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Solid Waste Management: Stakeholder's Analysis of Kugiya, Jos South Metropolis

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Abstract

Poorly managed solid waste poses significant environmental and public health risks, particularly in developing countries where waste management systems remain inefficient. This study investigated the barriers and opportunities for circular economy (CE) adoption in solid waste management through a stakeholder analysis of Kugiya Community in Bukuru, Jos South Metropolis, Plateau State, Nigeria. A survey research design was adopted using structured questionnaires administered to 384 stakeholders, of which 339 were validly returned, representing an 88.3% response rate. Data were analysed using descriptive statistics, Pearson correlation, and multiple regression analysis. The findings revealed a moderate positive relationship between solid waste management and circular economy adoption ($r = 0.539$). The regression model was statistically significant ($R = 0.458$; $R^2 = 0.210$; Adjusted $R^2 = 0.208$; $F = 17.71$; $p < 0.001$), indicating that the identified predictors explained 21.0% of the variation in circular economy adoption. Among the respondents, 52.6% were female, 34.8% possessed tertiary education, and 35.4% had resided in Kugiya for more than 10 years. Key barriers identified included weak policy enforcement, inadequate infrastructure, limited technical capacity, insufficient funding, and low public awareness. Significant opportunities included decentralized resource recovery, integration of informal waste workers, skills development, and strengthened stakeholder collaboration. The study concludes that addressing institutional and operational barriers is essential for successful circular economy implementation in Kugiya. It recommends stronger policy enforcement, improved waste segregation infrastructure, sustained public awareness campaigns, and coordinated government-stakeholder partnerships to promote sustainable solid waste management and accelerate the transition from a linear to a circular economy.

Keywords

Solid Waste Management Practices, Key Barriers, Potential Opportunities, Circular Economy, Interests, Power Relations,



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Introduction

Solid waste management is a global challenge of the twenty-first century plaguing both developed and developing societies (Ezeudu et al., 2021). Poorly managed solid waste constitutes a source of potential threat to the environment and public health. Among the greatest factors that problematize solid waste is the issue of materials and resource requirements that characterizes its management, which entails incurring both capital and recurrent expenditures (Ezeudu et al., 2021).

In Nigeria, the issue of solid waste management has been extensively deliberated in the extant literature with a series of challenges discussed and scores of solutions also recommended. Some of the prominently identified challenges include insufficient/irregular waste collection; lack of funding; inadequate facilities such as landfills, incinerators, waste vehicles; absence of technical knowledge and so much more (Obed-Ojukwu & Ugwueke, 2025).

The World Bank projects that waste generation in countries like Nigeria could triple by 2050, reflecting continued demographic expansion and rising consumption patterns. The consequences of inadequate waste management are severe: environmental degradation, contamination of soil and water resources, air pollution from open burning, and elevated public health risks, particularly for communities living near unmanaged dumpsites particularly Kugiya Community, Bukuru in Plateau State.

Globally, circular economy has the potential to transform the way we produce, consume, and live, fostering a more sustainable future for all. Countries and organizations worldwide are adopting circular economy principles, driving

innovation and sustainability in various sectors, including manufacturing industries are designing sustainable products and supply chains and agriculture industries are promoting regenerative agriculture practices.

Despite this promise, the adoption of circular economy principles in Nigeria's waste management sector remains limited and fragmented. Research identifies multiple barriers: weak institutional governance, fragmented regulatory mandates, inadequate infrastructure, limited technical capacity, low public awareness, and sociocultural practices that resist behavioural change. Furthermore, waste governance in Nigeria continues to be characterised by weak enforcement and limited coordination among the multiple actors involved government agencies, private sector operators, informal waste workers, and communities.

The informal sector, which plays a dominant role in recycling and materials recovery across Nigerian cities especially in Kugiya Community, Bukuru in Plateau State, remains largely unrecognised and unsupported within formal policy frameworks. Based on the above points the study intends to investigate barriers and opportunities for circular economy adoption in solid waste management: a stakeholders' analysis of Kugiya community in Bukuru, Jos South Metropolis.

Despite growing policy interest in circular economy approaches to waste management in Nigeria, a significant gap exists between national level policy aspirations and community level implementation realities (Nia & Fathollahzadeh, 2020). While national frameworks such as the Nigeria Circular Economy Road-map and initiatives like the Nigeria Circular Economy Working Group (NCEWG) articulate ambitious goals, the translation of these goals into practice at the

local level remains poorly understood and inadequately supported within the context of the study.

This study therefore addresses the following research problem: Despite the theoretical promise of circular economy principles for improving solid waste management and the practical opportunity presented by the reconstruction of Kugiyi Market, there is a lack of empirical evidence on the specific barriers and opportunities for CE adoption in this community, and no systematic analysis of the stakeholder dynamics that will shape such adoption. The study raises research questions, objectives of the study and hypotheses to decipher barriers and opportunities for circular economy adoption in solid waste management: a stakeholders analysis of Kugiyi community in Bukuru, Jos South metropolis of Plateau State.

LITERATURE REVIEW

The Circular Economy

The circular economy represents a fundamental departure from the linear economic model that has characterised industrial development since the Industrial Revolution. The linear "take make dispose" approach assumes unlimited resource availability and unlimited capacity for waste absorption assumptions that are increasingly untenable in the face of resource depletion, environmental degradation, and climate change (European Commission, 2020). In contrast, the circular economy is "regenerative by design and aims to gradually decouple growth from the consumption of finite resources". The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible (Hanna, McManus & Lyon, 2021).

