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## **Assessing willingness to pay for Services Provided by the Solid Waste Management Companies.**

**Prince Elisha Nsiah-Asamoah**

#### **Abstract**

*This is a descriptive research survey on willingness to pay for improve service delivery in solid waste collection. The survey intends finding facts enquires on quality service delivery by solid waste management companies. The variables or decisions expressed from the residents in the selected regional capitals and cities depend on the demographic socio-economic characteristics. The research seeks to measure quality service delivery, perception of quality service from residential stakeholders, and the causes from failure to meet the expectations from the refuse collectors. In such cases, the researcher cannot control the variables. The researcher only reported what was happening. It describes the state of affairs, as it exists between the service providers and their customers. The use of structured questions administered to residential apartments selected for this research. The focus is to reach the residents in the selected areas. The sampling design for the research work is the simple random sampling method. The number of residential houses interviewed was 1620. This gave chances to residents in the chosen cities and regional capitals. A participant in the study includes all available respondents ready to spend time and respond to the questions during the survey. 89.5% respondents were satisfied with the services provided by the solid waste management companies and are willing to pay for improve service delivery. This has improved the environmental condition against filth previously loitered in the communities. Collection of waste in cities has creates jobs and improve health lining conditions. The government of Ghana and the district assemblies being a major player in the country waste and sanitation systems, the government or other donor agencies could sponsor such research to cover low-income areas.*

**Keywords:** *Willingness to Pay, Service Providers, Solid Waste Management*

### **1.0 INTRODUCTION**

Managing metropolitans and municipal solid waste continues to burden many districts in Ghana. It has environmental impacts and health burden in many cities in the country. The phenomenon is not limited to Ghana alone but many Africa countries. Overcoming these challenges has been helpful through the municipal authorities engaging the private sectors in waste collection (Adam, M. N. 2018; Yescombe, E. R. 2018). The outsource waste management service providers engage the waste generators or households in collection of waste at an agreed fees payable daily, or weekly, or monthly. Payments depend on the waste service provider or the type of equipment used for the collection. This is a win-win service and has to be agreeing by the district assemblies, the waste polluter or producer, and the service provider. The waste service companies need to be innovative and proactive in handling the waste management service. Investing in solid waste management has it peculiar challenges as it poses a threat to project viability (Sulemana, A., Donkor, E. A., Forkuo, E. K., & Oduro-Kwarteng, S. 2018).

Wastes are unwanted substances that are of no use. Garbage mainly considered includes; wastes from houses - domestic waste, waste from schools, offices, municipal wastes, waste from industries and factories – industrial waste (Bahrami, A., Soltani, N., Pech-Canul, M. I., & Gutiérrez, C. A. 2016). The nature of the item or waste could be worthless, defective or of no value to the disposer. These wastes are normally materials, substances by product, eliminated naturally or discarded after no longer useful or of no value after its complete life cycle (Lagerkvist, A., & Dahlén, L. 2019).

Alabama department of environmental management defines “waste as any means of garbage, refuse, sludge, from water supply treatment plant, air pollution control facility and other discarded material. This include solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, agricultural operations and from community activities, including any material to be discarded by a generator” (Bahrami, A., Soltani, N., Pech-Canul, M. I., & Gutiérrez, C. A. 2016; Waste, F. H. 2018).

### 1.1 Sources of Solid Wastes

There are four sources of solid wastes, classified into Industrial, Commercial, Domestic, and Agricultural waste

**Industrial Waste:** These are waste created from the factories and industries. These wastes are dump or dislodge through rivers and seas and cause pollution. Examples include; plastic, glass, spilt oils and refinery wastes.

**Commercial Waste:** Commercial wastes are produce from schools, colleges, shopping malls, and Offices. Examples include; plastics pack bags, papers, paper cartons, wooden pallets, HDPE materials, and others.

**Domestic Waste:** These are waste from residential or household waste, collected during household activities from cooking, cleaning, weeding, laundry, painting and others.

**Agricultural Waste:** These are generated waste from agricultural sectors and fields. These includes waste from farms, animals rearing cattle's, goats, pigs, cows, chickens and others (Bahrami, A., Soltani, N., Pech-Canul, M. I., & Gutiérrez, C. A. 2016; Waste, F. H. 2018).

