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Privatized Waste Management Service Practices and Service Performance: Evidence from Oman

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Abstract

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. The purpose of this research is to investigate the linkage between privatized waste management (waste sorting by category, waste collection and transfer, waste treatment, waste transport, waste disposal, general cleaning) on service performance. The data collection instrument used was a questionnaire which was administrated to a total sample of 625 Omani resident unit. Reliability and validity tests employed. The research findings indicate significant correlation between waste management service practice and service performance. Based on the findings, strategic recommendations are proposed to implement the Privatization of waste management service for the private sector in Oman.

Keywords: privatization, service performance, waste management service.

1. Introduction

This paper is a continuation of a previously published paper entitled "A Review of Privatization of Waste Management Service in Oman" which was published in the International Journal of Scientific and Management Research Volume 5 Issue 7 (July) 2022, but the current paper includes research results while the previous paper is only a conceptual paper.

The researches on waste management service have been studied by numerous researchers, (i.e. Raugei, 2015; Jung, 2016; Salminen , 2016; Choon, et al., 2017; Sulemana et al., 2018; Shweta et al., 2018; Eres, 2019; Tsukiji et al., 2020; Taušová et al., 2020; Shegow &Funwie, 2020; Adekunle, 2020;Yuan, 2013; Molina & Catan ,2021; Ulhasanah & Goto , 2017). However, the existing study is deficient in investigating the relationship between privatized waste management service practice and service performance.

The study on privatized waste management service have been investigated by varies authors and perspective (i.e., Hinai, 2016; Kostanian Albert, 2019; Bolaane and Issac, 2015; Saei, 2012; Wang and Liu, 2018). 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 the role of government controlling and monitoring on the relationship between privatized waste management service practices onservice performance.

By reviewing the literature, the study of waste management and privation have been conducted in many countries and place (i.e. Raugei, 2015) in Barcelona; (Jung, 2016) in Norway; (Salminen , 2016) in Haaga-Helia University of applied science; (Choon, et al., 2017) in Malaysia; (Sulemana et al., 2018) in USA; (Shweta 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, 2020) in Nigeria; (Yuan, 2013) in China; (Molina & Catan (2021) in Philipines; (Ulhasanah & Goto , 2017) in Indonesia; (Hinai, 2016) in Egypt; (Kostanian Albert, 2019) in Lebanon; (Bolaane and Issac, 2015) in University of Botswana; (Saei, 2012) in New Delhi and Manila; (Wang and Liu, 2018) in China. However, little of study above was carried out in Oman perspective.

Some previous studies (i.e. (Hinai, 2016; Kostanian Albert, 2019; Bolaane and Issac, 2015; Saei, 2012; Wang and Liu, 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, Muscat musicality 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 privation are not following with government monitoring and control (Hinai, 2016; Kostanian Albert, 2019; Bolaane and Issac, 2015; Saei, 2012; Wang and Liu, 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, waste sorting by category, waste collection and transfer, waste treatment, waste transport, waste disposal, general cleaning work.

2. Literature Review and Hypotheses

2.1.1. Privatized Waste Management Service Practice and Effective Service Delivery

The 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., 2012). 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 (Taborri 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 (Taborri 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:

H1a: There is positive significant relationship between privatized waste management service practice and effective service.

2.1.2. Privatized Waste Management Service Practice 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).

Therefore, the following hypothesis will be tested:

H1b: There is positive significant relationship between privatized waste management service practice and efficiency.

2.1.3. Privatized Waste Management Service Practice 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).

Therefore, the following hypothesis will be tested:

H1c: There is positive significant relationship between privatized waste management service practice and time service delivery.

2.1.4. Privatized Waste Management Service Practice 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:

H1d: There is positive significant relationship between privatized waste management service practice and quality service.

2.1.5. Privatized Waste Management Service Practice and Health and Clean Environment

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).

Therefore, the following hypothesis will be tested:

H1e: There is positive significant relationship between privatized waste management service practice and health and clean environment.

2.1.6. Privatized Waste Management Service Practice and New Technologies and Innovative Technique

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).

Therefore, the following hypothesis will be tested:

H1f: There is positive significant relationship between privatized waste management service practice and new technologies and innovative technique.

2.1.7. Privatized Waste Management Service Practice 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 (Sujauddin et al., 2008) 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:

H1g: There is positive significant relationship between privatized waste management service practice and bureaucracy.

