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Public Support: A Missing Link in Implementation of Garbage Collection and Disposal in Nairobi City County (NCC), Kenya

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Abstract:
This study was an assessment of the effects of Public support for Public Private Partnerships (PPPs) in garbage collection and disposal in Nairobi City County (NCC) in Kenya. The study used a census method, where fifty seven private companies involved in garbage collection and disposal in NCC, were given questionnaires to answer. The main respondents in these companies were managers or supervisors since they are well equipped with policies, strategies and general operations of these companies. Thisensured a reliable source of data. Sanni, (2016) observed that public support was among the key factors affecting the implementation of PPPs in different sectors of the economy.Therefore, this study aimed to establish whether public support does affectimplementation of PPPs in garbage collection and disposal in NCC. Public support in this study was determined by three key indicators: public participation in garbage collection and disposal, disposing in designated areas and willingness of residents to pay for garbage collection service.Public support had a R^2result of .300 or 30.0%, which implies that the independent variable, public supportcan explain up to 30.0% of the total variability in the dependent variable, implementation of PPPs in garbage collection and disposal in NCC.The results confirmed Sanni, (2016), observation that public support is a key determinant in implementation of PPPs.The results also showed that public supporthas a statistically significant positive influence on implementation of PPPs in garbage collection and disposal in NCC(p-value = .000). This is less than the level of significance of 0.05. Therefore, any change in public support would result in .658 times changes in the implementation of PPPs in garbage collection and disposal in NCC.

Keywords: *Garbage collection and disposal, solid waste management, public support, public private partnerships*

1. Introduction

With a rapid increase in world population, the level of consumption is increasing exponentially IPA, (2014). With such an increase, the consequence is generation of a high amount of solid waste. This demands concerted efforts to set up a sustainable solid waste management(SWM) system that will reduce the pressure on environment. According to Narayana, (2009), if left unchecked, waste can have unimaginable harm to both humans and the environment. When conducting a research in India, he observed that when citizens are exposed to burning waste, they are vulnerable to dangerous toxins which can cause cancer and other health complications.

Most Municipalities in developing countries spend between 20 to 50 percent of their annual budget on SWM (Hoornweg, and Bhada-Tata (2012).This, however, doesn't translate to higher garbage collection coverage. 50 percent of the urban population access the services, from whom only40 to 70 percent of waste generated is collected. Contrary to these statistics of developing countries, high income countries spend less than 10 percent of their annual budget on SWM. However, their coverage is more than 90 percent, due to mechanized and efficient methods of garbage collection(UNEP n.d). This disparity clearly calls for redesigning of waste collection and disposal methods in developing countries to ensure their effectiveness and efficiency.Al-khatib et al. (2009) opined that Municipalities in developing countries have always been charged with responsibilities of providing SWM services. The burden has led to lower coverage of garbage collection services. The matter has been exacerbated by increasing population, strained social institutions and technical constraints. Communities have not made the matter better. They have resorted to destructive methods of waste disposal such as open dumping and burning waste, often leading to detrimental effects to human and environmentalhealth. (Mwanthi and Nyabola, 1997; Goett, 1998; Alavi Moghadam et al., 2009; Narayana, 2009; Al-Khatib et al., 2015; Hilburn, 2015)

In Kenya, garbage collection and disposal is one of the roles devolved to the County governments as per the fourth schedule, part two of the Constitution of Kenya 2010. As one of the forty seven counties (regional government) in Kenya, Nairobi City County(NCC) has been experiencing increased population growth that has led to pressure on available resources, increased production and consumption thus an increase in garbage. With a population of 3,138,369 peopleKNBS (2009), the picture painted of Nairobi in terms of garbage collection is grim. It is characterized by poor coverage, open dumping and generally inefficient solid management infrastructure. This represents the status of Kenya, since no County can be said to have streamlined its solid waste management.According to Kasozi & Von Blottnitz, (2010); JICA (2010), Nairobi city generates 4,016 tons of solid waste daily against a daily collection of approximately 33%. The situation never used to be this dire, in mid 1970s it used to collect 90% of the waste generated. Due to poor maintenance

of waste collection vehicles, increased migration to the city and better standards of living more waste was generated which the authority could not cope with. By mid 1980s Nairobi city council could only collect 20% of the waste generated (Henry et al., 2006). This increase of uncollected waste attracted organized private sector companies.

