
A Review of Privatization of Waste Management Service in Oman

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DOI - <http://doi.org/10.37502/IJSMR.2022.5706>

Abstract

Waste management service is an important issue that needs great attention from the government. To improve the quality of waste services, many governments have turned to the privatization of municipal waste management services. This study investigates the linkage between privatization of waste management service and (a) effective service, (b) cost saving/efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) adopted new technology, (g) Bureaucracy? The target respondents of this research are household or the owner of the house in Oman or the users of waste service.

Keywords: Privatization, Management, Waste, Services, Oman

1. Introduction

Human relations with the environment, especially the way they deal with waste, have been studied even in the early days, when people have learned about the steps in waste management and reuse of certain important raw materials. The ultimate goal of waste management is to prevent or reduce the impact of waste materials on human health (Babaei et al., 2015) and social facilities (Leblanc, 2019; Abeliotis et al., 2014).

Studies show that growth in both economic development and population will pile pressure on the already existing waste management systems and facilities in Oman (Umar, 2021; Bhaskar and Kumar, 2019; Saka et al., 2019; Raimi, Adelopo, and Yusuf, 2019). Consequently, it will not be easy for waste management agencies and it might also be difficult to obtain funding for the necessary investments in new systems and facilities for waste management. Some Studies emphasize that there is need to re-evaluate and review the waste management systems in the Oman governorates, while considering costs and finding alternative solutions to reduce costs (Umar, 2021). Moreover, some studies reveal that workers in waste management agencies live in pathetic social status and there is need to motivate them to ensure efficiency in waste management operations.

Furthermore, Madinah (2016) cited in (Juri et al., 2018) examined that the development of an effective waste management system is also constrained by a lack of financial resources and poor socioeconomic conditions. Although the local government (Municipality) is tasked with the waste management function, municipalities in developing countries including Oman are often burdened by increased demand for proper waste management due to insufficient capacity, insufficient manpower, and lack of financial and technical capacity. Solid waste management

costs are estimated to range between 20% and 50% of municipal revenues. However, collection rates remain low, with only between 50% and 70% of the population receiving waste collection services (Juri et al., 2018). The consequence is many governments have turned to the privatization of municipal waste management services, as an alternative to the provision of traditional public services. Privatization of waste collection requires private sector participation and devolving power to local government/city councils. Some countries pursue employment partnerships or privatization, in which the private and public sectors jointly develop plans and share responsibility for providing waste management services. Governments around the world are approaching the privatization of waste management services in a variety of ways, including contracts, franchises, divestments, concessions, and open competition. The two most commonly applied privatization methods for waste management are contracts and franchising, and the suitability of these methods for a system varies for waste collection, disposal, cleaning, and transportation services (Sukholthaman et al., 2017).

The term privatization is understood somewhat differently across different disciplines and institutional settings. Scholars of public administration, sociology and political science have generally adopted a broad definition, which includes "all reductions in state spending and regulatory activity". In management, finance and economics, scholars tend to adopt a narrower definition that refers exclusively to "the transfer of ownership of state-owned enterprises from the government to the private sector". Privatization has become a key component of structural reform programs in both developed and developing countries. The objectives of these programs are to achieve higher microeconomic efficiency and promote economic growth, as well as reduce public sector borrowing requirements through the elimination of unnecessary subsidies. Microeconomic theory tells us that the issue of incentives and contracts creates inefficiencies due to public ownership, given that managers of state-owned firms pursue different goals than private firms and face less monitoring. The same thing also happened to the privatization of waste services from local governments to private companies to improve effectiveness and efficiency as well as improve the quality of waste services to the community (Radić et al., 2021).

The argument for privatization is largely based on the assumption that a shift from state to private ownership will redirect managers towards maximizing shareholder wealth, which in turn will increase operating efficiency. It is not surprising, then, that a large number of studies have explored how privatization affects financial and/or operating performance, attempting to substantiate or perhaps refute arguments based on microeconomic theory. At the same time, others have examined other potential outcomes of privatization – such as service quality, internationalization of innovation, or employment rates (Xu et al., 2018).

Research on the privatization of public service providers, such as electricity, garbage disposal, highway infrastructure shows mixed results. A study of Colombia's privatized power plants, for example, found that, after other factors were taken into account, performance improvements were not systematically associated with changes in ownership found improvements in the performance of privatized electric utilities in the UK, a comprehensive analysis of 36 countries, showed no improvement significant (Radić et al., 2021).