### 1.2 Types of Solid Waste

There are two major types of waste, namely Biodegradables and Non-biodegradable.

**Biodegradable Waste:** Biodegradables are wastes produced from kitchens and it includes food remains, garden waste, droppings from poultry, domestics' animals and human fecal matter. Their contents are high in moist or mainly waste with high humidity. The waste can be turn into compost for manure and fertilizers. They are by nature able to decompose by themselves over a period depending on the organic materials (Komakech, A. J., Sundberg, C., Jönsson, H., & Vinnerås, B. 2015; Van, D. P., Fujiwara, T., Tho, B. L., Toan, P. P. S., & Minh, G. H. 2019).

**Non- Biodegradable Waste:** These wastes are by their nature harder or waste comprising hard substances and include broken glasses, and plastics. Non-biodegradable wastes are not able to decompose naturally and are mostly pollutants (Ghosh, A., Sarkar, J. P., & Das, B. 2019; Mukherjee, T., Rahaman, M., Ghosh, A., & Bose, S. 2019).

### 1.3 Solid Waste Management

Solid waste management refers to the process of collection and treating. It is the handling of waste material from source of generation, collection through recovery process to landfills sites. Solid waste is generated from industrial, residential and the commercial activities in a given area or location. These waste generated have to be handle in a special way. Generated waste from residents or industrial wastes are transported to waste landfills sites or to the dumpsites (Amegah, A. K., & Agyei-Mensah, S. 2017; Boateng, K. S., Agyei-Baffour, P., Boateng, D., Rockson, G. N. K., Mensah, K. A., & Edusei, A. K. 2019).

Waste are categorize based on the content of material or substance component matter. This includes plastics, paper, glass, metal and the organic waste (World Bank 2018). Irrespective of the waste continually produced, waste management companies systematically manage to ensure environmental best practices. Managing solid waste is critical in every country and its cities. Incorporation of health and environmental policies in nations on waste management is very useful. Effective management of waste reduces health related problems and outbreak of diseases (Sulemana, A., Donkor, E. A., Forkuo, E. K., & Oduro-Kwarteng, S. 2018).

Solid waste management includes planning, administration and financial engineering of the waste dump or landfills sites. The solutions are complex and interrelated to public health, environmental control agencies, city, town and regional planning, government influence, conservation biology and the re-engineering of the waste landfills (Yescombe, E. R. 2018).

Managing waste differ from refuse collection in residential apartments or households, industries, institutions or companies. It differs from urban and rural areas, the developed and developing countries. Waste generation keep on rising higher daily. In 2016, waste produced in the world cities were 2.01 billion tonnes globally. This amounts to 0.74 kilograms of waste generated per person per day. The rapid growth through urbanization is expected to increase by 70% since 2016 to 3.40 billion tonnes in 2050 (World Bank, September 20, 2018).

The objective of solid waste management is to reduce and eliminates the adverse economic effects from untreated waste on human life in the environment. Treated wastes also improve the quality of life of human beings and grey animals in communities (Ghosh, A., Sarkar, J. P., & Das, B. 2019; Mukherjee, T., Rahaman, M., Ghosh, A., & Bose, S. 2019).

#### 1.4 Solid Waste Disposal and Treatment

The handling of waste at the point of disposal is very crucial. The activity includes use of bins or containers that makes it easier and helpful for waste collection. This helps in lifting waste from household or residential apartment to disposal site or waste landfills using compassion trucks, dump trucks or tricycles in Ghana (Agbefe, L. E., Lawson, E. T., & Yirenya-Tawiah, D. 2019).

Waste disposal from household is the final stage of managing solid waste generated by households. The disposal processes aim to isolate the generated waste from its producers in their environment. Handling this particular depends on the nature of the waste produce. It also depends on the technology use by the service waste companies' in handling the waste, the financial resources, and skilled people (Asibey, M. O., Amponsah, O., & Yeboah, V. 2019).