Surveys show that over the years private companies have become very important participants in the city's waste collection sector (Kantai 2000). The private sector in PPP arrangement has been favoured due to their efficiency and effectiveness in implementation of projects. However, with the continued growth and dominance of the private sector in SWM in Nairobi, SWM service coverage and efficiency still remains too low. This is clearly manifested in the many illegal dumpsites all over the city. Indeed, even the Central Business District (CBD) has not been spared if the huge dumpsite off Kijabe Street and the sporadic rot next to the City Market as well as at the famous Wakulima market is anything to go by. The same can be said about most other neighbourhoods in the city especially in the eastern part (JICA, 1998). The inefficiency of private garbage collectors has been attributed to a number of factors: inadequate resources and equipment, unskilled workers, use of old technology in handling garbage, lack of adequate monitoring from responsible agencies as well as lack of support from the public/community.

It is the latter that this study try to establish whether it affects implementation of PPPs in garbage collection and disposal in NCC. In order to understand the whether there is an effect, three indicators of public support are chosen; public participation, disposing in designated places and willingness of public to pay garbage collection fee.

2. Literature Review

2.1. Public/Community Participation

There is no fixed definition for the term public participation. In this study the researcher adopted definition by Creighton, (2008), who defined it as a process where citizens or affected individuals are consulted by an organization or government before implementing a decision that will affect them.

The role of public support in garbage collection and disposal cannot be underestimated. According to Rangeti et al, (2016), community participation in garbage collection and disposal maybe the missing link in solid waste management. They opine that even though every community generates waste, they are viewed as a passive recipient of municipal services. As a result, they fail to recognize their role in garbage collection and become uncooperative in payment of garbage collection fees or even in clean-up campaign. In his study on SWM in India, Sauro, (2000),identified some gaps,and pointed out that public participation is a possible solution. Haile,(2012), postulates that lack of community participation in waste management is exhibited in littering habits and lack of support in garbage collection and disposal exercise. In his study on factors affecting community participation in Morogoro municipal solid waste management, Kalwani,(2009), posits that the major reasons for non-participation are lack of: local mobilization, coordination of local resources and community empowerment.

2.2. Disposing in Designated Places

Unprotected dumpsites are common sites in developing countries and pose a danger to both the public and the environment. Despite this knowledge, it is a common practice in many developing countries. Unlike developed nations, third world countries lack sanitary landfills and oftentimes disposal sites are located at a considerable distance from communities. This creates more financial constraints toprivategarbage collectors becausethe cost of collection and disposal of garbage is far more than what most firms could afford. This can lead to disposing in illegal places, exacerbating the garbage problems in the cities.

A social audit report compiled by TISA (2016) showed that despite 53% of respondents from the social audit agreeing that there were designated waste collection points in their areas, the social auditors found out that majority of the collection points were illegal as they were created by the residents themselves and not approved by the Nairobi City County. This report tend to agree with Mwanthi and Nyabola, (1997),who found that in the poorer parts of Nairobi City, 91% of residents interviewed lacked storage bins for waste. Of these, 84% were dumping indiscriminately or burning the waste at their backyard. Joardan (2000) asserts that the most common method of municipal waste is open uncontrolled dumping in low lying areas, as a result percolating harmful chemicals in the soil, underground water, canals and rivers.
A number of factors have been pointed out as influences of littering in developing countries. Yousif and Scott (2007);Milea, (2009); O'Connell, (2011) noted that some of the key factors including the attitude,habits and customs of the residents can contribute to increased dumping in illegal places. They noted that people are so accustomed to throwing waste in inappropriate places, that even with changes of waste disposal policies; they may not change their behaviours. The attitude may be influenced by lack of awareness on the effect of littering, social norms and even convenience of the residents.

2.3. Willingness to Pay

Inability of government to collect and dispose garbage in many developing countries necessitated a new strategy to handle the growing mass of waste on the streets and estates in urban areas. The new strategy would require engagement of private sector in PPP arrangement where private firms collect and transport garbage to designated dump site at a fee.Payment, however, hasbeen a challenge inlow income areas due to prevalence ofpoverty.

Since waste management fee is the cost to the generator of the waste, it should cover all costs incurred and also have a component of a profit margin that could act as an incentive by the service provider. McAllister (2015) postulated

that the fee should cover all costs incurred during the sorting, collection, transportation, recycling, administration work and even sensitization campaigns.

According to report by TISA, (2016) on status report of budget implementation in solid waste management in NCC, garbage collection fees remained a challenge to the low-income earners. They view the service as expensive, therefore, opting to manage the same on their own, as evidenced through dumping of garbage along the roads including the rivers. The low-income residents prioritizewater supply and electricity, and, view waste collection fees as unnecessary cost as they can dump on road sides, rail roads, waterways and drainage channels for free, (Kasozi & Von Blottnitz 2010). This explains why there is low garbage collection coverage in low income areas.