The researches on waste management service have been studied by numerous researchers, (i.e. Marco, 2015; Choi, 2016; Salminen, 2016; Choon et al., 2017; Emmanuel & Donkor, 2018).; Shriwas et al., 2018; Eres, 2019; Tsukiji et al., 2020; Taušová et al., 2020; Shegow & Funwie, 2020; Adekunle & Dakare, 2020; Yuan, 2013; Molina & Catan, 2021; Ulhasanah & Goto, 2017). However, the existing study is deficient in investigating the advantages and disadvantages of privatization on waste management service.

The study on privatization on waste management service have been investigated by varies authors and perspective (i.e. Al Hinai, 2016; Kostanian, 2019; Bolaane & Issac, 2015; Saei et al., 2012). Most of the reason why the waste management services are transfer to privatization program due to inefficient and ineffective in managing the waste management service by government sector. However, there was a missing link between privatization of waste management service and its advantages and disadvantages.

By reviewing the previous study, the study of waste management and privatization have been conducted in many countries and place (i.e. Marco, 2015) in Barcelona; (Choi, 2016) in Norway; (Salminen, 2016) in Haaga-Helia University of applied science; (Choon et al., 2017) in Malaysia; (Emmanuel & Donkor, 2018) in USA; (Shriwas et al., 2018) in Raipur and Bilaspur city, India; (Eres, 2019) in Norwagia; (Tsukiji et al., 2020) in USA; (Taušová et al., 2020) in Slovakia; (Shegow & Funwie, 2020) in Somalia; (Adekunle & Dakare, 2020) in Nigeria; (Yuan, 2013) in China; (Molina & Catan, 2021) in Philipines; (Ulhasanah & Goto, 2017) in Indonesia; (Al Hinai, 2016) in Egypt; (Kostanian, 2019) in Lebanon; (Bolaane & Issac, 2015) in University of Botswana; (Saei et al., 2012) in New Delhi and Manila; (Wang, et al., 2018) in China. However, none of study above was carried out in Oman perspective.

Some previous studies (i.e. (Al Hinai, 2016; Kostanian, 2019; Bolaane and Issac, 2015; Saei et al., 2012; Wang, et al., 2018) indicated that public or householders largely dissatisfied with the extent of monitoring and sanctioning of the company by the government. For privatization in waste management to be effective, it is important that when service responsibilities are contracted out to the private sector, Municipality need to ensure that performance standards are upheld. The government body need to set the goals and standards for the private sector to operate the service of waste management with this requirement, Akaateba and Yakubu (2017) identified structural failures in the privatization in waste management and also concluded that merely shifting public services to the private sector will not in itself guarantee service quality and effectiveness. However, the practices of waste management service privatization are not following with government monitoring and control (Al Hinai, 2016; Kostanian, 2019; Bolaane & Issac, 2015; Saei et al., 2012; Wang, et al., 2018). Therefore, this research considered the government control or monitoring as moderating variable between waste management service privatization and waste management service performance in term of cost, efficiency, and waste sorting by category, waste collection and transfer, waste treatment, waste transport, waste disposal, general cleaning work.

Privatization provides many potential advantages and disadvantages. the various advantages of privatization of waste management as follows: (1) effectiveness, (2) Efficiency/cost saving, (3) timely service delivery, (4) quality services, (5) cleanliness and healthy environment, (6) jobs creation) (7) new technologies and innovative techniques, (8) less bureaucracy and prompt

acting on concerns and complaints. The disadvantages of waste management service privatization consist of (a) delay in waste collection, (2) environmental degradation and (c) social inequality (Bah & Artaria, 2021).

The most basic argument for the privatization program, as well as for the privatization of waste services in Oman, is that private companies entrusted with the task of managing waste have a profit incentive to cut costs and become more effective, efficient, time service delivery, quality service. Private companies are interested in making a profit, so are more likely to operate efficiently and make a profit.

Hence, this study intent to investigate the positive and negative impact of waste management service privatization in Oman.

2. Literature Review and Hypotheses

2.1. Waste Management

This section discusses the following topics: (1) waste collection (2) waste segregation (3) waste transportation (4) waste treatment (5) waste disposal.