2.1.8. Privatized Waste Management Service Practice and Delay in Waste Collection

Privatization in unprofessional waste management causes delays in waste collection so that garbage accumulates and rots and pollutes the environment where residents live. In some countries, for example, in Kampala, Uganda, where waste management is largely dominated by municipalities with financial constraints, large sections of the community are underserved, resulting in the involvement of informal waste collectors who sometimes litter because the dumping site is too far away, especially if there are no one authorities are watching (Katusiimeh et al., 2012). Delay in Garbage Collection: sometimes private garbage collectors do not collect garbage leaving filled garbage containers in the community which causes poor state sanitation sometimes due to remote landfills, etc. (Lartey et al., 2018).

Therefore, the following hypothesis will be tested:

H1h: There is negative significant relationship between privatized waste management service practice and delay in waste collection.

2.1.9. Privatized Waste Management Service Practice and Environment Degradation

The privatization of waste management needs supervision to prevent monopolies, corruption, injustice, environmental damage; and manipulation of political beliefs (Burgess et al., 1997). Private sector companies are feared to exploit their workers because of low wages, unacceptable working conditions, low or declining standards of work, environmental degradation; and the possibility of a monopoly because only large companies will bid on services resulting in high prices (Cointreau-Levine & Coad, 2000) as complained in Lalchuanawma (2019).

Therefore, the following hypothesis will be tested:

H1i: There is negative significant relationship between privatized waste management service practice and environment degradation.

2.1.10. Privatized Waste Management Service Practice and Social Inequality

The privatization of waste management increases social inequality because companies are only willing to offer services to people who can afford the services while those who cannot afford it are left in poor sanitation conditions and related problems as happened in Dar Es Salaam, Tanzania (Niekerk et al., 2019). The negative impacts of privatization include the weakening of the public sector and its inability to ensure social equality, the subordination of wider public goods that generate long-term ecological and cultural values, to commercial interests, high costs because private companies want to make commercial profits in the market. nature of profits, dividends, rent and/or interest (Lalchuanawma, 2019). By charging privatization fees, it may not be suitable for all people, especially those with low incomes and high illiteracy rates, therefore, the classification of society becomes first, second; and the third class for the implementation of effective payment schemes (Lartey et al., 2018).

Therefore, the following hypothesis will be tested:

H1j: There is negative significant relationship between privatized waste management service practice and social inequality.

2.1.11. The Role of Government Control and monitoring on the Relationship between privatized waste management service practices towards Service 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:

H2: The relationship between privatized waste management service practice and service performance moderated by government control and monitoring.

3. Methodology

3.1. Study Design

The study adopted mixed research design using both quantitative and qualitative approaches (Saunders, 2012). Quantitative approach emphasizes measurement and data analysis in numerical form to give precise description, and in addition places emphasis on methodology, procedure and statistical measures to test hypothesis and make predictions. Furtherance to this, quantitative approach strives for precision by focusing on items that can be counted into predetermined categories and subjected to statistical analysis (Simiyu, 2012)

3.1.1. Target Population and Sample

Total target population of this research was Omani families/ Omani resident unit with total 406,303 (Oman population e-Census, 2020)

The Slovin's, formula use to determine the sample size for the survey (Cash & Hay, 2022)

$$n = \frac{N}{1 + N(e)^2}.$$

$$n = \frac{406{,}303}{1 + 406{,}303(0.04)^2} = 625$$

Where:

n: the sample size
N: the population size
e: the margin of error
1: constant value

3.1.2. Sampling Technique

Based on Slovin's formula, a suitable method is to use a probability sampling technique in which all elements of the population have a tendency to be part of the sample--a requirement that helps researchers to ensure the level of representativeness of their sample (Saunders et al., 2019). However, to achieve the research objective, a non-probability sampling design was adopted for several reasons. First, the research objectives and questions require the respondent's level of understanding of waste management service practices. Therefore, the target study sample consists of the owner of Omani resident unit.

3.2 Data Collection Procedure

The study administered a total of 625 questionnaires to the study population as a tool to capture the required data. The choice of the questionnaires has been arrived at because of the ease of administration. The drop and pick method were preferred for questionnaire administration so as to give respondents enough time to give well thought out responses. The researcher used the services of three research assistants to mainly make follow ups of the administered questionnaires.