In this way, the life-cycle of products is extended in practice, it implies reducing waste

to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible thanks to recycling. This is a departure from the traditional, linear economic model, which is based on a take-make-consume-throw away pattern (European Commission 2020). This model relies on large quantities of cheap, easily accessible materials and energy.

Reusing and recycling products would slow down the use of natural resources, reduce landscape and habitat disruption and help to limit biodiversity loss (Ezeudu, Chidolue & Umeghalu, 2021). Another benefit from the circular economy is a reduction in total annual greenhouse gas emissions. According to the European Environment Agency (2022), industrial processes and product use are responsible for 9.10% of greenhouse gas emissions in the EU, while the management of waste accounts for 3.32% (European Environment Agency, 2022).

Creating more efficient and sustainable products from the start would help to reduce energy and resource consumption, as it is estimated that more than 80% of a product's environmental impact is determined during the design phase. A shift to more reliable products that can be reused, upgraded and repaired would reduce the amount of waste. The aim is to tackle excessive packaging and improve its design to promote reuse and recycling (Ezeudu, Chidolue & Umeghalu, 2021). It is empirically justified that circular economy offers a sustainable alternative to the existing resource-intensive linear model by promoting reuse, recycling, and waste minimization, however its effective implementation remains limited leaving.

Therefore, the concept of circular economy emerged with the objective to decouple resource consumption from demand (Palea et

al., 2023). The very definition of circular economy was initially vague with distinct interpretations (Global Footprint Network, 2025). Lately, the recent contribution by Kirchherr et al. (2023) defined circular economy as "a regenerative economic system which necessitates a paradigm shift to replace the 'end of life' concept with reducing, alternatively, reusing, recycling, and recovering materials" (p. 4). Various strategies have been identified to implement circular economy and achieve a closed-loop system. Scholars developed several strategies, such as closing, slowing, and narrowing, which respectively aim to use again, longer, and fewer resources when implementing circular economy (Aarikka-Stenroos et al., 2022).

Barriers to Circular Economy Adoption

A substantial body of literature examines barriers to CE adoption, particularly in developing country contexts. A recent comprehensive review of waste management in Nigeria synthesised evidence across 84 studies to identify systemic failures and opportunities. The review found that "fragmented mandates, weak enforcement, and data scarcity entrench open dumping and burning, driving leachate and air pollution burdens and elevating disease risks, especially in informal settlements".

Critiques, limitations, advantages and disadvantages of CE. The concept of the circular economy (CE) has emerged as a promising response to the longstanding tension between economic growth and environmental sustainability (Nzeadibe & Ejike-Alieji, 2020). Rather than viewing these objectives as mutually exclusive, CE seeks to align them by reconfiguring production and consumption systems to minimize waste, extend the lifespan of materials, and reduce dependence on virgin resources. This transformative 30 model advocates for closing material loops and

optimizing resource use across entire product life cycles. Ojo, Oladinrin, and Obi (2021) note that CE is increasingly seen as a way to mitigate environmental damage while sustaining economic activity. However, this apparent alliance between growth and environmental preservation is built on fragile foundations, with several theoretical and practical limitations that must be acknowledged.

Solid Waste Management in Nigeria

Solid waste refers to the variety of waste products from human and animal activities that are thrown away as unneeded and undesired (Nwosu & Chukwueloka, 2020). Solid waste originates from industrial, residential, and commercial activities within a specific area, and can be handled in a diverse method (Mudassar et al., 2020). Solid waste management plays a crucial role in every society. Irrespective of its origin, composition, or potential hazards, a systematic approach is necessary to ensure adherence to environmental best practices (Mudassar et al., 2020; Muhammad et al., 2017).

Solid waste management is a crucial aspect of environmental hygiene; it must be considered in environmental planning. Waste can be divided into categories based on material composition, such as organic waste, plastic, glass, paper, and metal (Elena et al., 2020). Categorization can also depend on potential hazards, such as radioactive, infectious, flammable, toxic, or non-toxic wastes (Ubuoh et al., 2006). Categorizations may also relate to the waste's origin, industrial, domestic, commercial, institutional, or construction and demolition. Despite its source, composition, or potential hazards, it is crucial to manage solid waste systematically to uphold environmental best practices (Mudassar et al., 2020). Solid waste management must be incorporated into

environmental planning to maintain environmental hygiene (Mokuolu, 2021).

Solid waste management practices vary depending on whether they originate from residential or industrial sources, urban or rural areas, and developed or developing nations. Local government agencies are in charge of handling non-hazardous waste in urban areas (Elena et al., 2020). The handling of hazardous waste materials is subject to oversight by local, federal, and sometimes international authorities to ensure proper management. Managing solid waste is one of the issues that many developing countries face especially Nigeria. Negligent handling of solid waste can result in some health, environmental, and socioeconomic issues. The University's solid waste management is plagued by issues such as improper disposal of garbage, ineffective waste collection, and a shortage of disposal facilities.

This includes all solid waste products which are composed wholly or partly of such materials as garbage, sweepings, cleanings, trash, rubbish, litter, industrial solid wastes or domestic solid wastes including organic wastes or residues of animals, meat, fruit, vegetables, grains or fish; animal excreta or carcasses of animals; rubbish including wood, leaves, vegetation, tree trimmings, dead trees and shrubs, branches, sawdust, shavings, grass, paper products, straw, rags, clothing and all other combustibles; waste matter composed of soil, clay, sand, earth, gravel, fill, stones, bricks, plaster, glass, glassware, crockery, ashes, cinders, shells, metal and other non-combustibles; waste debris resulting from the construction, demolition, repair, or alteration of structures or buildings; accumulated waste materials composed of cans, containers, tires, junk, vehicle parts or other substances which may become a nuisance (Onungwe, Hunt & Jefferson, 2023).

