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Integration of Public Private Partnership (PPP) initiative in urban solid waste management in Port Harcourt Metropolis, Rivers State, Nigeria

[1]Elenwo, E.I. and [2]Dollah, O.C.
[1]Department of Geography and Environmental Management, Faculty of Social Sciences University of Port Harcourt,P.M.B.5323,Choba,RiversState,Nigeria.C

Abstract: The paper examines the integration of "Public private partnership initiative (PPP) in the management of urban solid waste in Port Harcourt Metropolis. It identifies the functions of PPP in urban solid waste in Port Harcourt Metropolis. Determined the awareness level of the private and public sector in solid waste management in the Metropolis. Suggest strategies for effective integration of Public Private Partnership in the management of urban solid waste in Port Harcourt Metropolis. The paper adopted the cross sectional survey method. Sample size was achieved through the application of Taro Yamane formula on the Nigeria's census data of 2006 projected to 2020. About 400 respondents were identified which cuts across the residents of the Metropolis and key persons in the field of solid waste management in the State. The analyses were done with about 323 retrieved questionnaires by the use of likert scale. The findings revealed that about 186(57.6%) respondents strongly agree that PPP will enhance delivery of projects in an efficient manner. Furthermore, about 186(56.7%) respondents strongly agree that integration of PPP will deploy funds/expertise in the management of solid waste in Port Harcourt Metropolis. Also about, 181(56.0%) strongly agree that the PPP initiative requires adequate publicity for its effectiveness. On the strategies for effective implementation of the PPP initiative, about 186(57.6%) strongly agree that operators must engage highly skilled professionals for effectiveness and efficiency in project implementation. Some of the recommendations include the involvement of more private businessmen /women in the operations of PPP initiatives in Port Harcourt Metropolis to assist in the management of solid waste. Only certified PPP initiative operators should be allowed to operate in Port Harcourt Metropolis. The government in collaboration with the private sector should set up effective monitoring team for the implementation and enforcement of the PPP initiative for efficiency and effectiveness.

Keywords: Integration, Public Private Partnership, Initiative, Solid Waste, Management.

1. Introduction

The increasing rate of urbanization has exacerbated the generation of urban solid waste to a crisis situation. This is because more than half of the world's population resides in urban areas or cities (Gobo, 2002). United Nations Environmental Programme (UNEP) report that all over the world, nearly 3,000 million people live in urban areas and everyday approximately 160,000 people joint them (Global Environment Outlook, 2000). In the year 2025 worldwide, urban population is expected to rise to 60 percent and it is projected that about 90 percent of this growth will occur in developing countries especially in Asia and Africa (UNEP, 2018). Over the last 20 years many urban areas in developing nations have experienced dramatic growth in urbanization, due to rapid population growth. This is caused by the devastation of rural economies and discouragement of agriculture; people migrate to cities with the hope of finding greener pasture, job opportunities, education and good health care. According to Ahmed and Ali (2004) as population grows in the cities so also are the production rate of Urban Solid Waste or Municipal Solid Waste (MSW). Municipal solid waste may be defined as wastes which are generated by households, commercial enterprises such as offices, hotels, supermarkets, shops, schools, institutions and municipal services. On the other hand, 'Waste Management" includes, waste collection, transport, sorting, recycling and disposal. Global waste management report (World Bank Report, 2018) estimated that 2.02 billion tons of solid waste was generated in 2006, and between 2007 to 2017, the global MSW increased by 57.3 percent. The failure of municipal solid waste management (MSWM) has resulted in serious health problems and environmental degradation. For instance, the deficient collection services, uncollected wastes are dumped in the streets and in drains, thereby contributing to flooding, breeding of insect and rodent vectors, and spreading of diseases. More so, some collected wastes have been seen disposed of in uncontrolled dumpsites or burnt openly. These practices cause environmental, economic, social, psychological, cultural and health problems. According to (Hope, 2018), the rate of solid waste generation in a city is closely related to the density of urban population, size of the urban habitation, consumption rate of commercial goods, income and lifestyles of the people. Furthermore, the rate of industrialization, geographical location, energy resources, climate, living standards and cultural habits has exacerbated the rate of municipal