3.3. Analysis of Data

Data analysis was guided by the research objectives presented. Once the questionnaires had been administered, the raw of data collected from the field were systematically organized to facilitate data analysis. Descriptive statistical analysis was carried out in accordance with the study objectives by use of (SPSS) program. Goodness of measure was done through testing of reliability and the validity. Reliability was done by testing for both consistency and stability. Consistency indicated how well the items measuring the concepts hang together as a set.

4. Result

4.1. Validity Analysis

The validity test of service performance, privatized waste management service practices and government control and monitoring. According to the result of completed questionnaires, the Cronbach's Alpha for service performance was 0.936, privatized waste management service practices was 0.920 and Cronbach's Alpha for government control and monitoring was 0.912, it means that all these questionnaire items are valid

4.2. Reliability Analysis

It is suggested that reliability should be equal to or above 0.60 have suggested four cut-off points for reliability, which includes excellent reliability (0.90 and above), high reliability (0.70-0.90), moderate reliability (0.50-0.70) and low reliability (0.50 and below) (Taherdoost, 2016).

The result of completed questionnaires, the Cronbach's Alpha for service performance was 0.925, privatized waste management service practices was 0.942 and Cronbach's Alpha for government control and monitoring was 0.921, it means that all these questionnaire items are high reliability

4.3. Correlation Analysis

The correlation between the independent variables, which is represented by waste sorting by category (WSBC), waste collection and transfer (WCAT), waste treatment (WTRE), waste transport (WTRA), waste disposal to final landfills (WD), general cleaning (GEC) and government control (GC) and the moderating variable, which is government control was positive. Waste sorting by category (WSBC) has a correlation of 0.722, $p < 0.01$ with service performance, waste collection and transfer (WCAT) has a correlation of 0.890, $p < 0.01$ with service performance, waste treatment (WTRE) has a correlation of 0.785, $p< 0.01$ with service performance, waste transport (WTRA) has a correlation of 0.867, $p < 0.01$ with service performance. waste disposal to final landfills (WD) has correlation of 0.801, $p < 0.01$with

service performance, general cleaning (GEC) has a correlation of 0.742, $p < 0.01$with service performance, general cleaning (GEC) has a correlation of 0.762, $p < 0.01$ with service performance, government control (GC) has a correlation of 0.771, $p < 0.01$ with service performance. This means that respondents are more likely to evaluate waste sorting by category (WSBC), waste collection and transfer (WCAT), waste treatment (WTRE), waste transport (WTRA), waste disposal to final landfills (WD), general cleaning (GEC) and government control (GC) positively correlation with service performance.

The correlations with service performance became higher when the moderator variable [(waste sorting by category (WSBC), waste collection and transfer (WCAT), waste treatment (WTRE), waste transport (WTRA), waste disposal to final landfills (WD), general cleaning (GEC) and government control (GC)] interacted with the independent variables (service performance). WSBCXGC scored a correlation of 0.771, $p < 0.01$ and WCATXGC scored a correlation of 0.872, $p < 0.01$. WTREXGC scored a correlation of 0.804, $p < 0.01$, WTRAXGC scored a correlation of 0.870, $p < 0.01$, WDXGC scored a correlation of 0.835, $p < 0.01$, GECXGC WDXGC scored a correlation of 0.799, $p < 0.01$.

4.4. Hypotheses Testing

Table 1 shows coefficients of each model along with corresponding test statistics. In model 1 where the dependent variable is overall Privatized waste management service practices, the model seems to be reliable (p-value for $F<0.01$ and adjusted R-square of 0.345. The Model showed that 34.5 % of service performance is related to six independent variables (Waste sorting by category, Waste collection and transfer, Waste treatment, Waste transport, Waste disposal¸ General cleaning)

Hypothesis 1a examines the linkage between privatized waste management service practices and service effectiveness. An analysis based on the multivariate regression model was conducted to test the combined effect of privatized waste management service practices (independent variables) on effectiveness of waste management service of Oman (dependent variable). The model seems to be reliable (p-value for $F<0.01$ and adjusted R-square of 0.740) showed that 74% of effectiveness of waste management service is related to privatize waste management service practices that consist of six sub-independent variables (waste sorting by category, waste collection and transfer, waste treatment, waste transport, waste disposal and general cleaning). Waste collection and transfer (WCAT) and waste transport (WTRA) are the most important determinant in effectiveness with p-value for $t<0.01$, followed by general cleaning with p-value $t<0.05$, While waste sorting by category, waste treatment, and waste disposal to final landfills are not significant. The result in model 1 Table 1 is to support H1a.

