevant and up-to-date training that meets industry standards.

The study by Marques et al. (2020) emphasized the importance of technical skills and expertise in enhancing the efficiency of PPP projects. By integrating private sector involvement in vocational education, public institutions can benefit from the expertise and resources of private companies, leading to improved training programs and better-prepared graduates. This approach not only addresses the immediate needs of the labor market but also ensures the long-term sustainability of infrastructure projects, including water service delivery systems. Institutional and governance structures play a vital role in the successful execution of PPP projects. Casady, Eriksson, Levitt, and Scott (2020) conducted research investigating the essential components of committed public-private partnerships. They surveyed institutional and governance structures, evaluating both US and international experiences with PPP Units. Their findings highlighted that these Units play a crucial role in addressing a common issue encountered in PPP programs: the lack of sufficient expertise within the public sector to effectively execute PPP deals. Establishing PPP Units can aid in cultivating the necessary technical skills required for successful PPP negotiations.

PPP Units serve as a focal point of authority during negotiations, which is particularly valuable when multiple ministries are involved in a PPP (Casady et al., 2020). These Units not only provide the necessary technical expertise but also ensure that all parties are aligned in their objectives and strategies. This centralized approach facilitates more efficient decision-making processes and helps mitigate the risks associated with complex negotiations. By consolidating expertise within dedicated PPP Units, governments can enhance their capacity to manage and execute large-scale infrastructure projects, including those related to water service delivery.

Addressing the skills gap in water service delivery requires a multifaceted approach that includes improving education and training systems, fostering public-private partnerships, and enhancing institutional and governance structures. The OECD (2015) report emphasizes the importance of aligning skills requirements with constructive responses from national initiatives. This alignment can be achieved through targeted education and training programs that focus on the specific needs of the water sector. Additionally, policies should encourage private sector involvement in vocational education and PPP projects, leveraging the expertise and resources of private companies to enhance training programs and infrastructure projects.

The disparity between the skills possessed by workers and those sought by managers presents a significant challenge to efficient water service delivery (Tsirkas et al., 2020). To address this challenge, governments and educational institutions must collaborate to develop training programs that are responsive to the evolving needs of the water sector. This includes incorporating advanced technologies and innovative practices into the curriculum, ensuring that graduates are equipped with the latest skills and knowledge.

Continuous learning and adaptation are essential for maintaining the technical skills required for effective water service delivery. As technologies and methodologies evolve, so too must the skills of the workforce. This requires ongoing professional development opportunities and a commitment to lifelong learning. By fostering a culture of continuous improvement, organizations can ensure that their employees remain proficient in the latest techniques and best practices.

In conclusion, technical skills in water service delivery are crucial for ensuring the provision of safe and sustainable water services. Addressing the skills gap requires a comprehensive approach that includes improving education and training systems, fostering public-private partnerships, and enhancing institutional and governance structures. By aligning skills requirements with national initiatives and encouraging private sector involvement, governments can enhance the technical capabilities of the workforce and ensure the successful implementation of water service projects. Continuous learning and adaptation are also essential for maintaining the proficiency of the workforce in an ever-evolving sector.

3.0 Materials and Methods

3.1 The materials

In this study, a mixed-methods strategy will be employed, integrating both qualitative and quantitative research techniques within a single investigation. The rationale behind adopting this strategy lies in its ability to offer a more holistic insight into the research issue. Quantitative research provided insights into trends and patterns through statistical analysis, whereas qualitative research contributed depth and context to these findings, as noted by Pandey & Pandey (2021). Moreover, employing a mixed-methods approach aids in mitigating the drawbacks typically associated with using quantitative or qualitative methods in isolation.

The target population of this study was 31978 respondents comprising of development partners, non-governmental organization involved in water projects, County government officials in ministry of water and officials from MEWASS and IMETHA water and sanitation company. According to the KNBS, (2019) Meru County has an estimate of 31933 household. These households are of relevance to the study as they were the direct beneficiaries of the provided water in the county. According Kothari (2019), population refers to an all-inclusive group of people or items that the researcher intended to investigate.