In Ghana and therefore most cities or urban centers, and in the regions the two main waste disposal processes after lifting from source are dumping it at waste landfills. Accra Compost Plant, a new company in Ghana into recycles of waste use a technology to convert organic waste from households into compost for commercial activities farming. The plant is able to separate the waste into organic and inorganic content materials. The organic materials are then process into compost and use as fertilizers for farming and horticulture (Annepu, R., & Themelis, N. J. 2013; Andrianisa, H. A., & Brou, Y. O. 2016; Tibu, C., Annang, T. Y., Solomon, N., & Yirenya-Tawiah, D. 2019). An equipment used for waste collection as shown below;



Figure 1: A Compassion lifting Refuse from a residential Apartment.

Source: Field survey, 2019

Other waste equipment includes personal protective, tricycles, and borla taxis.

#### 2.0 Research Design

The task of defining the research problem becomes the preparation towards the design of the research work. Research design involves the arrangement of conditions for collection and analysis from data. This done in a manner that aims to combine relevance from the research objectives. The research design is also the conceptual framework within which the research is conduct. It also constitutes the blue print for collection, measurement and the analysis of data. The design could also include an outline of what the researcher will be doing from the initial writing of the

hypothesis and its operational implications to the final analysis of the data (Kothari, C. R., 2004; Edmonds, W. A., & Kennedy, T. D. 2016).

The study is a descriptive cross sectional research with the intent of describing the characteristics of all household or residential apartments in the provision of quality waste management services. The reason for choosing this approach was to; measure service quality among the respondents, and the willingness to pay for quality service delivery from the waste management service providers (Bryman, A. 2016; Bell, E., Bryman, A., & Harley, B. 2018). Guided interviews and questionnaires conducted throughout the country on households that use the services of waste collectors. The researcher explains to the selected households the details of the questions for clarity before answering. The statistical tool for the analysis is the use of SPSS as a measurement tool (Blaikie, N., & Priest, J. 2019).

## **2.1 Research Method**

All methods used by a researcher in the course of studying the research problem are the research methods. It been established that no particular research is better than the order, once the research objectives is clearly define (Borrego et al. 2009; Flick, U. 2018). The choice to use a particular method will depend on the research problem. In this study, the researcher seeks to measure quality service in solid waste management companies in Ghana. The instrument used is a research questionnaire. It includes the collection of data, the statistical analysis tool to interpret the data (Creswell, J. W., & Clark, V. L. P. 2017; Bell, E., Bryman, A., & Harley, B. 2018).

### **2.2.1 Sources of Data**

Data collection through administering the questionnaires distributed to households or apartments in the regional capitals and some selected district assemblies in Ghana. Secondary data is information sourced from other alternatives by the researcher. For this study, the secondary data obtained is from various publications by authors who have written on the topic under consideration. These publications include periodic journals, textbooks, various government reports, company websites and online data sources. All cited materials are duly acknowledged in the references (Mertler, C. A., & Reinhart, R. V. 2016; Sekaran, U., & Bougie, R. 2016; Yin, R. K. 2017; Morris, T. P., White, I. R., & Crowther, M. J. 2019).

### **2.2.2 Target Population**

The target population for this study consists of all regional capitals, cities, and some selected residential apartments or a household that uses the services from solid waste management companies in Ghana. 1820 questionnaires were distributed throughout the country. Majority residential households' heads responded positively.

### **2.2.3 Sampling Technique**

The sampling method for this research work was the probability simple random method. This method is to find out the probability reaching to users from the services provided by the waste management companies. This is to give chances to each one of the possible selected households or apartment (Nardi, P. M. 2018; Kumar, Ranjit 2019).

### **2.2.4 Samples**

A sample is a portion of a population or universe (Tailor, 2005), and a population does not necessarily mean a number of people (Walliman, 2011). Sampling size is a function of the nature of the population, type of data to be use, type of analysis and availability of funds for the study (Saunders et al, 2009). The study will use simple random sampling techniques for the selection of respondents (Iacus, S. M., King, G., & Porro, G. 2019).

### **2.2.5 Questionnaires**

The instrument used was a research questionnaire. This was design to provide anonymity and encourage respondents to give honest answers. The questions focused on knowledge relating to measuring quality service in delivery in solid waste management companies in Ghana (Mertler, C. A., & Reinhart, R. V. 2016; Kumar, Ranjit 2019).