Hypothesis 1b examines the linkage between privatized waste management service practice and efficiency. The model 2 Table 4.15 show the reliable (p-value for $F<0.01$ and adjusted R-square of 0.762). The Model showed that 76.2% of efficiency of waste management service is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WCAT and GC are the most important determinant in efficiency with p-value for $t<0.01$, followed by WTRA with p-value $t<0.05$, While WSBC, WD and WTRE are not significant. The results in Table model 2 Table 4.15 support H1b.

Hypothesis 1c examines the linkage between privatized waste management service practices and time service delivery. The model indicated the reliable (p-value for F<0.01 and adjusted R-square of 0.736). The Model showed that 73.6% of time service delivery is related to six independent variables ((WSBC, WCAT, WTRE, WTRA, WD and GC). WCAT, WTRA and GC are the most important determinant in time service delivery with p-value for t<0.01, followed by WD with p-value t<0.05, WSBC, and WTRE are not significant. The result in model 3 Table1 is to support H1c.

Hypothesis 1d examines the linkage between privatized waste management service practices and service quality. The model indicated the reliable (p-value for F<0.01 and adjusted R-square of 0.723). The Model showed that 72.3% of quality service is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WCAT, WD and GC are the most important determinant in service quality with p-value for t<0.01, followed by WTRA with p-value t<0.05, While WSBC, and WTRE are not significant. The result in model 4 Table 1 is to support H1d.

Hypothesis 1e examines the linkage between privatized waste management service practices and health and clear environment. The model seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.762). The Model showed that 76.2% of health and clear environment is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WSBC, WCAT and GC are the most important determinant in service quality with p-value for t<0.01, followed by WTRE with p-value t<0.05, while WTRA and WD are not significant. The result in model 5 Table 1 is to support H1e.

Hypothesis 1f examines the linkage between privatized waste management service practices and new technologies and innovative technique. The model seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.676). The Model showed that 67.6% of new technologies and innovative technique of waste management service related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WTRA is the most important determinant in new technologies and innovative technique with p-value for t<0.01, followed by WSBC, WTRE, WD with p-value t<0.05, while WCAT and GC are not significant. The result in model 6 Table 1 is to support H1f.

Hypothesis 1g examines the linkage between privatized waste management service practices towards and bureaucracy. The model seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.786). The Model showed that 78.6% of bureaucracy is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WCAT, WD, and GC are the most important determinant in bureaucracy with p-value for t<0.01, while WCBC, WTRE are not significant. The result in model 7 Table 1is to support H1g.

Hypothesis H1h examines the linkage between privatized waste management service practices and delay in waste collection. The model seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.791). The model showed that 79.1% of delay in waste collection of waste management service privatization is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WCAT, WTRA), WD and GC are the most important

determinant in delay in waste collection with p-value for t<0.01, while WCBC, WTRE are not significant. A result in model 8 Table 1 is to support H1h.

Hypothesis H1i examines the linkage between privatized waste management service practices and environment degradation. The model seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.725). The model showed that 72.5% of environment degradation is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WSBC, WCAT, GC, and WTRE are the most important determinant in environment degradation with p-value for t<0.01, while WTRA and WD are not significant. The result in model 9 Table 1 is to support H1i.

Hypothesis H1j examines the linkage between privatized waste management service practices and social inequality. The model seems to be reliable (p-value for F<0.01 and adjusted R-square of 0.782). The model showed that 78.2% of social inequality is related to six independent variables (WSBC, WCAT, WTRE, WTRA, WD and GC). WCAT, WTRA, WD and GC are the most important determinant in social inequality with p-value for t<0.01, while WSBC and WTRE are not significant. The result in model 10 Table 1 is to support H1j.