Solid Waste Storage Containers

The owner or occupant of any premises where refuse may be present shall provide and keep on such premises sufficient containers for the storage of all refuse accumulating on the premises between collections. Refuse is extremely variable in composition, depending on the income and lifestyle of the generators (Sgamaro & Chiaroni, 2026). Each container shall have a close-fitting top. Containers shall be constructed of flame retardant materials; both the body of the container and the cover.

The flame retardant materials make these containers resistant to destruction by flame except flames of very high temperatures. Containers on residential properties shall not be placed or maintained in such a way as to unreasonably interfere with the use of the adjoining property (Aarikka-Stenroos, Chiaroni, Kaipainen & Urbinati, 2022). Containers on non-residential properties shall be fully screened and kept in such a manner as not to permit entry of or harbourage for animals, insects or other vermin. Containers on residential property shall be stored in such a manner as to be out of view from the street in front of the premises or in a garage located on the premises except so directed by public health officers.

Moreover, waste generated by households, offices etc., needed to be properly packaged (i.e. refuse put in black polyethylene or plastic bags) before taken to the central storage container(s) of the premises to prevent littering in case of overflow and facilitate easy transfer of such during collection.

The Scale of the Challenge

Nigeria's solid waste crisis reflects the convergence of rapid urbanisation, population growth, and inadequate infrastructure. With over 200 million people and urbanisation rates among the fastest in sub-Saharan Africa,

Nigeria generates more than 32 million tonnes of solid waste annually. In urban centres such as Lagos and Kano, per capita waste generation ranges between 0.60 and 0.65 kg per day. Much of this waste remains uncollected or is disposed of improperly, with consequences including "environmental degradation and heighten[ed] public health risks, exacerbated by weak strategic planning and institutional gaps".

The environmental and health impacts are severe. Leachates from unmanaged dumpsites contaminate soils and groundwater with heavy metals, leading to food contamination and toxic bioaccumulation (Pamuji, Rosyadi & Nasihuddin, 2023). Open burning contributes to air pollution and greenhouse gas emissions, undermining Nigeria's commitments to global climate agreements. The visible accumulation of waste in cities "diminishes urban aesthetics, discourages tourism, reduces investor confidence, and erodes quality of life".

Governance and Institutional Framework

Waste mismanagement and improper disposal are serious issues that often have damaging ramifications on the environment. It has been highlighted that the effects of waste mismanagement and improper disposal include pollution (air, water, and soil), flooding, positive impacts on climate change, and facilitating the breeding of viruses and bacteria that cause infectious diseases (Pamuji, Rosyadi & Nasihuddin, 2023). Some researchers have stated that many developing countries have it worse as many subscribe to using open dumping or open burning as waste disposal techniques.

Waste management in Nigeria operates within a complex institutional landscape involving federal, state, and local government actors. At the federal level, the National Environmental Standards and Regulations Enforcement

Agency (NESREA) and the Federal Ministry of Environment provide policy direction and regulatory oversight. The NESREA act replaced FEPA in functions in 2007. According to Akpoghome (2014), the agency was established and introduced as the agency for undertaking roles related to enforcing laws, policies, guidelines and rules concerning the sustainability of the environment.

The act enforced that no litter should be dropped except in designated areas in the environment. The act was an improved version of the FEPA act, which included the right to sue under the right conditions. This act came as a justification for creating a better environment that can limit waste. Aside from the national laws established under the Federal ministry of environment, other legal frameworks were put in place at the state and local levels, among which are the Special Environmental Sanitation Court Law, Environmental Sanitation Law, Kwara state Environmental Protection Agency Law, and other state laws, all with a common goal; to create a sustainable environment for better living and growth. States have established their own waste management authorities such as the Lagos Waste Management Authority (LAWMA) and the Ekiti State Waste Management Authority (EKSWAMA) with varying degrees of capacity and effectiveness. Local governments are constitutionally responsible for refuse collection and disposal but often lack the financial and technical resources to fulfil this mandate (Pamuji, Rosyadi & Nasihuddin, 2023).

Community Based and Stakeholder Approaches

Recognising the limitations of top down, government centric approaches, researchers and practitioners have increasingly advocated for community based and multistakeholder

models of waste management. A doctoral study of unofficial waste sites in Ado Ekiti employed the Integrated Sustainable Waste Management (ISWM) framework to analyse stakeholder roles and model intervention strategies. The research found that "to improve the situation a framework of Integrated Sustainable Waste Management was required which identified and engaged all of the relevant stakeholders," including community groups such as landlord tenant associations and youth development associations.

Community-based waste management development reflects broader trends in urban management, environmental awareness, and development thinking over recent decades (Scheinb, 2025). Early municipal waste management designs in developing nations typically followed centralized models from developed countries, emphasizing municipal responsibility for collection, transportation, and disposal.

These systems frequently failed to achieve universal coverage due to limited resources, institutional inefficiencies, and inability to serve informal settlements and low-income neighborhoods. Centralized system limitations became increasingly evident during the 1980s and 1990s as urban populations grew faster than municipal service provision capacity, creating widespread service gaps and environmental degradation. Recognition of these failures prompted experimentation with alternative approaches involving communities, nongovernmental organizations, and private sector actors in waste service delivery (Scheinb, 2025).

