EVALUATING THE IMPACT OF SOLID WASTE MANAGEMENT SYSTEM AND ITS ECONOMIC IMPLICATIONS IN DELTA STATE

[1]UMEADI Augustine Azubuike and [2]IBEGBULEM Andreas Brutus
[1]Exams and Records Department;
[2]Department of Business Administration & Management
[1 & 2] Delta State Polytechnic, Ozoro, Nigeria.

Abstract
This paper empirically examined the economic importance of solid waste management with specific reference to Delta State, Nigeria. The paper adopted description research design which entails the uses of questionnaire. The population of the study was 3,654 of public and private sectors in Delta State. Having applied scientific method of research, the population was reduced to 300 as the population size. Data for the study was subjected to Z-test statistics. Findings show that solid waste management has potentials of boosting the economic growth and development of Delta State Internally Generated Revenue (IGR). The paper recommends that Government should adopt an appropriate collection strategy that involved the public and private waste management bodies to generate adequate and sufficient IGR from rent paid by waste owners, and should be used by a management/government to reduce the unemployment of the youths/insecurity problem in Delta State.

Keywords: *Solid Waste, Insecurity, Employment, Internally Generated Revenue*

Introduction

1.1. Background to the Study

The need to properly evaluate the effect of solid waste management on economic conditions and health of average citizenry of Delta State has become imperative in view of the significance it assumed in the world today. Management of waste has become important because improper management of solid waste can cause harm to the life of citizen, safety and economic problems (Abdullahi & Ajibike, 2014)

In addition, problems of municipal waste have also turned into global challenges because of the high increase in population, rapid urbanization, and worldwide industrialization and limited resources (Ndubisi, Anekwe & Attah, 2016)

The problems caused by waste to the environment is pollution characterized by various types of solid waste which include textiles, plastic, metals, wood, papers, vegetal matter and food remnant of multiple constituency (Ndubisi, 2016). These problems associated with waste needed to be approached from several means such as technical, economic, social points of view in order to ensure sustainability, since the concept of environmental sustainability is of key criterion to design waste management system (Manfuedi & Christenson, 2019)

According to Ogbonnia (2017), academic debates in the field of environmental management have attempted to empirically demonstrate the link between solid waste management and economic development. The study opined that solid waste management could generate employment and contribute to internally generated revenue (IGR), but the extent to which submission is academically true and adopted has not received adequate empirical justification in most developing nations considering the management procedures these waste are being handled (Pervez & Kefal, 2013)

Today, there are ongoing debates on the extent to which solid waste management can affect national progress. This paper tries to focus on the direction of progress using Delta State as anchor point.

1.2. Statement of the Problem

The growing improper waste management leading to unsustainable development in Delta State demanded a proper evaluation needed to enhance the quality of lives of the citizens since developmental problems affect the environment. There are three component of sustainable development: economic, social and environmental protection.

1.3. Objective of the Study

The main objective of the study is to evaluate the impact of solid waste management system and its economic implications in Delta State. The specific objectives of the study are:
  i. To examine the impact of solid waste management system on economic sustainability in Delta State.

ii.   To ascertain the relationship between the solid waste management and its economic development.

1.4.   Research Questions

The following research questions guided the study:

i.   To what extent does solid waste management system impact on economic sustainability?

ii.   What is the degree of relationship between solid waste management and economic growth and development?

1.5.   Research Hypotheses

Based on the above formulated research questions, the following hypotheses guided the study:

Ho_1: There is no significant relationship between solid waste management and economic growth and development.

Ho_2: There is no high degree of relationship between waste management and economic growth and development in Delta State.

1.6.   Significance of the Study

The findings of the study will be of importance to the general public, government and waste management agencies.

1.7.   Scope of the Study

This research study was focused on solid waste management system and the economic sustainability in Delta State.

Review of Related Literature

2.1.   Conceptual Review

Meaning and Nature of solid Waste Management

Solid waste management has been one of the greatest challenges facing urban cities mostly developing countries. Delta state is one of the states in Nigeria faced with the problem of solid waste management often characterized by inefficient collection method, improper disposal, inadequacy of solid transportation. Some other factors militating against efficient solid waste management in the state are solid waste reduction technology at source, non-recycling of waste, lack of repairs and legislative bottleneck, inadequate waste disposal vehicles and poor town planning coupled with rapid population and urbanization have all conspired to add to the waste congestion in the streets with grave implication for environmental sustainability and economic development (Ogwekeka, 2003 cited by Agbaeze, Owuka, 2014).

Anekwe, (2016) sees waste as the total of all the materials thrown away from homes and commercial establishments and collected by local governments. It encompasses food waste, household waste and other kinds of inorganic waste from residential, commercial and institutions sources, the collection and disposal of which are performed by local authorities and which may be in either solid or semi –solid form. Examples of this kind of waste are electronic appliances, newspapers, clothing, food, scraps, boxes, disposable table wares, etc.