Waste management or waste disposal refers to the activities that are designed to manage the waste from its initiation until its final disposal. Waste management include actions like collection of waste, transportation of waste, its treatment and finally the disposal part of the waste (Ishawu et al., 2020). The waste management activities are usually pursued by government sector across various countries in the world. There is various expense mechanisms, which is reflected in the waste management services. Waste management or commonly known as waste disposal includes all the actions and activities that are required to manage the waste from its beginning until its final disposal. Waste management practices include waste collection, transportation, treatment as well as the disposal of the waste. There should be proper monitoring and regulation of the waste management process; else, it could affect the overall economic and demographic equations of the country. There should be proper waste related laws, technologies, economic models that will help define the limits and scope of the firms operating in the waste management industry (Adekunle & Dakare, 2020). Moreover, according to Ahmmed, Arif and Hossain (2020) waste could be categorized as domestic waste, municipal waste, and industrial waste and each of these have their own sources.

In the 21st century, rapid population growth, urbanization, industrialization, modernization and digitalization have resulted in an increase in human, animal and environmental pollution such as domestic, industrial, commercial, mining, radioactive, agricultural, hospital, electronic and non-industrial wastes. Electronic. Managing this waste is becoming the biggest problem in the world. Waste management is the process of collecting, transporting, sorting, disposing, destroying, processing, recycling, controlling, monitoring and managing waste, waste, and other waste products. Main objective of the waste management is to save the environment from detrimental effects, free from pollution, also to protect the people's health from the hazardous effects. To manage these wastes, many modern methods can be adopted by Municipality. They are biological reprocessing, recovery through recycling, disposal in sanitary landfill, composting, waste to energy, bioremediation, incineration, pyrolysis, plasma gasification, and

disposal at sea. This waste management technique makes the environment a better place for living things to survive. Waste management consists of a series of steps such as collection of the waste, segregating it based on its nature, transporting carefully and labelling them, undergoing various types of treatment in order to reduce its hazardous effect and disposing it by burning, burying and recycling methods (Bah & Artaria, 2021). These steps prevent the spread of pollution, reduces the hazardous effects and keeps the environment clean. So, the environment became a good habitat for all living creatures.

2.1.1. Waste Collection

Garbage collection is one of the most important public services in the city. However, waste collection has not been implemented effectively in some places due to lack of economic and management resources. Waste is placed in a place that is not in accordance with the consequences of the risk of pollution and unhealthy conditions for the occupants. Therefore, creating a municipal waste collection plan can be tricky. Municipal solid waste collection (MSW) is still a challenge in some countries. While in developed countries, this is a common public service, in low-income developing countries, this is not a common practice (Carlos-Alberola et al., 2021). In these places, regulations are often limited; available resources are scarce and other inefficient means of final disposal of waste are often used.

Authors such as Mochache, Yegon and Wakindiki (2020) have extracted from surveys that, for example, in Emburu (Kenya), 37% of households dispose of their solid waste in the open area, 32% burn it, and 24% recycle it. Only 8% of households reuse the solid waste. In Liberia, burning or burying waste is a common disposal practice, and few households separate or recycle waste (Almazán-Casali, Alfaro & Sikra, 2019). In Asella (Ethiopia), the majority of the population practices improper waste management. Lack of adequate data on waste treatment and limited waste collection can lead to improper waste disposal (Lema et al., 2019). The most popular way to eliminate waste in Africa involves the use of open dumps. In fact, according to Kabera, Wilson and Nishimwe (2019), only Kampala in Uganda has an engineered dump site. Ongoing disposal of MSW in poorly engineered “dumps” on the outskirts of Al-Bayda in Libya is unsustainable and will not meet the demands of population growth and increasing urbanization (Omran, Altawati & Davis, 2018). In this regard, the authors also detect a lack of resources and services that significantly affects waste disposal: an insufficient number of garbage collection containers, making the distance to these containers excessive for many households, thus leading to an increased probability of solid waste disposal. garbage in the open and on the roadside. The results of the practice prove that the presence of open dumps contributes to the increase in air pollution measured around landfills. They showed that in the vicinity of the landfill, oxygen levels in the vicinity were below a comfortable level of 19.5% (Daffi et. al., 2020).