### **2.2.6 Interviews**

The respondents for the questionnaires were identify based on their convenience and availability to answer. The purposes of this research and the questionnaires were explained in detail to the respondents so they would not doubt the researcher and to answer correctly. It was also to ensure safe responses and prompt a healthy understanding between the researcher and respondents (Creswell, J. W., & Creswell, J. D. 2017; Bell, E., Bryman,



A., & Harley, B. 2018; Flick, U. 2018). The period for distribution, collection of questionnaires, and conducting interviews was twelve (12) months. By the end of the period, the researcher was able to recover 1620 out of the 1810 of the questionnaires distributed representing 89.5% valid respondents (Yin, R. K. 2017; Nardi, P. M. 2018; Blaikie, N., & Priest, J. 2019).

### 2.2.7 Data Analysis and Detestation

Analysis of the data is by using the Statistical Packages for Science and Solution (SPSS version 17) and Microsoft Excel 2016. The data obtained grouped, coded and fed into the software to generate the analysis and produce the results. Statistical frequency distribution tables and charts used to present the findings for easy interpretation and easy identification of the patterns and relationships between variables (Dawson, C. 2019; Fink, A. 2019; Iacus, S. M., King, G., & Porro, G. 2019; Morris, T. P., White, I. R., & Crowther, M. J. 2019).

## 3.0 DATA ANALYSIS

In trying to answer the research question, respondents were asked whether they pay for disposing off their waste or not. The details of their responses are represented in Table 1.

**Table 1: Respondents View on Paying for Disposing off Waste**

Response	Frequency	Percent
Yes	1449	89.4
No	91	5.6
No idea	80	4.9
<b>Total</b>	<b>1620</b>	<b>100</b>

Source: Field survey, 2019.

The data in Table 1 reveals that as many as 1449 (89.4%) of the respondents claimed they pay for disposing off their waste whilst 91 (5.6%) of the respondents indicated otherwise in the negative. The remaining 80 (4.9%) responded that they do not have any idea about it. A deduction from the above is that the majority of the respondents pay for disposing off their waste. This confirms the findings from Boateng, K. S., Agyei-Baffour, P., Boateng, D., Rockson, G. N. K., Mensah, K. A., & Edusei, A. K. (2019) on household willingness to pay for improved solid waste management services in four major metropolitan cities in Ghana. To identify the amount charged for dumping, respondents were asked how much they pay collecting their refuse. The details of their responses are presented in Table 2.

**Table 2: Amount Paid for Waste Collection**

Amount paid	Frequency	Percent
GH¢ 1 – 50	987	61.2
GH¢ 51 – 100	441	27.3
GH¢ 101 – 150	93	5.8
GH¢ 151 – 200	9	0.6
GH¢ 201 – 250	76	4.7
GH¢ 251 – 300	3	0.1
GH¢ 301 – 350	4	0.2
GH¢ 351 – 400	2	0.1
<b>Total</b>	<b>1615</b>	<b>100</b>

Source: Field survey, 2019.

The findings in Table 2 shows that 987 (61.2%) of the respondents responded that they pay between GH¢ 1 – 50 for their waste collection, 441 (27.3%) of them pay between GH¢ 51 – 100 and 93 (5.8%) of them pay between GH¢ 101 – 150. Again, 9 (0.6%) of the respondents indicated that they pay between GH¢ 151 – 200 for their waste collection, 76 (4.7%) of them pay between GH¢ 201 – 250 and 3 (0.1%) of the respondents also pay between GH¢ 251 – 300. Furthermore, 4 (0.2%) of the respondents revealed that they pay between GH¢ 301 – 350 for their waste collection while 2 (0.1%) of them pay between GH¢ 351 – 400. The question is why the differences in the fee paid for dumping?

The difference in payment emanates from the regions socio economic factors and the service provider handling that residential apartment. A residential household who purchased their own dustbins which happens to be

the majority 61.2% monthly payment is up to GH 50. The difference as asked was on the equipment used in collection of refuse. Equipments like tricycle, borla taxi rates are lesser as compared to skip and compassion trucks. The higher user charges or payments as service charges from solid waste management companies further explain that, such residential apartments did not initially purchase the 240 Liters dustbins, hence their monthly bill charges is inclusive of the dustbins and the refuse collection. This confirms the earlier findings of Nkansah, E., Dafor, N. K., &Essel-Gaisey, F. (2015) on willingness to pay for solid waste dumpings.