URBAN SOLID WASTE MANAGEMENT IN NIGERIA

Urban Solid Waste Management Developments in Nigeria Historically, waste management in urban communities in Nigeria fell within the urban planning and management delegated as part of the function of the local government (Onibokun, 1989). In the pre-colonial era, urban centres in the four regions of the country, northern, southern, eastern, and western regions, were governed by a hierarchy of chiefs, including defined regions of jurisdiction and administration. The people living in these urban centres are guided by a set of clear guidelines and functional distinctions which reflects that women are mostly responsible for making sure public places are kept clean and tidy through a system of rotational street sweeping.

At the time, waste was disposed of in bushes and undeveloped vegetation where it was left to decay. The advent of the period of British colonial rule in 1900 hardly showed any marked changes from the pre-colonial administration on waste management in the urban centres.

Stakeholder Analysis in Waste Governance

The stakeholder is the primary dimension of ISWM, which is concerned with participation in waste management. Tennakoon and Kulatunga (2021) defined stakeholders as people or organizations who have an interest in managing waste or/and participating in activities that are related to it. Accordingly, stakeholders may include the government, which regulates and provides waste services, and the citizens who use the service (Rosilawati et al., 2023). However, Joseph (2006) posited that the oversimplification of stakeholders' governance for planning, designing, and executing SWM has partly resulted in the present outlook of waste mismanagement in developing countries.

Theoretical Foundations

The theory was developed by Edward Freeman in 1984, and it is widely recognized as the developer of Stakeholder Theory, formally introducing it in his landmark 1984 book, *Strategic Management: A Stakeholder Approach*. While the term "stakeholder" appeared earlier, it is believed that the term "stakeholder" in relation to organizations has been used since the 1930s, when Harvard Law Professor Merrick Dodd suggested that businesses had at least four major groups of stakeholders: share-owners, employees, customers and the general public. Stakeholder theory is an integrative framework for strategic management, its ultimate goal in the eyes of its proponents being to ensure the sustainability and survival of the firm. In their book "Stakeholder Theory:

The State of the Art", Freeman and al. (2010) suggest that stakeholder theory, 26 years after its introduction, is a managerial theory that should be seen as a theory of how firms actually work or can work. It is a theory that has a comprehensive and managerial scope, serving both researchers and practitioners. In terms of the stakeholder approach, the essential mission of management is to first identify all the stakeholders that are important to the company and then to try to balance their interests, needs and expectations on a permanent basis (Mercier, 2006).

In practice, this separation is manifested in the diffusion among managers and entrepreneurs of the statement "business is business". In fact, the genesis of stakeholder theory is based on the integration thesis and the principle of responsibility. By the integration thesis, the founders postulate, contrary to the traditional view, that most business decisions or statements about business have an implicit ethical content or

view, and most ethical decisions or statements have an implicit business content or view about business. Whereas, by the principle of responsibility, they assume that most people, most of the time, accept responsibility for the effects of their actions on others (Freeman et al. 2010). Thus, both of these arguments have been used to defend the impossibility of separating the domains of ethics from those of management or economics, and any attempt to separate business and ethics is in fact an illusion (Freeman and al., 2010).

Stakeholder analysis has emerged as a valuable tool for understanding complex governance arrangements in waste management. The approach recognises that waste systems involve multiple actors with diverse interests, resources, and perspectives, and that effective governance requires understanding and navigating these differences. Stakeholder Theory, as developed in management studies, posits that organisations should consider the interests of all groups who can affect or are affected by their activities.

2.6 Identified Research Gap

The literature review reveals several gaps that this study aims to address. First, while research on waste management in Nigeria has examined major cities such as Lagos, Ibadan, and Kano, there is a notable absence of studies focusing on medium sized urban centres and their market communities. The Jos Bukuru metropolis, despite its regional significance, has received minimal scholarly attention in the waste management literature.

Second, although stakeholder analysis has been applied to waste governance in Nigerian contexts, no study has specifically examined the dynamics surrounding circular economy adoption in Jos South LGA of Plateau State. Existing research has focused on general waste management challenges rather than the

specific barriers and opportunities associated with transitioning to circular models. Fourth, while the Inclusive Circularity framework has been applied in Kano State, its applicability in other Nigerian contexts remains unexplored. This study will test and potentially refine the framework through application to a market community in Plateau State.

RESEARCH METHODOLOGY

Research Design

Research design is a blueprint of a study which points the way a research is to be done, in terms of how data are collected and analyzed. This research adopted survey research design to capture the complexity of stakeholders' perspectives in Kugiya community in Bukuru, Jos South LGA of Plateau State, Nigeria. The study is set in the Kugiya community in Bukuru, Jos South LGA of Plateau State, Nigeria, characterized by mixed residential and commercial settlement patterns and growing waste management challenges.

Population and Sampling

This study adopted a case study, and the research's total population are Kugiya community in Bukuru, Jos South LGA of Plateau State, with Key stakeholders

Sample Size

Hence, the population is unknown and no approximate figure can be given. Cochran method for determining sample size was used to determine the sampling size (Cochran, 1977).

The formula is stated as;

$$s = Z^2 (p) (q) / e^2$$

Where:

s= sample size

Z= confidence level; (95%)

p = % of population picking a choice level of precision required

e= margin error =0.05

q=1-p

Substituting into the formula

Sample size (n2)

$$s = (1.96)^2 (0.5) (1-0.5) / (0.05)^2$$

$$s = 3.8416 (0.5) (0.5) / 0.0025$$

$$s = 0.9606 / 0.0025$$

$$s = 384.16$$

$$s = 384$$

Data Collection Techniques

The primary method of data collection was used for the study. Also, the study make use of structured questionnaire which was adapted from the study carried out by (Sgamaro & Chiaroni, 2026), with measuring five (5) point likert scale format.