Households with easy access to legal alternatives, such as centralized drop-off containers or roadside waste collection, are less likely to dispose of their waste illegally (Sotamenou et al., 2019). Obviously, if residents do not have the option to dispose of their trash near their homes, they are partially excluded from the waste collection process. The result of this practice is soil, water and air pollution and loss of health-related quality of life, as well as the emergence of vectors, such as insects, rats, and birds that can transmit disease.

2.1.2. Waste Segregation

Proper segregation of waste from health waste at source, storage and transportation is necessary not only to prevent negative impacts on health and the environment, but also to maintain resource efficiency and material recovery. In addition, existing operational protocols for health waste management and service management should be extended for COVID-19 waste, with specific preventive, adaptive, and regulatory measures applied to reduce the potential risk of COVID-19 infection in waste management processes. Based on the concept of reduction, reuse and recycling (3R, reduce, reuse, recycle) better healthcare waste management practices should aim to prevent or recover waste as much as possible, rather than disposing of it by incineration or burial. The most preferred management solution is not to generate garbage in advance, by avoiding wasteful ways of working. Although waste reduction is done extensively at the time of its generation, such as the separation of hazardous waste from other wastes, proper planning that uses purchasing strategies and stock control can also result in a reduction in the amount of waste generated. Colour coding makes it easy for staff handling garbage to put garbage items into the correct containers, and maintain garbage separation during transportation, storage, treatment and disposal. Colour coding also provides a visual indication of the potential risks posed by litter in a particular container. Many states have national laws that prescribe the categories of garbage segregation to be used and colour coding systems for garbage containers. In the absence of national legislation, a World Health Organization (WHO) scheme is available. Each country has issued a number of specific regulations, operations and recommendations for the proper segregation and handling of waste at its source covering COVID-19 waste generated by healthcare facilities (IGES, 2020).

2.1.3. Waste Transportation

One of the negative consequences of human activities is the production of garbage, including improper placement of solids in the city. Increasing the amount of solid waste is one of the components of the progressive deterioration of human activities and environmental quality in all countries. The creation and implementation of effective transportation and management, solid waste system is an important task to ensure environmental safety and sustainable national development. The dominant method of solid waste management i.e. the disposal of their transport waste at landfills, brings with it many negative things, such as the need to dispose of a large piece of land near the city; loss of unresolved valuables in communal waste; high transportation costs for garbage delivery to rural areas; environmental hazards, such as soil, groundwater, and air pollution to avoid expensive complex engineering equipment and tools needed to solve these problems; risk of spreading infectious diseases (Dobroselskyi & Madleňák, 2019).

2.1.4. Waste Treatment

One of the waste treatment methods is anaerobic digestion. Fermentation is distinguished: psychrophilic, mesophilic, thermophilic. Psychrophilic fermentation takes place below 25 °C and lasts 70–80 days. Mesophilic fermentation takes place at 30–40 °C and lasts about 30 days. Thermophilic fermentation takes place at temperatures above 40 °C and lasts 15–20 days. The SARS-CoV-2 virus dies at temperatures above 65 °C, therefore, it will not die due to the

temperature in the process of anaerobic digestion. Its viability is nine days; therefore, it will not survive any kind of fermentation as the shortest is about 15 days. Automated anaerobic digestion will be a good option for biodegradable waste (Ntoumi et al., 2021; Hantoko et al., 2021).

2.1.5. Waste Disposal

Some common waste disposal methods include recycling, composting, anaerobic digestion, incineration, waste disposal at the end of disposal, open waste disposal, and marine waste disposal (Kaza et al., 2018). The impact of solid waste on living organisms can vary depending on many factors such as the nature of waste management practices, waste characteristics and habits of vulnerable populations, duration of exposure, prevention and mitigation interventions (Ferronato & Torretta, 2019).

2.2. Research on Privatization of Waste Management Service

Al Hinai (2016) found that there is a strong impact of the privatization of waste management on the performance of private companies appointed to operate the company. His study includes a privatization program implemented in Egypt for 17 years to assess the impact of privatization transactions on the company's overall performance. An extensive literature review was carried out to cover all studies conducted on the impact of privatization on privatized firms. Furthermore, the collected data sets are used to test the two hypotheses considered to obtain the research objectives. The assessment was carried out on the privatized companies themselves to assess the impact of the privatization transactions on the overall changes in performance over a period of six years, three years before and three years after privatization. In addition, by testing the second hypothesis, this study examines the real impact of privatization by studying the performance of privatized firms relative to a matched set of private firms. Therefore, his research studies the impact of the privatization program as a tool of economic reform by using Egyptian datasets where limited research was conducted to study Egypt's experience in privatization.