solid waste problems. It is important to note that, the challenges of urban solid waste are particularly peculiar to developing countries, where resources are limited but urbanization is occurring rapidly. The municipal solid waste therefore, deserves careful attention for striking a balance between quality of service and cost effectiveness. But due to institutional, regulatory, financial, technical, lack of public participation, inadequate collection facilities, poor and uncontrolled disposal sites, most of the cities are facing difficulties in managing the municipal solid waste problems (Ajetunmobi, 2010). Port Harcourt Metropolis is an industrial and commercial center that is easily accessible by both air and sea from all parts of the world, its present development has mainly been determined by its origin as a port, situated on a narrow peninsula, surrounded by many native villages, with a topography that has been largely responsible for its present shape and its growth northward. The old Port Harcourt Township, without the surrounding villages, was laid out with a proper town plan and basic infrastructure such as well-paved roads, pipe-borne water and a good drainage system. However, due to rapid growth in population from the 1960s, uncontrolled development began to take place as many surrounding native villages gradually developed into (and are still developing into) suburban residential areas. And because these developments are taking place outside the main city center of Port Harcourt municipality with no proper governmental control, difficulty arises in the supervision and support of proper urban development, including proper road networking and indeed solid waste management. At present, the living conditions in Port Harcourt Metropolis has been characterized by high population increase, severe housing shortage, unplanned road networks resulting in incessant traffic grid locks, general overcrowding, and large heaps of refuse dotting different parts of the city (Elenwo,2015). This paper advocates the need for an effective partnership between the government and the private sectors through the Public Private Partnership initiative (PPP) in the management of solid waste in the city, considering the huge undisclosed amount expended monthly by the government agency (River state Waste Management Authority) in municipal solid waste management(MSWM).

2. Aim and Objectives of the Study

The aim of this study is to examine the integration of Public Private Partnership (PPP) initiative in urban solid waste management in Port Harcourt Metropolis. The objectives are as follows to;

(i) identifying the functions of PPP in the overall growth of the economy of the state.
(ii) examine the characteristics of PPP in the management of solid waste in Port Harcourt Metropolis
(iii) determine awareness level of the residents of Port Harcourt of the functions of PPP in solid waste management.
(iv) identify challenges of the PPP initiative in solid waste management in Port Harcourt Metropolis.
(v) suggest strategies for effective Public Private Partnership in the management of solid waste in Port Harcourt Metropolis.

3. The Concept of Public Private Partnership (PPP) Initiative and its Origin

Public private partnership initiative is a cooperative arrangement between two or more public and private sectors, typically of a long-term nature. Governments have used such a mix of public and private endeavours throughout history. However, in the late 20th century and early 21st century, there has been a clear trend in governments across the globe making greater use of various PPP arrangements. There is no consensus about how to define PPP. The PPP can be understood as a governance mechanism and a language game. When understood as a language game, or brand, the PPP phrase can cover hundreds of different types of long-term contracts with a wide range of risk allocations, funding arrangements and transparency requirements. And as a brand, the PPP concept is also closely related to concepts such as privatization and the contracting out of government services (Khanom, 2010). When understood as a governance mechanism, the PPP concept encompasses at least five families of potential arrangements, one of which is the long-term infrastructure contract in the model of the UK's Private Finance Initiative (PFI) Internet Source (Wikipedia, 2018). These types of arrangements have been favoured in different countries at different times. The Government of India defined a public private partnership initiative as "a partnership between a public sector entity (sponsoring authority) and a private sector entity a legal entity in which 51% or more of equity is with the private partner(s) for the creation and or management of infrastructure for public purpose for a specified period of time (concession period) on commercial terms and in which the private partner has been procured through a transparent and open procurement system (Public private partnerships in India 2011). "The private sector can help to improve environmental protection by dedicating highly skilled personnel to ensure efficient operation and compliance with environmental requirements" (Aribisala, Omotosho and Florunsho, 2004). The PPP was initiated to tackle the growing complex and multifunctional issues in building infrastructure projects; to help meet the demands for creative, functional and efficient delivery of projects; and for private investors to participate in profitable social development projects through partnership with the public sector. The PPPs