Data Analysis

A simple regression analysis was used to determine the expected relationships barriers and opportunities for Circular Economy Adoption in Solid Waste Management: A Stakeholders Analysis of Kugiya Community in Bukuru, Jos South Metropolis.

RESULTS AND DISCUSSION

4.1 DATA INTERPRETATION

4.1.1 Response Rate

A total of three hundred and eighty-four (384) (100%) copies of questionnaire were distributed to the study respondents and only a total of three hundred and thirty-nine (339) copies of questionnaires were returned. This gives a percentage return rate of 88.3%. The result of the administered and response rate of the questionnaire is presented in table 1 below.

Table 1: QUESTIONNAIRE USED FOR ANALYSIS.

Respondent	No of questionnaire Distributed	Number of questionnaire Returned	Response rate (%)
Consumers	384	339	88.3

Sources: Field work 2026

4.1.2 Respondents Profile

The demographic characteristics of the respondents were presented on the stakeholder category gender, age group, highest qualification and length of residence in Kugiya. The result of the demographic data of the respondents is presented in table 2 below with charts and diagrams.

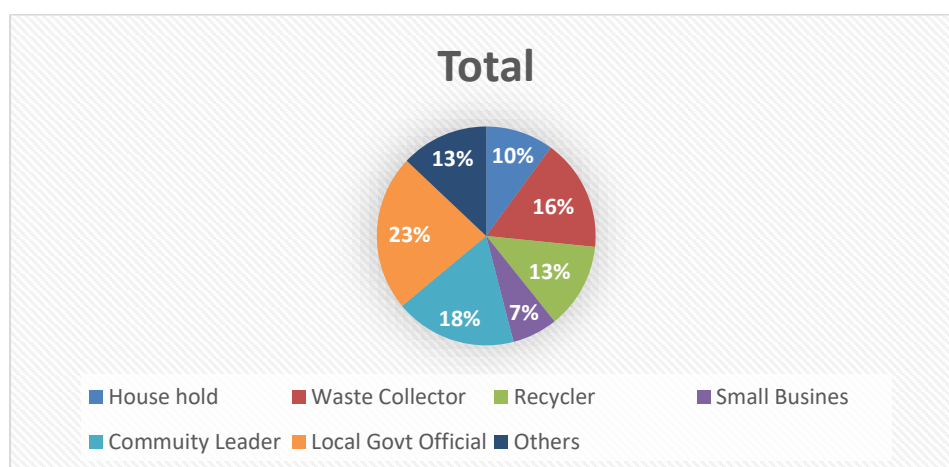
Table 2: STAKEHOLDER CATEGORIES

Categories	Frequency	Total
Household member / resident	34	10.0
Waste collector / refuse worker	56	16.5
Recycler / scrap dealer	43	12.6
Small business owner (shop, restaurant, etc.)	23	6.7
Community leader / CBO representative	61	17.9
Local government official (Jos South)	78	23.0
Other	44	12.9
Total	339	100.0

Source: Field work 2026

Based on the categories of the stakeholder, household member/resident had 34 respondents representing with (10.0%), Waste collector/refuse workers had 56 respondents representing with (16.5%), recyclers/scrap dealer had 43 respondents representing with (12.6%), small business owners (shop, restaurant etc) had 23 respondents representing with (6.7%), community leaders/ CBO representative had 61 respondents representing with (17.9%), Local government official (Jos South) had 78 respondents representing with (23.0%), while other had 44 respondents representing with (12.9%) as shown in pie chart below as Chart 1.

Chart 1



Source: Field work 2026

Table 3: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Attributes	Frequency	Percentages (%)
Gender		
Male	161	47.4
Female	178	52.6
Total	339	100.0
Age group		
Below 21 years	27	7.9
21-30 years	92	27.1
31-40 years	32	9.4
41-50 years	65	19.1
51-60 years	79	23.3
61 years and above	44	12.9
Total	339	100.0
Highest Qualification		
No formal schooling	45	13.2
Primary	75	22.1
Secondary	101	29.7
Tertiary (polytechnic/university)	118	34.8
Total	339	100.0
Duration in Kugiyu		
Less than 1 year	42	12.4
1-5 years	86	25.4
6-10 years	91	26.8
More than 10 years	120	35.4
Total	339	100.0

Table 3 presents the demographic characteristics of the respondents. In terms of gender, 161 respondents (47.4%) were male, while 178 respondents (52.6%) were female, indicating that females constituted the majority of the respondents.

Regarding age distribution, respondents aged 21-30 years constituted the largest group with 92 respondents (27.1%), followed by those aged 51-60 years with 79 respondents (23.3%). Respondents aged 41-50 years accounted for 65 (19.1%), while those aged 61 years and above accounted for 44 (12.9%). The age group 31-40 years comprised 32 respondents (9.4%), whereas respondents below 21 years constituted the least proportion with 27 respondents (7.9%).

Concerning educational qualification, respondents with tertiary education formed the largest category with 118 respondents

(34.8%), followed by those with secondary education, who accounted for 101 respondents (29.7%). Respondents with primary education were 75 (22.1%), while 45 respondents (13.2%) had no formal schooling.