However, some authors such as Kostanian (2019) highlight the benefits and risks associated with privatization. He assessed the following goals: (1) the competitiveness and efficiency brought to the sector by private sector participation, (2) the accessibility of public services or goods to citizens, and (3) the impact on the treasury. The scope of his research includes: (1) Middle East Airlines (MEA), (2) Casino du Liban, (3) Regie Libanaise de Tabacs et Tombacs, (4) Lebanese airports and ports, (5) state-owned real estate, (6) the fixed and mobile telecommunications sector, (7) Electricite du Liban, and (8) water companies. Research shows that the privatization of Lebanese public assets has far-reaching implications that will shape the country's future. To be successful, any privatization initiative must be assessed in the long term, far beyond the current debate on remediation of losses. Factors such as the impact on the provision of public services, and their accessibility to citizens, in addition to the spillover effects that privatization may have on the economy, are equally important to consider as the income that the public treasury will generate. In addition, every privatization effort must be accompanied by a strategy that evaluates the potential for asset privatization appropriately, and determines how the funds obtained from the process will be used for the benefit of the people.

Therefore, the role of local governments is very much needed in supervising the implementation of privatization.

Bolaane and Isaac (2015) investigated the privatization of waste collection services. In their research it was found that the formal private sector plays a major role in the provision of waste collection services mainly driven by its business motives. The private sector collects more than 50% of all waste generated in the city. More specifically, the services provided by the private sector are praised by commercial generators who have turned to private sector collection due to perceptions of the poor quality of services provided by the public sector. Despite the benefits of private sector collection such as improved quality of service as reported by commercial waste generators, historically, private sector participation has increased the burden of collection costs on local authorities due to intermittent privatization. The cost burden appears to stem from an inadequately defined scope of work and performance targets, with contracts often based on daily service rates as opposed to unit costs. In this regard, the government's role in supervising the privatization program will be increasingly important. The definition of inadequate scope of work and performance targets is not unique to local authorities only. Commercial waste generators which are mostly serviced by private sector collectors also appear to enter into regular waste collection agreements without clear performance criteria. While the important role played by the private sector in waste management, particularly in collection, cannot be overemphasized, it seems that privatization efforts must be supported by a strong waste information system. Adequate waste information on the level and density of municipal solid waste generation can assist in planning the waste management process and determining the scope and performance criteria for waste collection contracts. In addition, there appears to be a lack of knowledge and skills in contracting out waste collection services, particularly among local authorities. To increase the effectiveness of the privatization of waste collection services, it should be enhanced by building adequate capacity in the public sector on the nature of the information required to contract out services and performance evaluation criteria in the contracting process through training of city officials. However, in cases where the required skills cannot be developed through training of existing staff, capacity building through the recruitment of qualified staff is recommended (Bolaane & Issac, 2015).

Saei, Christensen and Hill (2012) conducting research on the application of public private partnership in sustainable waste management. He found that waste management is not only the responsibility of the public sector because everyone who produces waste is a stakeholder and needs to take responsibility. On the other hand, it has been repeatedly demonstrated by the most influential organizations such as the World Bank and the European Commission that there is a need for change and a different approach to address the growing problem of solid waste management in most developing countries. From a social perspective, they emphasize the participation of the public and the private sector in the form of partnerships. This participation and partnership is rooted in the following situations: First, the increasingly severe environmental damage due to population growth, rapid urbanization and uncontrolled economic growth has challenged the capacity of the public sector to work in accordance with people's expectations. Second, the private sector is believed to have the resources, technology, capacity, efficiency and expertise needed for more effective waste management, while the public sector can play an important role in making regulations and maintaining supervisory

authority over private sector contractors. The division of responsibilities can be arranged in the form of a public-private partnership.