Table 1: Target Population Position

S/No	Position	Population
1	County officials in the Department of Water, Irrigation, Environment and Climate Change	15
2	Non- Governmental Organizations managers	25
3	Development partners managers MEWASS and IMETHA officials	5
4	Targeted households presumed to benefit from water supply	31933
	Total	**31978**

Source: Department of Water, Irrigation, Environment and Climate Change, (2023)

3.2 Methods

The data obtained from the questionnaires was initially reviewed for completeness before being coded, tabulated, and analyzed with SPSS version 27.0. Descriptive statistical methods, included percentages and frequencies, were employed to describe the traits of the variables being investigated. This step ensured a systematic approach to understanding the data's distribution and central tendencies, providing a foundational analysis of the study's variables. Further inferential statistics, specifically the normality tests, and test of parallel lines was performed to explored the data. Pearson correlation and specifically the Kolmogorov-Smirnova was checked to check the significance of the p value.

An ordinal logistic regression was used to examine the significance of the influence of the independent variables on the dependent variable. The study adopted the regression model;

$Y = \alpha+\beta 1X1+ \mu$

Where;

Y = water service delivery α = Constant μ= Error β=1 is the logit coefficient of the predictors

X1= technical skills

4.0 Results and Discussion

4.1 Response Rate

The researcher distributed 395 questionnaires to the sampled respondents where 306 questionnaires were successfully filled and returned to the researcher as presented in Table 2.

Table 2: Questionnaire Return

Respondents Status		**Frequency**	**Percent**
Valid	Successful Responses	306	77.5
	Unsuccessful Responses	89	22.5
	Total	**306**	**100.0**

Source: Researchers, 2024

Findings from Table indicate that the response rate of 77.5% was achieved in this study, according to Mugenda and Mugenda (2009), a response rate of 70% and above is excellent to be used for further analysis. Thus, the response rate of the study was satisfactory.

4.2 Technical Skills and Water Service Delivery

The study set to focus on the effect of technical skills on Water Service Delivery in Meru County, Kenya. Presentation of the outcomes of the findings was done in Table 3.

Table 3: Technical Skills

	N	Min	Max	Mean	Std. Deviation
Public-Private Partnerships (PPPs) have introduced technical expertise in fields where it is necessary for implementing water projects.	306	1	5	4.38	0.860
The engagement of PPPs in project execution has facilitated the sourcing of experienced personnel.	306	1	5	4.08	0.709
The involvement of PPPs has improved project management within the water sector by effectively screening key competencies.	306	1	5	3.93	0.848
PPPs have also provided customized specialized training in areas requiring specific skills.	306	1	5	3.95	0.926
The corporation has enhanced skills development through the engagement of PPPs in project execution and implementation	306	1	5	3.23	0.926
Valid N (listwise)	306				

Source: Researchers, 2024

From Table 3, respondents agreed with the statement that PPPs had brought in technical expertise in fields where such was required in carrying out corporation's projects, this is supported by a mean of 4.38 and a standard deviation of 0.860; respondents also concurred with the statement that the engagement of PPPs in project execution has facilitated the sourcing of experienced personnel (M=4.08, SD=0.709) and that the involvement of PPPs has improved project management within the water sector by effectively screening key competencies (M=3.93, SD=0.848). On corporation enhancing skills development through the engagement of PPPs in project execution and implementation respondents were neutral on the matter (M=3.23, SD=0.926). Further respondents agreed that PPPs have also provided customized specialized training in areas requiring specific skills (M=.3.95, SD=0.926).

The outcomes of this study indicate that technical skills, as a proxy factor, were suitably effective in evaluating private-public partnerships and water service delivery projects in Meru County. These findings align with Puentes and Istrate (2011), who conducted research on the roles of committed private-public associations within dedicated public-private partnership frameworks. Their study involved a review of institutional and governance structures, assessing both United State of America and international experiences with PPP units.

Water Service Delivery

The study set out to assess water service delivery in Meru County. Presentation of the outcomes was done in Table 4.