Citing Medina (2002), improper handling and disposal of solid waste have contributed to high level of environmental and economic problems, mortality and morbidity witnessed in most urban cities in developing countries of the world.

Empirical Review

This is referred to as documented research on solid waste management and economic impact on sustainability with emphasis on Delta State.

According to the research conducted by Ndubusi, Anekwe & Attah (2016), the finding revealed that waste management practice has a significant impact on environmental sustainability in Anambra State, and recommended that Government should establish stringent legal and regulatory framework that will enhance efficient and appropriate collection and disposal of waste by Anambra State management Agency. Also, Government should pump sufficient funds into the agency to enable them dispose waste generated appropriately since hygiene and health of the citizen are very essential.

Okonwkwo (2014) conducted a research on an effective solid waste management system in Awka, Anambra State, Nigeria and concluded that methods of solid waste management are grossly inadequate and this could be attributed to approaches which are not all embracing. It was recommended that there should be a well-articulated plan of the various attributes of the system. The degree of effectiveness is measured by the volume of actually generated waste and the rate at which it is evacuated.

Agbaeze, Onwuka and Agbo (2014) carried out a study on the impact of solid waste management on economic development; using structured questionnaire administered to a cross section of people in three selected local government areas (Enugu East, North and South) personal interview was also conducted. It was observed that solid waste in practice in the State is unscientifically unsustainable and at the prerogative of people in power. Majority of the waste are dumped at open landfill. The authors recommended that massive enlightenment campaigns should be embarked upon to sensitize the people on the proposed waste management system so that they can key into it and contribute meaningfully to its substance. There is need also to encourage the reuse of plastic bags, reduce litter, raise public awareness about environmental issues and encourage the recycling as thicker bags will make recycling more economically viable. The state government should also reconsider the option of public –private partnership which has been adopted with huge success in other cities.

The study conducted by Obawote, Ajayi & Akerele (2016) on willingness to pay for improved solid waste management services in urbanizing area in South-East Nigeria, using

structured questionnaire administered ninety (90) respondents, and was analyzed using descriptive statistics, and ordered logic regression. The result shows that majority (92.2%) of the residents were aware of the inherited risks that could stem out of improper solid waste management, although a lesser proportion of them (64.4%) were willing to pay for an improvement. It was also recommended that government pursue policies that will significantly improve the income of residents and encourage public-private partnership in waste management.

Edward, Peter and Abenga (2017) conducted a research on financial and economic implication of solid waste management in Nigeria. He adopted survey research method to generate data from 300 personnel of the Internal Revenue Board. A large proportion of respondents strongly agreed that solid waste management has significant effect on internally generated revenue (IGR) and youth empowerment in the state. They therefore recommended that Nigeria Government should employ, train, empower unemployed youth in the area of solid waste management to reduce the rate of unemployment in Nigeria.

According to the study by Nkonyeasua (2016) on the assessment of landfill sites for solid waste management in Delta State, he carried out by visiting dumpsites to obtain the needed data and information through the instrumentation of a checklist, interview, questionnaire and focused group discussions, within 25 local government area in the State, finding shows that most solid waste collected and deposited in open dump sites on the outskirts of urban areas thereby forming breeding sites for disease vectors and polluting the environment and plausible recommendations for empowered waste and environmental management in the state.

Methodology

The study adopted descriptive research design which entails the use of distribution of questionnaire. The population of the study was 3,654 of two public and private sectors in Delta State, Delta State Management Board, Board of Internal Revenue and other registered agencies. Arising from the cumbersome nature of distributing questionnaire to each and every one of the total population, the study applied the use of TARO YEMENE formulae to reduce the population to manageable size of 300, hence the sample size was calculated to be 300. The sample size was divided into strata; senior management staff, middle managers. Subsequently, random sampling technique was used to select the determined sample size which was issued questionnaire. Returned questionnaire were analyzed, summarized and interpreted with the aid of simple statistics including total scores, likert scale rating and simple percentage. In testing the hypothesis, the data were further subjected to Z-test at 0.05 significant level. The following is the standard Z-test statistic used for testing the formulated hypothesis:

$$Z = \frac{PQ}{\sqrt{nPQ}}$$

Where:

P = Proportion of positive response (i.e strongly agree and agree)

Q = Proportion of negative response (i.e strongly disagree and disagree)

N = sample size

Percentages and analysis of data

Table 1

Category	Distributed	%	Returned	%
Senior Mgt. Staff	130	43.3	130	43.3
Middle Mgt. Staff	170	56.7	170	56.7
Total	**300**	**100**	**300**	**100**

Source: Field Survey, 2019

A careful look at table 1 shows that numbers of respondent that returned there questionnaire were 100%. The table shows that the numbers of retrieved and analyzed questionnaire were considered valid for subsequent evaluation.