originated from the United Kingdom with the development of mines in an arrangement (known as the Public Finance Initiative) between the government and a merchant bank several centuries ago. However, it was only in the late sixties that major capital projects in the developed world were executed almost exclusively through PPP arrangements. The World Bank estimates that every 1% of (government) funds invested in infrastructure leads to an equivalent 1% increase in gross domestic project (GDP) (World Bank Report 2018). Nigeria has not had a consistent history of investment in infrastructure; however, recent government agenda show that infrastructure development is gaining momentum. In the past 10 years, over 25 major infrastructure projects have been rolled out through PPP. The Federal Government of Nigeria, States and Local government areas (LGAs) has contributed over N10 trillion ($66 billion) to these (Draft PPP Manual for Nigeria, 2017). However, the total investment required to meet the vision 2020 target for infrastructure projects in N32 trillion ($210 billion) (Draft PPP Manual for Nigeria, 2017). The structure of PPP are building around two main types , on one hand, the cost of providing the facility/service is borne exclusively by the user of the service and on the other, the private company invests alongside government to provide a service and the cost of providing the service is wholly or partly carried by the government. Usually, the private company forms a special purpose vehicle (SPV) to develop, building or/and maintain or/and operate the project for a contracted period. The SPV is a financial entity created for the purpose of fulfilling a very specific and limited use, separated from the sponsoring or parent company for legal and tax reasons may be controlled by both the private company and the government working together. Overwhelming evidence in the past 50 years of the use of PPP structures indicate that these arrangements are relatively cost efficient, foster best practices for sharing and transfer of risk, assure superior value for money, saves time, streamline contracts and simplifies procurements, facilitates innovation through public-private cohesion, eradicates bureaucratic and political processes, encourages technology transfer and acts as vehicles which adopt life cycle approaches to delivering infrastructure and services. This paper advocates that these perceived benefits of the PPP can be integrated into the management of Municipal solid wastes in Port Harcourt Metropolis and if successful can be replicated in other state capitals in Nigeria to curb the hydra headed urban solid waste management problems.

4. Method of Study

The study adopted a cross sectional survey research method, investigating the adoption of Public Private Partnership Initiative (PPP) in the management of solid waste in Port Harcourt Metropolis. The target population according to (Kalton, 1983) includes elements such as persons, households or any unit which are studied. The target population identified for this study includes; the residents of Port Harcourt Metropolis with an estimated population census of (NPC,2006) of about 353, 285 person and projected estimated population to (2020) of about 504,434 persons. A sample size was estimated at 95% confidence interval using the;

Taro Yamane equation (1967);

$$n = \frac{N}{1+N\alpha^2}$$

Where;
n= sample size
N= total number of teachers in primary and secondary schools across port Harcourt city
α= 0.05

$$n = \frac{504,434}{1+504,434(0.05)^2} = 400$$

The questionnaires were administrated using random method in the selected communities. A total number of 400 questionnaires were administered. The questionnaires were administered by face to face interviews with the respondents, while the key persons were given the questionnaires to complete and return to the researcher. About 323 of the questionnaires were retrieved. The data collected was analyzed by the use of mean and rank order Statistics. The Likert scale was weighted in the design of the questionnaires as follows:

Strongly Agree (SA)	-5 points
Agree (A)	- 4 points
Disagree (D)	-3 points
Strongly Disagree (SD)	- 2 points
Undecided (UD)	- 1point

Weighted Means

This was calculated by multiplying the frequency of each point in the scale with its quantifier for all points and dividing by the total number of respondents. The Criterion Mean is derived by adding all quantifiers in the scale together and dividing by five, for example $\frac{5+4+3+2+1}{5} = 3.0$

If the weighted average is greater than the criterion mean, it can be inferred that the respondents generally agree with the statement.

5. Results

Demographic characteristics of respondent teachers

The demographics representations of the respondent include; gender, age distribution, and educational qualification

Gender distribution of the respondents

The tables 1 below shows that out of 323 total respondents; 112 were males and 87 were female representing 56.2% and 43.2% respectively for residents while that of key persons were 58 males and 66 females representing 45.9% and 54.1% respectively. It can be deduced that the number of males interviewed were more than the females.