3. Methodology

The study used descriptive research design. This method was used to establish whether the independent variable public support affects the dependent variable Implementation of PPPs in garbage collection and disposal. The study was done in Nairobi City County.

The target population was all private garbage collecting companies in NCC. The researcher used a census study because the population was only 57, thus making it easy to collect data from every unit of the population. Questionnaires were used to collect data from the supervisors and managers of private garbage collectors. The instruments were validated by researchers from Jomo Kenyatta university of Agriculture and Technology (JKUAT) and pilot tested for reliability using cronbach alpha reliability test where they attained a score of .783 which is above the acceptable threshold. The primary data collected was processed by first editing it to detect possible errors; the questions and variables were coded using the Statistical Package for Social Sciences (SPSS). Data analysis was done using the SPSS program and tables and figures were presented using the APA format of data presentation. Regression analysis was used to establish the relationship between independent variable Public support and dependent variable implementation of PPP in garbage collection and disposal i.e. $Y = a + b1X1$

4. Results and Discussions

4.1. Public Support

In a status report on budget implementation in SWM in NCC, TISA, (2016), observed that there was little and to some extent,no public participation in SWM. The report noted that this resulted in residents not caring about where they dump their garbage. The report further views it as a reason why there is no cooperation between the residents and private garbage collectors. The view by TISA, (2016) concurs with the findings of this study that established that 52.6% disagreed that they call meetings to discuss issues of garbage with the residents. These results of the findings are presented in the frequencies in Table 1 below.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	4	7.0	7.0	7.0
	agree	23	40.4	40.4	47.4
	disagree	30	52.6	52.6	100.0
	Total	57	100.0	100.0	

Table 1: To What Extent Do You Agree That You Call Meetings with Residents to Discuss Issues of Garbage Collection and Disposal?

The study established that even when the residents were called for the meetings, only 45.6% confirmed that when they call meetings residents attend them. This is shown in Table 2 below.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	4	7.0	7.0	7.0
	agree	22	38.6	38.6	45.6
	disagree	31	54.4	54.4	100.0
	Total	57	100.0	100.0	

Table 2: To What Extent Do You Agree That Residents Attend These Meetings?

The poor turnout at meeting could be due to poor methods of communication, existence of knowledge gap on issues to be discussed in the meetings or previous experience where their contribution was not considered. Asase et al., 2009 noted that, in order to get feedback and support from the community, there should be proper methods of communication with the community. Mistrust between the residents and private garbage collectors may be a reason for non-attendance. As IGRTC (2015)put it, effective public participation requires an open, accountable and structured process where the public can interact and influence decisions.

The study established that only 10.5% of the respondents agreed that views of the residents who attend meetings are considered when making decisions that affect them. This could explain poor meeting attendance by the residents, lack of cooperation in areas of garbage disposal and even poor payment of garbage collection fees.This information is illustrated by the Table 3 below.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	6	10.5	10.5	10.5
	neutral	23	40.4	40.4	50.9
	disagree	28	49.1	49.1	100.0
	Total	57	100.0	100.0	

Table 3: To What Extent Do You Agree That Views of Residents Are Considered? When Making Decision on Garbage Collection and Disposal?

Regarding the frequency of these meetings, the study established that 61.4% of private garbage collectors engage their clients yearly while only 3.4% engage them biannually. This may indicate that some issues that may require urgent attention may wait longer before they are addressed.Table 4 below illustrates the findings.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	half yearly	2	3.5	3.5	3.5
	yearly	35	61.4	61.4	64.9
	between 1-2 years	16	28.1	28.1	93.0
	over 2 years	4	7.0	7.0	100.0
	Total	57	100.0	100.0	

Table 4: How Often Do You Engage the Residents on Issues of Proper? Garbage Disposal in Order to Reduce Spilling of Garbage in Streets

The study also wanted to establish the views of private garbage collectors on whether engaging residents in decisions making on garbage collection and disposal can enhance cleanliness and litter free environment. The results showed that10.5% strongly agreed, 50.9% agreed that engaging residents on garbage collection and disposal issues can enhance cleanliness and litter free environment. 21.1% of the respondents neither agreed nor disagreed, while 17.5% were of the view that engaging residents will not enhance cleanliness in their environment.Generally, over 60% are in agreement. The results confirms views of Zhu et al.,(2008);Mrayyan and Hamdi, (2006), who observed that making public aware on solid waste issues can affect their attitude towards solid waste management. Table 5 below illustrates the results.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	6	10.5	10.5	10.5
	agree	29	50.9	50.9	61.4
	neutral	12	21.1	21.1	82.5
	disagree	10	17.5	17.5	100.0
	Total	57	100.0	100.0	

Table 5: To What Extent Do You Agree That Resident's Participation In Decisions Making In Garbage Collection and Disposal in Your Area Has Enhance Cleanliness And Litter Free Environment?