Table 2: Solid waste management and economic sustainability

Category	SA	A	UD	D	SD	Total
Senior Management	60	70	14	14	12	140
Middle Management	60	60	20	12	8	160
Total	**120**	**130**	**24**	**16**	**10**	**300**

Source: Field Survey, 2019

Table 3: Percentage proportion of solid waste management and economy

S/N	Options	Frequency	Percentage
1	Strongly agree	120	40.00
2	Agree	130	43.00
3.	Undecided	24	8.00
4.	Disagree	16	5.33
5	Strongly Disagree	10	3.33
		300	**100.00**

Source: Field Survey, 2019

Table 4: Relationship between solid waste management and economic growth

Category	SA	A	UD	D	SD	Total
Senior Management	50	60	4	4	2	120
Middle management	35	80	10	12	8	180
Total	**120**	**140**	**14**	**16**	**10**	**300**

Source: Field Survey, 2019

Table 5: Percentage proportion of response on waste management and economic relationship

S/N	Options	Frequency	Percentage
1	Strongly agree	120	40.00
2	Agree	140	46.67
3.	Undecided	14	4.67
4.	Disagree	16	5.33
5	Strongly Disagree	10	3.33
		150	100.00

Source: Field Survey, 2019

Hypotheses testing and empirical result

Research hypothesis one

Ho: There is no significant relationship between solid waste management and economic growth and development.

Hypothesis one is tested using the stated Z –test statistics, thus computing from table 4, P= 0.833, Q = 0.167 and n = 300

Therefore

$$Z = \frac{0.1391}{4.5679} = 0.0305$$

Decision: Since the calculated "Z" values of 0.0305 falls between -9.96 and 1.96 our critical value, we reject the null hypothesis and accept the alternative hypothesis which states that solid waste management has impact on economic sustainability.

Research Hypothesis Two
Ho: There is no high degree of relationship between waste management and economic growth and development in Delta State.
Hypothesis two is also tested using the stated Z- test statistics. Computing from table 4, P = 0.867, Q = O.133, and n =300
Therefore

$$Z = \frac{0.1156}{4.589} = 0.0277$$

Decision: Since our computed "Z" value of 0.0277 falls between -1.96 and 1.96 of our critical value, we reject the null hypothesis and accept the alternative hypothesis which states that there is no degree of relationship between waste management and economic growth and development in Delta State.

Conclusion

Having established empirical support, the study posited that solid waste management has the potentials of boosting the economic growth and development of Delta State (IGR) hence, there is a strong relationship between the solid waste management and economic sustainability of any government (Delta State with respect to its internally generated revenue).

Recommendation

Based on the conclusions, the following recommendations are hereby presented:

That there is urgent need for government to adopt appropriate collection strategies devoid of leakages among the parties involved in solid waste management (private and public) so as to generate adequate and sufficient IGR from rent paid by waste owners and impact on the economic sustainability of the state.

Secondly, since solid waste management has direct relationship with economic sustainability, government should tap into the opportunity by using it to curb youth unemployment and insecurity problems in Nigeria (Delta State).

REFERENCES

Abdulahai M, Ajibuike A (2014). Environmental impact of indiscriminate waste disposal, A case study of Nigeria Airforce base Kaduna; *International journal of engineering and applied sciences* (IJEAS) 1(1).

Abaeze A & Owuka (2014). Issues on environmental sanitation of Lagos Mainland, Nigeria, *the environmentalist* 9 (2) 91-99.

Aniekwe O (2016). Solid waste management and reuse in Maiduguri, Nigeria; *International Conference towards the Millennium development goal, Abuja.*

Akaele A. A & Oyawole (2016). Waste Management towards sustainable development in Nigeria. *International NGO Journal* 4(4) 173-179.

Edward P. & Gbenga (2017). Environmental Health impact of solid waste disposal in developing cities; *Journal of environmental protection.*

Medina M. (2012). Globalization development and municipal solid waste management in third world cities. *Journal of globalization* (5) 140-148.

Manifredi S. & Christenses, T. H (2009). Environmental assessment of solid waste landfilling technologist by means of local modeling waste management.

Ndubuisi A & Anekwe (2016). Mitigating the impact of solid waste in urban centre in Nigeria: *Journal of Human Ecology* 34 (2) 125-133.

Okonkwo A. U (2011). Waste management and economic growth: classification of waste; a means of revenue generation in Awka, Anambra state; Journal of environmental research and policies 5(4) 8-14.

Pervez A & Kafeed A (2013). Impact of solid waste on health and environmental; *Journal of sustainable development and green economic* (JSDGES) 2(1).