Table 1 Percentage Gender Distribution of Residents and key Persons Respondents

Community Residents	Sex	Frequency	Percentage (%)
	Male	112	56.2
	Female	87	43.8
	Total	199	100
Key Persons Residents	Sex	Frequency	Percentage (%)
	Male	58	45.9
	Female	66	54.1
	Total	124	100

Table 2. Functions of Public Private Partnership in the management of urban solid waste?

s/n	Items	SA	A	D	SD	UD	X	Remark
1	Initiated to tackle multifaceted infrastructural projects	171	62	4	43	34	3.0	Accept
2	To meet demands for sustainability-and creativity in governance	181	142	-	-	-	1.8	Accept
3	To enhance delivery of projects in an efficient manner	186	132	3	-	-	2.4	Accept
4	Encourage private partnership investment in development	67	49	54	61	92	3.0	Accept
5	To enhance sustainable development of projects in all sectors of the economy	169	146	2	6	-	2.8	Accept

The table 2, shows the functions of PPP as listed. For item 1, about 171(52.9%) reported strongly agree, 62(19.0%) says agree, 4(1.2%) disagree, 43(13.3%) strongly disagree, 34(10.5%) were undecided, that one of the functions of PPP was to tackle multifaceted infrastructural projects. Item 2, shows about 181(56.0%) strongly agree, 142 (43.9%) agree, while there are no responses on the others that another function of PPP is to meet demands of sustainability and creativity in governance. For item 3; 186(57.6%) strongly agreed,

132(40.9%) agreed and 3(1%) disagree, while others did not respond. Item 4 shows that 67(20.7%) strongly agreed, 49(15.2%) agreed, 54(16.7%) disagree, 61(18.9%) strongly disagreed. For Item 5, 169 (52.3%) reported strongly agree, 146(45.2%) shows agree, 2(6%) disagrees and 6(2%) strongly disagrees. From the entire population that that the PPP functions to enhance sustainable development of projects in sectors of the economy. The results obtained as shown from all, indicates that all item 1-5 have their respective mean below the criterion mean (3.0) as a result of this each of the item statement validated was accepted.

Table 3. Characteristics of Public Private Partnership in the management of urban solid waste?

s/n	Items	SA	A	D	SD	UD	X	Remark
1	It is a good policy that has been tested in developed countries	169	146	2	6	-	1.5	Accept
2	It will foster better SWM in Port Harcourt Metropolis	181	142	-	-	-	1.43	Accept
3	It will deploy funds/expertise in the management of solid waste in Port Harcourt Metropolis	186	132	3	-	-	1.42	Accept
4	PPP provide needed technologies for effective solid waste management	67	49	54	61	92	2.2	Accept
5	It will ensure clean and healthy environment for all.	171	62	4	43	34	2	Accept

The table 3 above shows responses on the characteristics of PPP in the management of MSW in Port Harcourt Metropolis. For Item 1; 169 (52.3%) reported strongly agree, 146(45.2%) shows agree, 2(6%) disagrees and 6(2%) strongly disagrees. In item 2; 181(56%) shows strongly agree and 142(44%) of the total respondent agreed that it will foster better solid waste management in the Metropolis. For item 3; 186(57.6%) strongly agreed, 132(40.9%) agreed and 3(1%) disagree, while others did not respond. Item 4 shows that 67(20.7%) strongly agreed, 49(15.2%) agreed, 54(16.7%) disagree, 61(18.9%) strongly disagreed and 92(28.3%). Finally item 5 shows that 171(53%) strongly agree, 62(19.2%) agreed, 4(1.2%) disagree, 43(13.3%) strongly disagrees and 34(10.5%) were undecided that the policy will ensure a clean and healthy environment for the residents. However, the result obtained as shown from all, indicates that all item 1-5 have their respective mean below the criterion mean (3.0) as a result of this each of the item statement validated was accepted.