4.2. Disposing in Designated Areas

This study established that 42.1% strongly agreed that disposing garbage in designated areas reduce garbage in the environment while 57.9% agreed on the same. This is evidenced in Table 6 below.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	24	42.1	42.1	42.1
	agree	33	57.9	57.9	100.0
	Total	57	100.0	100.0	

Table 6: To What Extent Do You Agree That Disposing Garbage in Designated Areas Reduce Garbage in the Environment?

Regarding whether residents have been disposing garbage in designated places, the result show that 40.4% agreed, 38.6% were neutral while 21.1% disagreed. Table 7 below illustrates the results. Given that some areas especially in the low income areas are not covered by private garbage collectors, the results may seem to contradict the views of (Mwanthi and Nyabola, 1997; Goett, 1998; Alavi Moghadam et al., 2009; Narayana, 2009; Al-Khatib et al., 2015; Hilburn, 2015) who postulated that people in developing countries often turn to destructive methods of waste disposal such as open dumping and burning waste often leading to detrimental effects to human health and environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	23	40.4	40.4	40.4
	neutral	22	38.6	38.6	78.9
	disagree	12	21.1	21.1	100.0
	Total	57	100.0	100.0	

Table 7: To What Extent Do You Agree That Residents Have Been? Disposing Garbage in Designated Areas?

The study also wanted to establish the extent to which private garbage collectors associate litter in the environment with the attitude of the residents. The result showed that 66.7% of the respondents agreed that attitude of residents contributes to littered streets and estates. The results confirms the views by Milea, (2009); O'Connell, (2011); Yousif and Scott, (2007), who postulated that the attitude, habits and customs of residents as causes of littered environment

4.3. Willingness to Pay

The researcher wanted to establish whether the residents pay on time. The study revealed 29.8% agreed that residents pay on time pay on time, 19.3% were noncommittal, while 50.9% disagreed that residents pay garbage fees on time. The research concurs with TISA, (2016),whose report observed thatgarbage collection fees remained a challenge especially to the low income earners who viewed the service as expensive, therefore, opting to manage the same on their own. Private garbage collectors attest that there is an improvement in payment of garbage fees. They devised a method where they collaborated with landlords and put water and garbage fees as one component of a bill to tenants in order to enhance payment. However there are still some challenges withthis arrangement since as a tenant delays paying the rent it means garbage collection fee is also delayed. Table 8 below confirms the TISA, (2016), view.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	17	29.8	29.8	29.8
	neutral	11	19.3	19.3	49.1
	disagree	29	50.9	50.9	100.0
	Total	57	100.0	100.0	

Table 8: To What Extent Do You Agree That Your Clients Agree to Pay Garbage Collection Fees on Time?

4.4. Linear Relationship between Dependent Variable and the Independent Variable

(Keith, 2006; Stevens, 2009; Osborne & Waters, 2002) opined that Pearson's correlation is used when working with two quantitative variables in a population. The resulting relationship can indicate a positive linear relationship or lack of relationship at all. The authors noted that Pearson's correlation coefficients indicate the extent of interdependence between two variables. This study sought to establish whether there was any form of relationship between public support and implementation of PPPs in garbage collection and disposal in NCC. The findings are summarized in table 9**.** The results indicate that, public support have a strong and significant (p-values less than 5% level of significance) linear relationship with implementation of PPPs in garbage collection and disposal in NCC.

		Public Support	Implementation of PPPs
Public Support	Pearson Correlation	1	.548**
	Sig. (2-tailed)		.000
	N	57	57
Implementation of PPPs	Pearson Correlation	.548**	1
	Sig. (2-tailed)	.000	
	N	57	57

Table 9: Linear Relationship between Dependent Variable and the Independent Variables
X1- Public Support
Y- Implementation of PPPs

4.5. Regression Analysis

Linear regression is done to establish a linear estimation of relationship between a response variable and one or more explanatory variable. Jaccard et al., (2006), noted that regression analysis is driven by a theoretical or a conceptual model that can be drawn in the form of a path diagram. The diagram provides the model for setting the regression and what statistics to examine.