Table 1. Model parameter estimates of service performance (p- value in parenthesis)

	Model 1 effective service	Model 2 DV = efficiency	Model 3 DV= timely service delivery	Model 4 DV = quality service	Model 5 DV = health and clean environment	Model 6 DV = new technologies and innovative technique	Model 7 DV = bureaucracy	Model 8 DV = delay in waste collection	Model 9 DV = environment degradation	Model 10 DV = social inequality
Constant	1.259 (0.000) **	1.439 (0.000) **	1.839 (0.000) **	3.728 (0.000) **	-0.118 (0.000) **	0.046 (0.000) **	0.457 (0.000) **	3.205 (0.000) **	0.718 (0.000) **	1.853 (0.000) **
WSBC	-0.103 (0.463)	-0.091 (0.489)	-0.113 (0.408)	-0.199 (0.366)	0.812 (0.000) **	0.297 (0.007) *	-0.031 (0.714)	0.045 (0.804)	1.087 (0.000) **	0.248 (0.227)
WCAT	1.245 (0.000) **	1.334 (0.000) **	1.143 (0.000) **	2.065 (0.000) **	1.783 (0.000) **	0.203 0.137	0.855 (0.000) **	1.455 (0.000) **	1.319 (0.000) **	1.874 (0.000) **
WTRE	0.308 (.060) *	0.184 (0.234)	0.037 (0.814)	-0.238 (0.357)	0.632 (0.015) *	0.332 (0.010) *	0.045 (0.642)	-0.068 (0.0753)	0.906 (0.001) **	-0.177 (0.460) *
WTRA	0.843 (0.000) **	0.589 (0.001) **	0.798 (0.000) **	0.839 (0.003) *	0.482 (0.091)	0.578 (0.000) **	0.179 (0.096)	1.148 (0.000) **	0.188 (0.0536)	0.969 (0.000) **
WD	0.055 (0.709)	0.241 (0.083)	0.323 (0.024) *	0.847 (0.000) **	0.308 (0.185)	0.362 (0.002) **	0.563 (0.000) **	0.996 (0.000) **	0.245 (0.324)	0.867 (0.000) **
GC	0.285 (0.011)	0.411 (0.000) **	0.369 (0.001) **	0.689 (0.000) **	0.632 (0.000) **	0.112 0.203	0.230 (0.001) **	0.519 (0.000) **	0.826 (0.000) **	0.683 (0.000) **
Adj R2	0.740	0.762	0.736	0.723	0.762	0.676	0.786	0.791	0.725	.0782
F Value	(0.000) **	(0.000) **	(0.000) **	(0.000) **	(0.000) **	(0.000) **	(0.000) **	(0.000) **	(0.000) **	(0.000) **

*p value <0.05, **p value <0.01

5. Discussion

This research examines privatized waste management service practices towards (a) effective service, (b) collection efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) adopted new technology and innovative technique, (g) bureaucracy (h) delay in waste collection, (i) environment degradation, (j) social inequality. The role of government control and monitoring on the relationship between privatized waste management service practices towards service performance also investigated in this research.

Data were collected from households were selected from the population of Omani resident unit. This study was develop a multivariate regression model based on the survey dataset for identifying the respondent's perception of service performance that include (a) the level effective service, (b) collection efficiency, (c) timely service delivery (d) quality service, (e) health and clean environment, (f) adopted new technology and innovative technique (g) Bureaucracy (h) delay in waste collection, (i) environment degradation, and (j) social inequality, that helps to understand the relationship between privatized waste management service practices and service performance. The specifics of each hypothesis testing result can be summarized in Table2.

Table 2: Summary Result of Hypotheses Testing

Hypothesis	**Description**	**Results**
H1a	There is positive significant relationship between privatized waste management service practices and effective service.	Accepted
H1b	There is positive significant relationship between privatized waste management service practices and collection efficiency.	Accepted
H1c	There is positive significant relationship between privatized waste management service practices and time service delivery.	Accepted
H1d	There is positive significant relationship between privatized waste management service practices and quality service.	Accepted
H1e	There is positive significant relationship between privatized waste management service practices and health and clean environment.	Accepted
H1f	There is positive significant relationship and new technologies and innovative technique.	Accepted
H1g	There is positive significant relationship between privatized waste management service practices and bureaucracy.	Accepted
H1h	There is negative significant relationship between privatized waste management service practices and delay in waste collection.	Accepted
H1i	There is negative significant relationship between privatized waste management service practices and environment degradation.	Accepted
H1j	There is negative significant relationship between privatized waste management service practices and social inequality.	Accepted
H2	The relationship between privatized waste management service practices and service performance moderated by government control and monitoring.	Accepted

There is positive significant relationship between privatized waste management service practice and (a) effective service, (b) efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) new technologies and innovative technique, (g) bureaucracy, (h) delay in waste collection, (i) environment degradation, (j) social inequality.