Table 4. Awareness level of Public Private Partnership policy by residents of Port Harcourt Metropolis?

s/n	Items	SA	A	D	SD	UD	X	Remark
1	Residents are aware of the PPP policy	43	34	62	171	4	3.0	Accept
2	PPP policy requires adequate publicity for effectiveness	181	142	-	-	-	1.8	Accept
3	PPP policy will ensure health /safety and better life for all in the Metropolis.	186	132	3	-	-	2.4	Accept
4	PPP policy will boost the economy and encourage waste to wealth initiative by government.	67	92	54	61	92/49	3.0	Accept
5	Policy will create clean and healthy environment.	169	146	2	6	-	2.8	Accept

The table 4, shows the awareness level of residents about the PPP policy as listed. For item 1, about 43(13.3 %) reported strongly agree, 34(10.5 %) says agree, 62(19.2. %) disagree, 171(52.9%) strongly disagree,

4(1.2%) were undecided, that they are aware of the PPP policy. Item 2, shows about 181(56.0%) strongly agree, 142 (43.9%) agree, while there are no responses on the others that PPP requires adequate publicity for effectiveness. For item 3; 186(57.6%) strongly agreed, 132(40.9%) agreed and 3(1%) disagree, while others did not respond. Item 4 shows that 67(20.7%) strongly agreed, 92(28.4%) agreed, 54(16.7%) disagree, 61(18.9%) strongly disagreed and 49(15.2%) were undecided. For Item 5, 169 (52.3%) reported strongly agree, 146(45.2%) shows agree, 2(6%) disagrees and 6(2%) strongly disagrees. From the entire population that that the PPP policy will create a clean and healthy environment if adopted in SWM in the Metropolis. The results obtained as shown from all, indicates that all item 1-5 have their respective mean below the criterion mean (3.0) as a result of this each of the item statement validated was accepted.

Table 5. Perceived challenges of PPP in the management of solid waste in Port Harcourt Metropolis?

s/n	Items	SA	A	D	SD	UD	X	Remark
1	Poor policy design/guidelines for project implementation	171	62	4	43	34	3.0	Accept
2	Lack of legal /institutional framework for project development/implementation	181	142	-	-	-	1.8	Accept
3	Quest for excessive profit margin by private partnership leading to poor project implementation	186	132	3	-	-	2.4	Accept
4	Poor business environment (insecurity/instability)	67	49	54	61	92	3.0	Accept
5	Lack of continuity in governance/corruption	169	146	2	6	-	2.8	Accept

The table 5 shows the perceived challenges of PPP in SWM in Port Harcourt Metropolis. Item 1, about 171(52.9%) reported strongly agree, 62(19.0%) says agree, 4(1.2%) disagree, 43(13.3%) strongly disagree, 34(10.5%) were undecided, that poor policy design/guidelines could impede PPP in SWM in Port Harcourt Metropolis. Item 2, shows about 181(56.0%) strongly agree, 142 (43.9%) agree, while there are no responses on the others that lack of legal /institutional framework for enforcement and implementation of PPP policy may pose some danger. For item 3; 186(57.6%) strongly agreed, 132(40.9%) agreed and 3(1%) disagree, while others did not respond. Item 4 shows that 67(20.7%) strongly agreed, 49(15.2%) agreed, 54(16.7%) disagree, 61(18.9%) strongly disagreed. For Item 5, 169 (52.3%) reported strongly agree, 146(45.2%) shows agree, 2(6%) disagrees and 6(2%) strongly disagrees. From the entire population, it could be deduced that the perceived challenges for the integration of the PPP in to the SWM policy of the state may not be realized base on the results obtained as shown. Furthermore, the analysis indicates that all item 1-5 have their respective mean below the criterion mean (3.0) as a result of this each of the item statement validated was accepted.