With respect to the duration of residence in Kugiyu, 120 respondents (35.3%) had lived in the area for more than 10 years, indicating a relatively high level of familiarity with the community. Respondents who had lived in Kugiyu for 6-10 years accounted for 91 (26.8%), while those who had stayed for 1-5 years were 86 (25.3%). The least category consisted of respondents who had lived in the area for less than one year, representing 42 respondents (12.3%).

Regression Analysis

Regression analysis describes and evaluates the relationships between a specified

dependent variable and one independent variables. In the case of this study, there is one dependent variable and four independent variables.

The models are specified thus:

$$CE = \alpha + \beta_1(SWM) + \beta_2(KB) + \beta_3(PP) + \beta_4(IP) + \beta_5(CSF) + \varepsilon_i$$

Where:

CE	= Circular economy
SWM _i	= Solid waste management
KB _{ii}	= Key barrier
PP _{iii}	= Potential opportunity
IP _{iv}	= interest and power
CSF _v	= Context specific framework

Correlation Matrix

The correlation coefficient is ordinarily adopted as index that controls the strength of the linear association between two sets of scores. This study employed Pearson's correlation coefficient to assess the strength and direction of the linear relationship between two continuous variables as from initial checks for normality, the data appeared to suggest that independent and dependent variables follow a normal distribution and did not violate any of the normality assumption. Pearson's correlation is most appropriate in these circumstances. The study sought to find out the influence of these variables on dependent variable. To determine how the independent variable related to the dependent variable and to what extent, a correlation analysis was carried out and the findings presented in Table 9 below.

Table 4: CORRELATIONS MATRIX FOR VARIABLES OF THE STUDY

	CE	SWM	KB	PP	IP	Cont
Circular economy	1.000					
Solid waste Mgt	0.539	1.000				
Key Barrier	0.313	0.152	1.000			
Potential opportunity	0.321	0.019	0.378	1.000		
Interest	0.234	0.534	0.423	0.298	1.000	
Context	0.387	0.476	0.542	0.543	0.349	1.000
Observations	339					

Notes: ***Significant at 1% level, * Significant at 10% level

Source: Researcher (2026)

Table 4 presents the correlation matrix for the study variables. The results reveal a moderate positive correlation between Circular Economy (CE) and Solid Waste Management (SWM) with a correlation coefficient of 0.539, indicating that improved solid waste management practices are associated with increased adoption of circular economy principles within the study area.

The findings further show weak positive correlations between Circular Economy and

Key Barriers (KB) ($r = 0.313$), Potential Opportunities (PP) ($r = 0.321$), Interest (IP) ($r = 0.234$), and Context (Cont) ($r = 0.387$). These results suggest that although the variables are positively related to circular economy adoption, the strength of the relationships varies.

The weakest positive relationship was observed between Potential Opportunities and Solid Waste Management ($r = 0.019$), indicating a negligible association between the

two variables. This suggests that potential opportunities alone may not significantly influence solid waste management practices.

Overall, the correlation results indicate that the study variables are positively associated with circular economy adoption and may contribute to enhancing stakeholder participation and sustainable waste management practices in Kugiya community.

Test of Hypotheses

Decision Rule

Reject the null hypothesis (H_0) if the p-value is less than 0.05 ($p < 0.05$).

Fail to reject the null hypothesis (H_0) if the p-value is greater than or equal to 0.05 ($p \geq 0.05$).

Table 5: MODEL SUMMARY

Model Summary ^b							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig.
1	.458 ^a	.210	.208	2.77659	.210	95.707	.000

- a. Predictors: (constant), solid waste management, key barrier, potential opportunity, interest, context specific framework
- b. Dependent variable: circular economy

Source: SPSS v.27 (2026)

Table 5 presents the model summary for the regression analysis examining the influence of solid waste management, key barriers, potential opportunities, interest, and context-specific framework on circular economy adoption.

The results show a multiple correlation coefficient (R) of 0.458, indicating a moderate positive relationship between the dependent variable (circular economy) and the independent variables (solid waste management, key barriers, potential opportunities, interest, and context-specific framework).

The coefficient of determination (R^2) is 0.210, implying that 21.0% of the variation in circular economy adoption is explained by the combined effect of the independent variables included in the model. The remaining 79.0% of the

variation is attributable to other factors not captured in the study.

The adjusted R^2 value of 0.208 indicates that, after adjusting for the number of predictors in the model, approximately 20.8% of the variation in circular economy adoption is explained by the independent variables.

Furthermore, the model recorded an F-change value of 95.707 with a significance value of 0.000 ($p < 0.001$), indicating that the regression model is statistically significant. This suggests that the independent variables jointly have a significant influence on circular economy adoption in Kugiya community.

Overall, the findings demonstrate that solid waste management, key barriers, potential opportunities, interest, and context-specific framework significantly contribute to explaining variations in circular economy

adoption, although a substantial proportion of the variation is influenced by factors outside the model.