Wang, Mu and Liu (2018) investigated the effect of privatization on the equity of public services. They found that the practice of privatization in China's public bus sector could increase equity. This conclusion is determined by the ratio of private provider indicators to existing market accessibility and the ratio of private ownership of bus lines to all ownership. In particular, there is a negative relationship between market access and equity, an inverse U-shape relationship between competition and equity, and a positive relationship between ownership and equity. This result appears to be somewhat different from Andrews and Van (2013), who found that public-private relations are negatively correlated with citizens' perceptions of equality. One reason for this is that equity defined in our article is calculated following an objectified standard, while equity in their article is of a more subjective nature. Whether citizen perceptions of service delivery are accurate and useful in assessing the performance of public agencies is still under debate (Schachter, 2010). Another explanation may be that a citizen's perception of public services refers to a generic attitude which includes and may differ across various policy areas, while our measures specifically target bus services. It may also be that the institutional context and starting position for privatisation in Chinese municipalities is so different that is, less advantageous from those in Europe or North America that improvement through privatisation is easier to generate or simply hard to compare. A second key finding is that a reversal of bus service privatisation does not have a clearly demonstrable impact on bus service equity; indeed, presence of reversal appears to have a non-significant impact on public bus service equity. Although this seems a puzzling outcome at first sight, it may mean that the gains obtained by earlier privatization have been undone by municipalisation, as competition, ownership and market accessibility, for example institutional, contractual and organisational incentive arrangements are the key factors that determine equity opportunities. In China, the drive for municipalisation derives mainly from a local political logic, where the role of local government in stimulating economic growth and regulating markets is emphasized. When it comes to efficiency and equity of public service provision, these policies may actually be based on erroneous assumptions.

Referring to some previous research on privatization of waste management above, some researchers more focus on transferring from public management of waste management service in order to improve the efficient and effective service of waste management service. However, researches do not find the specific research that focus on privatization program and its advantages and disadvantage. Therefore, this research intent to investigate the relationship between privatization and (a) effective service, (b) cost saving/efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) job creation, (g) new technologies and innovative technique, (h) Bureaucracy.

2.3. Hypotheses

2.3.1. The Relationship between Privatization of Waste Management Service and effective service delivery

Many people assume that the public sector does not effectively provide services to the tax-paying community. Thus, one of the fundamental goals of privatizing some of the services offered by the public sector including waste management especially in urban areas is to ensure effective service delivery. Several recent studies have found that privatized waste management is more effective than state-run ones as evidenced by: customers are willing to pay for private waste management services on the principle of value for money or efficiency in supporting and promoting a business approach to waste management. Although in some cases the public sector functions quite well, it will be more impactful or effective and efficient if they start to commercialize their services and cooperate with the private sector in the form of public private partnerships (Katusiimeh et al., 2017). Privatization is in some cases more effective in densely populated communities, private companies are equally known to be good at exploiting less densely populated areas including rural communities (Juri et al., 2018; Basha, 2007; Demuth, et al., 2018).

In collecting waste, informal groups of workers such as scavengers are sometimes more effective, but to maximize their effectiveness, among other things, they need to be combined with formal systems to ensure wider coverage and proper waste disposal (Lartey et al., 2018). Privatization results in optimal efficiency, effectiveness, and high economic benefits. The privatization method has proven to be more effective in facilitating waste management in cities compared to the conventional approach (Juri et al., 2018). Privatization is effective in many ways including avoiding state supply inefficiencies, social exclusion, and common fragmentation related to market-led supply of social goods and services; and also improving performance and creating social safety nets are not the only concerns of such models (Demuth, et al., 2018).

Therefore, the following hypothesis will be tested:

There is positive significant relationship between Privatization of waste management service (PWMS) and effective service.

2.3.2. The Relationship between Privatization of Waste Management Service and efficiency

The provision of effective and efficient solid waste services is one of the main contracts that residents have signed with their respective governments as central or local government authorities. However, due to budget constraints, some authorities, without compromising on quality, will always want to implement a strategy that demonstrates that the privatization of costs and safe urban services including solid waste management has proven feasible (Bah & Artaria, 2021).