Table 6. Strategies for effective integration of PPP in solid waste management in the Metropolis?

s/n	Items	SA	A	D	SD	UD	X	Remark
1	PPP operators must ensure that health/ safety and lives of the citizens are promoted and sustained.	169	146	2	6	-	1.5	Accept
2	PPP operators must adhere to international best practices in the execution of projects	181	142	-	-	-	1.43	Accept
3	Operators must engage highly skilled professionals for effectiveness and efficiency in project implementation.	186	132	3	-	-	1.42	Accept

4	PPP operators must engage the citizens/stake holders on an aggressive campaign on the benefits of the PPP policy for sustainable development.	67	49	54	61	92	2.2	Accept
5	PPP operators must ensure the use of the best technology in solid waste management to foster a clean and livable environment.	171	62	4	43	34	2	Accept

The table 6 above shows responses on the strategies for effective integration of PPP in SWM in Port Harcourt Metropolis. For Item 1; 169 (52.3%) reported strongly agree, 146(45.2%) shows agree, 2(6%) disagrees and 6(2%) strongly disagrees. In item 2; 181(56%) shows strongly agree and 142(44%) of the total respondent agreed that operators must adhere to best international best practices for better solid waste management in the Metropolis. For item 3; 186(57.6%) strongly agreed, 132(40.9%) agreed and 3(1%) disagree, while others did not respond. Item 4 shows that 67(20.7%) strongly agreed, 49(15.2%) agreed, 54(16.7%) disagree, 61(18.9%) strongly disagreed and 92(28.3%). Finally item 5 shows that 171(53%) strongly agree, 62(19.2%) agreed, 4(1.2%) disagree, 43(13.3%) strongly disagrees and 34(10.5%) were undecided that the policy operators should ensure the use best technology in the management of solid waste in the Metropolis. However, the result obtained as shown from all, indicates that all item 1-5 have their respective mean below the criterion mean (3.0) as a result of this each of the item statement validated was accepted.

6. Findings and Discussions

The paper examined the integration of PPP initiative, in the management of solid waste in Port Harcourt Metropolis. Public private partnership initiative (PPP) shall provides quality services, adequate and proper funding and skilled personnel in urban solid waste management in the Metropolis as observed from analyses carried out. The table 3 above shows responses on the characteristics of PPP in the management of MSW in Port Harcourt Metropolis. However, the results obtained as shown from all respondents, indicates that all item 1-5 have their respective mean below the criterion mean (3.0) as a result of this, each of the item statement validated was accepted. For instance in table 2, item 3, about 186(57.6%) respondents strongly agreed that PPP will enhance delivery of projects in an efficient manner. Also, in table 3 items 3, about 186(56.7%) respondents strongly agrees that integration of PPP will deploy funds/expertise in the management of solid waste in Port Harcourt Metropolis. More so, in table 4, item 2, 181(56.0%) strongly agree that the PPP initiative requires adequate publicity for its effectiveness. Also on the challenges of the PPP implementation, about 186(57.6%) respondents strongly agreed that the quest for excessive profit margin by private partnership operators may lead to poor project implementation, thereby making the initiative ineffective. On the strategies for effective implementation of the PPP initiative, about 186(57.6%) in table 6, item 3 strongly agree that operators must engage highly skilled professionals for effectiveness and efficiency in project implementation.

7. Conclusion

The importance of clean environment to the inhabitants of Port Harcourt Metropolis which will foster good health and the protection of the environment cannot be over emphasized. This is because it is widely known that indiscriminate dumping of solid waste blocks our drainages and degrades the soil texture of such environment, causes flooding, breeds mosquitoes that infect us with diseases, even the bad odour its emits during decomposing makes the total environment unpleasant and unsightly to behold. The government should engage in PPP initiatives as a better alternative/option for solid waste disposal and management in Port Harcourt Metropolis, this will also reduce the huge amount of expenditure of government in solid waste management which can be channeled for the development of other sectors of the economy.

8. Recommendations

The following suggestions are made:

1. There should mount an aggressive sensitization campaign on urban solid waste management, regularly in Port Harcourt Metropolis for the citizens to accept the PPP initiative.
2. The paper advocates the need for more private businessmen/women to engage in the PPP initiates to assist the government in realization of this laudable policy.
3. Only certified PPP operators should be allowed to operate in Port Harcourt Metropolis.

4. Clean and healthy environment should be encouraged by all and this will usher in the ideology of waste to wealth in municipal solid waste management (MSWM) in the Metropolis.
5. The government in collaboration with the private sector should set up effective monitoring team for the implementation and enforcement of the PPP initiative for efficiency and effectiveness.

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