Respondents asked to indicate how payment is done for their waste collection and the details are provided in Table 3,

**Table 3: Mode of Payment of Waste Collection**

Mode of Payment	Frequency	Percent
Revenue collector	836	55.8
Pay to truck drivers	577	38.5
Pay directly to service providers	72	4.8
Through bank	12	0.8
<b>Total</b>	<b>1497</b>	<b>100</b>

Source: Field survey, 2019.

It was also observed from Table 3 that 836 (55.8%) of the respondents pay their waste collectors through their revenue collectors, 577 (38.5%) pay to the truck drivers and 72 (4.8%) pay directly to the waste collectors offices. On the contrary, 12 (0.8%) pay their waste collectors through the banks. It can be concluded that majority of the respondents pay their waste collectors through their revenue collectors. This contradict the previous studies of Padi, A., Addor, J., &Nunfam, V. F. (2015), Boateng, S., Amoako, P., Poku, A. A., Appiah, D. O., &Garsonu, E. K. (2016), done in Takoradi and Kumasi metropolis which states that payment of waste collection is to the district assembly. However, the result confirms the study of (Adam, M. N. 2018; Sulemana, A., Donkor, E. A., Forkuo, E. K., &Oduro-Kwarteng, S. 2018; Yescombe, E. R. 2018).

Respondents were further asked who should pay for their waste collection. The detailed responses are shown Table 4.

**Table 4: Distribution of Who Should Pay for Waste Collection**

Who should pay	Frequency	Percent
Landlord/estate developer	128	8.4
Local assembly	189	12.4
Self-payment	1209	79.2
<b>Total</b>	<b>1526</b>	<b>100</b>

Source: Field survey, 2019.

As shown in Table 4, 128 (8.4%) of the respondents indicated that their property owners or estate developers should pay for their waste collection money and 189 (12.4%) also stated that their local assembly should pay for their waste collection money. However, 1209 (79.2%) of the respondents agree that they should pay for their waste collection money. It can be deduced that majority of the respondents agree that they should pay for their waste collection money. This supports the findings from similar research by: Bhattarai, K. (2015); in India, Nepal, Andrianisa, H. A., &Brou, Y. O. (2016); in Abidjan, Côte d'Ivoire, Patrick, I. M. V., Okon, U. E., & Solomon, U. U. (2017); in Nigeria, Boateng, K. S., Agyei-Baffour, P., Boateng, D., Rockson, G. N. K., Mensah, K. A., &Edusei, A. K. (2019); in Ghana on four major metropolitan cities on household willingness to pay for improved solid waste management services.

### 3.1 TESTING OF HYPOTHESES

There is no statistically significant difference comparing quality service delivery by solid waste management companies with satisfaction from heads of households.  $H_0$  There is no significant relationship between amount residents paid for waste disposal and quality of service.  $H_0$  There is no significant relationship between households with or without dustbins and satisfaction with waste management service.  $H_0$  There is no significant difference between services provided and clients' expectation on delivery service quality. In conclusion, the research was valid meeting the research objectives stated. Majority of the heads in the household's interview were satisfy with the services of the solid waste management companies.

#### 4.0 CONCLUSIONS

Almost or higher proportion of the respondents were satisfying with the services provided by solid waste management companies, and are willing to pay for improve quality service delivery. The study concludes that educational level, number of dependents, gender of household, income, and the location of residents influence household satisfaction from solid waste management companies. These factors also influence the willingness to pay for the service.

#### 5.0 FURTHER STUDY AND RESEARCH

With the government of Ghana and the district assemblies being a major player in the country waste and sanitation systems, the government or other donor agencies could sponsor such research to cover low-income areas. Other researchers can research to investigate on risk and challenges of financing solid waste management in Ghana. Similar research study can be done on developing key performance indicators and measuring tools for assessing waste management companies.

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