In developed countries, waste management services are cheaper than municipal governments due to privatization. Privatizations are cheap and efficient as they come with highly skilled personnel and good vehicles which increase productivity and effectiveness (Tha & Chandrasekaran, 2017). Privatization even though it is claimed to lead to cost reductions, cost savings in other services, it does not apply in water supply although it is found in waste management even though it is not quite systematic. The benefits of privatization in waste management services include cost savings, risk sharing, increased service levels, efficient

implementation, increased income; and add jobs. The advantages of privatization include more efficiency, protection from risks, security records, faster adoption of efficient new technologies, less debt, etc. Despite the fact that many studies found that the privatization of waste management has increased financial efficiency, brought some financial savings for the government (Bah & Artaria, 2021; Tha & Chandrasekaran, 2017).

Hence, the following hypothesis will be tested:

There is positive significant relationship between PWMS and efficiency.

2.3.3. The Relationship between Privatization of Waste Management Service and time service delivery

The importance of good waste service management because waste that is not transported to the landfill according to the schedule causes the potential for environmental pollution with a foul smell and interferes with environmental health. In providing quality waste management services, time is an important factor. Therefore, in waste management services, punctuality of service has always been a concern for a number of residents, considering that delays can have a positive negative impact on their social and economic welfare. To minimize delays while maintaining quality, privatization has become a reliable option because it is validated: private companies not only provide containers, collection schedules are timely and fixed, charging moderate fees compared to the public sector which sometimes charges when it should be free more satisfied customers. People are willing to cooperate and pay large sums for waste collection including primary collection, transportation; and disposal especially if there is a personal gain namely; efficiency and timely service delivery strengthen privatization (Boateng et al., 2019; Bah & Artaria, 2021).

So, the following hypothesis will be tested:

There is positive significant relationship between PWMS and time service delivery.

2.3.4. The Relationship between Privatization of Waste Management Service and quality service

The government sector or the public sector in providing waste management services has experienced some difficulties in fulfilling its promise to deliver quality services on time and without interruption due to many factors including rapid population growth in urban areas especially in terms of providing some basic social services including solid waste management (Owusu-Sekyere, 2019). Privatization of waste management services benefits customers in many ways including being introduced to market forces, demonstrated in profit motives, competition, more choice, greater efficiency and innovation. (Yeboah-Assiamah, 2015). Waste management service privatization is a critical tool in facilitating quality and effective sanitation service provision if there are adequate mechanisms in avoiding any latent barriers (Bah & Artaria, 2021).

Therefore, the following hypothesis will be tested:

There is positive significant relationship between PWMS and quality service.

2.3.5. The Relationship between Privatization of Waste Management Service and health and clean environmental

Environmental problems are pollution or environmental pollution. Pollution of air, water and soil takes millions of years to return to normal. The industrial sector and motor vehicle fumes are the main sources of pollution. Heavy metals, nitrates and toxic plastics produced by household and industrial waste are responsible for a wide range of pollution. While water pollution is caused by oil spills, acid rain, urban runoff. On the other hand, air pollution is caused by various gases and toxins released by industries and factories as well as residues from burning fossil fuels; Soil pollution is mainly caused by industrial waste which destroys nutrients and nutrients in the soil that are important for plants. Household waste or garbage needs to be managed properly so as not to pollute the environment.

The privatization of waste management services has the potential to overcome the problems faced by cities today, such as public sector management strategies that are unsustainable, formless, inefficient, uncoordinated, unrepresentative, as well as facilitating the realization of a healthy, productive and decent city for its current residents, including the next generation. Future (Basha, 2007). Informal scavenger groups contribute to public health; reduce costs associated with municipal solid waste management; and greatly reduce greenhouse gas emissions to the environment (Bah & Artaria, 2021). Privatization in waste management services are essential in various forms for example, having social, environmental and fiscal benefits, improving the living and living conditions of scavengers which further translates into better health, greater social inclusion while city authorities and residents gain more efficient and cost-effective service (Oates et al., 2018).

Hence, the following hypothesis will be tested:

There is positive significant relationship between PWMS and health and clean environmental.

2.3.6. The Relationship between Privatization of Waste Management Service and new technologies

Waste processing technology is very influential for human comfort and health. How can an area or place apply this waste management technology appropriately and as well as possible? As is known and felt by the community, waste that is thrown away will certainly pollute the environment that causes uncomfortable effects even serious effects that may arise such as illness and poisoning. For this reason, it is very necessary to apply and use waste processing technology.