Taborri et al. (2018); Basha (2007); Demuth et al. (2018) argued that privatized company was more effective than conducted by government sectors. Moreover, Al Hinai (2016) found that there was a strong impact of the privatization on the organization performance. Furthermore, Von Weizsäcker et al. (2005) suggest that privatized company could increase effectiveness, competition, service quality, efficiency, employment, and improve the local economy. The privatized company can impact to effectiveness, efficiency, timely service delivery and many others (Bah & Artaria, 2021). Moreover, Yuan (2013) argued that there was a strong relationship between effectiveness of waste management practices towards social, environmental and economic. However, Hypothesis 1a in this study found a significant relationship between privatized waste management service practices and effective service.

According to Tha and Chandrasekaran (2017), privatized company can generate waste management services cheaper than local governments. By privatizations, they deploy highly skilled and relatively good vehicles that increase the efficiency and effectiveness. Moreover, privatized company was claimed to cost reductions and cost savings. (Bah & Artaria, 2021; Tha & Chandrasekaran, 2017). Some studies indicated that privatized company is an option that municipalities can be considered to achieve quality, efficiency, effectiveness, and coverage (Abbas, Kirwan, & Lu, 2020; Umar, 2021). The privatized company has always been seen as an opportunity to increase efficiency. This study found that that there was significant relationship between privatized waste management service practices and efficiency.

Waste or garbage that is not deliver to the landfill according to the schedule causes the potential for environmental pollution with a foul smell and interferes with environmental health. Therefore, time service delivery is an important factor in providing the quality waste management service. To minimize delays time service delivery, privatized company 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 (Boateng et al., 2019; Bah & Artaria, 2021). The finding of this study showed that there was significant relationship between privatized waste management service practice and time service delivery.

The research examined the linkage between privatization of waste management service practices and service quality and research finding showed that there was significant linkage between privatization and service quality. It means that privatization program has able to increase the quality of service. In providing waste management services to the public, the government sector has experienced some difficulties in fulfilling its promise to deliver quality services on time and without interruption due to many factors including the rapid population growth in urban areas especially in terms of providing some basic social services (Owusu-Sekyere, 2019). Therefore, there is a need for privatized company in the waste management process that can work professionally so that the quality of waste management services can be improved. Waste management service carried out in a monopoly by the government sector tends to affect the cost of providing services and the quality of services provided to the community is not as expected. Privatization plays an important role in maintaining the poor quality of waste services so as to improve the quality of waste management services to the

community (Al Hinai, 2016). So, the privatized company could improve the quality of waste management service.

The hypothesis investigated the relationship between privatized waste management service practices towards health and clean environment. The privatized waste management service practices can overcome the environment issues faced by urban communities today, and facilitate the realization of a healthy city for current generation and next generation (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; Oates et al., 2018). Environmental pollution is a problem in managing a healthy and clean environment. Pollution of air, water and soil takes a long time to return to normal. It will affect the health of the earth's population, including humans. In industrial and urban areas is a major source of pollution. Heavy metals, nitrates, and toxic plastics produced by household and industrial waste also have an impact on environmental pollution. Therefore, waste management should be managed professionally to produce a clean and healthy environment. This found that significant linkage between privatized waste management service practices and clean environment.

Privatized waste management service practices can adopt more innovative technologies than government services do. This research investigates the relationship between privatized waste management service practices towards new technologies and innovative techniques (H1f) and research finding showed that there was strong linkage between privatized waste management service practices toward new technologies and innovative techniques. It means that by privatization, privatized company can adopt new technologies that enable them to increase the quality of service (Oates et al., 2018). A good waste processing technology is very influential for the comfort and health of the community, especially urban communities. Therefore, waste management companies can apply this waste management technology appropriately and as well as possible. Garbage that is just thrown away will certainly pollute the environment, causing uncomfortable effects and even serious effects that may arise such as disease and poisoning. For this reason, it is very necessary to apply and utilize waste management technology in waste management service.

The hypothesis investigated the relationship between privatized waste management service practices and bureaucracy and research finding showed that a significant relationship between privatized waste management service practices and bureaucracy. It means that by privatized waste management service practices can reduce the bureaucracy in waste service management service.