Table 6: ANOVA

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	737.780	5	1477.556	17.71	.000 _b
	Residual	2775.395	333	8.332		
	Total	3513.240	338			
a. Dependent Variable: circular economy						
b. Predictors: (Constant) solid waste management, key barrier, potential opportunities, interest, context-specific framework						

Source: SPSS OUTPUT V. 27 (2026)

"Table 6 shows that the results of F statistics of 17.71..." with the scientifically accurate text below:

Table 7: COEFFICIENT TABLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.607	.956		10.046	.000
	Solid waste Mgt	.319	.034	.318	8.124	.000
	Key Barrier	.203	.056	.551	7.134	.000
	Potential opportunity	.373	.061	.418	6.124	.001
	Interest	.352	.051	.391	7.123	.002
	Context	.403	.063	.469	8.883	.000
a. Dependent Variable: circular economy						

Source: SPSS OUTPUT V. 27 (2026)

Discussion

From the result in Table 7, the p-value 0.000 of key element, challenges, strategies is less than the significance level of 0.05 as shown in the study to reject the null hypothesis (H_0) and accepts the alternative hypothesis (H_1) when $p < 0.05$. which states that there is no significant effect between current state of solid waste management practices in Kugiya community stakeholders participate. Meaning that there is a significant effect between

current state of solid waste management practices and Kugiya community stakeholders participate. The study rejects the null hypothesis and accept the null hypotheses which states that which states that there is a significant effect between current state of solid waste management practices and Kugiya community stakeholders participate.

Based on the hypotheses two the study to reject the null hypothesis which states that there is no significant effect between key

barriers institutional, economic, social, technical, and infrastructural to the adoption of circular economy principles by different stakeholder groups. Meaning that there is a significant effect between key barriers institutional, economic, social, technical, and infrastructural to the adoption of circular economy principles by different stakeholder groups. The study rejects the null hypothesis and accept the null hypotheses which states that which states that there is a significant effect between key barriers institutional, economic, social, technical, and infrastructural on the adoption of circular economy principles by different stakeholder groups.

The third hypotheses the study to reject the null hypothesis which states that there is no significant effect between potential opportunities for circular economy adoption and Kugiya community stakeholders participate. Meaning that there is a significant effect between potential opportunities for circular economy adoption and Kugiya community stakeholders participate. The study rejects the null hypothesis and accept the null hypotheses which states that which states that there is a significant effect between potential opportunities for circular economy adoption and Kugiya community stakeholders participate.

The fourth hypotheses the study to reject the null hypothesis which states that there is no significant relationship between interests, power relations, affect interactions among stakeholders and circular economy adoption by Kugiya community stakeholders. Meaning that there is a significant relationship between interests, power relations, affect interactions among stakeholders and circular economy adoption by Kugiya community stakeholders. The study rejects the null hypothesis and accept the null hypotheses and accept alternative hypotheses which states that

there is a significant relationship between interests, power relations, affect interactions among stakeholders and circular economy adoption by Kugiya community stakeholders.

The fifth hypotheses the study to reject the null hypothesis which states that there is no significant relationship between context specific framework that can be developed to guide the integration of circular economy principles and waste management in Kugiya communities. Meaning that there is a significant relationship between context specific framework that can be developed to guide the integration of circular economy principles and waste management in Kugiya communities. The study rejects the null hypothesis and accept the null hypotheses which states that there is a significant relationship between context specific framework that can be developed to guide the integration of circular economy principles and waste management in Kugiya communities.

DISCUSSION

The result from the regression analysis conducted it showed a positive significant relationship between current state of solid waste management practices in Kugiya community stakeholders participate. Hence, the null hypothesis was not supported in the hypothesis one, which states that there is a significant effect between current state of solid waste management practices and Kugiya community stakeholders participate.

The result from the hypothesis indicate that there is a significant effect between current state of solid waste management practices and Kugiya community stakeholders participate. The study aligned with the study conducted by Benachio, et al. (2020), the study highlighted the importance of understanding divergent stakeholder perspectives for designing effective interventions. Based on objective

two and research hypothesis two, the result from the linear regression analysis also showed a positive significant relationship between to key barriers institutional, economic, social, technical, and infrastructural to the adoption of circular economy principles by different stakeholder groups. Hence, the null hypothesis was not supported in the hypothesis two, which states that key barriers institutional, economic, social, technical, and infrastructural to the adoption of circular economy principles by different stakeholder groups. The result from the hypothesis indicate key barriers institutional, economic, social, technical, infrastructural influences the adoption of circular economy principles by different stakeholder groups. The result agreed with the study carried out by Gerçeker and Pável (2022), which indicated Each company studied in the research has 70% of recycled waste, the most recycled material is steel.

Based on objective three and research hypothesis three the study established a positive significant, by rejecting the null hypothesis which states that there is a significant effect between potential opportunities for circular economy adoption and Kugiya community stakeholders participate. This finding invalidates the null H_{03} while the study accepted the alternative hypothesis.

The finding is in line with the proposition of Umar, Shafiq and Ahmad (2020), which further submit that the findings show that 25% of the respondents replied that only below 10% of the generated wastes in construction could be reused or recycled. Only 5% of the respondents affirmed that more than 50% of the entire waste generated in their projects can be reused and recycled. The case study performed in this research indicated that the waste generated in high-rise building projects was about 4.4 tons/day

but in the housing projects, it was obtained as 2.47 tons/day. Although the quantity of waste generated is estimated, the quantity of waste recycled and reused is unknown.

The result from the regression analysis showed a positive significant relationship between there is no significant relationship between interests, power relations, affect interactions among stakeholders and circular economy adoption by Kugiya community stakeholders. Hence, the null hypothesis was not supported in the hypothesis four, which states that there is a significant relationship between interests, power relations, affect interactions among stakeholders and circular economy adoption by Kugiya community stakeholders. The result from the hypothesis indicate that interests, power relations, affect interactions influence stakeholders and circular economy adoption by Kugiya community stakeholders.