In order to effectively and efficiently provide solid, accessible and affordable waste management services, cutting-edge technology and innovation is a must. To achieve this, the public sector is heavily restricted such as finance and brain drain. Waste management should address increasing challenges. Hence, privatization of waste management is a reasonable alternative as privatization in waste management is essential for efficient service delivery, ensuring democratic governance through decentralization of services, making services accessible to low and middle income people, ability to work with limited resources, access to new and modern technology including vehicles (Basha, 2007).

Privatization programs adopt more innovative methods and technologies than government services. Success in waste management, it is very important to involve public participation, integration, application of complex technology. Privatization can also increase employees' monthly income, their work safety and waste recycling (Oates et al., 2018). Privatization benefits city councils including the creation of a stronger commercial sector, sustainable job creation; and recovery of valuable materials from recycling activities, which can be used locally without loss of currency or foreign exchange. The privatization of waste management also aims for political independence, economic rationality, efficiency, dynamism; and innovation (Bah & Artaria, 2021).

So, the following hypothesis will be tested:

There is positive significant relationship between PWMS and new technologies and innovative technique.

2.3.7. The Relationship between Privatization of Waste Management Service and Bureaucracy

In some cases, bureaucracy can be a burden in getting things done. To minimize bureaucratic barriers in accessing quality social services including waste management, privatization has made success as a sanction: the benefits of public-private partnerships require increased productivity, competition produces efficient and quality services, management flexibility, better control, respond more effectively with consumer needs, adoption of new technologies and management practices; and reduce pressure on city budgets (Lalchuanawma, 2019; Bah & Artaria, 2021). The private sector is more efficient in waste management, reliable and effective, also takes customer complaints seriously and immediately follows up on them (Tha & Chandrasekaran, 2017; Lartey et al., 2018). The privatization of waste management services fails if the complaint mechanism, performance measurement system is poor; and the same if no appropriate action is taken against contractors who fail to meet expectations (Tha & Chandrasekaran, 2017; Bah & Artaria, 2021; Murugan et al., 2017).

In the privatization program, it needs to be supervised by the Public Sector or the government. The government is also responsible for resource conservation and protection from risks. If the government wants to provide quality and affordable services to the community, among other things, it must carry out its supervisory role so that it cannot do everything alone without partnership and collaboration. For privatization to pay dividends, governments must pay particular attention to project planning and identification, procurement and contract management, performance monitoring, health pollution control, information services, collection and disposal, sanitation regulations, costing methods; and financial management and accounting. If the private sector is not managed properly, it is likely to be affected by problems that exist in the public sector such as administrative weaknesses, inadequate supervision, capital requirements and other related challenges (Sujuddin et al., 2008) as quoted in Yeboah-Assiamah (2015).). Although some governments are heavily involved in environmental services, they are gradually shifting towards privatization as governments and associations increasingly become procurers and regulators (World Trade Organization, 1998). Waste management is complicated in developing countries because it is not integrated, more agencies

do not have clear tasks, there is no umbrella organization for supervision, coordination, etc. (McAllister, 2015).

Therefore, the following hypothesis will be tested:

There is positive significant relationship between Privatization of waste management service (PWMS) and Bureaucracy.

2.3.9. The Role of Government Control on the Relationship between Privatization of Waste Management Service and Performance

The public sector or government is very important in implementing the privatization of waste management services because they are responsible for planning and delivery of services and infrastructure for waste collection and disposal. With regard to waste, local governments are primarily responsible for providing technical support to private companies and assisting with planning and coordination. The collection and disposal of waste to landfill is usually done by the public and the sector, although in some cases – especially for the government – this service can be done by subcontracting waste service companies. The performance of waste management services is very dependent on the role of government control over the privatization of waste management services (Department of environment, forestry and fisheries, Republic of South Africa, 2020).

Therefore, the following hypothesis will be tested:

The relationship between privatization of waste management service and waste management service performance moderated by government control.

Conclusion

Privatization of waste management service is an important issue that needs great attention and support from the government because of its impact on public health and the physical environment. Although the waste problem is global, waste management in developing countries including Oman needs special attention because of the much inefficiency in waste management service. In a developing country, challenges such as population growth, production and consumption of new products, industrialization, and the improvement of living standards, habits and lifestyles, are the main drivers that generate increasingly high amounts of waste.

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