The complicated bureaucracy that is usually applied in the government sector can slow down or become a burden in completing a job. Bureaucratic obstacles in accessing waste management services require collaboration between the private sector and the government or what is called privatization (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 privatized waste management service practices fail 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).

Waste management is largely dominated by municipalities with financial constraints, large sections of the community are underserved, resulting in the involvement of informal waste collectors who sometimes litter because the dumping site is too far away, especially if there are no one authorities are watching (Katusiimeh et al., 2012). Sometimes private garbage collectors do not collect garbage leaving filled garbage containers in the community which causes poor state sanitation sometimes due to remote landfills, its cause the delay in waste collection (Lartey et al., 2018). Privatized waste management service practices in unprofessional waste management causes delays in waste collection so that garbage accumulates and rots and pollutes the environment were resident's life.

Hypothesis examines the linkage between privatized waste management service practices and delay in waste collection and research finding showed that a significant relationship between privatized waste management service practices and delay in waste collection. It means that by privatized waste management service practices can reduce the delay in waste collection. The privatized waste management service practices need supervised by the government through government control and monitoring to prevent monopolies, corruption, injustice, environmental damage; and manipulation of political beliefs. Private sector companies are feared to exploit their workers because of low wages, unacceptable working conditions, low or declining standards of work, environmental degradation; and the possibility of a monopoly because only large companies will bid on services resulting in high prices (Lalchuanawma, 2019).

The Hypothesis examines the linkage between privatized waste management service practices and environment degradation and research finding showed that there was strong linkage between privatized waste management service practices and environment degradation. It means that by privatized waste management service practices can reduce the environment degradation. Waste or garbage if not managed properly, has a severe impact on local living standards and the environment issues. Therefore, privatized waste management service practices were needed to reduce the environmental degradation. (Tha & Chandrasekaran, 2017; Bah & Artaria, 2021; Murugan et al., 2017)

The privatized waste management service practices increase social inequality (Niekerk et al., 2019). The negative impacts of privatization include the weakening of the public sector and its inability to ensure social equality, the subordination of wider public goods that generate long-term ecological and cultural values, to commercial interests; high costs because private companies want to make commercial profits in the market, nature of profits, dividends (Lalchuanawma, 2019). By charging privatized waste management service practices fees, it may not be suitable for all people (Lartey et al., 2018). In this research Hypothesis H1j examines the linkage between privatized waste management service practices and social inequality has been tested and the study result showed that significant relationship between privatized waste management service practices and social inequality. It means that privatization increase the social inequality.

5.1.2 The role of government control and monitoring on the relationship between privatized waste management service practice and service performance

Privatized waste management service practices are important to implement because they are responsible for planning and delivery of 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 privatized company, although in some cases – especially for the government – this service can be done by subcontracting waste service companies (Department of environment, forestry and fisheries, Republic of South Africa, 2020).

Hypothesis examined the role of government control and monitoring on the relationship between privatized waste management service practice and service performance. The finding showed that government control did moderate the relationship between privatized waste management service practice and service performance.

6. Research Contribution

The main objective of this thesis was to add to the knowledge on the privatization by exploring the relationship between privatized waste management service practices towards service performance. By formulating, developing and testing a research framework that has been discussed in chapter two can be said that this study overall contributes to the knowledge of the role of managing the waste management service on sustainability. First, it proposed a theoretical privatized waste management service practices framework that identified waste management service that included waste sorting by category, waste collection and transfer, waste treatment, waste transport, waste disposal, and general cleaning. Second, this study provides a practical and useful tool for policy makers to audit and assess impact of privatized waste management service practices towards (a) effective service, (b) collection efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) adopted new technology and innovative technique (g) bureaucracy, (h) delay in waste collection, (i) environment degradation, (j) social inequality. The practices of privatization on waste management service can be used to evaluate the extent to which privatized company that provide services in general cleaning in Oman

Third, this study provides proposed conceptual framework in literature regarding privatized waste management service practices and its impact on service performance. Fourth, the results showed that there was strong linkage between privatized waste management service practices and (a) effective service, (b) collection efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) adopted new technology and innovative technique (g) bureaucracy, (h) delay in waste collection, (i) environment degradation, (j) social inequality.