The study aligned with the study conducted by Idris and Bello (2023), which established that some strategies with high mean ratings and statistical significance, those strategies are as waste management and recycling facilities, design for disassembly, and prioritizing the use of renewable and sustainable materials. Some of the gaps that were identified during the research are the barriers and challenges that are met to implement the circular economy strategies.

The result from the regression analysis which showed a positive significant relationship and established the fact that there is a significant relationship between context specific framework that can be developed to guide the integration of circular economy principles and waste management in Kugiya communities. Hence, the null hypothesis was not supported in the hypothesis five. The result from the hypothesis indicate that there is a significant

relationship between context specific framework that can be developed to guide the integration of circular economy principles and waste management in Kugiyi communities. The study aligned with the study conducted by Mulindwa et al. (2024), which established that that the waste management value chain across manufacturers, waste management companies and recycling in Kigali needs to adopt a higher level of the 10-R principle of the circular economy. It also shows that there is low adoption of other indicators of the 10-R principles among manufacturing companies. Except for R3-Reuse and R8-Recycle, that was highly adopted by manufacturing companies and individuals.

CONCLUSION AND RECOMMENDATION

CONCLUSIONS

The findings of the study clearly show the insanitary conditions of solid waste storage facilities used in the study area, in addition, there were no labelled or colour coded containers for different kinds of waste to ease segregation of different kinds of waste; this helps compound the recycling and reuse component of solid waste management in Kugiyi communities. It was also evident that there were no well-constructed confined transfer stations, and the open space transfer stations are arbitrarily designated at unused vacant plots or/and most cases at the middle of access roads that cause vehicular and human traffic jam thereby posed undue difficulty to road users in Kugiyi communities. From the study, inadequately formulated or poorly implemented environmental policies or lack of enabling legislatures are also attributable to poor solid waste management. Therefore, Government should establish regulations that will deter citizen and inhabitants from poor and unacceptable solution. However, despite this positive perception, implementation was hindered by several key barriers, including low

public awareness, inadequate infrastructure, limited government support, and weak collaboration between stakeholders. These barriers reflect systemic and contextual challenges that must be addressed to transition from linear to circular waste systems effectively. The study underscored the importance of community engagement, education, and policy alignment in fostering sustainable waste practices. It also highlighted the need for inclusive models that integrate informal waste actors and reflect the socio-cultural realities of the context.

Burning of solid waste was minimal, recycling and reuse of solid waste was also minimal except private informal sector waste pickers that sort and collect useable and valuable waste for personal gains. The findings also clearly revealed that the last destination of these solid wastes "landfills" that were investigated did not comply with operational standards either in terms of design or performance, and they have inherent long-term adverse impact potentials on the environment and public health. Therefore, to save the environment and allay public health fears by these shortfalls; government and relevant agencies should intervene and engage in serious monitoring of the activities of the operators to ensure compliance, and also engage in continuous evaluations of the safety levels of landfills while in use, at closure and post-closure periods.

The study concluded that the adoption of circular economy strategies reduces solid waste management in Kugiyi communities, through key strategies implementation such as lifecycle thinking, resource efficiency, and materials reuse and recycling were found to have a significant positive impact on waste management practices. The study also highlighted the importance of robust waste management systems, including waste assessments, segregation, and proper disposal methods.

RECOMMENDATIONS

Based on the above conclusion the study makes the following recommendations;

1. Stakeholder should consider creating awareness disposal of sanitary containers and bags in a proper manner to avoid especially households waste and establishment for storage of solid waste and presentation for collection at collection point for easy.
2. Government in conjunction with stakeholders should make policies on collection of waste from slums and squatter areas or localities, thereby should enforced resident on the harmful nature of such in order to prevent dumping into river channels, drainages and even at public spaces.
3. There should be potential opportunities for circular economy adoption since it enhances waste management among residents of Kugiyi community stakeholders.
4. There should be regular collection schedule with sufficient frequency to avoid accumulation and overflow of waste through interactions among stakeholders on circular economy adoption.
5. Storage facilities shall be created and established within the context specific framework by taking into account quantities of waste generation in a given area and the population densities.

CONTRIBUTION TO KNOWLEDGE

1. Theoretically, the research contributes to the growing body of literature on circular economy implementation in developing country contexts like Nigeria. While CE has been extensively theorised in

industrialised nations, its applicability and adaptation in sub-Saharan African settings require further empirical investigation. By applying Stakeholder Theory and the Inclusive Circularity framework to a specific community case study, this research will generate insights into how context specific factors shape CE adoption trajectories.

2. Practically, the study generate evidence-based recommendations relevant to multiple audiences in Kugiyi community especially for policymakers at the Plateau State level including the Jos Metropolitan Development Board and the newly established Plateau Market Authority the research provide insights into community perspectives and stakeholder dynamics that can inform market management and waste governance strategies. For market traders and their associations, the research has identified practical steps for improving waste management and capturing value from recyclable materials. For informal waste workers, the study will contribute evidence supporting their recognition and integration into formal waste management systems.
3. Furthermore, given the contemporary relevance of circular economy discourse in Nigeria and Plateau State exemplified by UNIDO's ongoing engagement with the Nigeria Circular Economy Working Group this research is timely. It responds to calls for evidence based, contexts specific approaches to circular transition and contributes to the growing imperative to link governance reform with culturally sensitive and inclusive solutions.

SUGGESTION FOR FURTHER STUDIES

The future studies can navigate into investigating effective adoption of CE principles as their guiding model in reducing

waste management in Plateau State, Nigeria. The study can be conducted using qualitative approach, through prioritization of sustainable practices and investment in innovative solutions concepts in waste management.

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