4.5.1. Regression Analysis between Public Support and Implementation of PPPs in Garbage Collection and Disposal in NCC

To evaluate the influence of Public Supporton implementation of PPPs in garbage collection and disposal in NCC, a simple linear regression analysis was performed. The findings were presented in Table 10, 11 and 12**.** Table 10 presents an R^2 result of .300 or 30.0%, which implies that the independent variable, Public Supportcan explain up to a total of 30.0% of the total variability in the dependent variable, implementation of PPPs in garbage collection and disposal in NCC**.**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548[a]	.300	.288	0.4889

Table 10: Model Summary of Public Support and Implementation of PPPs in Garbage Collection and Disposal in NCC

4.6. ANOVA for Public Support and Implementation of PPPs in Garbage Collection and Disposal in NCC

An ANOVA test was performed to test whether the overall model fitted on the data was statistically significant. The results obtained were presented in Table 11. The results indicate that, the model fitted on the data was statistically significant. This is supported by an F value of (23.61, 1, 55) with a p-value (.000) which is less than .05 the level of significance. This means that, Public Supportdoes have a statistically significant influence on implementation of PPPs in garbage collection and disposal in NCC.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.642	1	5.642	23.605	.000
	Residual	13.145	55	.239		
	Total	18.787	56			

Table 11: ANOVA for Public Support and Implementation of PPPs in Garbage Collection and Disposal in NCC

To support the ANOVA findings on Public Supportand implementation of PPPs in garbage collection and disposal in NCC, the regression coefficients were obtained and presented in Table 12. These results show that Public Supporthas a statistically significant positive influence on implementation of PPPs in garbage collection and disposal in NCC (p-value = .000) which is less than the level of significance of 0.05.Therefore, any change the Public Support would result in .658 times changes in the implementation of PPPs in garbage collection and disposal in NCC.

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	1.101	.373	2.953	.000
Public Support	.658	.136	4.059	.000

Table 12: Coefficients of Public Support and Implementation of PPPs in Garbage Collection and Disposal in NCC

Using the summary presented in Table 12, a linear regression model of the form, $y = \alpha + \beta xi$ can be fitted as follows:
Implementation of PPP = 1.101 +0.658Public Support

5. Conclusion

It can be concluded from the study that public support affects implementation of PPPs in garbage collection and disposal in NCC.Public support had a R^2result of .300 or 30.0%, which implies that the independent variable, public supportcan explain up to 30.0% of the total variability in the dependent variable, implementation of PPPs in garbage collection and disposal in NCC**.**The results indicated that public support is a key determinant in implementation of PPPs.The results also showed that public supporthas a statistically significant positive influence on implementation of PPPs in garbage collection and disposal in NCC(p-value = .000). This is less than the level of significance of 0.05. Therefore, any change in public support would result in .658 times changes in the implementation of PPPs in garbage collection and disposal.

Public support can be evident when residents participate on activities or decisions that affect them. Public participation is initiated through forums such as meetings. The results on whether private garbage collectors call meetings with the residents indicate that over half (52.6%) don't. This could be a reason why residents don't cooperate with private garbage collectors in terms of disposing in designated areas as some respondents indicated that residents do not dispose garbage in designated areas. However, the numbers could be higher as 38.6 % respondents were noncommittal on the issue. The results also show that 54.4% of respondents indicated that residents do not attend meetings when they are called. The poor attendance of the meetings could discourage private garbage collectors from regularly calling for meetings.

Concerning the payment of garbage collection fees, only about a half of the respondents (50.9%) concurred that residents don't pay on time. This nonpayment could be due to lack of sensitization on the importance of paying these fees. The sensitization could have been done during forum such as meetings called by the private garbage collectors.

6. Recommendations

Public support is a key element in garbage collection and disposal. From the results of the study, the researcher makes a number of recommendations.

- For the private garbage collectors and City County to achieve litter free environment, they must engage residents at all levels. The engagement should be genuine and not just a procedure as a requirement by the constitution of Kenya 2010.

- To ensure full participation, private garbage collectors should bridge the knowledge gaps through workshops, seminars and use of local leaders. This will ensure that the agents and the residents are at par in areas of concern.
- The media also need to be brought on board and be a party to the agenda of litter free environment. They can be used to bridge the information gap between the private garbage collectors, County government and the residents of Nairobi by sensitizing them on behavioral change towards waste disposal.

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