Through the empirical of the influence of privatized waste management service practice and (a) effective service, (b) efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) new technologies and innovative technique, (g) bureaucracy, this research adds the government control and monitoring as moderating variable. Government control and monitoring is important in privatization practices. This is in line with agency theory that describes the relationship between shareholders as principle and management as agents.

Management is a contracted party by shareholders to work in the interests of shareholders. Because of the Oman Environmental Service Holding Company (Be'ah) was appointed or chosen, the government must account for all their work to shareholders (Imam and Erna, 2020)

The finding supports the idea that government control and monitoring moderated the relationship between privatized waste management service practices towards service performance. It is consistent with previous literature (Peng et al., 2016). Policy maker improved (a) effective service, (b) collection efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) adopted new technology and innovative technique (g) bureaucracy, (h) delay in waste collection, (i) environment degradation, (j) social inequality through privatized waste management service practices. The analysis failed to provide evidence of a relationship between privatized waste management service practices and service performance moderated by government control and monitoring. Moreover, this research aims to achieve enhanced research and development in the waste management services that will also contribute to the society. The waste management sector will also reflect an enhanced sector capacity that will influence the sustainability of the operations.

7. Research Limitations

The current study focuses only on the effect of privatized waste management service practices towards service performance, and the linkage between privatized waste management service practices toward service performance moderated by government control and monitoring. As the domain of research on only public sector namely general cleaning service department, the final finding of this research cannot be generalized for all sectors. The researcher also faced certain limitations due to the reluctance of some respondents to fill out the questionnaires and their privacy in which the respondents thought research was lacking.

Future studies replicating this research across multiple industries and sector would increase the understanding of sustainable clean and clear environment. Second, the sample selection was based on a convenience sample, which is often used for exploratory work (Cash & Hay, 2022), rather than a random probability sample. Additional research could be conducted using a random probability sample. Third, the study is based on a self-reported questionnaire. Therefore, there is a possibility of respondents answering questions in a way that is perceived to be more desirable or acceptable than what is actually experienced or believed. Thus, the results of this study should be considered indicative rather than definitive based on these limitations

8. Recommendation for Future Research

One contribution of this research adds to the knowledge on privatization by exploring the relationship between privatized waste management service practices and service performance. The scales established provided reliable and valid measurement of these constructs, and their component dimensions. The scales were developed with the objective to enable research in sustainable management areas that have received pragmatic attention across public service.

However, this research only carried out on cleaning service industry and certain industry practices may not be applicable. Future research could utilize confirmatory factor analysis to substantiate the generalizability of the proposed scales across industry types.

This research has linkage the privatized waste management service practices toward service performance. The scales developed to study the proposed relationships between privatized waste management service practices toward service performance were developed using an exploratory factor analysis. In order to complete the two-step research cycle for developing standardized scales, future research should conduct confirmatory factor analysis to test the hypothesized measurement scales against new sample data from the same referent population of companies. This factor is an important issue, since a minimal amount of confirmatory research in firm integration exists. This lack of confirmatory studies presents a major obstacle for consensus on the use of instruments. Future research could more rigorous and systematic test of alternative factor structures by using confirmatory factor analysis.

The findings of this research confirm that government regulation and monitoring did moderate the relationship between privatized waste management service practices and service performance. Moreover, Oman government need to control and monitor for privatization practices especially in waste management service privatization practices because local governments should provide better waste management services, which include (1) waste collection (2) waste segregation (3) waste transportation (4) waste treatment (5) waste disposal.

The research finding show that significant relationship between privatized waste management service practices and (a) effective service, (b) collection efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) new technologies and innovative technique, (g) bureaucracy, (h) delay in waste collection, (i) environment degradation, (j) social inequality. Therefore, the government should build the strong partnership with privatized company to ensure the performance of waste management service.

9. Conclusion

As discussed in the statistical analysis in chapter four, the results indicated a significant relationship between privatized waste management service practices toward service performance. The service performance consists of (a) effective service, (b) collection efficiency, (c) timely service delivery, (d) quality service, (e) health and clean environment, (f) new technologies and innovative technique, (g) bureaucracy, (h) delay in waste collection, (i) environment degradation, (j) social inequality. These results appear to support H1a-H1j.

The research finding also confirm the hypothesis H2 that consider the relationship between privatized waste management service practices toward service performance moderated by government control and monitoring and statistical testing found that government control and monitoring did moderate the relationship between privatized waste management service practices and service performance.

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