Table 4: Water Service Delivery

	N	Min	Max	Mean	Std. Deviation
Recent experiences indicate project efficiency, thus contributing to enhanced water delivery	306	1	5	3.86	0.882
The completed water projects have achieved the anticipated impact on customers, resulting in their satisfaction.	306	1	5	3.99	0.847
Implemented water projects have delivered expected returns and cost reductions, contributing to better services.	306	1	5	4.09	0.867
Contractors involved in the water projects have had their interests addressed, obtaining benefits from their execution	306	1	5	3.61	0.761

The completion of projects has allowed the water companies to prepare for the future through their successful implementation.	306	1	5	4.14	1.031
Valid N (listwise)	306				

Source: Researchers, 2024

The study findings indicated that respondents agreed that the water sector in Meru County lately experiences indicate project efficiency, thus contributing to enhanced water service delivery (M=3.86 SD=0.882); that the completed water projects have achieved the anticipated impact on customers, resulting in their satisfaction (M=3.99 SD=0.847) and that implemented water projects have delivered expected returns and cost reductions, contributing to better services (M=4.09 SD=0.867). The respondents also agreed with the statement that contractors involved in the water projects have had their interests addressed, obtaining benefits from their execution (M=3.61 SD=0.761) and that completion of projects has allowed the water companies to prepare for the future through their successful implementation (M=4.14 SD=1.031). The research outcomes show that water service delivery was satisfactorily fit in assessing PPPs and service delivery.

4.3 Correlation Results of Study Variables

Pearson's correlation explains the association amidst two factors and falls between positive 1 to negative 1 where positive 1 suggests a sturdy/robust positive association and a negative 1 suggests a sturdy/robust inverse association. The more the affiliation will in general zero the feebler it ends up being. The presentation of the outcomes of correlation results as done in Table 5.

Table 5: Pearson's Correlation Results

		Service Delivery	Technical Skills
Service Delivery	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	306	
Technical Skills	Pearson Correlation	0.647**	1
	Sig. (2-tailed)	0.000	
	N	306	306

Source: Researchers, 2024

The connection between water service delivery and the predictor variable technical skills, was positive, with values of 0.647. The results indicate that the predictor variable, namely technical skills, has a strong correlation with effective water service delivery.

4.4 Regression Analysis

Presentation of the results on the fitness goodness of the joint model was done in Table 6.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.789[a]	0.646	0.664	1.2459

a. Predictors: (Constant), technical skills
Source: Researchers, 2024

The outcomes of the results show that technical skills were satisfactorily explaining performance of projects as evidenced by the R square (adjusted) of 0.646 which shows that technical skills can explain 64.6% of the water service delivery. The rest of the extent (35.4%) shows that there are different components not caught in this investigation which clarify its execution.

Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.809	4	1.452	36.906	.000[b]
	Residual	32.591	302	0.210		
	Total	38.400	306			

a. Dependent Variable: Service Delivery
b. Predictors: (Constant), technical skills

The outcomes of the research imply that the joint model is qualified to be significant in statistical terms. The findings show that the F Cal was of 36.906 which was greater than the F Critical which was 3.789 at p value 0.000. This suggests that the model demonstrated a good fit. The results indicate that technical skills are key determinants of water service delivery.

Coefficient's Regression

Presentation of the outcomes on coefficient's regression was done in Table 7.

Table 7: Coefficient's Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.281	0.172		7.454	0.000
	Technical Skills	0.354	0.065	0.479	3.897	0.000

a. Dependent Variable: Service Delivery

Source: Researchers, 2024

The outcomes of the findings indicate that there is an optimistic link amidst specialized abilities, money related commitment, hazard moderation and responsibility and undertaking execution beta coefficients as indicated by their coefficients of 0.354. Furthermore, technical skills were statistically significant as shown by significance values of 0.000. The results indicated that technical skills were key predictors of water service delivery. The outcomes of the results show that; a unit rise in technical skills translates to increase in water service delivery by 0.354 units.

5.1 Conclusion

Regarding technical skills and water service delivery, it can be concluded that PPPs have introduced technical expertise in areas where it was needed for executing the corporation's projects. The findings indicate that experienced personnel were effectively sourced through the engagement of PPPs, enhancing project management within the corporation. Key competencies were thoroughly screened by involving PPPs, leading to improved project outcomes. Additionally, PPPs provided specialized training in areas requiring specific skills, contributing to skills development within the corporation. Finally, Meru County has implemented technical skills measures, which are crucial for determining water service delivery in the institutions.

5.2 Recommendations

Regarding technical skills, the researcher suggests that PPP management should ensure they procure the most cost-effective technical expertise in fields where required for the corporation's projects to achieve high output levels. Additionally, the researcher recommends implementing measures to screen key competencies to enhance better project management.

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